

Level 3 NVQ Diploma in Process Engineering Maintenance (0640-30)

February 2013 Version 2.0
(March 2013)



Qualification at a glance

| | |
|---------------------------------------|---|
| Subject area | Process Engineering |
| City & Guilds number | 0640 |
| Age group approved | 16+ |
| Assessment | Portfolio of evidence |
| Fast track | Available |
| Support materials | Centre handbook |
| Registration and certification | Consult the Walled Garden/Online Catalogue for last dates |

| Title and level | City & Guilds number | Accreditation number |
|---|---------------------------------|-----------------------------|
| Level 3 NVQ Diploma in Process Engineering Maintenance (Mechanical) | 0640-30 | 600/5969/2 |
| Level 3 NVQ Diploma in Process Engineering Maintenance (Instrument and Control) | 0640-30 | 600/5969/2 |
| Level 3 NVQ Diploma in Process Engineering Maintenance (Electrical) | 0640-30 | 600/5969/2 |

| Version and date | Change detail | Section |
|-------------------------|---------------------------------|----------------|
| 2.0 March 2013 | Amend Credit value for unit 619 | Structure |
| | | |



Contents

| | | |
|-----------------|---|-----------|
| 1 | Introduction | 9 |
| | Structure | 9 |
| 2 | Centre requirements | 23 |
| | Approval | 23 |
| | Resource requirements | 23 |
| | Candidate entry requirements | 24 |
| 3 | Delivering the qualification | 25 |
| | Initial assessment and induction | 25 |
| | Recording documents | 25 |
| 4 | Assessment | 26 |
| | Assessment of the qualification | 26 |
| | Assessment strategy | 26 |
| 5 | Units | 27 |
| Unit 386 | How to carry out handover of process engineering plant and equipment | 28 |
| Unit 387 | Carry out handover of process engineering plant and equipment | 32 |
| Unit 388 | Minimise risks to life, property and the environment within process engineering environments | 36 |
| Unit 389 | How to prepare work areas for the maintenance of process engineering plant and equipment | 39 |
| Unit 390 | Prepare work areas for the maintenance of process engineering plant and equipment | 43 |
| Unit 391 | Prepare equipment in support of electrical engineering activities | 47 |
| Unit 392 | Prepare materials for the maintenance of electrical plant and equipment | 50 |
| Unit 393 | How to prepare materials for the maintenance of electrical plant and equipment | 54 |
| Unit 394 | Adjust electrical plant and equipment to meet operational requirements | 57 |
| Unit 395 | How to carry out the removal of components from electrical plant and equipment | 60 |
| Unit 396 | Carry out the removal of components from electrical plant and equipment | 64 |
| Unit 397 | How to carry out the replacement of components from electrical plant and equipment | 68 |
| Unit 398 | Carry out the replacement of components from electrical plant and equipment | 72 |
| Unit 399 | Determine the feasibility of repair of components from electrical plant and equipment | 76 |

| | | |
|-----------------|--|------------|
| Unit 405 | How to diagnose and determine the causes of faults in electrical plant and equipment | 79 |
| Unit 406 | Diagnose and determine the causes of faults in electrical plant and equipment | 83 |
| Unit 407 | How to diagnose and determine the causes of faults in instrument and control systems | 87 |
| Unit 408 | Diagnose and determine the causes of faults in instrument and control systems | 91 |
| Unit 409 | How to diagnose and determine the causes of faults in mechanical plant and equipment | 95 |
| Unit 410 | Diagnose and determine the causes of faults in mechanical plant and equipment | 99 |
| Unit 503 | How to reinstate the work area after completing the maintenance of process engineering plant and equipment | 103 |
| Unit 504 | Reinstate the work area after completing the maintenance of process engineering plant and equipment | 107 |
| Unit 505 | How to minimise risks to life, property and the environment within process engineering environments | 111 |
| Unit 506 | How to work safely, minimise risk and comply with emergency procedures within process engineering environments | 114 |
| Unit 507 | Work safely, minimise risk and comply with emergency procedures within process engineering environments | 117 |
| Unit 508 | How to maintain effective working relationships within process engineering maintenance | 120 |
| Unit 509 | Maintain effective working relationships within process engineering maintenance | 122 |
| Unit 510 | How to adjust electrical plant and equipment to meet operational requirements | 125 |
| Unit 511 | Interpret detailed electrical information from technical sources | 128 |
| Unit 512 | Read and extract information from electrical engineering drawings and specifications | 130 |
| Unit 513 | How to read and extract information from electrical engineering drawings and specifications | 132 |
| Unit 514 | How to identify and suggest improvements to working practices whilst maintaining electrical plant and equipment | 134 |
| Unit 515 | How to adjust instrument and control systems to meet operational requirements | 137 |
| Unit 516 | Interpret detailed instrument and control information from technical sources | 140 |
| Unit 517 | How to interpret detailed instrument and control information from technical sources | 142 |

| | | |
|-----------------|---|------------|
| Unit 518 | How to read and extract information from instrument and control engineering drawings and specifications | 144 |
| Unit 519 | Read and extract information from instrument and control engineering drawings and specifications | 146 |
| Unit 520 | How to identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems | 148 |
| Unit 521 | How to adjust mechanical plant and equipment to meet operational requirements | 151 |
| Unit 522 | Interpret detailed mechanical information from technical sources | 155 |
| Unit 523 | How to read and extract information from mechanical engineering drawings and specifications | 157 |
| Unit 524 | Read and extract information from mechanical engineering drawings and specifications | 159 |
| Unit 525 | How to identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment | 161 |
| Unit 526 | How to interpret detailed mechanical information from technical sources | 164 |
| Unit 527 | How to interpret detailed electrical information from technical sources | 166 |
| Unit 600 | How to prepare equipment in support of electrical engineering activities | 168 |
| Unit 601 | How to determine the feasibility of repair of components from electrical plant and equipment | 171 |
| Unit 602 | Identify and suggest improvements to working practices and procedures whilst maintaining electrical plant and equipment | 175 |
| Unit 603 | How to establish that an electrical engineering maintenance process has been completed to specification | 178 |
| Unit 604 | Establish that an electrical engineering maintenance process has been completed to specification | 182 |
| Unit 605 | Test the performance and condition of electrical plant and equipment | 186 |
| Unit 606 | How to monitor the performance and condition of electrical plant and equipment | 189 |
| Unit 607 | Monitor the performance and condition of electrical plant and equipment | 193 |
| Unit 608 | Assess the performance and condition of electrical plant and equipment | 197 |
| Unit 609 | How to assess the performance and condition of electrical plant and equipment | 201 |
| Unit 610 | How to inspect electrical plant and equipment | 205 |
| Unit 611 | Inspect electrical plant and equipment | 209 |
| Unit 612 | How to test the performance and condition of electrical plant and equipment | 213 |

| | | |
|-----------------|--|------------|
| Unit 613 | How to carry out planned maintenance on electrical plant and equipment | 217 |
| Unit 614 | Carry out planned maintenance on electrical plant and equipment | 221 |
| Unit 615 | How to deal with variations and defects in electrical plant and equipment | 225 |
| Unit 616 | Deal with variations and defects in electrical plant and equipment | 228 |
| Unit 619 | Prepare equipment required for maintaining instrument and control systems | 231 |
| Unit 620 | How to prepare equipment required for maintaining instrument and control systems | 235 |
| Unit 621 | How to prepare materials required for maintaining instrument and control systems | 239 |
| Unit 622 | Prepare materials required for maintaining instrument and control systems | 242 |
| Unit 623 | Adjust instrument and control systems to meet operational requirements | 246 |
| Unit 624 | Carry out the removal of components from instrument and control systems | 250 |
| Unit 625 | How to carry out the removal of components from instrument and control systems | 254 |
| Unit 626 | Carry out the replacement of components in instrument and control systems | 258 |
| Unit 627 | How to carry out the replacement of components in instrument and control systems | 262 |
| Unit 628 | Determine the feasibility of repair of components from instrument and control systems | 266 |
| Unit 629 | How to determine the feasibility of repair of components from instrument and control systems | 269 |
| Unit 630 | Identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems | 273 |
| Unit 631 | Establish that an instrument and control system maintenance process has been completed to specification | 276 |
| Unit 632 | How to establish that an instrument and control system maintenance process has been completed to specification | 280 |
| Unit 633 | Test the performance and condition of instrument and control systems | 284 |
| Unit 634 | Monitor the performance and condition of instrument and control systems | 287 |
| Unit 635 | How to monitor the performance and condition of instrument and control systems | 291 |
| Unit 636 | Assess the performance and condition of instrument and control systems | 295 |
| Unit 637 | How to assess the performance and condition of instrument and control systems | 299 |

| | | |
|-----------------|--|------------|
| Unit 638 | Inspect instrument and control systems | 303 |
| Unit 639 | How to inspect instrument and control systems | 307 |
| Unit 640 | How to test the performance and condition of instrument and control systems | 311 |
| Unit 641 | How to carry out planned maintenance on instrument and control systems | 315 |
| Unit 642 | Carry out planned maintenance on instrument and control systems | 319 |
| Unit 643 | How to deal with variations and defects in instrument and control systems | 323 |
| Unit 644 | Deal with variations and defects in instrument and control systems | 326 |
| Unit 644 | Deal with variations and defects in instrument and control systems | 328 |
| Unit 647 | How to prepare materials for the maintenance of mechanical plant and equipment | 329 |
| Unit 648 | Prepare materials for the maintenance of mechanical plant and equipment | 332 |
| Unit 649 | Adjust mechanical plant and equipment to meet operational requirements | 336 |
| Unit 650 | How to carry out the removal of components from mechanical plant and equipment | 340 |
| Unit 651 | Carry out the removal of components from mechanical plant and equipment | 344 |
| Unit 652 | How to carry out the replacement of components from mechanical plant and equipment | 348 |
| Unit 653 | Carry out the replacement of components from mechanical plant and equipment | 352 |
| Unit 654 | Determine the feasibility of repair of components from mechanical plant and equipment | 356 |
| Unit 655 | Prepare equipment in support of mechanical engineering activities | 359 |
| Unit 656 | How to prepare equipment in support of mechanical engineering activities | 363 |
| Unit 657 | How to determine the feasibility of repair of components from mechanical plant and equipment | 367 |
| Unit 658 | Identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment | 371 |
| Unit 659 | How to establish that a mechanical engineering maintenance process has been completed to specification | 374 |
| Unit 660 | Establish that a mechanical engineering maintenance process has been completed to specification | 378 |
| Unit 661 | Test the performance and condition of mechanical plant and equipment | 382 |

| | | |
|-------------------|---|------------|
| Unit 662 | How to monitor the performance and condition of mechanical plant and equipment | 385 |
| Unit 663 | Monitor the performance and condition of mechanical plant and equipment | 389 |
| Unit 664 | How to assess the performance and condition of mechanical plant and equipment | 393 |
| Unit 665 | Assess the performance and condition of mechanical plant and equipment | 397 |
| Unit 666 | How to inspect mechanical plant and equipment | 401 |
| Unit 667 | Inspect mechanical plant and equipment | 405 |
| Unit 668 | How to test the performance and condition of mechanical plant and equipment | 409 |
| Unit 669 | Carry out planned maintenance on mechanical plant and equipment | 413 |
| Unit 670 | How to carry out planned maintenance on mechanical plant and equipment | 417 |
| Unit 671 | How to deal with variations and defects in mechanical plant and equipment | 421 |
| Unit 672 | Deal with variations and defects in mechanical plant and equipment | 425 |
| Appendix 1 | Relationships to other qualifications | 429 |
| Appendix 2 | Sources of general information | 430 |



1 Introduction

This document tells you what you need to do to deliver the qualifications:

| Area | Description |
|------------------------------------|---|
| Who is the qualification for? | For candidates who work or want to work in the oil and gas sector as a Process Operator. They may also be suitable for people with job roles such as electrical, mechanical or chemical engineer, maintenance engineer or technician. |
| What does the qualification cover? | They allow candidates to learn, develop and practise the skills required for employment and/or career progression in the oil and gas sector. At Level 3 qualifications are aimed at more experienced technicians or operators that have greater autonomy in their role. |

Structure

To achieve the Level 3 NVQ Diploma in Processing Engineering Maintenance (Mechanical), learners must achieve **64** credits. The learner must achieve **47** credits from the mandatory units (386-388, 409-410, 503-509, 669-672) plus a **minimum** of **8** credits from four units from group A (389-390, 521, 647-657) and a **minimum** of **9** credits from four units from group B (522-526, 658-668).

| Level 3 NVQ Diploma in Process Engineering Maintenance (Mechanical) | | | |
|---|-----|--|---|
| Mandatory | | | |
| DI/602/0687 | 386 | How to Carry Out Handover of Process Engineering Plant and Equipment | 3 |
| YI/602/0686 | 387 | Carry Out Handover of Process Engineering Plant and Equipment | 2 |
| F/602/0973 | 388 | Minimise Risks to Life, Property and the Environment Within Process Engineering Environments | 4 |
| K/602/0868 | 409 | How to Diagnose and Determine the Causes of Faults in Mechanical Plant and | 4 |

| | | | |
|------------|-----|--|---|
| | | Equipment | |
| H/602/0867 | 410 | Diagnose and Determine the Causes of Faults in Mechanical Plant and Equipment | 4 |
| K/502/3002 | 503 | How to reinstate the work area after completing the maintenance of process engineering plant and equipment | 3 |
| H/502/3001 | 504 | Reinstate the work area after completing the maintenance of process engineering plant and equipment | 2 |
| H/602/0688 | 505 | How to minimise risks to life, property and the environment within process engineering environments | 3 |
| D/602/0690 | 506 | How to work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |
| K/602/0689 | 507 | Work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |
| K/602/0627 | 508 | How to maintain effective working relationships within process engineering maintenance | 1 |
| H/602/0626 | 509 | Maintain effective working relationships within process engineering maintenance | 1 |
| Y/602/0865 | 669 | Carry Out Planned Maintenance on Mechanical Plant and Equipment | 4 |
| D/602/0866 | 670 | How to Carry Out Planned Maintenance on Mechanical Plant and Equipment | 4 |

| | | | |
|--------------------------------------|-----|--|---|
| K/602/1003 | 671 | How to Deal with Variations and Defects in Mechanical Plant and Equipment | 3 |
| H/602/1002 | 672 | Deal with Variations and Defects in Mechanical Plant and Equipment | 3 |
| Optional - Group A Mechanical | | | |
| H/602/0870 | 521 | How to adjust mechanical plant and equipment to meet operational requirements | 3 |
| D/502/3000 | 389 | How to Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment | 4 |
| A/502/2999 | 390 | Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment | 3 |
| F/602/1007 | 647 | How to Prepare Materials for the Maintenance of Mechanical Plant and Equipment | 2 |
| A/602/1006 | 648 | Prepare Materials for the Maintenance of Mechanical Plant and Equipment | 2 |
| M/602/0869 | 649 | Adjust Mechanical Plant and Equipment to Meet Operational Requirements | 3 |
| J/602/1011 | 650 | How to Carry out the Removal of Components from Mechanical Plant and Equipment | 3 |
| F/602/1010 | 651 | Carry out the Removal of Components from Mechanical Plant and Equipment | 3 |
| M/602/0872 | 652 | How to Carry Out the Replacement of Components from Mechanical Plant and Equipment | 3 |
| K/602/0871 | 653 | Carry Out the Replacement of Components from Mechanical Plant and | 3 |

| | | | |
|--------------------------------------|-----|--|---|
| R/602/1013 | 654 | Equipment Determine the Feasibility of Repair of Components from Mechanical Plant and Equipment | 3 |
| M/602/1035 | 655 | Prepare Equipment in Support of Mechanical Engineering Activities | 2 |
| T/602/1036 | 656 | How to Prepare Equipment in Support of Mechanical Engineering Activities | 2 |
| Y/602/1014 | 657 | How to Determine the Feasibility of Repair of Components from Mechanical Plant and Equipment | 3 |
| Optional – Group B Mechanical | | | |
| T/602/0873 | 522 | Interpret detailed mechanical information from technical sources | 2 |
| J/602/0876 | 523 | How to read and extract information from mechanical engineering drawings and specifications | 3 |
| F/602/0875 | 524 | Read and extract information from mechanical engineering drawings and specifications | 3 |
| R/602/0878 | 525 | How to identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment | 2 |
| A/602/0874 | 526 | How to Interpret Detailed Mechanical Information from Technical Sources | 2 |
| L/602/0877 | 658 | Identify and Suggest Improvements to Working Practices and Procedures whilst Maintaining Mechanical Plant and Equipment | 4 |
| L/602/0880 | 659 | How to Establish that a Mechanical Engineering Maintenance Process has been Completed to Specification | 3 |
| Y/602/0879 | 660 | Establish that a Mechanical Engineering | 3 |

| | | | |
|------------|-----|---|---|
| | | Maintenance Process has been Completed to Specification | |
| R/602/0931 | 661 | Test the Performance and Condition of Mechanical Plant and Equipment | 3 |
| H/602/0934 | 662 | How to Monitor the Performance and Condition of Mechanical Plant and Equipment | 4 |
| L/602/0930 | 663 | Monitor the Performance and Condition of Mechanical Plant and Equipment | 3 |
| M/602/0936 | 664 | How to Assess the Performance and Condition of Mechanical Plant and Equipment | 4 |
| K/602/0935 | 665 | Assess the Performance and Condition of Mechanical Plant and Equipment | 4 |
| F/602/0939 | 666 | How to Inspect Mechanical Plant and Equipment | 3 |
| T/602/0937 | 667 | Inspect Mechanical Plant and Equipment | 3 |
| D/602/0933 | 668 | How to Test the Performance and Condition of Mechanical Plant and Equipment | 3 |

To achieve the Level 3 NVQ Diploma in Processing Engineering Maintenance (Instrument and Control), learners must achieve **64** credits. The learners must achieve **47** credits from the mandatory units (386-388, 407-408, 503-509, 641-644), a minimum of **8** credits from 4 units in group A (389-390, 515, 619-629) and a minimum of **9** credits from 4 units in group B (516-520, 630-640).

| Level 3 NVQ Diploma in Process Engineering Maintenance (Instrument and Control) | | | |
|--|-----|--|---|
| Mandatory | | | |
| D/602/0687 | 386 | How to Carry Out Handover of Process Engineering Plant and Equipment | 3 |
| Y/602/0686 | 387 | Carry Out Handover of Process Engineering Plant and Equipment | 2 |
| F/602/0973 | 388 | Minimise Risks to Life, Property and the Environment Within Process Engineering Environments | 4 |
| F/602/0827 | 407 | How to Diagnose and Determine the Causes of Faults in Instrument and Control Systems | 4 |
| T/602/0825 | 408 | Diagnose and Determine the Causes of Faults in Instrument and Control Systems | 4 |
| K/502/3002 | 503 | How to reinstate the work area after completing the maintenance of process engineering plant and equipment | 3 |
| H/502/3001 | 504 | Reinstate the work area after completing the maintenance of process engineering plant and equipment | 2 |
| H/602/0688 | 505 | How to minimise risks to life, property and the environment within process engineering environments | 3 |
| D/602/0690 | 506 | How to work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |
| K/602/0689 | 507 | Work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |

| | | | |
|--|-----|--|---|
| K/602/0627 | 508 | How to maintain effective working relationships within process engineering maintenance | 1 |
| H/602/0626 | 509 | Maintain effective working relationships within process engineering maintenance | 1 |
| H/602/0822 | 641 | How to Carry Out Planned Maintenance on Instrument and Control Systems | 4 |
| Y/602/0820 | 642 | Carry Out Planned Maintenance on Instrument and Control Systems | 4 |
| J/602/0988 | 643 | How to Deal with Variations and Defects in Instrument and Control Systems | 3 |
| F/602/0987 | 644 | Deal with Variations and Defects in Instrument and Control Systems | 3 |
| Optional – Group A – Instrument and Control | | | |
| L/602/0992 | 515 | How to adjust instrument and control systems to meet operational requirements | 3 |
| D/502/3000 | 389 | How to Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment | 4 |
| A/502/2999 | 390 | Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment | 3 |
| L/602/0829 | 619 | Prepare Equipment Required for Maintaining Instrument and Control Systems | 2 |
| L/602/0832 | 620 | How to Prepare Equipment Required for Maintaining Instrument and Control Systems | 2 |
| D/602/0835 | 621 | How to Prepare Materials Required for Maintaining Instrument and Control Systems | 2 |
| R/602/0833 | 622 | Prepare Materials Required for Maintaining Instrument and Control Systems | 2 |
| F/602/0990 | 623 | Adjust Instrument and Control Systems to Meet Operational Requirements | 3 |
| R/602/0993 | 624 | Carry Out the Removal of Components from | 3 |

| | | | |
|--|-----|--|---|
| | | Instrument and Control Systems | |
| Y/602/0994 | 625 | How to Carry Out the Removal of Components from Instrument and Control Systems | 3 |
| D/602/0995 | 626 | Carry Out the Replacement of Components in Instrument and Control Systems | 3 |
| H/602/0996 | 627 | How to Carry Out the Replacement of Components in Instrument and Control Systems | 3 |
| K/602/0997 | 628 | Determine the Feasibility of Repair of Components from Instrument and Control Systems | 3 |
| M/602/0998 | 629 | How to Determine the Feasibility of Repair of Components from Instrument and Control Systems | 3 |
| Optional – Group B – Instrument and Control | | | |
| H/602/0836 | 516 | Interpret detailed instrument and control information from technical sources | 2 |
| M/602/0838 | 517 | How to interpret detailed instrument and control information from technical sources | 2 |
| K/602/0840 | 518 | How to read and extract information from instrument and control engineering drawings and specifications | 3 |
| T/602/0839 | 519 | Read and extract information from instrument and control engineering drawings and specifications | 3 |
| T/602/0842 | 520 | How to identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems | 2 |
| M/602/0841 | 630 | Identify and Suggest Improvements to Working Practices and Procedures whilst Maintaining Instrument and Control Systems | 4 |
| A/602/0843 | 631 | Establish that an Instrument and Control System Maintenance Process has been Completed to | 3 |

| | | | |
|------------|-----|--|---|
| | | Specification | |
| F/602/0844 | 632 | How to Establish that an Instrument and Control System Maintenance Process has been Completed to Specification | 3 |
| J/602/0845 | 633 | Test the Performance and Condition of Instrument and Control Systems | 3 |
| Y/602/0848 | 634 | Monitor the Performance and Condition of Instrument and Control Systems | 3 |
| H/602/0853 | 635 | How to Monitor the Performance and Condition of Instrument and Control Systems | 4 |
| M/602/0855 | 636 | Assess the Performance and Condition of Instrument and Control Systems | 4 |
| A/602/0857 | 637 | How to Assess the Performance and Condition of Instrument and Control Systems | 4 |
| J/602/0859 | 638 | Inspect Instrument and Control Systems | 3 |
| A/602/0860 | 639 | How to Inspect Instrument and Control Systems | 3 |
| L/602/0846 | 640 | How to Test the Performance and Condition of Instrument and Control Systems | 3 |

To achieve the Level 3 NVQ Diploma in Processing Engineering Maintenance (Electrical), learners must achieve **64** credits. The learners must achieve **47** credits from the mandatory units (386-388, 405-406, 503-509, 613-616), a minimum of **8** credits from 4 units in group A (389-399, 510, 600-601) and a minimum of **9** credits from 4 units in group B (511-514, 527, 602-612).

| Level 3 NVQ Diploma in Process Engineering Maintenance (Electrical) | | | |
|--|-----|--|---|
| Mandatory | | | |
| D/602/0687 | 386 | How to Carry Out Handover of Process Engineering Plant and Equipment | 3 |
| Y/602/0686 | 387 | Carry Out Handover of Process Engineering Plant and Equipment | 2 |
| F/602/0973 | 388 | Minimise Risks to Life, Property and the Environment Within Process Engineering Environments | 4 |
| F/602/0696 | 405 | How to Diagnose and Determine the Causes of Faults in Electrical Plant and Equipment | 4 |
| T/602/0694 | 406 | Diagnose and Determine the Causes of Faults in Electrical Plant and Equipment | 4 |
| K/502/3002 | 503 | How to reinstate the work area after completing the maintenance of process engineering plant and equipment | 3 |
| H/502/3001 | 504 | Reinstate the work area after completing the maintenance of process engineering plant and equipment | 2 |
| H/602/0688 | 505 | How to minimise risks to life, property and the | 3 |

| | | | |
|--|-----|--|---|
| | | environment within process engineering environments | |
| D/602/0690 | 506 | How to work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |
| K/602/0689 | 507 | Work safely, minimise risk and comply with emergency procedures within process engineering environments | 3 |
| K/602/0627 | 508 | How to maintain effective working relationships within process engineering maintenance | 1 |
| H/602/0626 | 509 | Maintain effective working relationships within process engineering maintenance | 1 |
| M/602/0693 | 613 | How to Carry Out Planned Maintenance on Electrical Plant and Equipment | 4 |
| H/602/0691 | 614 | Carry Out Planned Maintenance on Electrical Plant and Equipment | 4 |
| Y/602/0977 | 615 | How to Deal with Variations and Defects in Electrical Plant and Equipment | 3 |
| L/602/0975 | 616 | Deal with Variations and Defects in Electrical Plant and Equipment | 3 |
| Optional – Group A - Electrical | | | |
| D/502/3000 | 389 | How to Prepare Work Areas for the Maintenance of | 4 |

| | | | |
|------------|-----|--|---|
| | | Process Engineering Plant and Equipment | |
| A/502/2999 | 390 | Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment | 3 |
| J/602/0697 | 391 | Prepare Equipment in Support of Electrical Engineering Activities | 2 |
| H/602/0979 | 392 | Prepare Materials for the Maintenance of Electrical Plant and Equipment | 2 |
| Y/602/0980 | 393 | How to Prepare Materials for the Maintenance of Electrical Plant and Equipment | 2 |
| F/602/0701 | 394 | Adjust Electrical Plant and Equipment to Meet Operational Requirements | 3 |
| K/602/0983 | 395 | How to Carry out the Removal of Components from Electrical Plant and Equipment | 3 |
| D/602/0981 | 396 | Carry Out the Removal of Components From Electrical Plant and Equipment | 3 |
| H/602/0707 | 397 | How to Carry Out the Replacement of Components From Electrical Plant and Equipment | 3 |
| Y/602/0705 | 398 | Carry Out the Replacement of Components from Electrical Plant and Equipment | 3 |
| M/602/0984 | 399 | Determine the Feasibility of Repair of Components from | 3 |

| | | | |
|---------------------------------------|-----|--|---|
| | | Electrical Plant and Equipment | |
| J/602/0702 | 510 | How to adjust electrical plant and equipment to meet operational requirements | 3 |
| R/602/0699 | 600 | How to Prepare Equipment in Support of Electrical Engineering Activities | 2 |
| T/602/0985 | 601 | How to Determine the Feasibility of Repair of Components From Electrical Plant and Equipment | 3 |
| Optional –Group B - Electrical | | | |
| K/602/0708 | 511 | Interpret Detailed Electrical Information from Technical Sources | 2 |
| H/602/0741 | 512 | Read and extract information from electrical engineering drawings and specifications | 3 |
| K/602/0742 | 513 | How to read and extract information from electrical engineering drawings and specifications | 3 |
| T/602/0744 | 514 | How to identify and suggest improvements to working practices and procedures whilst maintaining electrical plant and equipment | 2 |
| M/602/0709 | 527 | How to interpret detailed electrical information from technical sources | 2 |
| M/602/0743 | 602 | Identify and Suggest Improvements to Working Practices and Procedures Whilst Maintaining | 4 |

| | | | |
|------------|-----|---|---|
| | | Electrical Plant and Equipment | |
| F/602/0746 | 603 | How to Establish that an Electrical Engineering Maintenance Process has Been Completed to Specification | 3 |
| A/602/0745 | 604 | Establish That an Electrical Engineering Maintenance Process has been Completed to Specification | 3 |
| J/602/0747 | 605 | Test the Performance and Condition of Electrical Plant and Equipment | 3 |
| R/602/0752 | 606 | How to Monitor the Performance and Condition of Electrical Plant and Equipment | 4 |
| J/602/0750 | 607 | Monitor the Performance and Condition of Electrical Plant and Equipment | 3 |
| D/602/0754 | 608 | Assess the Performance and Condition of Electrical Plant and Equipment | 4 |
| K/602/0756 | 609 | How to Assess the Performance and Condition of Electrical Plant and Equipment | 4 |
| M/602/0760 | 610 | How to Inspect Electrical Plant and Equipment | 3 |
| T/602/0758 | 611 | Inspect Electrical Plant and Equipment | 3 |
| R/602/0749 | 612 | How to Test the Performance and Condition of Electrical Plant and Equipment | 3 |



2 Centre requirements

Approval

Centres already offering City & Guilds qualifications

Centres that have offered the following qualifications will be automatically approved to deliver Process Engineering Maintenance qualifications:

- 0663-03 Level 3 NVQ in Process Engineering Maintenance

Centres not already offering City & Guilds qualifications

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the Centre Manual - Supporting Customer Excellence for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Resource requirements

Physical resources and site agreements

The assessment methods used to assess the occupational competence of the candidates should be valid, reliable, fair and applicable to real work in the normal day to day working environment.

Centre staffing

Staff delivering the qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the areas for which they are delivering training and/or have experience of providing training. This knowledge must be above or to the same level as the training being delivered
- hold the Level 3 Qualification in Process Engineering Maintenance, or an equivalent qualification.
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and internal verifiers

Level 3 TAQA Award in Assessing Competence in the Work Environment or Assessor/Verifier (A/V) units are valued as qualifications for centre staff, but they are not currently a requirement for the qualifications

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as these qualifications are not approved for under 16s.



3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards their qualification.
- any units they have already completed, or credit they have accumulated which is relevant to the qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualifications, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, **Learning Assistant**, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed a set of *Recording forms* including examples of completed forms, for new and existing centres to use as appropriate. *Recording forms* are available on the City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.



4 Assessment

Assessment of the qualification

Candidates must:

- have a completed portfolio of evidence for each unit

The following must be applied to the assessment of this qualification:

- Candidates must finish their assessment within six months

Assessment strategy

The assessment strategy for these qualifications has been set by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers.

Please note: simulation is not always suitable for the qualifications within this sector. The Assessment Strategy defines where evidence from stimulation is acceptable, and in which contexts.

Please refer to the latest version of Cogent's Assessment Strategy. The August 2009 version can be found on the City & Guilds website. (This version is the most recent version at August 2012).

Please contact Cogent for further detail, information and/or latest version:

Cogent SSC Limited

Unit 5

Mandarin Court

Centre Park

Warrington

WA1 1GG

Tel: 01925 515200

Fax: 01925 515240



5 Units

Availability of units

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number
- title
- level
- credit value
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

Unit 386

How to carry out handover of process engineering plant and equipment

| | |
|--|---|
| UAN: | D/602/0687 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 22 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to carry out handover of process engineering plant and equipment |
| Assessment criteria |
| The learner can: 1.1 explain own contribution to the handover procedures 1.2 explain the handover procedures including when and how handover should occur 1.3 describe the record and documentation systems and procedures 1.4 explain how to check and confirm the information received at handover is accurate, up-to-date and complete 1.5 describe the types of support through working relationships that can be offered to those transferring control. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>2. Know how to follow organisational policies and procedures.</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>2.1 explain own responsibilities in respect of health, safety and environment, including the limits of own personal responsibility, own legal responsibility for own health and safety and the health and safety of others</p> <p>2.2 explain the relevant regulations and the safe working practices and procedures required within own work area</p> <p>2.3 explain own responsibilities with regards to the reporting lines and procedures in own working environment and the types of working relationships.</p> |

Unit 386

How to carry out handover of process engineering plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of carrying out and completing a safe and effective handover of process plant and equipment. It includes the handover to others and own acceptance and confirmation of responsibility for the control of the process plant and equipment. The learner will be following the organisations safe working practices and working within the work permit procedures.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices **as they apply to the learner.**

Scope

The level and extent of responsibility will involve the learner ensuring the handover is completed by following defined procedures, the learner will be accountable for the integrity of the handover and ensuring it is recorded in a formal manner. In all cases, the learner will still be expected to refer to others for final authorisation, even though the learner remains responsible for identifying and implementing decisions.

The type of plant and equipment to be handed over could include:

- Systems and sub-systems
- Process equipment
- New installations

The handover procedures and environments may include operational or non-operational conditions. A typical example of a handover during operational conditions could be:

- Shift changes on continuous process plants

A typical example of handover under non-operational conditions could be:

- Between maintenance and operational teams at the end of an overhaul
- Handover of a large on-going maintenance project
- Handover from in-house maintenance teams to outside specialists
- Shift to shift

Record and documentation systems and procedures should include the level of detail on the condition of engineering products/assets as required by different parties, how to confirm that information received at handover is accurate and complete, and what the types of situation are where additional information and clarification might be required.

The parties to handover to could include:

- Clients
 - Production operations
 - Maintenance operations
 - Line supervisors
- The complexity of handovers could include:
- Written
 - Oral
 - Test documentation

Unit 387

Carry out handover of process engineering plant and equipment

| | |
|--|--|
| UAN: | Y/602/0686 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out handover of process engineering plant and equipment. |
| Assessment criteria |
| The learner can: 1.1 confirm and define the condition of the engineering products or assets in accordance with specifications 1.2 make sure the information received at handover is accurate, up-to-date and complete 1.3 communicate handover of process plant and equipment as specified 1.4 produce and maintain records of the handover in accordance with organisational procedures. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>2. Be able to accept and confirm responsibility for the control of process engineering plant and equipment.</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>2.1 check and confirm that the condition of the engineering products or assets are in an acceptable handover condition</p> <p>2.2 clearly define and obtain agreement on the moment of transfer of responsibility</p> <p>2.3 seek additional information if there are any areas of doubt or lack of clarity</p> <p>2.4 provide proper support and co-ordination to those transferring control</p> <p>2.5 confirm and record acceptance and control in line with agreed procedures.</p> |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times.</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 387 Carry out handover of process engineering plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of carrying out and completing a safe and effective handover of process plant and equipment. It includes the handover to others and own acceptance and confirmation of responsibility for the control of the process plant and equipment. The learner will be following the organisations safe working practices and working within the work permit procedures.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring the handover is completed by following defined procedures, the learner will be accountable for the integrity of the handover and ensuring it is recorded in a formal manner. In all cases, the learner will still be expected to refer to others for final authorisation, even though the learner remains responsible for identifying and implementing decisions.

The type of plant and equipment to be handed over could include:

- Systems and sub-systems
- Process equipment
- New installations

The handover procedures and environments may include operational or non-operational conditions. A typical example of a handover during operational conditions could be:

- Shift changes on continuous process plants

A typical example of handover under non-operational conditions could be:

- Between maintenance and operational teams at the end of an overhaul
- Handover of a large on-going maintenance project
- Handover from in-house maintenance teams to outside specialists
- Shift to shift

Record and documentation systems and procedures should include the level of detail on the condition of engineering products/assets as required by different parties, how to confirm that information received at handover is accurate and complete, and what the types of situation are where additional information and clarification might be required.

The parties to handover to could include:

- Clients
 - Production operations
 - Maintenance operations
 - Line supervisors
- The complexity of handovers could include:
- Written
 - Oral
 - Test documentation

Unit 388

Minimise risks to life, property and the environment within process engineering environments

| | |
|--|--|
| UAN: | F/602/0973 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 12 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to identify and minimise risks |
| Assessment criteria |
| The learner can: 1.1 carry out risk assessments correctly 1.2 identify hazards and assess the level of risk involved 1.3 minimise the risks and implement control measures in the minimum agreed timescales 1.4 monitor the effectiveness of the risk control measures and take prompt additional action where needed. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to communicate all necessary information accurately. |
| Assessment criteria |
| The learner can: 2.1 relay information about risk control measures to those who are affected by them 2.2 clarify any implications of the risk control measures that are in place, if this is required 2.3 ensure that information provided for safety system records is clear, accurate and up-to-date. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times and comply with organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely in accordance with the regulations for own working environment.</p> |

Unit 388 Minimise risks to life, property and the environment within process engineering environments

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Minimise Risks to Life, Property and the Environment within Process Engineering Environments' The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence. This unit is about the learner's competence in minimising the risks to life, property and the environment. The learner will be required to identify hazards, assess the risks involved, minimise the risks by implementing control measures and providing on going monitoring. All the relevant safety systems will require updating.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within agreed specifications and following clearly defined procedures with regard to identifying and dealing with risks to life, property and the environment. The learner will be expected to take immediate action appropriate to the circumstances.

The type of hazards involved could be those that may affect the safety and/or integrity of:

- People
- Environment
- Operational Equipment

The risk control measures to be implemented will include those approved by the company.

The type of action to be taken will be limited to own responsibility but could include:

- Removal of the hazard
- Raising the alarm
- Shutting down the process
- Stopping the work

The methods of communicating or reporting actions will be accordance with the requirements of the company.

Unit 389

How to prepare work areas for the maintenance of process engineering plant and equipment

| | |
|--|--|
| UAN: | D/502/3000 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to maintain their own and others' safety. |
| Assessment criteria |
| The learner can: 1.1 describe their own responsibilities in respect of health and safety and the environment, including their legal responsibilities and the limits of this responsibility 1.2 identify the relevant regulations and safe working practices required within their work area. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to prepare the work area for the maintenance of process engineering plant and equipment. |
| Assessment criteria |
| The learner can: 2.1 describe the work area preparation requirements and methods. This should include how to ensure the location and condition of the work environments are appropriate in terms of: a.layout b.accessibility c.isolations d.safety e.security 2.2 describe the connection and operation of the applicable supply |

services and connection procedures related to the equipment, including pneumatic, electrical and hydraulic tools.

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to respond to problems. |
| Assessment criteria |
| The learner can: 3.1 describe the potential problems and consequences of not preparing work areas correctly and the hazards which may occur 3.2 describe their responsibilities with regard to the reporting lines and procedures within the working environment. |

Unit 389 How to prepare work areas for the maintenance of process engineering plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is an experienced operator with relevant technical training.

Assessment Context

This unit is about the learner's knowledge in preparing the work area in order to carry out the maintenance of plant and equipment. The learner will be involved in activities such as clearing materials and equipment from the worksite, providing service supplies and completing isolations. The learner will be following their organisation's safe working practices and working within the work permit procedures.

This unit is common to the Mechanical, Electrical and Instrument & Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

The level and extent of responsibility will involve the learner being responsible for ensuring the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the Permit to Work system.

The type of work area to be prepared would include:

- Chemicals manufacturing and petroleum sites
- Controlled operational areas
- Offshore installations

The type of work area preparations could involve ensuring that the location and condition of work environments are appropriate in terms of:

- Layout
- Security
- Safety
- Isolations (where relevant)
- Accessibility

The type of work area protection and safety requirements will take into account any hazards due to the particular working conditions that could also include:

- Working on access structures (scaffold)
- At height
- Inside systems and plant

- Adverse weather conditions
- Confined spaces
- In shafts

The Knowledge and Understanding levels expressed indicate the minimum level of knowledge and understanding sufficient to perform the learner's role in a manner that would normally be associated with the minimum acceptable performance of a competent person undertaking the learner's role.

The expression "working knowledge and understanding" indicates the learner is able to:

- Identify and apply relevant information, procedures and practices to the learner's usual role in the learner's expected working environments needing only occasional recourse to reference materials
- Describe, in their own words, the principles underlying the learner's working methods. This does not mean the ability to quote "Chapter and verse". Rather the learner must know what supporting information is available, how and where to find it and from whom to seek further guidance and information to confirm any additional required detail
- Interpret and apply the information obtained to the learner's role, the learner's working practice and in the learner's expected working environment.

Unit 390

Prepare work areas for the maintenance of process engineering plant and equipment

| | |
|--|--|
| UAN: | A/502/2999 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 14 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Maintain their own and others safety |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with safety, health and other relevant regulations and guidelines. |

| |
|---|
| Learning outcome |
| The learner will: 2. Prepare the work area for the maintenance of process engineering plant and equipment. |
| Assessment criteria |
| The learner can: 2.1 ensure that the work environment is suitable for the work activities to be undertaken 2.2 ensure that all necessary service supplies are disconnected and ready for use 2.3 prepare the work areas so that they are ready for the engineering activities to be carried out 2.4 make sure that required safety arrangements are in place to protect other workers from activities likely to disrupt normal working 2.5 report completion of preparations in line with organisational procedures. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>3. Respond to problems</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 deal promptly and effectively with problems within their control and report those that cannot be resolved.</p> |

Unit 390 Prepare work areas for the maintenance of process engineering plant and equipment

Supporting information

This unit should be assessed in a work environment and is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Prepare Work Areas for the Maintenance of Process Engineering Plant and Equipment'.

The assumed pre-requisite is an experienced operator with relevant technical training.

Assessment Context

This unit is about the learner's competence in preparing the work area in order to carry out the maintenance of plant and equipment. The learner will be involved in activities such as clearing materials and equipment from the worksite, providing service supplies and completing isolations. The learner will be following their organisation's safe working practices and working within the work permit procedures.

This unit is common to the Mechanical, Electrical and Instrument & Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

The level and extent of responsibility will involve the learner being responsible for ensuring the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the Permit to Work system.

The type of work area to be prepared would include:

- Chemicals manufacturing and petroleum sites
- Controlled operational areas
- Offshore installations

The type of work area preparations could involve ensuring that the location and condition of work environments are appropriate in terms of:

- Layout
- Security
- Safety
- Isolations (where relevant)
- Accessibility

The type of work area protection and safety requirements will take into account any hazards due to the particular working conditions that could also include:

- Working on access structures (scaffold)
- At height
- Inside systems and plant
- Adverse weather conditions
- Confined spaces
- In shafts

Unit 391

Prepare equipment in support of electrical engineering activities

| | |
|--|--|
| UAN: | J/602/0697 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine and undertake equipment preparation |
| Assessment criteria |
| The learner can: 1.1 determine the equipment preparation requirements 1.2 determine the types of equipment which may be used 1.3 obtain the required equipment and ensure that it is in safe and useable condition 1.4 carry out the necessary preparations to equipment in line with work requirements 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines</p> <p>3.2 make sure that required safety arrangements are in place to protect other workers from activities likely to disrupt normal working.</p> |

Unit 391 Prepare equipment in support of electrical engineering activities

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Prepare Equipment in Support of Electrical Engineering Activities.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in preparing electrical equipment in order to carry out maintenance of plant and equipment. The learner will be required to obtain the equipment, ensure it is in a safe condition and advise the appropriate people. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

Equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

Types of equipment to be prepared could include fixed (machine) and/or portable (hand or machine):

- Protective clothing/equipment
- Lifting/handling equipment
- Access structures (typical ladders, steps, trestles, Youngman boards, temporary staging, access hoist "cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harness
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, safety checks, changing settings or the calibrating as well as routine checks on its condition, operation, suitability and safety, in compliance with company procedures.

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 392

Prepare materials for the maintenance of electrical plant and equipment

| | |
|--|--|
| UAN: | H/602/0979 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to prepare materials accurately and report completion. |
| Assessment criteria |
| The learner can: 1.1 obtain all the required materials and check them for quantity and quality 1.2 determine how the materials need to be prepared 1.3 carry out the preparations using suitable equipment 1.4 ensure preparation is carried out to the required standard 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to work safely at all times. |
| Assessment criteria |
| The learner can: 3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 392 Prepare materials for the maintenance of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Prepare Materials for the Maintenance of Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in preparing the materials in order to carry out the maintenance of electrical plant and equipment. The learner will be required to check the quality and quantity of the materials determine how the materials should be prepared and report on completion. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type and complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation

The types of materials could include materials and/or components used in the engineering activity, including:

- Conductors
- Sub components
- Test equipment
- Spare parts

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 393

How to prepare materials for the maintenance of electrical plant and equipment

| | |
|--|--|
| UAN: | Y/602/0980 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 14 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to prepare materials for maintenance |
| Assessment criteria |
| The learner can: 1.1 identify the materials to use and recognise defects in the quality of them 1.2 explain the types of handling and preparation methods and techniques needed for different materials 1.3 explain how to ensure the preparations have been carried out to the required standard 1.4 describe own responsibilities for ensuring the security of the tools and equipment and their control procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures. |
| Assessment criteria |
| The learner can: 2.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 2.2 explain the relevant regulations and safe working practices and procedures required within own work area 2.3 explain own responsibilities with regard to the reporting lines and procedures in working environment. |

Unit 393 How to prepare materials for the maintenance of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of preparing the materials in order to carry out the maintenance of electrical plant and equipment. The learner will be required to check the quality and quantity of the materials determine how the materials should be prepared and report on completion. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type and complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation

The types of materials could include materials and/or components used in the engineering activity, including:

- Conductors
- Sub components
- Test equipment
- Spare parts

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 394

Adjust electrical plant and equipment to meet operational requirements

| | |
|--|--|
| UAN: | F/602/0701 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Identify the equipment to be adjusted |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate operating specifications for the equipment being maintained. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to carry out the required adjustments |
| Assessment criteria |
| The learner can: 2.1 carry out adjustments within the limits of own personal authority 2.2 make the required adjustments in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to complete the adjustment process |
| Assessment criteria |
| The learner can: 3.1 confirm that the adjusted equipment meets the required operating specification 3.2 report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments 3.3 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 394 Adjust electrical plant and equipment to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Adjust Electrical Plant and Equipment to Meet Operational Requirements.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in adjusting electrical equipment in line with the manufacturer's and organisation's parameters. The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisation's safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at the learner's discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type and complexity of adjustments to be made could include:

- Tightening of connections
- Checking and adjusting movement
- Inspection for movement and cleaning

The quality standards and accuracy to be achieved are as set down in the work specifications

Maintenance methods and procedures should include how different types of adjustment should be made, how much time is allowed for different types of adjustment, which tools, materials and methods should be used for maintenance and how to minimise disruption to other activities.

Unit 395

How to carry out the removal of components from electrical plant and equipment

| | |
|--|--|
| UAN: | K/602/0983 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to remove components correctly |
| Assessment criteria |
| The learner can: 2.1 explain the types of component removal methods and techniques including, isolations and connections that have to be made, and which tools, equipment and methods can be used to remove specific components from specific plant and equipment 2.2 explain how to ensure the removal of components is carried out to the required standard 2.3 explain how to identify component defects that have been removed 2.4 identify the tool and equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment used. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to store and dispose of components |
| Assessment criteria |
| The learner can: 3.1 explain how to label and store components for re-use and what the available marking systems are for specific components and connections 3.2 describe how to dispose of unwanted components and substances. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 395 How to carry out the removal of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of removing components from electrical equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases. Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of components to be removed may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives.

Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of process control systems
- Heat exchangers
- Components of electrical back-up systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices

- Circuit boards
- Safety/protection devices
- Components of electrical panels

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

Complex removal refers to situations where the components can only be removed by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where removal of one component necessitates removal of the other interacting components.

The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access information on the environmental standards, including an appreciation of Control of Substances Hazardous to Health (COSHH), Safety and Emergency Preparedness

Unit 396

Carry out the removal of components from electrical plant and equipment

| | |
|--|--|
| UAN: | D/602/0981 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to carry out the preparations for the removal of components. |
| Assessment criteria |
| The learner can: 1.1 establish, and where appropriate, mark component orientation for re-assembly 1.2 ensure that any stored energy or substances are released safely and correctly. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to remove components. |
| Assessment criteria |
| The learner can: 2.1 remove the required components using approved tools and techniques 2.2 take suitable precautions to prevent damage to components, tools and equipment during removal 2.3 check the condition of the removed components and record those that will require replacing 2.4 ensure the removal of components is carried out to the required standard. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to complete the removal process |
| Assessment criteria |
| The learner can: 3.1 label and store or discard the removed components in an appropriate location and in accordance with approved procedures 3.2 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 396 Carry out the removal of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Removal of Components from Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in removing components from electrical equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases. Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of components to be removed may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives.

Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of process control systems
- Heat exchangers
- Components of electrical back-up systems

Typical fragile components could be:

- Components of electrical circuit protectors

- Electrical metering devices
- Circuit boards
- Safety/protection devices
- Components of electrical panels

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

Complex removal refers to situations where the components can only be removed by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where removal of one component necessitates removal of the other interacting components.

The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access information on

Unit 397

How to carry out the replacement of components from electrical plant and equipment

| | |
|--|--|
| UAN: | H/602/0707 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to carry out the replacement of components including the methods and equipment to use |
| Assessment criteria |
| The learner can: 2.1 explain the types of component replacement methods and techniques, including the types of reconnection that have to be made, and which tools, equipment and methods can be used to replace specific components in specific plant and equipment 2.2 explain how to ensure the replacement of components is carried out to the required standard 2.3 explain the handling methods and techniques including manual handling pressure and thermal methods and techniques 2.4 identify own responsibilities for ensuring the care and security of tools and equipment used. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 397 How to carry out the replacement of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of replacing components in electrical plant and equipment. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, and replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

Equipment to be worked on could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be replaced may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic). Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of process control systems
- Heat exchangers
- Components of electrical back-up systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Components of electrical panels

The assembly methods and techniques may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where replacement of one component necessitates replacements of other interacting components.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 398

Carry out the replacement of components from electrical plant and equipment

| | |
|--|---|
| UAN: | Y/602/0705 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out the preparations needed in order to replace components |
| Assessment criteria |
| The learner can: 1.1 obtain all the required components and ensure that they are in a suitable condition for replacement and fit for purpose 1.2 ensure that any replacement components used meet the required specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to replace and adjust components correctly. |
| Assessment criteria |
| The learner can: 2.1 take adequate precautions to prevent damage to components, tools and equipment during replacement 2.2 replace the components in the correct sequence using appropriate tools and techniques 2.3 make any necessary settings or adjustments to the components to ensure they will function correctly 2.4 ensure the replacement of components is carried out to the required standard. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 3.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 4.2 maintain documentation in accordance with organisational requirements. |

Unit 398 Carry out the replacement of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Replacement of Components from Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in replacing components in electrical plant and equipment. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, and replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

Equipment to be worked on could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be replaced may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic). Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of process control systems
- Heat exchangers
- Components of electrical back-up systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Components of electrical panels

The assembly methods and techniques may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where replacement of one component necessitates replacements of other interacting components.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 399

Determine the feasibility of repair of components from electrical plant and equipment

| | |
|--|--|
| UAN: | M/602/0984 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine the feasibility of repair of components |
| Assessment criteria |
| The learner can: 1.1 follow the relevant repair specifications 1.2 assess the amount and level of wear or damage to the component and determine what work is required to bring the component back to the specified condition 1.3 report on findings and conclusions on the feasibility and cost-effectiveness of repairs. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 399 Determine the feasibility of repair of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Determine the Feasibility of Repair of Components from Electrical Plant and Equipment.'

The assumed prerequisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of electrical back-up systems
- Heat exchangers
- Components of process control systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Safety/protection devices
- Components of electrical panels

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of repair to be made requires one or more techniques to be applied depending upon its complexity. The techniques are standard within the sector but may require some modification to achieve the required result. The techniques may relate to one or more technologies depending upon the complexity of the repair.

Typical repair techniques could include:

- Re-aligning
- Re-shaping by material removal
- Re-soldering
- Bonding
- Replacing

Complex repairs are those which can only be achieved using tools and techniques which have been specifically modified in some way to achieve the repair and/or where no pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 405

How to diagnose and determine the causes of faults in electrical plant and equipment

| | |
|--|--|
| UAN: | F/602/0696 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 34 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to use fault diagnostic aids and methods in order to diagnose problems |
| Assessment criteria |
| The learner can: 1.1 identify fault diagnostic aids including electrical test equipment, historical data and schematic drawings 1.2 describe fault finding methods including how to investigate problems 1.3 identify the extent and location of problems, what to do when causes are difficult to find and which actions can be taken to deal with the fault. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to analyse methods and techniques while assessing likely risks |
| Assessment criteria |
| The learner can: 2.1 explain how to analyse methods and techniques of analysis including historical data, comparison and circuit measurements 2.2 assess the likely risks arising from faults such as fire, electric shock and damage to plant. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to record details accurately and understand the importance of doing so</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 identify maintenance reporting documentation and control procedures and how descriptions should be presented</p> <p>3.2 state why it is important to record results of the diagnosis</p> <p>3.3 describe why it is important to relay conclusions on to others in a time span appropriate to the nature of the problem.</p> |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>4. Know how to follow organisational policies and procedures.</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>4.1 identify own responsibilities in respect to health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>4.2 state the relevant regulations and the safe working practices and procedures required within own work area</p> <p>4.3 explain reporting lines and procedures in own working environment</p> <p>4.4 describe company procedures and manufacturers guidelines for the operating and care of test equipment and control procedures.</p> |

Unit 405 How to diagnose and determine the causes of faults in electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit covers the knowledge required to diagnose and find faults within electrical plant and equipment. The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people. To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up of the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions.

The types of plant and equipment may be single or multiple technologies

Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of fault finding techniques or procedures, diagnostic aids and equipment could include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing .
- Timed monitoring
- Sectional isolation

The type and range of problems and faults may arise from environmental factors such as exposure to sudden temperature changes and/or human error and/or from materials that have been used in or by the plant and equipment and/or from inherent features of the product/asset such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures to include:

- Test results
- Data sheets
- Company procedures.

Unit 406

Diagnose and determine the causes of faults in electrical plant and equipment

| | |
|--|--|
| UAN: | T/602/0694 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to investigate and diagnose the possible causes of electrical faults |
| Assessment criteria |
| The learner can: 1.1 review and use all relevant information on the symptoms and problems associated with the products or assets 1.2 investigate and establish the most likely causes of the faults 1.3 select, use and apply diagnostic techniques, tools and aids to locate faults 1.4 complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to determine electrical fault causes and record details appropriately |
| Assessment criteria |
| The learner can: 2.1 determine the implications of the fault in terms of other work and safety considerations 2.2 use the evidence gained to draw valid conclusions about the nature and probable cause of the fault 2.3 record details on the extent and location of the faults in an appropriate format. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 406 Diagnose and determine the causes of faults in electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Diagnose and Determine the Causes of Faults in Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit covers the competence required to diagnose and find faults within electrical plant and equipment. The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people. To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up of the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions.

The types of plant and equipment may be single or multiple technologies.

Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of fault finding techniques or procedures, diagnostic aids and equipment could include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing
- Timed monitoring
- Sectional isolation

The type and range of problems and faults may arise from environmental factors such as exposure to sudden temperature changes and/or human error and/or from materials that have been used in or by the plant and equipment and/or from inherent features of the product/asset such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures to include:

- Test results
- Data sheets
- Company procedures.

Unit 407

How to diagnose and determine the causes of faults in instrument and control systems

| | |
|--|--|
| UAN: | F/602/0827 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 34 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to use fault diagnostic aids and methods in order to diagnose problems |
| Assessment criteria |
| The learner can: 1.1 identify fault diagnostic aids including mechanical test equipment, historical data and schematic drawings 1.2 describe fault finding methods including how to investigate problems 1.3 identify the extent and location of problems, what to do when causes are difficult to find and which actions can be taken to deal with the fault. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to analyse methods and techniques while assessing likely risks |
| Assessment criteria |
| The learner can: 2.1 explain how to analyse methods and techniques of analysis including historical data, comparison and circuit measurements 2.2 assess the likely risks arising from faults such as fire, electric shock and damage to plant. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to record details accurately and understand the importance of doing so |
| Assessment criteria |
| The learner can: 3.1 identify maintenance reporting documentation and control procedures and how descriptions should be presented 3.2 state why it is important to record results of the diagnosis 3.3 describe why it is important to relay conclusions on to others in a time span appropriate to the nature of the problem. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures. |
| Assessment criteria |
| The learner can: 4.1 identify own responsibilities in respect to health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 state the relevant regulations and the safe working practices and procedures required within own work area 4.3 explain reporting lines and procedures in own working environment 4.4 describe company procedures and manufacturers guidelines for the operating and care of test equipment and control procedures. |

Unit 407 How to diagnose and determine the causes of faults in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Diagnose and Determine the Causes of Faults in Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit covers the knowledge required to diagnose and find faults within instrument and control systems. The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people. To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions

The type of systems investigated may be single or multiple technologies. Typical systems could be:

- Measurement system
- Control systems
- Analysers, protection and detection devices

The types of fault finding techniques or procedures, diagnostic aids and equipment include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing
- Timed monitoring
- Sectional isolation

The type and range of problems and faults may arise from environmental factors such as exposure to sudden temperature changes and/or from human error and/or from materials that have been used in or by the systems and/or from inherent features of the systems such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures include:

- Test results
- Date sheets
- Company procedures.

Unit 408

Diagnose and determine the causes of faults in instrument and control systems

| | |
|--|--|
| UAN: | T/602/0825 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to investigate and diagnose the possible causes of instrument and control system faults |
| Assessment criteria |
| The learner can: 1.1 review and use all relevant information on the symptoms and problems associated with the products or assets 1.2 investigate and establish the most likely causes of the faults 1.3 select, use and apply diagnostic techniques, tools and aids to locate faults 1.4 complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to determine instrument and control system fault causes and record details appropriately |
| Assessment criteria |
| The learner can: 2.1 determine the implications of the fault in terms of other work and safety considerations 2.2 use the evidence gained to draw valid conclusions about the nature and probable cause of the fault 2.3 record details on the extent and location of the faults in an appropriate format. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 408

Diagnose and determine the causes of faults in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Diagnose and Determine the Causes of Faults in Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit covers the competence required to diagnose and find faults within instrument and control systems. The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people. To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions

The type of systems investigated may be single or multiple technologies. Typical systems could be:

- Measurement system
- Control systems
- Analysers, protection and detection devices

The types of fault finding techniques or procedures, diagnostic aids and equipment include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing
- Timed monitoring
- Sectional isolation

The type and range of problems and faults may arise from environmental factors such as exposure to sudden temperature changes and/or from human error and/or from materials that have been used in or by the systems and/or from inherent features of the systems such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures include:

- Test results
- Date sheets
- Company procedures.

Unit 409

How to diagnose and determine the causes of faults in mechanical plant and equipment

| | |
|--|--|
| UAN: | K/602/0868 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 34 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to use fault diagnostic aids and methods in order to diagnose problems |
| Assessment criteria |
| The learner can: 1.1 identify fault diagnostic aids including mechanical test equipment, historical data and schematic drawings 1.2 describe fault finding methods including how to investigate problems 1.3 identify the extent and location of problems, what to do when causes are difficult to find and which actions can be taken to deal with the fault. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to analyse methods and techniques while assessing likely risks |
| Assessment criteria |
| The learner can: 2.1 explain how to analyse methods and techniques of analysis including historical data, comparison and circuit measurements 2.2 assess the likely risks arising from faults such as fire, electric shock and damage to plant. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to record details accurately and understand the importance of doing so |
| Assessment criteria |
| The learner can: 3.1 identify maintenance reporting documentation and control procedures and how descriptions should be presented 3.2 state why it is important to record results of the diagnosis 3.3 describe why it is important to relay conclusions on to others in a time span appropriate to the nature of the problem. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures. |
| Assessment criteria |
| The learner can: 4.1 identify own responsibilities in respect to health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 state the relevant regulations and the safe working practices and procedures required within own work area 4.3 explain reporting lines and procedures in own working environment 4.4 describe company procedures and manufacturers guidelines for the operating and care of test equipment and control procedures. |

Unit 409 How to diagnose and determine the causes of faults in mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit covers the knowledge required to diagnose and find faults within mechanical plant and equipment. The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people.

To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions

The type of plant and equipment may be single or multiple technologies. Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Fluid distribution systems

The types of fault finding techniques or procedures, diagnostic aids and equipment include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing
- Timed monitoring
- Sectional isolation

The type and range of problems and faults include those arising from environmental factors such as exposure to sudden temperature changes and/or from human error and/or from materials that have been used in or by the plant and equipment and/or from inherent features of the plant and equipment such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures include:

- Test results
- Date sheets
- Company procedures

Unit 410

Diagnose and determine the causes of faults in mechanical plant and equipment

| | |
|--|---|
| UAN: | H/602/0867 |
| Level: | 4 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to investigate and diagnose the possible causes of mechanical faults |
| Assessment criteria |
| The learner can: 1.1 review and use all relevant information on the symptoms and problems associated with the products or assets 1.2 investigate and establish the most likely causes of the faults 1.3 select, use and apply diagnostic techniques, tools and aids to locate faults 1.4 complete the fault diagnosis within the agreed time and inform the appropriate people when this cannot be achieved. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to determine mechanical fault causes and record details appropriately |
| Assessment criteria |
| The learner can: 2.1 determine the implications of the fault in terms of other work and safety considerations 2.2 use the evidence gained to draw valid conclusions about the nature and probable cause of the fault 2.3 record details on the extent and location of the faults in an appropriate format. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 410 Diagnose and determine the causes of faults in mechanical plant and equipment

Supporting information

Guidance

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Diagnose and Determine the Causes of Faults in Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit covers the competence required to diagnose and find faults within mechanical plant and equipment.

The learner will be required to select the most appropriate fault finding technique and tools to locate the fault and on completion notify the appropriate people. To record the results the learner will follow company procedures and the organisation's safe working practices at all times and work within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to determination and follow up the information needed to support a clear and accurate definition of the problem and the selection and analysis of diagnostic procedures appropriate to the problem as identified. In some cases, the learner may still be expected to refer to others for final authorisations, even though they remain responsible for identifying and implementing decisions

The type of plant and equipment may be single or multiple technologies. Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Fluid distribution systems

The types of fault finding techniques or procedures, diagnostic aids and equipment include:

- Function testing
- Comparison diagnosis
- Substitution
- Examination of failed components
- Operational performance testing
- Timed monitoring
- Sectional isolation

The type and range of problems and faults include those arising from environmental factors such as exposure to sudden temperature changes and/or from human error and/or from materials that have been used in or by the plant and equipment and/or from inherent features of the plant and equipment such as design aspects, age, and/or natural wear and tear.

The level and complexity of diagnosis can be achieved by applying procedures which are formally specified or which are devised by the learner in response to the symptoms of the fault.

The record keeping systems and procedures include:

- Test results
- Date sheets
- Company procedures

Unit 503

How to reinstate the work area after completing the maintenance of process engineering plant and equipment

| | |
|--|--|
| UAN: | K/502/3002 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to maintain their own and others' safety |
| Assessment criteria |
| The learner can: 1.1 describe their own responsibilities in respect of health and safety and the environment, including their legal responsibilities and the limits of this responsibility 1.2 identify the relevant regulations and safe working practices required within their work area 1.3 describe the work area restoration requirements and the relevant health and safety, and organisational safe working practices and procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to reinstate the work area after completing maintenance of process engineering plant and equipment |
| Assessment criteria |
| The learner can: 2.1 describe the material and equipment stores procedures and organisational procedures which they have to follow 2.2 describe the appropriate waste disposal methods and procedures for different types of waste, in accordance with current health and safety regulations, relevant legislation and organisational practice. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to respond to problems</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 describe their responsibilities with regard to the reporting lines and procedures within the working environment.</p> |

Unit 503

How to reinstate the work area after completing the maintenance of process engineering plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is an experienced operator with relevant technical training.

Assessment Context

This unit is about the learner's knowledge in restoring the work area to a safe condition prior to returning to operations. The learner will be required to identify and separate waste materials for disposal and identify and separate out materials suitable for storage and further use. The learner will be following their organisation's safe working practices at all times and working within the work permit procedures.

This unit is common to the Electrical, Mechanical and Instrument & Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

The level and extent of responsibility will involve the learner being responsible for ensuring the equipment and work site is safe for others or the learner to work on by following defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the Permit to Work system.

The work areas to be restored should relate to chemical manufacturing on onshore sites or offshore installations.

The resources to be stored are materials and equipment for use at some time in the future and retained either in secure, enclosed containment or unenclosed within a work area or storage facility. Resources could be identified, sorted, protected and evaluated for further use. Appropriate storage facilities should be used where necessary. Typical resources could include:

- Consumables
- Assembly/alignment aids
- Storing/stacking equipment
- Lifting equipment
- Safety equipment
- Personal Protective Equipment/shielding equipment
- Excess materials
- Process and ancillary equipment

- Industrial gas cylinders
- Tools/equipment
- Protection sheeting
- Re-usable components assemblies

The disposal of hazardous and non-hazardous materials could include:

Non hazardous:

- Packaging/protecting materials
- Swarf
- Material offcuts

Replaced “lifed” consumables

- Hazardous:
- Chemicals and fluids e.g. solvents and cleaning agents
- Sharp objects/offcuts
- Asbestos or asbestos based
- Oils and greases

The Knowledge and Understanding levels expressed indicate the minimum level of knowledge and understanding sufficient to perform the learner’s role in a manner that would normally be associated with the minimum acceptable performance of a competent person undertaking the learner’s role.

The expression “working knowledge and understanding” indicates the learner is able to:

- Identify and apply relevant information, procedures and practices to the learner’s usual role in the learner’s expected working environments needing only occasional recourse to reference materials
- Describe, in their own words, the principles underlying the learner’s working methods. This does not mean the ability to quote “Chapter and verse”. Rather the learner must know what supporting information is available, how and where to find it and from whom to seek further guidance and information to confirm any additional required detail
- Interpret and apply the information obtained to the learner’s role, working practice and expected working environment.

Unit 504

Reinstate the work area after completing the maintenance of process engineering plant and equipment

| | |
|--|--|
| UAN: | H/502/3001 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Maintain their own and others' safety |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with safety, health and other relevant regulations and guidelines. |

| |
|---|
| Learning outcome |
| The learner will: 2. Reinstate the work area after completing maintenance of process engineering plant and equipment |
| Assessment criteria |
| The learner can: 2.1 separate equipment, components and materials for re-use from waste items and materials 2.2 store re-useable materials and equipment in an appropriate location 2.3 dispose of waste materials in line with organisational and environmental safety procedures 2.4 restore the work areas to a safe condition in accordance with agreed requirements and schedules. |

| |
|--|
| Learning outcome |
| The learner will: 3. Respond to problems |
| Assessment criteria |
| The learner can: 3.1 deal promptly with problems within their control and report those that cannot be solved. |

Unit 504 Reinstatement of the work area after completing the maintenance of process engineering plant and equipment

Supporting information

This unit should be assessed in a work environment and is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Reinstatement of the Work Area after Completing the Maintenance of Process Engineering Plant and Equipment'.

The assumed pre-requisite is an experienced operator with relevant technical training.

Assessment Context

This unit is about the learner's competence in restoring the work area to a safe condition prior to returning to operations. The learner will be required to identify and separate waste materials for disposal and identify and separate out materials suitable for storage and further use. The learner will be following their organisation's safe working practices at all times and working within the work permit procedures.

This unit is common to the Electrical, Mechanical and Instrument & Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

The level and extent of responsibility will involve the learner being responsible for ensuring the equipment and work site is safe for others or the learner to work on by following defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the Permit to Work system. The work areas to be restored should relate to chemical manufacturing on onshore sites or offshore installations.

The resources to be stored are materials and equipment for use at some time in the future and retained either in secure, enclosed containment or unenclosed within a work area or storage facility. Resources could be identified, sorted, protected and evaluated for further use. Appropriate storage facilities should be used where necessary. Typical resources could include

- Consumables
- Assembly/alignment aids
- Storing/stacking equipment
- Lifting equipment
- Safety equipment
- Personal Protective Equipment/shielding equipment
- Excess materials

- Process and ancillary equipment
- Industrial gas cylinders
- Tools/equipment
- Protection sheeting
- Re-usable components assemblies

The disposal of hazardous and non-hazardous materials could include:

Non hazardous:

- Packaging/protecting materials
- Swarf
- Material offcuts
- Replaced “lived” consumables

Hazardous:

- Chemicals and fluids e.g. solvents and cleaning agents
- Sharp objects/offcuts
- Asbestos or asbestos based
- Oils and greases

Unit 505

How to minimise risks to life, property and the environment within process engineering environments

| | |
|--|--|
| UAN: | H/602/0688 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to identify hazards and minimise risks |
| Assessment criteria |
| The learner can: 1.1 identify the types of hazards involving processes, tools, equipment and materials that are likely to be met whilst carrying out the maintenance of plant and equipment 1.2 describe the actions which can minimise risk from hazards. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know the safety assessment methods and reporting procedures |
| Assessment criteria |
| The learner can: 2.1 describe the safety assessment methods and techniques to be used 2.2 explain how to carry out a risk assessment correctly 2.3 explain safety reporting procedures and documentation for own working environment. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain what own responsibilities are in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 describe the relevant regulations and the safe working practices and procedures required within own work area</p> <p>3.3 explain and understand own responsibilities with regard to the reporting lines and procedures for own working environment.</p> |

Unit 505 How to minimise risks to life, property and the environment within process engineering environments

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of minimising the risks to life, property and the environment. The learner will be required to identify hazards, assess the risks involved, minimise the risks by implementing control measures and providing ongoing monitoring. All the relevant safety systems will require updating.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within agreed specifications and following clearly defined procedures with regard to identifying and dealing with risks to life, property and the environment. The learner will be expected to take immediate action appropriate to the circumstances.

The type of hazards involved could be those that may affect the safety and/or integrity of:

- People
- Environment
- Operational Equipment

The risk control measures to be implemented will include those approved by the company.

The type of action to be taken will be limited to own responsibility but could include:

- Removal of the hazard
- Raising the alarm
- Shutting down the process
- Stopping the work

The methods of communicating or reporting actions will be in accordance with the requirements of the company.

Unit 506

How to work safely, minimise risk and comply with emergency procedures within process engineering environments

| | |
|--|--|
| UAN: | D/602/0690 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to work safely at all times |
| Assessment criteria |
| The learner can: 1.1 describe how to work safely at all times 1.2 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 1.3 explain the relevant regulations and the safe working practices and procedures required within own work area. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know and understand first aid procedures |
| Assessment criteria |
| The learner can: 2.1 identify the sources of competent assistance including the location of local first-aid facilities and first-aiders 2.2 identify the systems for alerting relevant professional authorities. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to comply with emergency procedures and reporting procedures |
| Assessment criteria |
| The learner can: 3.1 explain the procedures for shutdown and evacuation 3.2 identify where information on shutdown and evacuation procedures can be obtained 3.3 describe the contingency reporting documentation and systems in own work area 3.4 describe the reporting procedures for near misses or accidents. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know and understand own responsibilities regarding reporting |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities with regards to the reporting lines and procedures in own working environment. |

Unit 506 How to work safely, minimise risk and comply with emergency procedures within process engineering environments

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of working safely, dealing with risks by taking action to minimise the risks and where necessary complying with emergency procedures.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within an overall risk control strategy which has been developed by safety specialists and which includes detailed criteria for identifying risks together with clearly defined procedures for action which must be followed. In some cases, the learner may be expected to refer to others for final authorisations, even though the learner remains responsible for identifying and implementing decisions

The types of contingencies, i.e. accidents and incidents by their very nature are unexpected but the company risk control strategy sets out the responses that the learner should follow in order to limit risks arising.

The actions to be taken could include:

- Isolation of hazard/containment
- Stopping activities
- Reporting to appropriate person
- Restriction of others exposure to hazard
- Implementation of alarm and evacuation procedures to assembly point

Unit 507

Work safely, minimise risk and comply with emergency procedures within process engineering environments

| | |
|--|--|
| UAN: | K/602/0689 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 1.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 1.2 deal safely with dangers that can be contained using appropriate equipment and materials, in accordance with organisational policy and procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to minimise risk of injury and damage |
| Assessment criteria |
| The learner can: 2.1 take prompt and appropriate action to minimise risk of personal and third party injury as a first priority and then damage to property and equipment. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to comply with emergency and organisational procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 call for expert help in the event of contingencies occurring, using warning systems as appropriate</p> <p>3.2 follow shutdown and evacuation procedures promptly and correctly.</p> |

Unit 507

Work safely, minimise risk and comply with emergency procedures within process engineering environments

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Work Safely, Minimise Risk and Comply with Emergency Procedures within Process Engineering Environments.'

The assumed pre-requisite is that the learner undertaking this unit will be an operator/technician seeking recognition of their competence.

This unit is about the learner's competence in working safely, dealing with risks by taking action to minimise the risks and where necessary complying with emergency procedures.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within an overall risk control strategy which has been developed by safety specialists and which includes detailed criteria for identifying risks together with clearly defined procedures for action which must be followed. In some cases, the learner may be expected to refer to others for final authorisations, even though the learner remains responsible for identifying and implementing decisions

The types of contingencies, i.e. accidents and incidents by their very nature are unexpected but the company risk control strategy sets out the responses that the learner should follow in order to limit risks arising.

The actions to be taken could include:

- Isolation of hazard/containment
- Stopping activities
- Reporting to appropriate person
- Restriction of others exposure to hazard
- Implementation of alarm and evacuation procedures to assembly point

Unit 508

How to maintain effective working relationships within process engineering maintenance

| | |
|--|--|
| UAN: | K/602/0627 |
| Level: | 2 |
| Credit value: | 1 |
| GLH: | 9 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to create and maintain effective working relationships |
| Assessment criteria |
| The learner can: 1.1 describe how to create and maintain effective working relationships, and why it is important to do so. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 describe own and others responsibilities with regards to lines of communication 2.2 identify the types of problems that can affect relationships and what actions can be taken to deal with specific difficulties. |

Unit 508 How to maintain effective working relationships within process engineering maintenance

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner will be an operator developing their skills and knowledge and seeking recognition of competence.

This unit is about the learner's knowledge of developing and maintaining effective working relationships with others. This may include colleagues, supervisors and visitors and may be frequent or infrequent. Both oral and written methods will be used.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices.

Scope

The groups of people with which relationships should be maintained include people with whom the learner comes into contact as part of their work role either on a frequent or regular basis, or occasionally only.

Typical relationships could be with:

- Those for whom the learner has responsibility
- Clients
- Other disciplines
- Security/safety personnel
- Those to whom the learner is responsible
- Colleagues
- Suppliers

Effective working relationships require communication with others. This could include:

- Formal/informal

Oral

- Written

Examples could include:

- Tool box talks
- Safety feedback
- Complaints
- Appraisals/performance reviews
- Inductions
- Production loop
- Liaison between training and workplace contacts

Unit 509

Maintain effective working relationships within process engineering maintenance

| | |
|--|---|
| UAN: | H/602/0626 |
| Level: | 2 |
| Credit value: | 1 |
| GLH: | 4 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to establish and maintain effective working relationships |
| Assessment criteria |
| The learner can: 1.1 establish and maintain effective working relationships. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to maintain effective communication within working relationships |
| Assessment criteria |
| The learner can: 2.1 keep others informed about work plans or activities which affect them 2.2 seek assistance from others in a polite and courteous way without causing undue disruption to normal work activities 2.3 respond in a timely and positive way when others ask for help or information. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to deal with disagreements and problems effectively</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 deal with disagreements in an amicable and constructive way so that good relationships are maintained.</p> |

Unit 509 Maintain effective working relationships within process engineering maintenance

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Maintain Effective Working Relationships within Process Engineering Maintenance.'

The assumed pre-requisite is that the learner will be an operator developing their skills and knowledge and seeking recognition of competence.

This unit is about the learner's competence in developing and maintaining effective working relationships with others. This may include colleagues, supervisors and visitors and may be frequent or infrequent. Both oral and written methods will be used.

This unit is common to the Electrical, Mechanical, Instrument and Control disciplines.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices.

Scope

The groups of people with which relationships should be maintained include people with whom the learner comes into contact as part of their work role either on a frequent or regular basis, or occasionally only.

Typical relationships could be with:

- Those for whom the learner has responsibility
- Clients
- Other disciplines
- Security/safety personnel
- Those to whom the learner is responsible
- Colleagues
- Suppliers

Effective working relationships require communication with others. This could include:

- Formal/informal
- Oral
- Written

Examples could include:

- Tool box talks
- Safety feedback
- Complaints
- Appraisals/performance reviews
- Inductions
- Production loop
- Liaison between training and workplace contacts

Unit 510

How to adjust electrical plant and equipment to meet operational requirements

| | |
|--|--|
| UAN: | J/602/0702 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to 1.2 describe the maintenance methods and procedures including: <ul style="list-style-type: none">• Where to access operating requirements• The specific operating requirements of specific assets• Internal maintenance schedules 1.3 identify the maintenance records and documentation procedures in line with company and manufacturers' procedures 1.4 explain the equipment operating and care and control procedures of the equipment in use. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them with regards to adjustments procedures |
| Assessment criteria |
| The learner can: 2.1 explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.2 describe own responsibilities with regard to the reporting lines and procedures in the working environment. |

| |
|---|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others.</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area.</p> |

Unit 510 How to adjust electrical plant and equipment to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of adjusting electrical equipment in line with the manufacturer's and organisation's parameters. The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at the learner's discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type and complexity of adjustments to be made could include:

- Tightening of connections
- Checking and adjusting movement
- Inspection for movement and cleaning

The quality standards and accuracy to be achieved are as set down in the work specifications.

Maintenance methods and procedures should include how different types of adjustment should be made, how much time is allowed for different types of adjustment, which tools, materials and methods should be used for maintenance and how to minimise disruption to other activities.

Unit 511

Interpret detailed electrical information from technical sources

| | |
|--|--|
| UAN: | K/602/0708 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to interpret detailed electrical information from technical sources |
| Assessment criteria |
| The learner can: 1.1 use up-to-date, accurate and relevant information on technical requirements 1.2 ensure that the information contains all essential data 1.3 identify and interpret the required details. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly and effectively with any problems occurring with the requirements and their interpretation. |

Unit 527 Interpret detailed electrical information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Interpret Detailed Electrical Information from Technical Sources.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Electrical schematics and single line diagrams
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 512

Read and extract information from electrical engineering drawings and specifications

| | |
|--|--|
| UAN: | H/602/0741 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to interpret detailed electrical information from technical sources |
| Assessment criteria |
| The learner can: 1.1 use up-to-date, accurate and relevant information on technical requirements. 1.2 correctly interpret the drawings and specifications 1.3 ensure that the information contains all necessary data 1.4 identify and interpret the required details. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with inaccuracies effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly with any inaccuracies occurring with the requirements and their interpretation 2.2 report any inaccuracies or discrepancies in drawings and specification. |

Unit 512 Read and extract information from electrical engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Read and Extract Information from Electrical Engineering Drawings and Specifications.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in extracting information from technical drawings and publications prior to starting electrical maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications.

The information to be extracted will relate to the maintenance and repair of plant and equipment.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturer's specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 513

How to read and extract information from electrical engineering drawings and specifications

| | |
|--|--|
| UAN: | K/602/0742 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to read and extract information from electrical engineering drawings and specifications |
| Assessment criteria |
| The learner can: 1.1 describe the information and document systems that relate to the maintenance of plant and equipment 1.2 explain the currently used types of engineering drawings and specifications 1.3 explain the conventions, symbols and abbreviations used within own company 1.4 identify the sources of information available to use 1.5 explain the identification and selection of data to ensure that the data is current and relevant to the location. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 define the document care and control procedures that are specified by the company 2.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 513 How to read and extract information from electrical engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of extracting information from technical drawings and publications prior to starting electrical maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications. The information to be extracted will relate to the maintenance and repair of plant and equipment.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturer's specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 514

How to identify and suggest improvements to working practices whilst maintaining electrical plant and equipment

| | |
|--|--|
| UAN: | T/602/0744 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 explain the sources of information available 1.2 describe how to present suggestions for improvement. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 explain the work improvement methods and techniques that are set by the company 2.2 describe the organisational structure, improvement systems and procedures that are set by the company 2.3 identify the working relationships taking account of the organisation structure, the individuals and any external influences. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 514 How to identify and suggest improvements to working practices whilst maintaining electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

Sources of information available could include:

- Company records
- Company procedures
- Clients
- Personal experience
- Tool box talks

The presentation techniques will be in line with company procedures.

Unit 515

How to adjust instrument and control systems to meet operational requirements

| | |
|--|--|
| UAN: | L/602/0992 |
| Level: | Level 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 identify the maintenance schedules and related specifications 1.2 describe the maintenance methods and procedures including: <ul style="list-style-type: none">• Where to access operating requirements• The specific operating requirements of specific assets• Internal maintenance schedules 1.3 identify the maintenance records and documentation procedures in line with company and manufacturer's procedures 1.4 explain the equipment operating and care and control procedures of the equipment in use. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them with regards to adjustments procedures |
| Assessment criteria |
| The learner can: 2.1 explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.2 describe own responsibilities with regard to the reporting lines and procedures in own working environment. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area.</p> |

Unit 515 How to adjust instrument and control systems to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of adjusting instrument and control equipment in line with the manufacturer's and organisation's parameters. The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could include:

- Measurement systems
- Analysers, protection and detection devices
- Control systems

Maintenance methods and procedures should include how different types of adjustment should be made, how much time is allowed for different types of adjustment, which tools, materials and methods should be used for maintenance, and how to minimise disruption to other activities.

The type and complexity of adjustments to be made could include:

- Replenishment of consumables
- Safety checks
- Checking outputs
- Recording data
- Replacement of worn/damaged/corroded components
- Cleaning
- Tightening of connections
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion/ movement
- Replacement of regularly changed 'lived' components

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 516

Interpret detailed instrument and control information from technical sources

| | |
|--|--|
| UAN: | H/602/0836 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to interpret detailed instrument and control information from technical sources |
| Assessment criteria |
| The learner can: 1.1 use up-to-date, accurate and relevant information on technical requirements 1.2 ensure that the information contains all essential data 1.3 identify and interpret the required details. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly and effectively with any problems occurring with the requirements and their interpretation. |

Unit 516 Interpret detailed instrument and control information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Interpret Detailed Instrument and Control Information from Technical Sources.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise.

The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Instrument and control schematics and single line diagrams
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 517

How to interpret detailed instrument and control information from technical sources

| | |
|--|--|
| UAN: | M/602/0838 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret detailed instrument and control information from technical sources |
| Assessment criteria |
| The learner can: 1.1 explain the information and document systems that relate to the maintenance of instrument and control systems 1.2 describe document care and control procedures in line with the company and manufacturer's procedures 1.3 explain the specification structure and content 1.4 describe the conventions, symbols and abbreviations used. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 explain the standards and regulations that relate to the maintenance of instrument and control systems 2.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 517 How to interpret detailed instrument and control information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise.

The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Instrument and control schematics and single line diagrams
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations could include:

- British standards
- Codes of Practice
 - International standards
- Company specific
- Manufacturer specific

Unit 518

How to read and extract information from instrument and control engineering drawings and specifications

| | |
|--|--|
| UAN: | K/602/0840 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to read and extract information from instrument and control engineering drawings and specifications |
| Assessment criteria |
| The learner can: 1.1 describe the information and document systems that relate to the maintenance of systems 1.2 explain the currently used types of engineering drawings and specifications 1.3 explain the conventions, symbols and abbreviations used within the company 1.4 identify the sources of information available 1.5 explain the identification and selection of data to ensure that the data is current and relevant to the location. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 define the document care and control procedures that are specified by the company 2.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 518 How to read and extract information from instrument and control engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of extracting information from technical drawings and publications prior to starting instrument and control maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications.

The information to be extracted will relate to the maintenance and repair of systems.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturers specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 519

Read and extract information from instrument and control engineering drawings and specifications

| | |
|--|--|
| UAN: | T/602/0839 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to interpret and use detailed instrument and control information |
| Assessment criteria |
| The learner can: 1.1 use the approved source to obtain the required drawings and specifications 1.2 correctly interpret the drawings and specifications 1.3 identify, extract and interpret the required information 1.4 use the information obtained to ensure that work output meets the specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems and inaccuracies effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly and effectively with any problems within own control and report those which cannot be solved 2.2 report any inaccuracies or discrepancies in drawings and specification. |

Unit 519 Read and extract information from instrument and control engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Read and Extract Information from Instrument and Control Engineering Drawings and Specifications.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in extracting information from technical drawings and publications prior to starting instrument and control maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications.

The information to be extracted will relate to the maintenance and repair of systems.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturers specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 520

How to identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems

| | |
|--|--|
| UAN: | T/602/0842 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 explain the sources of information available 1.2 describe how to present suggestions for improvement. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 explain the work improvement methods and techniques that are set by the company 2.2 describe the organisational structure, improvement systems and procedures that are set by the company 2.3 identify the working relationships taking account of the organisation structure, the individuals and any external influences. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 520

How to identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The engineering activities will be within the learner's own area of expertise.

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

Sources of information available could include:

- Company records
- Company procedures
- Clients
- Personal experience
- Tool box talks

The presentation techniques will be in line with company procedures.

Unit 521

How to adjust mechanical plant and equipment to meet operational requirements

| | |
|--|--|
| UAN: | H/602/0870 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 identify the relevant maintenance schedules and related specifications 1.2 describe the maintenance methods and procedures including: <ul style="list-style-type: none">• Where to access operating requirements• The specific operating requirements of specific assets• Internal maintenance schedules 1.3 identify the maintenance records and documentation procedures in line with company and manufacturer's procedures 1.4 explain the equipment operating and care and control procedures of the equipment in use. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them with regards to adjustments procedures |
| Assessment criteria |
| The learner can: 2.1 explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.2 describe own responsibilities with regard to the reporting lines and procedures in the working environment. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area.</p> |

Unit 521 How to adjust mechanical plant and equipment to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of adjusting mechanical equipment in line with the manufacturer's and organisation's parameters. The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at their discretion to achieve the best possible result in the conditions applying.

In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could involve more than one technology and/or involve a significant number of fragile/valued components and is difficult to access for maintenance.

Typical assets could include:

- Prime movers
- Distribution systems
- Transmission system and components

And may include:

- Work within confined spaces
- Working in hazardous areas
- Working at height/over water

The type and complexity of adjustments to be made could include

- Pressure control
- Temperature control
- Speed control
- Humidity control
- Flow control

Examples of complexity include:

- Direct adjustment to system component
- Adjustment via control loop

- Adjustment via external control system

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 522

Interpret detailed mechanical information from technical sources

| | |
|--|--|
| UAN: | T/602/0873 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to interpret detailed mechanical information from technical sources |
| Assessment criteria |
| The learner can: 1.1 use up-to-date, accurate and relevant information on technical requirements 1.2 ensure that the information contains all essential data 1.3 identify and interpret the required details. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly and effectively with any problems occurring with the requirements and their interpretation. |

Unit 522 Interpret detailed mechanical information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Interpret Detailed Mechanical Information from Technical Sources.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise.

The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Piping and instrumentation diagrams (P&ID's)
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 523

How to read and extract information from mechanical engineering drawings and specifications

| | |
|--|--|
| UAN: | J/602/0876 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to read and extract information from mechanical engineering drawings and specifications |
| Assessment criteria |
| The learner can: 1.1 describe the information and document systems that relate to the maintenance of plant and equipment 1.2 explain the currently used types of engineering drawings and specifications 1.3 explain the conventions, symbols and abbreviations used within the company 1.4 identify the sources of information available 1.5 explain the identification and selection of data to ensure that the data is current and relevant to the location. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 define the document care and control procedures that are specified by the company 2.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 523 How to read and extract information from mechanical engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of extracting information from technical drawings and publications prior to starting mechanical maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications.

The information to be extracted will relate to the maintenance and repair of plant and equipment.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturer's specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 524

Read and extract information from mechanical engineering drawings and specifications

| | |
|--|--|
| UAN: | F/602/0875 |
| Level: | 2 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to interpret and use detailed mechanical information |
| Assessment criteria |
| The learner can: 1.1 use the approved source to obtain the required drawings and specifications 1.2 correctly interpret the drawings and specifications 1.3 identify, extract and interpret the required information 1.4 use the information obtained to ensure that work output meets the specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems and inaccuracies effectively |
| Assessment criteria |
| The learner can: 2.1 identify and deal promptly and effectively with any problems within own control and report those which cannot be solved 2.2 report any inaccuracies or discrepancies in drawings and specification. |

Unit 524 Read and extract information from mechanical engineering drawings and specifications

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Read and Extract Information from Mechanical Engineering Drawings and Specifications.' The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in extracting information from technical drawings and publications prior to starting mechanical maintenance work. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner ensuring that the information is sourced from the latest version on the drawings and specifications.

The information to be extracted will relate to the maintenance and repair of plant and equipment.

The currently used types of engineering drawings and specifications could include:

- Schematic diagrams
- As-built drawings
- Manufacturer's specifications
- Piping and Instrumentation Diagrams (P&ID's)

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 525

How to identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment

| | |
|--|--|
| UAN: | R/602/0878 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 explain the sources of information available 1.2 describe how to present suggestions for improvement. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 explain the work improvement methods and techniques that are set by the company 2.2 describe the organisational structure, improvement systems and procedures that are set by the company 2.3 identify the working relationships taking account of the organisation structure, the individuals and any external influences. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 525 How to identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

Sources of information available could include:

- Company records
- Company procedures
- Clients
- Personal experience
- Tool box talks

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

The presentation techniques will be in line with company procedures.

Unit 526

How to interpret detailed mechanical information from technical sources

| | |
|--|--|
| UAN: | A/602/0874 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret detailed mechanical information from technical sources |
| Assessment criteria |
| The learner can: 1.1 explain the information and document systems that relate to the maintenance of mechanical plant and equipment 1.2 describe document care and control procedures in line with the company and manufacturer's procedures 1.3 explain the specification structure and content 1.4 describe the conventions, symbols and abbreviations used. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 explain the standards and regulations that relate to the maintenance of mechanical plant and equipment 2.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 526

How to interpret detailed mechanical information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Piping and instrumentation diagrams (P&ID's)
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations used could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 527

How to interpret detailed electrical information from technical sources

| | |
|--|---|
| UAN: | M/602/0709 |
| Level: | 2 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to interpret detailed electrical information from technical sources |
| Assessment criteria |
| The learner can: 3.1 explain the information and document systems that relate to the maintenance of electrical plant and equipment 3.2 describe document care and control procedures in line with the company and manufacturer's procedures 3.3 explain the specification structure and content 3.4 describe the conventions, symbols and abbreviations used. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain the standards and regulations that relate to the maintenance of electrical plant and equipment 4.2 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 527

How to interpret detailed electrical information from technical sources

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of interpreting information from drawings, diagrams and technical manuals. The learner will be required to ensure the information is accurate, up to date and contains all the data. The learner will also be required to identify and deal with problems that may arise.

The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the source information is obtained from the latest version. In some cases, the learner may be expected to refer to others when checking the data even though they remain responsible for the final product.

The complexity of technical detail could include:

- Pneumatic schematics
- Electrical schematics and single line diagrams
- Hydraulic schematics

The technical problems and issues will vary from solving simple single line diagrams to more complex drawings and specifications provided by the manufacturer.

The conventions, symbols and abbreviations could include:

- British standards
- Codes of practice
- International standards
- Company specific
- Manufacturer specific

Unit 600

How to prepare equipment in support of electrical engineering activities

| | |
|--|--|
| UAN: | R/602/0699 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to determine equipment preparation |
| Assessment criteria |
| The learner can: 1.1 explain how to determine the equipment preparations 1.2 explain how to determine the types of equipment necessary 1.3 explain the types of decision within own responsibility. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to prepare equipment correctly |
| Assessment criteria |
| The learner can: 2.1 explain the equipment preparation methods and procedures 2.2 identify the types of equipment which may be used 2.3 describe own responsibilities for ensuring the security of tools and equipment used. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to deal with problems and report completion of preparations |
| Assessment criteria |
| The learner can: 3.1 identify and deal with problems within own scope of responsibility 3.2 explain how to report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 600 How to prepare equipment in support of electrical engineering activities

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of preparing electrical equipment in order to carry out maintenance of plant and equipment. The learner will be required to obtain the equipment, ensure it is in a safe condition and advise the appropriate people. The learner will be following the organisations safe working practices and working within the work permit procedures

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

Equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

Types of equipment to be prepared could include fixed (machine) and/or portable (hand or machine):

- Protective clothing/equipment
- Lifting/handling equipment
- Access structures (typical ladders, steps, trestles, Youngman boards, temporary staging, access hoists... "cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harness
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, safety checks, changing settings or the calibrating as well as routine checks on its condition, operation, suitability and safety, in compliance with company procedures.

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 601

How to determine the feasibility of repair of components from electrical plant and equipment

| | |
|--|---|
| UAN: | T/602/0985 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 28 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to determine the feasibility of the repair |
| Assessment criteria |
| The learner can: 2.1 explain how to assess the condition of components for re-use 2.2 explain how to determine the feasibility and viability of repairs 2.3 describe component replacement methods and techniques. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 601 How to determine the feasibility of repair of components from electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of electrical back-up systems
- Heat exchangers
- Components of process control systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Safety/protection devices
- Components of electrical panels

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of repair to be made requires one or more techniques to be applied depending upon its complexity. The techniques are standard within the sector but may require some modification to achieve the required result. The techniques may relate to one or more technologies depending upon the complexity of the repair.

Typical repair techniques could include:

- Re-aligning
- Re-shaping by material removal
- Re-soldering
- Bonding
- Replacing

Complex repairs are those which can only be achieved using tools and techniques which have been specifically modified in some way to achieve the repair and/or where no pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 602

Identify and suggest improvements to working practices and procedures whilst maintaining electrical plant and equipment

| | |
|--|--|
| UAN: | M/602/0743 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 8 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 collect information and feedback on current working practices and procedures. 1.2 assess current working practices and procedures against agreed standards. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 identify opportunities for improving working practices and procedures 2.2 make suggestions for improvements that are realistic and which indicate the benefits that might be achieved 2.3 ensure that suggested improvements meet organisational requirements 2.4 present suggestions for improvements in accordance with organisational procedures 2.5 contribute to discussions about work practices and quality. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 602 Identify and suggest improvements to working practices and procedures whilst maintaining electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Identify and Suggest Improvements to Working Practices and Procedures whilst Maintaining Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence. This unit is about the learner's competence in identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

Sources of information available could include:

- Company records
- Company procedures
- Clients
- Personal experience
- Tool box talks

The presentation techniques will be in line with company procedures.

Unit 603

How to establish that an electrical engineering maintenance process has been completed to specification

| | |
|--|--|
| UAN: | F/602/0746 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to carry out equipment checks |
| Assessment criteria |
| The learner can: 2.1 explain how to make an adequate check of compliance against criteria 2.2 describe the inspection of equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment used. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 explain how to identify defects in plant and equipment 3.2 identify how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to identify documentation procedures and maintain records accurately |
| Assessment criteria |
| The learner can: 4.1 identify quality control systems and documentation procedures 4.2 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.3 describe what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 603

How to establish that an electrical engineering maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of ensuring that the work has been completed to company and or manufacturer's standards.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at the learner's discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of products or assets to be checked are electrical plant and equipment related to engineering work. This would include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The inspection, test and record-keeping procedures to be followed are as set in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedures, the Electricity at Work regulations and BS 7671.

The types of checks made depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications. Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturers' data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them.

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 604

Establish that an electrical engineering maintenance process has been completed to specification

| | |
|--|--|
| UAN: | A/602/0745 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out equipment checks |
| Assessment criteria |
| The learner can: 1.1 follow and make appropriate use of the specifications for the product or asset being checked 1.2 use all the correct tools and inspection equipment and check that they are in a useable condition 1.3 carry out the checks in an appropriate sequence using approved methods and procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess defects and report completion |
| Assessment criteria |
| The learner can: 2.1 identify and assess any defects or variations from the specification and take appropriate action 2.2 report completion of compliance activities in line with organisational procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 604 Establish that an electrical engineering maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Establish that an Electrical Engineering Maintenance Process has been Completed to Specification.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence. This unit is about the learner's competence in ensuring that the work has been completed to company and or manufacturer's standards.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at the learner's discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of products or assets to be checked are electrical plant and equipment related to engineering work. This would include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The inspection, test and record-keeping procedures to be followed are as set in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The engineering drawings and related specifications could include:

- Component
- Assembly
 - General arrangements
 - Isometrics
 - 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedures, the Electricity at Work regulations and BS 7671.

The types of checks made depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications. Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturers' data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them.

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 605

Test the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | J/602/0747 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to test the performance and condition of electrical plant and equipment |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate procedures for use of tools and equipment to carry out the required tests 1.2 set up and carry out the tests using the correct procedures and within agreed timescales 1.3 record the results of the tests in the appropriate format 1.4 review the results and carry out further tests if necessary. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 605 Test the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Test the Performance and Condition of Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in testing electrical plant and equipment. The learner will be expected to refer to manufacturers' manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The typical plant and equipment which are likely to be tested could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of tools and equipment to be used:

- Electrical test equipment
- Hand tools
- Load banks

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results.

Aspects from which the product is likely to be tested could include:

- Operating conditions
- Output
- Safety limits
- Transmission
- Rotation
- Noise
- Resistance
- Continuity
- Speed
- Vibration
- Coating/insulation/protection

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment.

The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly.

The testing methods and procedures used could be expected to include which tests relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 606

How to monitor the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | R/602/0752 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to set up and calibrate the equipment for monitoring |
| Assessment criteria |
| The learner can: 1.1 explain the performance requirements of plant and equipment 1.2 describe the monitoring methods and procedures for plant and equipment 1.3 identify which data is required to make decisions 1.4 explain the importance of the need for equipment calibration and authorisation procedures including ensuring that the monitoring equipment is set up and calibrated correctly. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to carry out the monitoring activities and record the outcomes |
| Assessment criteria |
| The learner can: 2.1 explain monitoring equipment settings, operating and care and control procedures 2.2 describe the formats for recording and monitoring results in line with company procedures 2.3 describe how to ensure that performance monitoring is carried out to the required standard 2.4 explain how to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and minimise disruption during monitoring |
| Assessment criteria |
| The learner can: 3.1 identify the types of disruption which can occur during monitoring and how to minimise different types of disruption. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 606 How to monitor the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of completing performance and condition monitoring on operational and static electrical plant and equipment.

The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of assets to be monitored involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner.

The performance requirements of plant and equipment could be expected to include manufacturers and company specifications on performance requirements.

Typical assets could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying.

Typical monitoring methods could include:

- Inspection of assets
- Taking instrument readings
- Sampling/analysing/reviewing outputs
- Checking documentary information

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration
- Current readings
- Run down and up time

Unit 607

Monitor the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | J/602/0750 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to set up and calibrate the equipment for monitoring |
| Assessment criteria |
| The learner can: 1.1 correctly set up and check/calibrate the equipment required for the monitoring being carried out. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to carry out the monitoring activities and review the outcomes |
| Assessment criteria |
| The learner can: 2.1 carry out the monitoring activities effectively 2.2 minimise disruption to normal activities 2.3 record and review the outcomes and take appropriate actions 2.4 ensure that performance monitoring is carried out to the required standard 2.5 optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 607 Monitor the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Monitor the Performance and Condition of Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in completing performance and condition monitoring on operational and static electrical plant and equipment.

The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of assets to be monitored involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner.

The performance requirements of plant and equipment could be expected to include manufacturers and company specifications on performance requirements.

Typical assets could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying.

Typical monitoring methods could include:

- Inspection of assets
- Taking instrument readings
- Sampling/analysing/reviewing outputs
- Checking documentary information

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration
- Current readings
- Run down and up time

Unit 608

Assess the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | D/602/0754 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to set up and carry out the assessment |
| Assessment criteria |
| The learner can: 1.1 ensure that the necessary test data on which to conduct the assessment is obtained 1.2 carry out the assessment using all relevant data and valid methods 1.3 check that the assessment provides clear and accurate information. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 compare current performance and condition data with that from previous assessments 2.2 identify and report the implications arising from the assessments 2.3 record the results of the assessments in the appropriate format. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 60

Assess the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Assess the Performance and Condition of Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in assessing the performance and condition of electrical plant and equipment using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The type of assets to be assessed involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturers' specification
- Historical
- Maintenance records
- Trend analysis

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures. The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures.

Unit 609

How to assess the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | K/602/0756 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to explain and identify test specifications and monitoring methods |
| Assessment criteria |
| The learner can: 1.1 explain equipment operating and test specifications including manufacturer's and company specifications 1.2 identify equipment monitoring methods and procedures including the types of data provided from monitoring, which methods can verify data and why it is important to do so. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 describe the assessment methods and techniques for specific data, plant and equipment 2.2 identify the factors which have to be taken into account when assessing performance of specific plant and equipment 2.3 documentation and control procedures including how to present results of the assessment, and who should receive the results and implications of assessments. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 609

How to assess the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of assessing the performance and condition of electrical plant and equipment using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices **AS THEY APPLY TO THE LEARNER**.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The type of assets to be assessed involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturers' specification
- Historical
- Maintenance records
- Trend analysis

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures. The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures.

Unit 610

How to inspect electrical plant and equipment

| | |
|--|--|
| UAN: | M/602/0760 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to inspect electrical plant and equipment |
| Assessment criteria |
| The learner can: 2.1 explain the inspection methods and techniques that are approved by the company 2.2 describe the calibration of equipment care and control procedures that are approved by the company 2.3 identify inspection equipment care and control procedures that are approved by the company. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 identify defects in products, equipment and systems 3.2 explain the quality control systems and documentation procedures 3.3 describe how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 4.1 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.2 identify what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 610 How to inspect electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of completing checks on electrical plant and equipment. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The type of products to be inspected involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The aspects, characteristics and complexity of checks are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedures, the Electricity at Work regulations and BS 7671.

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The inspection methods, techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 611

Inspect electrical plant and equipment

| | |
|--|--|
| UAN: | T/602/0758 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to inspect electrical plant and equipment |
| Assessment criteria |
| The learner can: 1.1 follow the correct specification for the product/equipment being inspected 1.2 use the correct equipment to carry out the inspection 1.3 identify and confirm the inspection checks to be made and acceptance criteria to be used 1.4 carry out all required inspections as specified. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 2.1 record the results of the inspection in the appropriate format. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to identify defects and deal with problems promptly |
| Assessment criteria |
| The learner can: 3.1 identify any defects or variations from the specification 3.2 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 611 Inspect electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking ‘How to Inspect Electrical Plant and Equipment.’

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner’s competence in completing checks on electrical plant and equipment. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature.

To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices **AS THEY APPLY TO THE LEARNER.**
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner’s discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The type of products to be inspected involves multiple technologies or are of a single technology interacting with other assets in a dynamic manner.

Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The aspects, characteristics and complexity of checks are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedures, the Electricity at Work regulations and BS 7671.

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The inspection methods, techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 612

How to test the performance and condition of electrical plant and equipment

| | |
|--|--|
| UAN: | R/602/0749 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know the different types of test methods and equipment |
| Assessment criteria |
| The learner can: 1.1 explain the engineering test specifications 1.2 identify different types of test equipment and their applications 1.3 describe the calibration of equipment and authorisation procedures 1.4 explain appropriate testing methods and procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to test equipment correctly |
| Assessment criteria |
| The learner can: 2.1 describe the analysis methods and techniques 2.2 identify the environmental controls relating to testing, including company Health and Safety Executive (HSE) policy 2.3 explain the test reporting documentation and procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 612 How to test the performance and condition of electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of testing electrical plant and equipment. The learner will be expected to refer to manufacturers' manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices **AS THEY APPLY TO THE LEARNER.**
Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The typical plant and equipment which are likely to be tested could include:

- Rotating equipment and tools
 - Protection methods
 - Electrical distribution systems
- The type of tools and equipment to be used:

- Electrical test equipment
- Hand tools
- Load banks

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results.

Aspects from which the product is likely to be tested could include:

- Operating conditions
- Output
- Safety limits
- Transmission
- Rotation
- Noise
- Resistance
- Continuity
- Speed
- Vibration
- Coating/insulation/protection

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment.

The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly. The testing methods and procedures used could be expected to include which tests relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 613

How to carry out planned maintenance on electrical plant and equipment

| | |
|--|--|
| UAN: | M/602/0693 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 30 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to 1.2 describe the maintenance methods and procedures which are standard during maintenance and how they can be modified to optimise the work 1.3 identify the maintenance records and documentation procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them |
| Assessment criteria |
| The learner can: 2.1 explain own responsibilities for the care and control of equipment used 2.2 explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.3 describe own responsibilities with regard to the reporting lines and procedures in the working environment 2.4 explain how to deal with problems within the limits of own responsibility. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify methods for the disposal of waste |
| Assessment criteria |
| The learner can: 3.1 identify appropriate methods and waste disposal procedures in relation to legislation, regulation and procedures for waste segregation. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others. 4.2 explain the relevant regulations and safe working practices and procedures required within own work area. |

Unit 613

How to carry out planned maintenance on electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of maintaining electrical equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The plant or equipment to be maintained could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures. Typical procedures could include:

- Electrical switching activities, including isolation, de-isolation and re-set that may include low, medium and high voltage
- Tightening of connections
- Checking outputs
- Replacement of regular changed “lived” components (lamps, bulbs, indicators)
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion/ movement
- Replacement of worn/damaged/corroded components
- Cleaning

The quality standards and accuracy to be achieved are as set down in the Quality Assurance (QA) and Quality Control (QC) specifications.

Unit 614

Carry out planned maintenance on electrical plant and equipment

| | |
|--|--|
| UAN: | H/602/0691 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out planned maintenance |
| Assessment criteria |
| The learner can: 1.1 follow the relevant maintenance schedules to carry out the required work 1.2 carry out maintenance activities within the limits of personal authority 1.3 carry out the maintenance activities in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to report defects and record activities accurately |
| Assessment criteria |
| The learner can: 2.1 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule 2.2 complete relevant maintenance records accurately and pass them on to the appropriate person. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to dispose of waste correctly |
| Assessment criteria |
| The learner can: 3.1 dispose of waste materials in accordance with safe working practices and approved procedures. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 614 Carry out planned maintenance on electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Carry Out Planned Maintenance on Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in maintaining electrical equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The plant or equipment to be maintained could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures. Typical procedures could include:

- Electrical switching activities, including isolation, de-isolation and re-set that may include low, medium and high voltage
- Tightening of connections
- Checking outputs
- Replacement of regular changed “lived” components (lamps, bulbs, indicators)
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion/movement
- Replacement of worn/damaged/corroded components
- Cleaning

The quality standards and accuracy to be achieved are as set down in the Quality Assurance (QA) and Quality Control (QC) specifications.

Unit 615

How to deal with variations and defects in electrical plant and equipment

| | |
|--|--|
| UAN: | Y/602/0977 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 22 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe the engineering drawings and related specifications to interpret, including technical drawings. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to identify and deal with variations and defects |
| Assessment criteria |
| The learner can: 2.1 explain the identification of defects in products and assets including observation and using senses; fault reports; maintenance logs; operations logs 2.2 identify methods of dealing with defects and variations as defined by company procedures 2.3 state what factors determine the actions to be taken following a defect/variation 2.4 describe why it is important to maintain records of the checks made and the assessments that result from those checks 2.5 indicate what information should be entered on those records and where they should be kept. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 identify the relevant regulations and the safe working practices and procedures required within own work area</p> <p>3.3 outline quality control, systems and documentation procedures that are specified by own company</p> <p>3.4 describe the reporting lines and procedures in own working environment.</p> |

Unit 615 How to deal with variations and defects in electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of identifying, assessing and dealing with variations and defects in electrical products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The assets or equipment to be maintained could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.

Unit 616

Deal with variations and defects in electrical plant and equipment

| | |
|--|--|
| UAN: | L/602/0975 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to identify variations and defects |
| Assessment criteria |
| The learner can: 1.1 identify defects with regard to the product or asset specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess variations and defects |
| Assessment criteria |
| The learner can: 2.1 assess the defects and determine action required to return the products and assets to specified condition. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to report and record variations and defects |
| Assessment criteria |
| The learner can: 3.1 report recommendations for action to the appropriate people promptly and in accordance with organisational procedures 3.2 record details of defects in accordance with quality assurance and control systems and procedures. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to deal with the variations or defects |
| Assessment criteria |
| The learner can: 4.1 repair or replace the defect 4.2 discard or store the defect. |

| |
|--|
| Learning outcome |
| The learner will: 5. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 5.1 work safely at all times, complying with health and safety and other relevant regulations. |

Unit 616 Deal with variations and defects in electrical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Deal with Variations and Defects in Electrical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in identifying, assessing and dealing with variations and defects in electrical products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The assets or equipment to be maintained could include:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.

Unit 619

Prepare equipment required for maintaining instrument and control systems

| | |
|--|--|
| UAN: | L/602/0829 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine and undertake equipment preparation |
| Assessment criteria |
| The learner can: 1.1 determine the equipment preparation requirements 1.2 determine the types of equipment which may be used 1.3 obtain the required equipment and ensure that it is in safe and useable condition 1.4 carry out the necessary preparations to equipment in line with work requirements 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines</p> <p>3.2 make sure that required safety arrangements are in place to protect other workers from activities likely to disrupt normal working.</p> |

Unit 619 Prepare equipment required for maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Prepare Equipment Required for Maintaining Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in preparing instrument and control equipment in order to carry out the maintenance of systems. The learner will be required to obtain and prepare the instrument and control equipment including making sure the safety arrangements are in place and report to the appropriate authority when completed. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

The types of equipment to be prepared could include:

- Protective clothing/equipment
- Lifting and handling equipment
- Access structures (typical adders, steps, trestles, Youngman boards, temporary staging, access hoists "cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harnesses
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, changing settings or the calibrating as well as routine checks on its condition, operation, suitability, in compliance with company procedures.

Typical preparation could include:

- Identification
- Addition of extra lifting points
- Storage
- Confirming alignment
- Development
- Cleaning protecting/preserving
- Security
- Precision measuring
- Weight confirming/assessment
- Checking quality and quantity
- Asset/product orientation
- Setting out

Unit 620

How to prepare equipment required for maintaining instrument and control systems

| | |
|--|--|
| UAN: | L/602/0832 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to determine equipment preparation |
| Assessment criteria |
| The learner can: 1.1 explain how to determine the equipment preparations 1.2 explain how to determine the types of equipment necessary 1.3 explain the types of decision within own responsibility. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to prepare equipment for maintaining systems |
| Assessment criteria |
| The learner can: 2.1 explain the equipment preparation methods and procedures 2.2 identify the types of equipment which may be used 2.3 describe own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to deal with problems and report completion of preparations |
| Assessment criteria |
| The learner can: 3.1 identify and deal with problems within own scope of responsibility 3.2 explain how to report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 620 How to prepare equipment required for maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of preparing instrument and control equipment in order to carry out the maintenance of systems. The learner will be required to obtain and prepare the instrument and control equipment including making sure the safety arrangements are in place and report to the appropriate authority when completed. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

The types of equipment to be prepared could include:

- Protective clothing/equipment
- Lifting and handling equipment
- Access structures (typicaladders, steps, trestles, Youngman boards, temporary staging, access hoists "cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harnesses
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, changing settings or the calibrating as well as routine checks on its condition, operation, suitability, in compliance with company procedures.

Typical preparation could include:

- Identification
- Addition of extra lifting points
- Storage
- Confirming alignment
- Development
- Cleaning protecting/preserving
- Security
- Precision measuring
- Weight confirming/assessment
- Checking quality and quantity
- Asset/product orientation
- Setting out

Unit 621

How to prepare materials required for maintaining instrument and control systems

| | |
|--|--|
| UAN: | D/602/0835 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 14 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to prepare materials required for maintaining systems |
| Assessment criteria |
| The learner can: 1.1 identify the materials to use and recognise defects in the quality of them 1.2 explain the types of handling and preparation methods and techniques needed for different materials 1.3 explain how to ensure the preparations have been carried out to the required standard 1.4 describe own responsibilities for ensuring the security of the tools and equipment and their control procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 explain own responsibilities in respect of health, safety and environment, including the limits of own personal responsibility, own legal responsibility for own health and safety and the health and safety of others 2.2 explain the relevant regulations and safe working practices and procedures required within own work area 2.3 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 621 How to prepare materials required for maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of preparing the materials in order to carry out the maintenance of instrument and control systems. The learner will be required to check the quality and quantity of the selected materials determine how the materials should be prepared and report on completion. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type of complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation.

The types of materials could include materials and/or components used in the engineering activity, including:

- Conductors
- Components
- Test equipment
- Spare parts

The responsibilities for ensuring the security of the tools and equipment and their control procedures could be expected to include:

- Ingress protection ratings
- Portable appliance testing
- Explosion protection rating equipment
- Heating and ventilation
- Corrosion
- Permit systems

Unit 622

Prepare materials required for maintaining instrument and control systems

| | |
|--|--|
| UAN: | R/602/0833 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to prepare materials required for maintaining systems and report completion |
| Assessment criteria |
| The learner can: 1.1 obtain the required materials and check them for quantity and quality 1.2 determine how the materials need to be prepared 1.3 carry out the preparations using suitable equipment 1.4 ensure preparation is carried out to the required standard 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 622 Prepare materials required for maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Prepare Materials Required for Maintaining Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in preparing the materials in order to carry out the maintenance of instrument and control systems. The learner will be required to check the quality and quantity of the selected materials determine how the materials should be prepared and report on completion. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type of complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation

The types of materials could include materials and/or components used in the engineering activity, including:

- Conductors
- Components
- Test equipment
- Spare parts

The responsibilities for ensuring the security of the tools and equipment and their control procedures could be expected to include:

- Ingress protection ratings
- Portable appliance testing
- Explosion protection rating equipment
- Heating and ventilation
- Corrosion
- Permit systems.

Unit 623

Adjust instrument and control systems to meet operational requirements

| | |
|--|--|
| UAN: | F/602/0990 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Identify the systems to be adjusted |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate operating specifications for the equipment being maintained. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to carry out the required adjustments |
| Assessment criteria |
| The learner can: 2.1 carry out adjustments within the limits of own personal authority 2.2 make the required adjustments in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to complete the adjustment process |
| Assessment criteria |
| The learner can: 3.1 confirm that the adjusted equipment meets the required operating specification 3.2 report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments 3.3 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 623

Adjust instrument and control systems to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Adjust Instrument and Control Systems to Meet Operational Requirements.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in adjusting instrument and control equipment in line with the manufacturer's and organisation's parameters. The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could include:

- Measurement systems
- Analysers, protection and detection devices
- Control systems

Maintenance methods and procedures should include how different types of adjustment should be made, how much time is allowed for different types of adjustment, which tools, materials and methods should be used for maintenance, and how to minimise disruption to other activities.

The type and complexity of adjustments to be made could include:

- Replenishment of consumables
- Safety checks
- Checking outputs
- Recording data
- Replacement of worn/damaged/corroded components
- Cleaning
- Tightening of connections
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion/ movement
- Replacement of regularly changed 'lived' components

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 624

Carry out the removal of components from instrument and control systems

| | |
|--|--|
| UAN: | R/602/0993 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to prepare for removal of components |
| Assessment criteria |
| The learner can: 1.1 establish, and where appropriate, mark component orientation for re-assembly 1.2 ensure that any stored energy or substances are released safely and correctly. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to remove components correctly |
| Assessment criteria |
| The learner can: 2.1 remove the required components using approved tools and techniques 2.2 take suitable precautions to prevent damage to components, tools and equipment during removal 2.3 check the condition of the removed components and record those that will require replacing 2.4 ensure the removal of components is carried out to the required standard. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to complete the removal process |
| Assessment criteria |
| The learner can: 3.1 label and store or discard the removed components in an appropriate location and in accordance with approved procedures 3.2 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 624 Carry out the removal of components from instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Removal of Components from Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in removing components from instrument and control equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases. Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of components to be removed may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives. Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components to be removed could be:

- Components of gauges
- Components of metering devices
- Components of motors
- Components of analysing devices
- Actuators
- Seatings
- Components of circuit/environmental protectors
- Safety limit protection devices
- Seals
- Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components. The engineering drawings and related specifications could include

:•Component

- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access inform

Unit 625

How to carry out the removal of components from instrument and control systems

| | |
|--|--|
| UAN: | Y/602/0994 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to remove components correctly |
| Assessment criteria |
| The learner can: 2.1 explain the types of component removal methods and techniques, i.e. isolation and connections that have to be made, and which tools, equipment and methods can be used to remove specific components from specific plant and equipment 2.2 explain how to ensure the removal of components is carried out to the required standard 2.3 explain how to identify component defects that have been removed 2.4 identify the tool and equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to store and dispose of components |
| Assessment criteria |
| The learner can: 3.1 explain how to label and store components for re-use and what the available marking systems are for specific components and connections 3.2 describe how to dispose of unwanted components and substances. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 625 How to carry out the removal of components from instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of removing components from instrument and control equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases. Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The type of components to be removed may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives.

Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components to be removed could be:

- Components of gauges
- Components of metering devices
- Components of motors•Components of analysing devices
- Actuators
- Seatings
- Components of circuit/environmental protectors
- Safety limit protection devices
- Seals
- Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The component may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components. The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The specifications to which a learner would be expected to work to could include:

- Product worksheets
- Technical drawings (components, assembly, general arrangement, isometrics)
- Method statements
- Maintenance schedules

The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access information on the environmental standards, including an appreciation of Control of Substances Hazardous to Health (COSHH), Safety and Emergency Pr

Unit 626

Carry out the replacement of components in instrument and control systems

| | |
|--|--|
| UAN: | D/602/0995 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out the preparations needed in order to replace components |
| Assessment criteria |
| The learner can: 1.1 obtain all the required components and ensure that they are in a suitable condition for replacement and fit for purpose 1.2 ensure that any replacement components used meet the required specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to replace and adjust components correctly |
| Assessment criteria |
| The learner can: 2.1 take adequate precautions to prevent damage to components, tools and equipment during replacement 2.2 replace the components in the correct sequence using appropriate tools and techniques 2.3 make any necessary settings or adjustments to the components to ensure they will function correctly 2.4 ensure the replacement of components is carried out to the required standard. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 3.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 4.2 maintain documentation in accordance with organisational requirements. |

Unit 626 Carry out the replacement of components in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Replacement of Components in Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in replacing components in instrument and control systems. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion

- Portable appliance testing
- Heating and ventilation
- Permit systems

The types of components to be removed may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives. Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components could be:

- Components of gauges
- Components of metering devices
- Components of motors
- Components of analysing devices
- Actuators
- Seatings
- Components of circuit/environmental protectors
- Safety limit protection devices
- Seals•Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components

There are particular problems associated with the assembly methods and techniques. This could relate to orientation, fragility and locating requirements. The methods and techniques used to take account of this could include

- Using thread fasteners
- Clamping
- Connecting male/female connectors
- Installing springs
- Soldering
- Sealing
- Terminating cables/impulse lines

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and or where replacement of one component necessitates replacements of other interacting components.

Unit 627

How to carry out the replacement of components in instrument and control systems

| | |
|--|--|
| UAN: | H/602/0996 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to carry out the replacement of components including the methods and equipment to use |
| Assessment criteria |
| The learner can: 2.1 explain the types of component replacement methods and techniques, including the types of reconnection that have to be made, and which tools, equipment and methods can be used to replace specific components from specific products/assets 2.2 explain how to ensure the replacement of components is carried out to the required standard 2.3 explain the handling methods and techniques including manual handling pressure and thermal methods and techniques 2.4 identify own responsibilities for ensuring the care and security of tools and equipment that are used. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 627 How to carry out the replacement of components in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of replacing components in instrument and control systems. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
 - General arrangements
 - Isometrics
 - 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The equipment to be worked on includes:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion

- Portable appliance testing
- Heating and ventilation
- Permit systems

The types of components to be removed may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives.

Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components could be:

- Components of gauges
- Components of metering devices
- Components of motors
- Components of analysing devices
- Actuators
- Seatings
- Components of circuit/environmental protectors
- Safety limit protection devices
- Seals
- Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components

There are particular problems associated with the assembly methods and techniques. This could relate to orientation, fragility and locating requirements. The methods and techniques used to take account of this could include:

- Using thread fasteners
- Clamping
- Connecting male/female connectors
- Installing springs
- Soldering
- Sealing
- Terminating cables/impulse lines

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where replacement of one component necessitates replacements of other interacting components.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 628

Determine the feasibility of repair of components from instrument and control systems

| | |
|--|--|
| UAN: | K/602/0997 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine the feasibility of repair of components |
| Assessment criteria |
| The learner can: 1.1 follow the relevant repair specifications 1.2 assess the amount and level of wear or damage to the component and determine what work is required to bring the component back to the specified condition 1.3 report on findings and conclusions on the feasibility and cost-effectiveness of repairs. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 628 Determine the feasibility of repair of components from instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Determine the Feasibility of Repair of Components from Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components could be:

- Components of gauges
- Components of metering devices
- Components of motors
- Components of analysing devices
- Actuators
- Seatings
- Components of circuit / environmental protectors
- Safety limit protection devices
- Seals
- Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components

Assessing the conditions of components for re-use could be expected to include electrical integrity.

Determining the feasibility and viability of repairs could be expected to include instrument and control integrity.

Component replacement methods and techniques could be expected to include manufacturers' data and sources of information.

The type of repair to be made may require one or more techniques to be applied depending upon its complexity.

The techniques are standard within the sector but may require some modification to achieve the required result. The techniques may relate to one or more technologies depending upon the complexity of the repair:

- Re-aligning
- Bonding
- Re-soldering
- Re-sealing
- Re-shaping by material removal

Complex repairs are those which can only be achieved using tools and techniques which have been specially modified in some way to achieve the repair and/or where pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 629

How to determine the feasibility of repair of components from instrument and control systems

| | |
|--|--|
| UAN: | M/602/0998 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 28 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to determine the feasibility of repair |
| Assessment criteria |
| The learner can: 2.1 explain how to assess the condition of components for re-use 2.2 explain how to determine the feasibility and viability of repairs 2.3 describe component replacement methods and techniques. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 629

How to determine the feasibility of repair of components from instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives.

Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Metering devices
- Control panels
- Mechanical panels
- Mechanical linkages
- Components of back-up systems
- Motors
- Control valves/governors
- Components of process control systems

Typical fragile components could be:

- Components of gauges
- Components of metering devices
- Components of motors
- Components of analysing devices
- Actuators
- Seatings
- Components of circuit/environmental protectors
- Safety limit protection devices
- Seals
- Components of control panels
- Springs
- Diaphragms
- Components of impulse systems
- Electronic components .

Assessing the conditions of components for re-use could be expected to include electrical integrity.

Determining the feasibility and viability of repairs could be expected to include instrument and control integrity.

Component replacement methods and techniques could be expected to include manufacturers' data and sources of information.

The types of repair to be made may require one or more techniques to be applied depending upon its complexity. The techniques are standard within the sector but may require some modification to achieve the required result.

The techniques may relate to one or more technologies depending upon the complexity of the repair:

- Re-aligning
- Bonding
- Re-soldering
- Re-sealing
- Re-shaping by material removal

Complex repairs are those which can only be achieved using tools and techniques which have been specially modified in some way to achieve the repair and/or where pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 630

Identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems

| | |
|--|--|
| UAN: | M/602/0841 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 8 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 collect information and feedback on current working practices and procedures 1.2 assess current working practices and procedures against agreed standards. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 identify opportunities for improving working practices and procedures 2.2 make suggestions for improvements that are realistic and which indicate the benefits that might be achieved 2.3 ensure that suggested improvements meet organisational requirements 2.4 present suggestions for improvements in accordance with organisational procedures 2.5 contribute to discussions about work practices and quality. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 630 Identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Identify and Suggest Improvements to Working Practices and Procedures whilst Maintaining Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The engineering activities will be within the learner's own area of expertise.

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

Sources of information available could include:

- Company records
- Company procedures
- Clients. •Personal experience
- Tool box talks

The presentation techniques will be in line with company procedures.

Unit 631

Establish that an instrument and control system maintenance process has been completed to specification

| | |
|--|--|
| UAN: | A/602/0843 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out equipment checks |
| Assessment criteria |
| The learner can: 1.1 follow and make appropriate use of the specifications for the product or asset being checked 1.2 use all the correct tools and inspection equipment and check that they are in a useable condition 1.3 carry out the checks in an appropriate sequence using approved methods and procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess defects and report completion |
| Assessment criteria |
| The learner can: 2.1 identify and assess any defects or variations from the specification and take appropriate action 2.2 report completion of compliance activities in line with organisational procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 631 Establish that an instrument and control system maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Establish that an Instrument and Control System Maintenance Process has been Completed to Specification.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in ensuring that the work has been completed to company and/or manufacturer's standard.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products/assets to be checked are instrument and control systems related to engineering maintenance work. This would include:

- Engines
- Transmission systems
- Power transmission systems
- Turbines
- Mechanical/hydraulic systems/actuators
- Fluid/gas transmission systems

Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturer's data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them.

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The inspection, test and record-keeping procedures to be followed are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards.

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and Installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications.

Unit 632

How to establish that an instrument and control system maintenance process has been completed to specification

| | |
|--|--|
| UAN: | F/602/0844 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to carry out equipment checks |
| Assessment criteria |
| The learner can: 2.1 explain how to make an adequate check of compliance against criteria 2.2 describe the inspection of equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 explain how to identify defects in plant and equipment. 3.2 identify how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to identify documentation procedures and maintain records accurately |
| Assessment criteria |
| The learner can: 4.1 identify quality control systems and documentation procedures 4.2 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.3 describe what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 632 How to establish that an instrument and control system maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of ensuring that the work has been completed to company and/or manufacturer's standard.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products/assets to be checked are Instrument and control systems related to engineering maintenance work. This would include:

- Engines
- Transmission systems
- Power transmission systems
- Turbines
- Mechanical/hydraulic systems/actuators
- Fluid/gas transmission systems.

Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturer's data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them. Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The inspection, test and record-keeping procedures to be followed are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedures, the Electricity at Work regulations and BS 7671. The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and Installation
- Repair of Components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications.

Unit 633

Test the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | J/602/0845 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to test the performance and condition of instrument and control systems |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate procedures for use of tools and equipment to carry out the required tests 1.2 set up and carry out the tests using the correct procedures and within agreed timescales 1.3 record the results of the tests in the appropriate format 1.4 review the results and carry out further tests if necessary. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 633

Test the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Test the Performance and Condition of Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner competence in testing instrument and control systems. The learner will be expected to refer to manufacturer's manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The typical systems which are likely to be tested could include:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The types of tools and test equipment to be used include:

- Electrical test equipment
- Hand tools – fixed/portable
- Machine tools – fixed/portable

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment.

The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly.

The testing methods and procedures used could be expected to include which test relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results. The testing and analytical techniques/procedures to be followed are clearly defined and, although they may involve more than one stage, full details on when and how to proceed through the stages are available.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 634

Monitor the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | Y/602/0848 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to set up and calibrate the equipment for monitoring |
| Assessment criteria |
| The learner can: 1.1 correctly set up and check/calibrate the equipment required for the monitoring being carried out. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to carry out the monitoring activities and review the outcomes |
| Assessment criteria |
| The learner can: 2.1 carry out the monitoring activities effectively 2.2 minimise disruption to normal activities 2.3 record and review the outcomes and take appropriate actions 2.4 ensure that performance monitoring is carried out to the required standard 2.5 optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 634 Monitor the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Monitor the Performance and Condition of Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in completing performance and condition monitoring on operational and static instrument and control systems. The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The types of assets to be monitored involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The performance requirements of plant and equipment could be expected to include manufacturer's and company specifications on performance requirements.

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying.

Typical monitoring methods could include:

- Analysing trends
- Investigating abnormal characteristics
- Researching historical data
- Analysing/reviewing outputs
- Comparison against norms

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets.

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration monitoring
- Current readings
- Run down and up time

Unit 635

How to monitor the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | H/602/0853 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

Learning outcome

The learner will:

1. Know how to set up and calibrate the equipment for monitoring

Assessment criteria

The learner can:

- 1.1 explain the performance requirements of plant and equipment
- 1.2 describe the monitoring methods and procedures for plant and equipment
- 1.3 identify which data is required to make decisions
- 1.4 explain the importance of the need for equipment calibration and authorisation procedures including ensuring that the monitoring equipment is set up and calibrated correctly.

Learning outcome

The learner will:

2. Know how to carry out the monitoring activities and record the outcomes

Assessment criteria

The learner can:

- 2.1 explain monitoring equipment settings, operating and care and control procedures
- 2.2 describe the formats for recording and monitoring results in line with company procedures
- 2.3 describe how to ensure that performance monitoring is carried out to the required standard
- 2.4 explain how to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying.

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and minimise disruption during monitoring |
| Assessment criteria |
| The learner can: 3.1 identify the types of disruption which can occur during monitoring and how to minimise different types of disruption. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 635

How to monitor the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of completing performance and condition monitoring on operational and static instrument and control systems. The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The types of assets to be monitored involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The performance requirements of plant and equipment could be expected to include manufacturers and company specifications on performance requirements.

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying.

Typical monitoring methods could include:

- Analysing trends
- Investigating abnormal characteristics
- Researching historical data
- Analysing/reviewing outputs
- Comparison against norms

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets.

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration monitoring
- Current readings
- Run down and up time

Unit 636

Assess the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | M/602/0855 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to set up and carry out the assessment |
| Assessment criteria |
| The learner can: 1.1 ensure the necessary test data on which to conduct the assessment is obtained 1.2 carry out the assessment using all relevant data and valid methods 1.3 check that the assessment provides clear and accurate information. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 compare current performance and condition data with that from previous assessments 2.2 identify and report the implications arising from the assessments 2.3 record the results of the assessments in the appropriate format. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times.</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 636

Assess the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Assess the Performance and Condition of Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in assessing the performance and condition of instrument and control systems using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The types of assets to be assessed involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturer's specification
- Historical
- Maintenance records
- Trend analysis.

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures.

The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures.

Unit 637

How to assess the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | A/602/0857 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to explain and identify test specifications and monitoring methods |
| Assessment criteria |
| The learner can: 1.1 explain equipment operating and test specifications including manufacturer's and company specifications 1.2 identify equipment monitoring methods and procedures including the types of data provided from monitoring, which methods can verify data and why it is important to do so. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 describe the assessment methods and techniques for specific data and systems 2.2 identify the factors which have to be taken into account when assessing performance of specific systems 2.3 explain the reporting documentation and control procedures including how to present results of the assessment, and who should receive the results and implications of assessments. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 637

How to assess the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of assessing the performance and condition of instrument and control systems using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The types of assets to be assessed involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner.

Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturer's specification
- Historical
- Maintenance records
- Trend analysis

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures.

The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures.

Unit 638

Inspect instrument and control systems

| | |
|--|--|
| UAN: | J/602/0859 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to inspect instrument and control systems |
| Assessment criteria |
| The learner can: 1.1 follow the correct specification for the product/equipment being inspected 1.2 use the correct equipment to carry out the inspection 1.3 identify and confirm the inspection checks to be made and acceptance criteria to be used 1.4 carry out all required inspections as specified. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 2.1 record the results of the inspection in the appropriate format. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to identify defects and deal with problems promptly |
| Assessment criteria |
| The learner can: 3.1 identify any defects or variations from the specification 3.2 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 638 Inspect instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Inspect Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in completing checks on instrument and control systems. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products to be inspected involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The aspects, characteristics and complexity of checks are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications and company procedures.

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection methods and techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 639

How to inspect instrument and control systems

| | |
|--|--|
| UAN: | A/602/0860 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to inspect instrument and control systems |
| Assessment criteria |
| The learner can: 2.1 explain the inspection methods and techniques that are approved by the company 2.2 describe the calibration of equipment care and control procedures that are approved by the company 2.3 identify inspection equipment care and control procedures that are approved by the company. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 identify defects in products, equipment and systems 3.2 explain the quality control systems and documentation procedures 3.3 describe how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 4.1 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.2 identify what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 639 How to inspect instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of completing checks on instrument and control systems. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature.

To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decision

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of products to be inspected involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical systems could be:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The aspects, characteristics and complexity of checks are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications and company procedures.

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection methods and techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 640

How to test the performance and condition of instrument and control systems

| | |
|--|--|
| UAN: | L/602/0846 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know the different types of test methods and equipment |
| Assessment criteria |
| The learner can: 1.1 explain the engineering test specifications 1.2 identify different types of test equipment and their applications 1.3 describe the calibration of equipment and authorisation procedures 1.4 explain appropriate testing methods and procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to test equipment correctly |
| Assessment criteria |
| The learner can: 2.1 describe the analysis methods and techniques 2.2 identify the environmental controls relating to testing, including company Health and Safety Executive (HSE) policy 2.3 explain the test reporting documentation and procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 640 How to test the performance and condition of instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of testing instrument and control systems. The learner will be expected to refer to manufacturer's manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices **AS THEY APPLY TO THE LEARNER.**
Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The typical systems which are likely to be tested could include:

- Measurement systems
- Control systems
- Analysers, protection and detection devices

The types of tools and test equipment to be used include:

- Electrical test equipment
- Hand tools – fixed/portable
- Machine tools – fixed/portable

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment. The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly.

The testing methods and procedures used could be expected to include which tests relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results. The testing and analytical techniques/procedures to be followed are clearly defined and, although they may involve more than stage, full details on when and how to proceed through the stages are available.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 641

How to carry out planned maintenance on instrument and control systems

| | |
|--|--|
| UAN: | H/602/0822 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 30 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 identify the relevant maintenance schedules and related specifications 1.2 describe which maintenance methods and procedures are standard during maintenance and how they can be modified to optimise work 1.3 identify the maintenance records and documentation procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them |
| Assessment criteria |
| The learner can: 2.1 explain own responsibilities for the care and control of equipment used 2.2 explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.3 describe own responsibilities with regard to the reporting lines and procedures in the working environment 2.4 explain how to deal with problems within the limits of own responsibility. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify methods for the disposal of waste |
| Assessment criteria |
| The learner can: 3.1 identify appropriate methods and waste disposal procedures in relation to legislation, regulation and procedures for waste segregation. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area. |

Unit 641 How to carry out planned maintenance on instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of maintaining instrument and control equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system

The plant or equipment to be maintained could include:

- Measurement systems
- Analysers, protection and detection devices
- Control systems

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures.

Typical procedures could include:

- Isolation
- De-isolation
- Testing of equipment
- Tightening of connections
- Checking outputs
- Replacement of regularly changed “lived” components (lamps, bulbs, indicators etc)
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion movement
- Replacement of worn/damaged/corroded components
- Cleaning

The quality standards and accuracy to be achieved are as set down in the Quality Assurance (QA) and Quality Control (QC) specifications.

Unit 642

Carry out planned maintenance on instrument and control systems

| | |
|--|--|
| UAN: | Y/602/0820 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out planned maintenance |
| Assessment criteria |
| The learner can: 1.1 follow the relevant maintenance schedules to carry out the required work 1.2 carry out maintenance activities within the limits of own personal authority 1.3 carry out the maintenance activities in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to report defects and record activities accurately |
| Assessment criteria |
| The learner can: 2.1 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule 2.2 complete relevant maintenance records accurately and pass them on to the appropriate person. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to dispose of waste correctly |
| Assessment criteria |
| The learner can: 3.1 dispose of waste materials in accordance with safe working practices and approved procedures. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 642 Carry out planned maintenance on instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of maintaining instrument and control equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system

The plant or equipment to be maintained could include:

- Measurement systems
- Analysers, protection and detection devices
- Control systems

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures.

Typical procedures could include:

- Isolation
- De-isolation
- Testing of equipment
 - Tightening of connections
- Checking outputs
- Replacement of regularly changed “lived” components (lamps, bulbs, indicators etc.)
- Checking and adjusting movements/components
- Inspection for damage/wear/corrosion movement
- Replacement of worn/damaged/corroded components
- Cleaning

The quality standards and accuracy to be achieved are as set down in the Quality Assurance (QA) and Quality Control (QC) specifications.

Unit 643

How to deal with variations and defects in instrument and control systems

| | |
|--|--|
| UAN: | J/602/0988 |
| Level: | Level 3 |
| Credit value: | 3 |
| GLH: | 22 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe the engineering drawings and related specifications to interpret, including technical drawings. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to identify and deal with variations and defects |
| Assessment criteria |
| The learner can: 2.1 explain the identification of defects in products and assets including observation and using senses; fault reports; maintenance logs; operations logs 2.2 identify methods of dealing with defects and variations as defined by the company procedures 2.3 state what factors determine the actions to be taken following a defect/variation 2.4 describe why it is important to maintain records of the checks made and the assessments that result from those checks 2.5 indicate what information should be entered on those records and where they should be kept. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 identify the relevant regulations and the safe working practices and procedures required within own work area</p> <p>3.3 outline quality control, systems and documentation procedures that are specified by the company</p> <p>3.4 describe the reporting lines and procedures in own working environment.</p> |

Unit 643 How to deal with variations and defects in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of identifying, assessing and dealing with variations and defects in instrument and control products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The assets or equipment to be maintained could include:

- Measurement systems
- Analysers, protection and detection systems
- Control systems

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.

Unit 644

Deal with variations and defects in instrument and control systems

| | |
|--|---|
| UAN: | F/602/0987 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to identify variations and defects |
| Assessment criteria |
| The learner can: 1.1 identify defects with regard to the product or asset specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess variations and defects |
| Assessment criteria |
| The learner can: 2.1 assess the defects and determine action required to return the products and assets to specified condition. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to report and record variations and defects |
| Assessment criteria |
| The learner can: 3.1 report recommendations for action to the appropriate people promptly and in accordance with organisational procedures 3.2 record details of defects in accordance with quality assurance and control systems and procedures. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to deal with the variations or defects |
| Assessment criteria |
| The learner can: 4.1 repair or replace the defect 4.2 discard or store the defect. |

| |
|--|
| Learning outcome |
| The learner will: 5. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 5.1 work safely at all times, complying with health and safety and other relevant regulations. |

Unit 644 Deal with variations and defects in instrument and control systems

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Deal with Variations and Defects in Instrument and Control Systems.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in identifying, assessing and dealing with variations and defects in instrument and control products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The assets or equipment to be maintained could include:

- Measurement systems
- Analysers, protection and detection systems
- Control systems

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.

Unit 647

How to prepare materials for the maintenance of mechanical plant and equipment

| | |
|--|--|
| UAN: | F/602/1007 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 14 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to prepare materials for maintenance |
| Assessment criteria |
| The learner can: 1.1 identify the materials to use and recognise defects in the quality of them 1.2 explain the types of handling and preparation methods and techniques needed for different materials 1.3 explain how to ensure the appropriate preparations have been carried out to the required standard 1.4 describe own responsibilities for ensuring the security of the tools and equipment and their control procedures that are used. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 2.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 2.2 explain the relevant regulations and safe working practices and procedures required within own work area 2.3 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 647 How to prepare materials for the maintenance of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of preparing the materials in order to carry out the maintenance of plant and equipment. The learner will be required to check the quality and quantity of the materials, determine how the materials should be prepared and report on completion. The learner will be following the organisation's safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The type and complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation .

The types of materials could include materials and/or components used in the engineering activity, including:

- Spare parts
- Proprietary items (repair by replacement)

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 648

Prepare materials for the maintenance of mechanical plant and equipment

| | |
|--|--|
| UAN: | A/602/1006 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to prepare materials accurately and report completion |
| Assessment criteria |
| The learner can: 1.1 obtain all the required materials and check them for quantity and quality 1.2 determine how the materials need to be prepared 1.3 carry out the preparations using suitable equipment 1.4 ensure preparation is carried out to the required standard 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 648 Prepare materials for the maintenance of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Prepare Materials for the Maintenance of Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in preparing the materials in order to carry out the maintenance of plant and equipment. The learner will be required to check the quality and quantity of the materials determine how the materials should be prepared and report on completion. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the preparations are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work.

The type and complexity of material preparations involve standard treatments and/or require taking instrument readings for analysis. Typical preparation could include:

- Identification
- Storage
- Confirming alignment
- Setting out
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Checking quality and quantity
- Asset/product orientation.

The types of materials could include materials and/or components used in the engineering activity, including:

- Spare parts
- Proprietary items (repair by replacement)

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion.
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 649

Adjust mechanical plant and equipment to meet operational requirements

| | |
|--|--|
| UAN: | M/602/0869 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Identify the equipment to be adjusted |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate operating specifications for the equipment being maintained. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to carry out the required adjustments |
| Assessment criteria |
| The learner can: 2.1 carry out adjustments within the limits of own personal authority 2.2 make the required adjustments in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to complete the adjustment process |
| Assessment criteria |
| The learner can: 3.1 confirm that the adjusted equipment meets the required operating specification 3.2 report any instances where the equipment fails to meet the required performance after adjustments or where there are identified defects outside the required adjustments 3.3 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 649 Adjust mechanical plant and equipment to meet operational requirements

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Adjust Mechanical Plant and Equipment to Meet Operational Requirements.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence. This unit is about the learner's competence in adjusting mechanical equipment in line with the manufacturer's and organisation's parameters.

The learner will be required to identify the equipment to be adjusted, carry out the adjustment and complete the appropriate documentation. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope.

The level and extent of responsibility extends to the interpretation of a specification, selecting and verifying methods, procedures and materials at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The type of equipment to be worked on could involve more than one technology and/or involve a significant number of fragile/valued components and is difficult to access for maintenance.

Typical assets could include:

- Prime movers
- Distribution systems
- Transmission system and components

And may include:

- Work within confined spaces
- Working in hazardous areas
- Working at height/over water.

The type and complexity of adjustments to be made could include:

- Pressure control
- Temperature control
- Speed control
- Humidity control
- Flow control

Examples of complexity include:

- Direct adjustment to system component
- Adjustment via control loop
- Adjustment via external control system

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 650

How to carry out the removal of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | J/602/1011 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to remove components correctly |
| Assessment criteria |
| The learner can: 2.1 explain the types of component removal methods and techniques including isolations and connections that have to be made, and which tools, equipment and methods can be used to remove specific components from specific plant and equipment 2.2 explain how to ensure the removal of components is carried out to the required standard 2.3 explain how to identify component defects that have been removed 2.4 identify the tool and equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to store and dispose of components |
| Assessment criteria |
| The learner can: 3.1 explain how to label and store components for re-use and what the available marking systems are for specific components and connections 3.2 describe how to dispose of unwanted components and substances. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 650 How to carry out the removal of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of removing components from mechanical equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases.

Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The equipment to be worked on may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives. Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical equipment could be:

- Heat exchangers
- Pumps
- Engines
- Components of process systems

The type of components to be removed could include:

- Components of mechanical/hydraulic/pneumatic systems
- Mechanical metering devices
- Components of engines
- Safety limit protection devices
- Actuators
- Components of pumps.

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The components may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components. The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access information on the environmental standards, including an appreciation of Control of Substances Hazardous to Health (COSHH), Safety and Emergency Preparedness Analysis (SEPA) and company procedures. The specifications to which a learner would be expected to work to could include:

- Percussion
- Pressure/hydraulic
- Mechanical strip
- Thermal techniques
- Manual handling
- Lifting Operations and Lifting Equipment Regulations (LOLER)

Complex removal/replacement refers to situations where components can only be removed or replaced by dismantling the surrounding areas e.g. by cutting and/or where removal/replacement of one component necessitates removal/replacement of the other interacting components

Unit 651

Carry out the removal of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | F/602/1010 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to carry out the preparations for the removal of components |
| Assessment criteria |
| The learner can: 1.1 establish, and where appropriate, mark component orientation for re-assembly 1.2 ensure that any stored energy or substances are released safely and correctly. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to remove components |
| Assessment criteria |
| The learner can: 2.1 remove the required components using approved tools and techniques 2.2 take suitable precautions to prevent damage to components, tools and equipment during removal 2.3 check the condition of the removed components and record those that will require replacing 2.4 ensure the removal of components is carried out to the required standard. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to complete the removal process |
| Assessment criteria |
| The learner can: 3.1 label and store the removed components in an appropriate location 3.2 store or discard the removed components in accordance with approved procedures 3.3 maintain documentation in accordance with organisational requirements. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 651 Carry out the removal of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Removal of Components from Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in removing components from mechanical equipment using manufacturer's procedures. The learner will be required to ensure suitable precautions are taken to prevent the escape of liquids or gases. Following removal, the components should be labelled and stored according to organisational procedures. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The engineering drawings and related specifications to which the learner will be expected to work could include:

- Technical drawings (component, assembly, general arrangements, isometric, 1st and 3rd angle projections)
- Method statements and product worksheets
- Tolerances

The equipment to be worked on may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives.

Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical equipment could be:

- Heat exchangers
- Pumps
- Engines
- Components of process systems

The type of components to be removed could include:

- Components of mechanical/hydraulic/pneumatic systems
- Mechanical metering devices
- Components of engines
- Safety limit protection devices
- Actuators
- Components of pumps.

The removal techniques or procedures to be followed should involve components to be removed that may require a sequential series of steps to complete the removal. The components may be difficult to access and may be surrounded by other fragile/valued components and may need specialised tooling requirements. Removal may involve more than one technology and/or involve a significant number of fragile components. The disposal of unwanted components and substances should include what substances could be released during removal of components, which risks are associated with the release of substances and where to access information on the environmental standards, including an appreciation of Control of Substances Hazardous to Health (COSHH), Safety and Emergency Preparedness Analysis (SEPA) and company procedures.

The specifications to which a learner would be expected to work to could include:

- Percussion
- Pressure/hydraulic
- Mechanical strip
- Thermal techniques
- Manual handling
- Lifting Operations and Lifting Equipment Re

Unit 652

How to carry out the replacement of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | M/602/0872 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 identify maintenance schedules and related specifications to work to. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to carry out the replacement of components including the methods and equipment to use |
| Assessment criteria |
| The learner can: 2.1 explain the types of component replacement methods and techniques, including the types of reconnection that have to be made, and which tools, equipment and methods can be used to replace specific components from specific products/assets 2.2 explain how to ensure the replacement of components is carried out to the required standard 2.3 explain the handling methods and techniques including manual handling pressure and thermal methods and techniques 2.4 identify own responsibilities for ensuring the care and security of tools and equipment that are used. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 652 How to carry out the replacement of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of replacing components in mechanical plant and equipment. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The equipment to be worked on are those that are resistant to most forms of danger or disruption during their working lives. Fragile components could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical equipment could be:

- Heat exchangers
- Pumps
- Engines
- Components of process systems

The type of components to be replaced could be:

- Components of mechanical/hydraulic/pneumatic systems
- Mechanical metering devices
- Gaskets
- Components of engines
- Safety limit protection devices
- Actuators/valves
- Components of pumps
- Bearings

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The assembly methods and techniques could involve:

- Hydraulic
- Thermal
- Lifting Operations and Lifting Equipment Regulations (LOLER) and manual handling

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where replacement of one component necessitates replacement of other interacting components.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 653

Carry out the replacement of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | K/602/0871 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out the preparations needed in order to replace components |
| Assessment criteria |
| The learner can: 1.1 obtain all the required components and ensure that they are in a suitable condition for replacement and fit for purpose 1.2 ensure that any replacement components used meet the required specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to replace and adjust components correctly |
| Assessment criteria |
| The learner can: 2.1 take adequate precautions to prevent damage to components, tools and equipment during replacement 2.2 replace the components in the correct sequence using appropriate tools and techniques 2.3 make any necessary settings or adjustments to the components to ensure they will function correctly 2.4 ensure the replacement of components is carried out to the required standard. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 3.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines 4.2 maintain documentation in accordance with organisational requirements. |

Unit 653

Carry out the replacement of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Carry Out the Replacement of Components from Mechanical Plant and Equipment.' The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in replacing components in mechanical plant and equipment. The learner will be required to ensure the replaced components meet the required specifications, protect them from damage, replace using the appropriate tools and techniques and make any final adjustments. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The equipment to be worked on are those that are resistant to most forms of danger or disruption during their working lives. Fragile components could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical equipment could be:

- Heat exchangers
- Pumps
- Engines
- Components of process systems

The type of components to be replaced could be:

- Components of mechanical/hydraulic/pneumatic systems
- Mechanical metering devices
- Gaskets
- Components of engines
- Safety limit protection devices
- Actuators/valves
- Components of pumps
- Bearings

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The assembly methods and techniques could involve:

- Hydraulic
- Thermal
- Lifting Operations and Lifting Equipment Regulations (LOLER) and manual handling

Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de-soldering and/or where replacement of one component necessitates replacement of other interacting components.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 654

Determine the feasibility of repair of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | R/602/1013 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine the feasibility of repair of components |
| Assessment criteria |
| The learner can: 1.1 follow the relevant repair specifications 1.2 assess the amount and level of wear or damage to the component and determine what work is required to bring the component back to the specified condition 1.3 report on findings and conclusions on the feasibility and cost-effectiveness of repairs. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 654 Determine the feasibility of repair of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Determine the Feasibility of Repair of Components from Mechanical Plant and Equipment.' The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most form of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of electrical back-up systems
- Heat exchangers
- Components of process control systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Safety/protection devices
- Components of electrical panels

Assessing conditions of components for re-use and determining the feasibility and viability of repairs could be expected to include mechanical integrity. Component replacement methods and techniques could be expected to include manufacturer's data and sources of information.

The type of repair to be made requires one or more techniques to be applied depending upon its complexity. The techniques are standard within the sector but may require some modification to achieve the required result. The techniques may relate to one or more technologies depending upon the complexity of the repair.

Typical repair techniques could include:

- Re-aligning
- Re-shaping by material removal
- Re-soldering
- Bonding
- Replacing.

Complex repairs are those which can only be achieved using tools and techniques which have been specially modified in some way to achieve the repair and/or where no pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

The engineering specifications to which the learner will be expected to work could include:

- Product worksheets
- Method statements
- Manufacturer's data sheets
- Maintenance schedules
- Technical drawings (component, assembly, general arrangements, isometric)

Unit 655

Prepare equipment in support of mechanical engineering activities

| | |
|--|--|
| UAN: | M/602/1035 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Be able to determine and undertake equipment preparation |
| Assessment criteria |
| The learner can: 1.1 determine the equipment preparation requirements 1.2 determine the types of equipment which may be used 1.3 obtain all the required equipment and ensure that it is in a safe and useable condition 1.4 carry out the necessary preparations to equipment in line with work requirements 1.5 report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to deal with problems effectively |
| Assessment criteria |
| The learner can: 2.1 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines</p> <p>3.2 make sure that required safety arrangements are in place to protect other workers from activities likely to disrupt normal working.</p> |

Unit 655 Prepare equipment in support of mechanical engineering activities

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Prepare Equipment in Support of Mechanical Engineering Activities.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in preparing mechanical equipment in order to carry out the maintenance of plant and equipment. The learner will be required to obtain and prepare the mechanical equipment including making sure the safety arrangements are in place and report to the appropriate authority when completed. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

Equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

The types of equipment to be prepared could include fixed (machine) and/or portable (hand or machine):

- Protective clothing/equipment
- Lifting and handling equipment
- Access structures (typically ladders, steps, trestles, Youngman boards, temporary staging, access hoists "Cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harness
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, safety checks, changing settings or calibrating as well as routine checks on its condition, operation, suitability and safety, in compliance with company procedures. Typical preparations could include:

- Identification
- Addition of extra lifting points
- Storage
- Confirming alignment
- Development
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Weight confirming/assessment
- Checking quality/quantity
- Asset/product orientation
- Setting out

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 656

How to prepare equipment in support of mechanical engineering activities

| | |
|--|--|
| UAN: | T/602/1036 |
| Level: | 3 |
| Credit value: | 2 |
| GLH: | 18 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to determine equipment preparation |
| Assessment criteria |
| The learner can: 1.1 explain how to determine the equipment preparations 1.2 explain how to determine the types of equipment necessary 1.3 explain the types of decision within own responsibility. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to prepare equipment accurately |
| Assessment criteria |
| The learner can: 2.1 explain the equipment preparation methods and procedures 2.2 identify the types of equipment which may be used 2.3 describe own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to deal with problems and report completion of preparations |
| Assessment criteria |
| The learner can: 3.1 identify and deal with problems within own scope of responsibility 3.2 explain how to report completion of preparations in line with organisational procedures. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 explain own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 656 How to prepare equipment in support of mechanical engineering activities

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of preparing mechanical equipment in order to carry out the maintenance of plant and equipment. The learner will be required to obtain and prepare the mechanical equipment including making sure the safety arrangements are in place and report to the appropriate authority when completed. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

Equipment safety checks and inspections will be carried out to ensure that there are no obvious faults present, in accordance with company procedures.

The types of equipment to be prepared could include fixed (machine) and/or portable (hand or machine):

- Protective clothing/equipment
- Lifting and handling equipment
- Access structures (typically ladders, steps, trestles, Youngman boards, temporary staging, access hoists "cherry-pickers")
- Process equipment
- Tools
- Safety equipment/harness
- Temporary electrical supplies

Types of equipment preparation could involve selection, inspection, safety checks, changing settings or calibrating as well as routine checks on its condition, operation, suitability and safety, in compliance with company procedures. Typical preparations could include:

- Identification
- Addition of extra lifting points
- Storage
- Confirming alignment
- Development
- Cleaning
- Protecting/preserving
- Security
- Precision measuring
- Weight confirming/assessment
- Checking quality/quantity
- Asset/product orientation
- Setting out

Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

Unit 657

How to determine the feasibility of repair of components from mechanical plant and equipment

| | |
|--|--|
| UAN: | Y/602/1014 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 28 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to determine the feasibility of repair |
| Assessment criteria |
| The learner can: 2.1 explain how to assess the condition of components for re-use 2.2 explain how to determine the feasibility and viability of repairs 2.3 describe component replacement methods and techniques. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 657 How to determine the feasibility of repair of components from mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of establishing deviation from the required tolerances and what action to take to bring the component back into service. The learner will be following the organisations safe working practices and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the equipment and work site is safe for others or self to work in by following company defined procedures. The learner will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics•1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type of components to be repaired may be robust or fragile. Robust components are those which are resistant to most forms of damage or disruption during their working lives. Fragile components are those which are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).

Typical robust components could be:

- Components of power/lighting transmission
- Motors/components of motors
- Components of electrical back-up systems
- Heat exchangers
- Components of process control systems

Typical fragile components could be:

- Components of electrical circuit protectors
- Electrical metering devices
- Circuit boards
- Safety/protection devices
- Components of electrical panels

Assessing conditions of components for re-use and determining the feasibility and viability of repairs could be expected to include mechanical integrity.

Component replacement methods and techniques could be expected to include manufacturer's data and sources of information.

The type of repair to be made requires one or more techniques to be applied depending upon its complexity. The techniques are standard within the sector but may require some modification to achieve the required result. The techniques may relate to one or more technologies depending upon the complexity of the repair.

Typical repair techniques could include:

- Re-aligning
- Re-shaping by material removal
- Re-soldering
- Bonding
- Replacing.

Complex repairs are those which can only be achieved using tools and techniques which have been specially modified in some way to achieve the repair and/or where no pre-defined procedures exist for effecting repair and/or where the repair site is difficult to access.

The quality standards and accuracy to be achieved are as set down in the work specifications.

The engineering specifications to which the learner will be expected to work could include:

- Product worksheets
- Method statements
- Manufacturer's data sheets
- Maintenance schedules
- Technical drawings (component, assembly, general arrangements, isometric)

Unit 658

Identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment

| | |
|--|--|
| UAN: | L/602/0877 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 8 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to collect and assess information on current practices and procedures |
| Assessment criteria |
| The learner can: 1.1 collect information and feedback on current working practices and procedures 1.2 assess current working practices and procedures against agreed standards. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to suggest opportunities for improvement |
| Assessment criteria |
| The learner can: 2.1 identify opportunities for improving working practices and procedures 2.2 make suggestions for improvements that are realistic and which indicate the benefits that might be achieved 2.3 ensure that suggested improvements meet organisational requirements 2.4 present suggestions for improvements in accordance with organisational procedures 2.5 contribute to discussions about work practices and quality. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 658 Identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Identify and Suggest Improvements to Working Practices and Procedures whilst Maintaining Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in identifying and suggesting improvements. The learner will be required to collect and assess information on current practices and suggest opportunities for improvement by following agreed company procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The complexity of activities will be those processes and systems on which the maintenance activities are being conducted.

The type and range of improvements to be identified will involve the changes to existing procedures and processes covering safety, quality, time and cost.

Sources of information available could include:

- Company records
- Company procedures
- Clients
- Personal experience
- Tool box talks

The methods for identifying improvements may include use of sense, discussions at tool box talks and own work practices.

The presentation techniques will be in line with company procedures.

Unit 659

How to establish that a mechanical engineering maintenance process has been completed to specification

| | |
|--|--|
| UAN: | L/602/0880 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to carry out equipment checks correctly |
| Assessment criteria |
| The learner can: 2.1 explain how to make an adequate check of compliance against criteria 2.2 describe the inspection of equipment care and control procedures including own responsibilities for ensuring the security of tools and equipment that are used. |

| |
|--|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 explain how to identify defects in plant and equipment 3.2 identify how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|--|
| Learning outcome |
| The learner will: 4. Know how to identify documentation procedures and maintain records accurately |
| Assessment criteria |
| The learner can: 4.1 identify quality control systems and documentation procedures 4.2 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.3 describe what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 659

How to establish that a mechanical engineering maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of ensuring that the work has been completed to company and or manufacturer's standards..

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products/assets to be checked include mechanical plant and equipment related to engineering maintenance work. This would include:

- Engines
- Transmission systems
- Power transmission systems
- Turbines
- Mechanical/hydraulic systems/actuators
- Fluid/gas transmission systems.

Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturer's data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them. Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The inspection, test and record-keeping procedures to be followed are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards. The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and Installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications.

Unit 660

Establish that a mechanical engineering maintenance process has been completed to specification

| | |
|--|--|
| UAN: | Y/602/0879 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out equipment checks correctly |
| Assessment criteria |
| The learner can: 1.1 follow and make appropriate use of the specifications for the product or asset being checked 1.2 use all the correct tools and inspection equipment and check that they are in a useable condition 1.3 carry out the checks in an appropriate sequence using approved methods and procedures. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess defects and report completion |
| Assessment criteria |
| The learner can: 2.1 identify and assess any defects or variations from the specification and take appropriate action 2.2 report completion of compliance activities in line with organisational procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 660 Establish that a mechanical engineering maintenance process has been completed to specification

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to establish that a Mechanical Engineering Maintenance Process has been completed to Specification.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in ensuring that the work has been completed to company and or manufacturer's standards.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to dismantling the asset to a specified degree but the learner may alter and/or vary the sequence of actions and techniques followed at their discretion to achieve the best possible result in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products/assets to be checked include mechanical plant and equipment related to engineering maintenance work. This would include:

- Engines
- Transmission systems
- Power transmission systems
- Turbines
- Mechanical/hydraulic systems/actuators
- Fluid/gas transmission systems.

Adequate checks of compliance against criteria could be expected to include ex-equipment and data sheets, commissioning procedures, manufacturer's data and local procedures.

Identification of defects in plant and equipment should include what the typical defects and variations are that arise and how to identify them. Equipment care and control procedures could be expected to include:

- Ingress protection ratings
- Explosion protection rating equipment
- Corrosion
- Portable appliance testing
- Heating and ventilation
- Permit systems

The inspection, test and record-keeping procedures to be followed are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The aspects, characteristics and complexity of checks to be made are as set down in manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards. The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and Installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The quality standards and accuracy are as set down in work specifications.

Unit 661

Test the performance and condition of mechanical plant and equipment

| | |
|--|--|
| UAN: | R/602/0931 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to test the performance and condition of mechanical plant and equipment |
| Assessment criteria |
| The learner can: 1.1 follow the appropriate procedures for use of tools and equipment to carry out the required tests 1.2 set up and carry out the tests using the correct procedures and within agreed timescales 1.3 record the results of the tests in the appropriate format 1.4 review the results and carry out further tests if necessary. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 2.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 661

Test the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Test the Performance and Condition of Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in testing mechanical plant and equipment. The learner will be expected to refer to manufacturer's manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The typical plant and equipment which are likely to be tested could include:

- Prime mover
- Fluid distribution systems
- Transmission systems and components

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment. The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly.

The testing methods and procedures used could be expected to include which tests relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The type of tools and test equipment to be used include:

- Gauge/recorders
- Any test equipment as required (must be within calibration)

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results. The testing and analytical techniques/procedures to be followed are clearly defined and, although they may involve more than one stage, full details on when and how to proceed through the stages are available.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 662

How to monitor the performance and condition of mechanical plant and equipment

| | |
|--|--|
| UAN: | H/602/0934 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to set up and calibrate the equipment for monitoring |
| Assessment criteria |
| The learner can: 1.1 explain the performance requirements of plant and equipment 1.2 describe the monitoring methods and procedures for plant and equipment 1.3 identify which data is required to make decisions 1.4 explain the importance of the need for equipment calibration and authorisation procedures including ensuring that the monitoring equipment is set up and calibrated correctly. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to carry out the monitoring activities and record the outcomes |
| Assessment criteria |
| The learner can: 2.1 explain monitoring equipment settings, operating and care and control procedures 2.2 describe the formats for recording and monitoring results in line with company procedures 2.3 describe how to ensure that performance monitoring is carried out to the required standard 2.4 explain how to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and minimise disruption during monitoring |
| Assessment criteria |
| The learner can: 3.1 identify the types of disruption which can occur during monitoring and how to minimise different types of disruption. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 explain the relevant regulations and safe working practices and procedures required within own work area 4.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 662

How to monitor the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of completing performance and condition monitoring on operational and static mechanical plant and equipment. The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The types of assets to be monitored involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Prime mover
- Distribution systems
- Transmission systems and components

The performance requirements of plant and equipment could be expected to include manufacturer's and company specifications on performance requirements.

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying.

Typical monitoring methods could include:

- Analysing trends
- Investigating abnormal characteristics
- Researching historical data
- Analysing/reviewing outputs
- Comparison against norm.

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets.

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration monitoring
- Current readings
- Run down and up time

Unit 663

Monitor the performance and condition of mechanical plant and equipment

| | |
|--|--|
| UAN: | L/602/0930 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to set up and calibrate the equipment for monitoring |
| Assessment criteria |
| The learner can: 1.1 correctly set up and check/calibrate the equipment required for the monitoring being carried out. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to carry out the monitoring activities and review the outcomes |
| Assessment criteria |
| The learner can: 2.1 carry out the monitoring activities effectively 2.2 minimise disruption to normal activities 2.3 record and review the outcomes and take appropriate actions 2.4 ensure that performance monitoring is carried out to the required standard 2.5 optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 663

Monitor the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Monitor the Performance and Condition of Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in completing performance and condition monitoring on operational and static mechanical plant and equipment. The learner will be required to set-up, monitor and record the results in accordance with company procedures. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The types of assets to be monitored involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Prime mover
- Distribution systems
- Transmission systems and components

The performance requirements of plant and equipment could be expected to include manufacturer's and company specifications on performance requirements.

The monitoring methods and equipment to be used may need to be customised to suit the conditions applying. Typical monitoring methods could include:

- Analysing trends
- Investigating abnormal characteristics
- Researching historical data
- Analysing/reviewing outputs
- Comparison against norm.

The monitoring conditions or operating environment may be normal operating environments which are complex by virtue of access problems and/or the likelihood of disruption to the monitoring process. Conditions may also be abnormal as a result of unusual hazards being present or non-standard demands placed on the operation of the assets.

The complexity of monitoring to be carried out would include motor tests as advised by company procedures, including:

- Temperature monitoring
- Vibration monitoring
- Current readings
- Run down and up time

Unit 664

How to assess the performance and condition of mechanical plant and equipment

| | |
|--|---|
| UAN: | M/602/0936 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 32 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to explain and identify test specifications and monitoring methods |
| Assessment criteria |
| The learner can: 1.1 explain equipment operating and test specifications including manufacturer's and company specifications 1.2 identify equipment monitoring methods and procedures including the types of data provided from monitoring, which methods can verify data and why it is important to do so. |

| |
|--|
| Learning outcome |
| The learner will: 2. Know how to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 describe the assessment methods and techniques for specific data, plant and equipment 2.2 identify the factors which have to be taken into account when assessing performance of specific plant and equipment 2.3 explain the reporting documentation and control procedures including how to present results of the assessment, and who should receive the results and implications of assessments. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 664 How to assess the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of assessing the performance and condition of mechanical plant and equipment using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The types of assets to be assessed involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Prime mover
- Distribution systems
- Transmission systems and components

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturer's specification
- Historical
- Maintenance records
- Trend analysis.

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures. The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures

- Run down and up time

Unit 665

Assess the performance and condition of mechanical plant and equipment

| | |
|--|--|
| UAN: | K/602/0935 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to set up and carry out the assessment |
| Assessment criteria |
| The learner can: 1.1 ensure the necessary test data on which to conduct the assessment is obtained 1.2 carry out the assessment using all relevant data and valid methods 1.3 check that the assessment provides clear and accurate information. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to assess and report the results |
| Assessment criteria |
| The learner can: 2.1 compare current performance and condition data with that from previous assessments 2.2 identify and report the implications arising from the assessments 2.3 record the results of the assessments in the appropriate format. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Be able to work safely at all times</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines.</p> |

Unit 665

Assess the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Assess the Performance and Condition of Mechanical Plant and Equipment'. The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in assessing the performance and condition of mechanical plant and equipment using all available sources of information. The learner will be required to check that they have all the necessary data, complete the assessment and analyse the results by comparing with norms and previous records. To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.
Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The types of assets to be assessed involve multiple technologies or are of a single technology interacting with other plant and equipment in a dynamic manner and could include:

- Prime mover
- Distribution systems
- Transmission systems and components

The type of data to be analysed covers:

- Vibration
- Temperature
- Current
- Voltage

The analysis methods to be used covers:

- Comparison to manufacturer's specification
- Historical
- Maintenance records
- Trend analysis.

The complexity of monitoring information to be used could include motor, plant or equipment tests as advised by company procedures. The information gained will vary in complexity and depend on the assessment being carried out. The information gathered will be used in various ways as dictated by the test or company procedures

- Run down and up time

Unit 666

How to inspect mechanical plant and equipment

| | |
|--|--|
| UAN: | F/602/0939 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe engineering drawings and their related specifications, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to inspect mechanical plant and equipment |
| Assessment criteria |
| The learner can: 2.1 explain the inspection methods and techniques that are approved by the company 2.2 describe the calibration of equipment care and control procedures that are approved by the company 2.3 identify inspection equipment care and control procedures that are approved by the company. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify and deal with defects and variations |
| Assessment criteria |
| The learner can: 3.1 identify defects in products, equipment and systems 3.2 explain the quality control systems and documentation procedures 3.3 describe how defects and variations should be dealt with and what factors determine the actions to be taken. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 4.1 explain why it is important to maintain records of the checks made and the assessments that result from those checks 4.2 identify what information should be entered on those records and where they should be kept. |

| |
|---|
| Learning outcome |
| The learner will: 5. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 5.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 5.2 explain the relevant regulations and safe working practices and procedures required within own work area 5.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment. |

Unit 666 How to inspect mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of completing checks on mechanical plant and equipment. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature.

To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products to be inspected involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The aspects, characteristics and complexity of checks are as set down in the manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedure, the Electricity at Work regulations and BS 7671

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The inspection methods, techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 667

Inspect mechanical plant and equipment

| | |
|--|--|
| UAN: | T/602/0937 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to inspect mechanical plant and equipment |
| Assessment criteria |
| The learner can: 1.1 follow the correct specification for the product/equipment being inspected 1.2 use the correct equipment to carry out the inspection 1.3 identify and confirm the inspection checks to be made and acceptance criteria to be used 1.4 carry out all required inspections as specified. |

| |
|---|
| Learning outcome |
| The learner will: 2. Be able to record the results of the inspection correctly |
| Assessment criteria |
| The learner can: 2.1 record the results of the inspection in the appropriate format. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to identify defects and deal with problems promptly |
| Assessment criteria |
| The learner can: 3.1 identify any defects or variations from the specification 3.2 deal promptly and effectively with problems within own control and report those that cannot be solved. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 667 Inspect mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

This unit should not be taken prior to taking 'How to Inspect Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in completing checks on mechanical plant and equipment. The learner will be required to complete the checks following the company procedures. The checks may be routine or non-routine in nature.

To record the results the learner will follow company procedures and the organisations safe working practices at all times and work within the work permit procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices **AS THEY APPLY TO THE LEARNER.**

Scope

The level and extent of responsibility extends to selecting and modifying methods at the learner's discretion to optimise the effectiveness of the monitoring and assessment undertaken in the conditions applying. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The types of products to be inspected involve multiple technologies or are of a single technology interacting with other assets in a dynamic manner. Typical plant and equipment could be:

- Rotating equipment and tools
- Protection methods
- Electrical distribution systems

The calibration of equipment care and control procedures that are approved by the company should include the procedure for recertification and how to interpret the calibration certificate.

The inspection equipment care and control procedures that are approved by the company should include storage, both in situ and transit and the checking of calibration certificates.

The identification of defects in products, equipment and systems should include what the typical defects are that arise and how to identify them, typical examples are:

- Weathering
- Wear and tear
- Corrosion

The aspects, characteristics and complexity of checks are as set down in the manufacturer's guidelines and procedures and will include ensuring compliance with relevant international standards, equipment manufacturer specifications, Health and Safety Executive (HSE), company procedure, the Electricity at Work regulations and BS 7671

The type of checks made will depend on the engineering process carried out which may include:

- Dismantling
- Assembly
- Positioning and installation
- Repair of components
- Removal and replacement of components
- Adjustment
- Planned maintenance activities testing

The inspection methods, techniques and type of equipment to be used are as set out in internal Quality Assurance (QA) and Quality Control (QC) procedures.

The quality standards and accuracy to be achieved are as set down in work specifications.

Unit 668

How to test the performance and condition of mechanical plant and equipment

| | |
|--|--|
| UAN: | D/602/0933 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 26 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know the different types of test methods and equipment |
| Assessment criteria |
| The learner can: 1.1 explain the engineering test specifications 1.2 identify different types of test equipment and their applications 1.3 describe the calibration of equipment and authorisation procedures 1.4 explain appropriate testing methods and procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to test equipment correctly |
| Assessment criteria |
| The learner can: 2.1 describe the analysis methods and techniques 2.2 identify the environmental controls relating to testing, including company Health and Safety Executive (HSE) policy 2.3 explain the test reporting documentation and procedures. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 explain the relevant regulations and safe working practices and procedures required within own work area</p> <p>3.3 identify own responsibilities with regard to the reporting lines and procedures in the working environment.</p> |

Unit 668 How to test the performance and condition of mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge. This unit is about the learner's knowledge of testing mechanical plant and equipment. The learner will be expected to refer to manufacturer's manuals and follow the company procedures.

During this work the learner must take account of the relevant installation procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility is limited to working within a detailed specification and following clearly defined procedures. In some cases, the learner may still be expected to refer to others for final authorisation, even though they remain responsible for identifying and implementing decisions.

The typical plant and equipment which are likely to be tested could include:

- Prime mover
- Fluid distribution systems
- Transmission systems and components

The engineering test specifications could be expected to include the latest manufacturer's data sheets and test specifications for specific equipment.

The calibration of equipment and authorisation procedures should include how to ensure that test equipment is set up and calibrated correctly.

The testing methods and procedures used could be expected to include which tests relate to different aspects of performance and conditions specifications, which procedures are followed in different testing contexts, and what the normal timescales are for conducting tests, including individual company procedures.

The analysis methods and techniques could be expected to include what data is provided from tests and which methods can verify data, why it is important to be sure about the reliability, validity and completeness of data before analysis begins, and which analysis methods and procedures can be applied to test results.

The test reporting documentation and procedures should include what the format is for recording the test procedures and results in line with individual company procedures.

The types of tools and test equipment to be used include:

- Gauge/recorders
- Any test equipment as required (must be within calibration)

The type and complexity of tests to be carried out are clearly defined and are appropriate for the engineering product. Detailed procedures and specifications define the set up and conduct of the tests and the interpretation of test results. The testing and analytical techniques/procedures to be followed are clearly defined and, although they may involve more than one stage, full details on when and how to proceed through the stages are available.

The quality standards and accuracy to be achieved are as set down in the work specifications.

Unit 669

Carry out planned maintenance on mechanical plant and equipment

| | |
|--|--|
| UAN: | Y/602/0865 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 10 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to carry out planned maintenance procedures |
| Assessment criteria |
| The learner can: 1.1 follow the relevant maintenance schedules to carry out the required work 1.2 carry out maintenance activities within the limits of own personal authority 1.3 carry out the maintenance activities in the specified sequence and in an agreed time scale. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to report defects and record activities accurately |
| Assessment criteria |
| The learner can: 2.1 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule 2.2 complete relevant maintenance records accurately and pass them on to the appropriate person. |

| |
|---|
| Learning outcome |
| The learner will: 3. Be able to dispose of waste correctly |
| Assessment criteria |
| The learner can: 3.1 dispose of waste materials in accordance with safe working practices and approved procedures. |

| |
|---|
| Learning outcome |
| The learner will: 4. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 4.1 work safely at all times, complying with health and safety and other relevant regulations and guidelines. |

Unit 669 Carry out planned maintenance on mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Carry out Planned Maintenance on Mechanical Plant and Equipment'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence

This unit is about the learner's competence in maintaining mechanical equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and finally complete the appropriate documentation. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales.

The plant or equipment to be maintained could involve more than one technology and/or involve a significant number of fragile/valued components.

Typical assets could include:

- Prime movers
- Fluid distribution systems
- Transmission system and Components

And may include:

- Working within confined spaces
- Working in hazard areas
- Working at height/over water

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures typical procedures include:

- Isolation
 - De-isolation
 - Testing of equipment
 - Replenishment/checking levels of consumables
 - Tightening of connections/fasteners
 - Checking and adjusting mechanical/hydraulic/pneumatic movements/components
 - Checking tensions
 - Replacement of regularly changed 'lived' components (filters, charts etc)•
- Recording data
- Inspection for damaged/wear/corrosion/ movement
 - Safety limit checks
 - Checking output
 - Cleaning
 - Lubricating
 - Replacement of worn/damaged/corroded components.

The quality standards and accuracy to be achieved need to be in line with company procedures and manufacturers recommendations.

Unit 670

How to carry out planned maintenance on mechanical plant and equipment

| | |
|--|--|
| UAN: | D/602/0866 |
| Level: | 3 |
| Credit value: | 4 |
| GLH: | 30 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Know and understand the maintenance schedules, methods and records |
| Assessment criteria |
| The learner can: 1.1 Identify maintenance schedules and related specifications to work to 1.2 Describe which maintenance methods and procedures are standard during maintenance and how they can be modified to optimise work 1.3 Identify the maintenance records and documentation procedures. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know own responsibilities and the limits of them |
| Assessment criteria |
| The learner can: 2.1 Explain own responsibilities for the care and control of equipment that are used 2.2 Explain the maintenance authorisation procedures and limits of responsibility and authority in line with the company and manufacturer's procedures 2.3 Describe own responsibilities with regard to the reporting lines and procedures in the working environment 2.4 Explain how to deal with problems within the limits of own authority. |

| |
|---|
| Learning outcome |
| The learner will: 3. Know how to identify methods for the disposal of waste |
| Assessment criteria |
| The learner can: 3.1 Identify appropriate methods and waste disposal procedures in relation to legislation, regulation and procedures for waste segregation. |

| |
|---|
| Learning outcome |
| The learner will: 4. Know how to follow organisational policies and procedures |
| Assessment criteria |
| The learner can: 4.1 Explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others 4.2 Explain the relevant regulations and safe working practices and procedures required within own work area. |

Unit 670 How to carry out planned maintenance on mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge

This unit is about the learner's knowledge of maintaining mechanical equipment in line with the manufacturer's and organisational practices and procedures. The learner will be required to complete the maintenance procedures in a timely manner, follow procedures and finally complete the appropriate documentation. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER. Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner.

Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

Maintenance schedules and related specifications to be followed could be expected to include:

- Authorisation procedures
- Product worksheets
- Tests
- Internal maintenance schedules
- Safe working practices
- Method statements
- Records
- Timescales

The plant or equipment to be maintained could involve more than one technology and/or involve a significant number of fragile/valued components.

Typical assets could include:

- Prime movers
- Fluid distribution systems
- Transmission system and components

And may include:

- Working within confined spaces
- Working in hazard areas
- Working at height/over water

The maintenance procedures and activities to be followed are fully defined within the company maintenance procedures typical procedures include:

- Isolation
- De-isolation
- Testing of equipment
- Replenishment/checking levels of consumables
- Tightening of connections/fasteners
- Checking and adjusting mechanical/hydraulic/pneumatic movements/components
- Checking tensions
- Replacement of regularly changed 'lived' components (filters, charts etc)
- Recording data
- Inspection for damaged/wear/corrosion/ movement
- Safety limit checks
- Checking output
- Cleaning
- Lubricating
- Replacement of worn/damaged/corroded components .

The quality standards and accuracy to be achieved need to be in line with company procedures and manufacturers recommendations.

Unit 671

How to deal with variations and defects in mechanical plant and equipment

| | |
|--|--|
| UAN: | K/602/1003 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 22 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|--|
| Learning outcome |
| The learner will: 1. Know how to interpret engineering drawings and their related specifications |
| Assessment criteria |
| The learner can: 1.1 describe the engineering drawings and related specifications to interpret, including technical drawings. |

| |
|---|
| Learning outcome |
| The learner will: 2. Know how to identify and deal with variations and defects |
| Assessment criteria |
| The learner can: 2.1 explain the identification of defects in products and assets including observation and using relevant senses; fault reports; maintenance logs; operations logs 2.2 identify methods of dealing with defects and variations as defined by the company procedures 2.3 state what factors determine the actions to be taken following a defect/variation 2.4 describe why it is important to maintain records of the checks made and the assessments that result from those checks 2.5 indicate what information should be entered on those records and where they should be kept. |

| |
|--|
| Learning outcome |
| <p>The learner will:</p> <p>3. Know how to follow organisational policies and procedures</p> |
| Assessment criteria |
| <p>The learner can:</p> <p>3.1 explain own responsibilities in respect of health, safety and environment, including the limits of personal responsibility, legal responsibility for own health and safety and the health and safety of others</p> <p>3.2 identify the relevant regulations and the safe working practices and procedures required within own work area</p> <p>3.3 outline quality control, systems and documentation procedures that are specified by the company</p> <p>3.4 describe the reporting lines and procedures in own working environment.</p> |

Unit 671 How to deal with variations and defects in mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their knowledge.

This unit is about the learner's knowledge of identifying, assessing and dealing with variations and defects in mechanical products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The assets or equipment to be maintained could involve more than one technology and/or involve a significant number of fragile/valued components.

Typical assets could include:

- Prime mover
- Fluid distribution systems
- Transmission system and components

And may include:

- Working within confined spaces
- Working in hazardous areas
- Working at height/over water.

The engineering drawings and related specifications could include:

- Component
- Assembly
- General arrangements
- Isometrics
- 1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.

Unit 672

Deal with variations and defects in mechanical plant and equipment

| | |
|--|--|
| UAN: | H/602/1002 |
| Level: | 3 |
| Credit value: | 3 |
| GLH: | 6 |
| Endorsement by a sector or regulatory body: | This unit is endorsed by Cogent, the Sector Skills Council for Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymers. |

| |
|---|
| Learning outcome |
| The learner will: 1. Be able to identify variations and defects |
| Assessment criteria |
| The learner can: 1.1 identify defects with regard to the product or asset specification. |

| |
|--|
| Learning outcome |
| The learner will: 2. Be able to assess variations and defects |
| Assessment criteria |
| The learner can: 2.1 assess the defects and determine action required to return the products and assets to specified condition. |

| |
|--|
| Learning outcome |
| The learner will: 3. Be able to report and record variations and defects |
| Assessment criteria |
| The learner can: 3.1 report recommendations for action to the appropriate people promptly and in accordance with organisational procedures 3.2 record details of defects in accordance with quality assurance and control. |

| |
|--|
| Learning outcome |
| The learner will: 4. Be able to deal with the variations or defects |
| Assessment criteria |
| The learner can: 4.1 repair or replace the defect 4.2 discard or store the defect. |

| |
|--|
| Learning outcome |
| The learner will: 5. Be able to work safely at all times |
| Assessment criteria |
| The learner can: 5.1 work safely at all times, complying with health and safety and other relevant regulations. |

Unit 672 Deal with variations and defects in mechanical plant and equipment

Supporting information

This unit is subject to the requirements set out in the Cogent Assessment Strategy.

This unit should not be taken prior to taking 'How to Deal with Variations and Defects in Mechanical Plant and Equipment.'

The assumed pre-requisite is that the learner undertaking this unit will be an experienced operator/technician seeking recognition of their competence.

This unit is about the learner's competence in identifying, assessing and dealing with variations and defects in mechanical products or assets. The reporting of recommendations to the appropriate people will be required. The learner will be following the organisations safe working practices at all times and working within the work permit procedures.

During this work the learner must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO THE LEARNER.

Scope

The level and extent of responsibility will involve the learner being responsible for ensuring that the maintenance procedures are carried out safely by following company defined procedures. Responsibility will also include identifying the actions to take when variations and defects are found. The learner will be accountable for the integrity of the work and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorised signatories within the permit to work system.

The assets or equipment to be maintained could involve more than one technology and/or involve a significant number of fragile/valued components.

Typical assets could include:

- Prime mover
- Fluid distribution systems
- Transmission system and components

And may include:

- Working within confined spaces
- Working in hazardous areas
- Working at height/over water.

The engineering drawings and related specifications could include:

- Component
- Assembly •General arrangements•Isometrics•1st and 3rd angle projections
- Method statements
- Product worksheets
- Tolerances

The type and complexity of defects will vary from severe damage with the potential for immediate failure to minor damage.



Appendix 1 Relationships to other qualifications

Links to other qualifications

Mapping is provided as guidance and suggests areas of commonality between the qualifications. It does not imply that candidates completing units in one qualification have automatically covered all of the content of another.

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

These qualifications have connections to the:

- Level 2 Certificate in Process Engineering Maintenance (0640-20)
- Level 2 Diploma in Jetty Operations (0640-21)
- Level 2 Diploma in Bulk Liquid Operations (0640-22)
- Level 2 Diploma in Processing Operations: Hydrocarbons (0640-23)
- Level 3 NVQ Diploma in Jetty Operations (0640-31)
- Level 3 NVQ Diploma in Processing Operations: Hydrocarbons (0640-33)
- Level 3 NVQ Diploma in Processing Operations: Hydrocarbons (Control room) (0640-34)
- Level 3 NVQ Diploma in Downstream Control Room Operations (0640-34)
- Level 3 NVQ Diploma in Downstream Field Operations (0640-35)

Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales – see **www.cityandguilds.com/esw**



Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Qualifications and Credit Framework (QCF):** general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for GOLLA/e-volve assessments.

City & Guilds
Believe you can



www.cityandguilds.com

Useful contacts

UK learners

General qualification information

T: +44 (0)844 543 0033

E: learnersupport@cityandguilds.com

International learners

General qualification information

T: +44 (0)844 543 0033

F: +44 (0)20 7294 2413

E: **intcg@cityandguilds.com**

Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

E: **centresupport@cityandguilds.com**

Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

F: +44 (0)20 7294 2404 (BB forms)

E: **singlesubjects@cityandguilds.com**

International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

E: **intops@cityandguilds.com**

Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

E: **walledgarden@cityandguilds.com**

Employer

Employer solutions, Mapping, Accreditation, Development Skills, Consultancy

T: +44 (0)121 503 8993

E: **business@cityandguilds.com**

Publications

Logbooks, Centre documents, Forms, Free literature

T: +44 (0)844 543 0000

F: +44 (0)20 7294 2413

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: feedbackandcomplaints@cityandguilds.com

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Land Based Services (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

Copyright

The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute and may not be copied, reproduced or distributed without prior written consent. However, approved City & Guilds centres and candidates studying for City & Guilds qualifications may photocopy this document free of charge and/or include a PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching candidates working towards a City & Guilds qualification, or for internal administration purposes
- candidates may copy the material only for their own use when working towards a City & Guilds qualification

The *Standard Copying Conditions* (see the City & Guilds website) also apply.

Please note: National Occupational Standards are not © The City and Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Published by City & Guilds, a registered charity established to promote education and training

City & Guilds

1 Giltspur Street
London EC1A 9DD
T +44 (0)844 543 0000
F +44 (0)20 7294 2413
www.cityandguilds.com

HB-02-0640