

Level 3 NVQ Diploma in Planned and Reactive Maintenance on Heating and Ventilating Systems (6188-32)

Candidate performance evidence logbook

600/1008/3



www.cityandguilds.com
February 2012
Version 1.0

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| Qualification title | Number | QAN |
|--|---------|------------|
| Level 3 NVQ Diploma in Planned and Reactive Maintenance on Heating & Ventilating Systems | 6188-32 | 600/1008/3 |

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Contents

| | | |
|-------------------|--|-----------|
| 1 | About your candidate logbook | 7 |
| 1.1 | Contact details | 7 |
| 1.2 | Introduction to the logbook | 8 |
| 2 | The assessment process | 9 |
| 3 | Using your logbook | 10 |
| 4 | Qualification structures | 11 |
| 5 | Overall Unit Sign-off | 12 |
| Unit 326 | Maintain and diagnose faults on heating and ventilating industrial and commercial systems | 13 |
| | On Site Assessment Plan / Feedback | 31 |
| | On Site Observation Report | 32 |
| | Supplementary Evidence Sheet | 33 |
| | Oral Questioning Supplementary Evidence Sheet | 34 |
| | Photographic Supplementary Evidence | 35 |
| | Workplace Recorder Details | 36 |
| | Assessor Continuation Sheet | 37 |
| | Signature Sheet | 38 |
| Appendix 1 | Summary of City & Guilds assessment policies | 39 |

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1 About your candidate logbook

1.1 Contact details

| | |
|--|--|
| Candidate name | |
| Candidate enrolment no | |
| Centre name | |
| Centre number | |
| Programme start date | |
| Date of registration with City & Guilds | |

Keep a record of relevant contact details in the space provided below. You may find it helpful to make a note of phone numbers and e-mail addresses here.

| | |
|----------------------------------|--|
| Your Assessor(s) | |
| Your Internal Verifier | |
| Quality Assurance Contact | |

1 About your candidate logbook

1.2 Introduction to the logbook

This logbook will help you complete the units in City & Guilds' **Level 3 NVQ Diploma in Planned and Reactive Maintenance on Heating and Ventilating Systems (6188-32)**. It contains forms you can use to record your evidence of what you have done.

About City & Guilds

City & Guilds is your awarding body for this qualification. City & Guilds is the UK's leading awarding body for vocational qualifications.

Information about City & Guilds and our qualifications is available on our website **www.cityandguilds.com**.

2 The assessment process

The following people at your centre will explain the assessment process and help you achieve your unit(s).

The assessor/tutor

The assessor/tutor is the person you will have the most contact with as you work towards your unit(s). You may have more than one assessor/tutor depending on which unit(s) you take or you may be assessed by a person who is not your tutor.

The internal verifier

The internal verifier maintains the quality of assessment within the centre.

The external verifier

The external verifier works for City & Guilds and helps to ensure that your centre meets the required standards for quality and assessment.

3 Using your logbook

Recording forms

This logbook contains all of the forms you and your assessor will need to plan, review and organise your evidence. Your assessor will be able to help you decide which forms you need to complete and help you fill them in.

Please photocopy these forms as required.

4 Qualification structures

To achieve the **Level 3 NVQ Diploma in Planned and Reactive Maintenance on Heating and Ventilating Systems (6188-32)**, learners must achieve 62 credits from the eight mandatory units in the table shown below. This Logbook includes only those units assessed by performance in the workplace (marked with an *).

| City & Guilds unit number | Unit accreditation number | Unit title | Credit value | GLH |
|--------------------------------------|----------------------------------|--|---------------------|------------|
| Unit 301 | R/602/2498 | Understand how to organise resources within BSE | 3 | 26 |
| Unit 302 | R/502/9151 | Understand and carry out electrical work on industrial and commercial heating and ventilating systems and components | 12 | 102 |
| Unit 307 | F/602/4862 | Understand the principles and requirements of industrial and commercial fuel systems | 12 | 112 |
| Unit 322 | D/502/8231 | Understand industrial and commercial hot and cold water system maintenance and fault diagnosis techniques | 8 | 65 |
| Unit 323 | F/502/8190 | Understand industrial and commercial hot water heating system maintenance and fault diagnosis techniques | 8 | 65 |
| Unit 324 | J/502/8191 | Understand industrial and commercial ventilation system maintenance and fault diagnosis techniques | 7 | 61 |
| Unit 325 | L/502/8192 | Understand industrial and commercial air conditioning system maintenance and fault diagnosis techniques | 7 | 61 |
| *Unit 326 | R/502/8193 | Maintain and diagnose faults on H&V industrial and commercial systems | 5 | 12 |

5 Overall Unit Sign-off

The following units are included in the rules of combination for the **Level 3 NVQ Diploma in Planned and Reactive Maintenance on Heating and Ventilating Systems (6188-32)**.

Learners must achieve this portfolio unit to contribute towards achievement of the overall qualification.

| City & Guilds unit | Unit title | Unit Achieved Yes/No | Assessor Initials | Date |
|--------------------|---|----------------------|-------------------|------|
| 326 | Maintain and diagnose faults on heating and ventilating industrial and commercial systems | | | |

Declaration

I confirm that the evidence supplied for the above unit is authentic and a true representation of my own work. The work logged is my own work carried out during my normal work duties.

The answers in the question bank are my own work and discussed with my assessor on completion. I have been observed in my workplace by my assessor on several occasions.

| | |
|-----------------------------|--|
| Candidate Name: | |
| Candidate Signature: | |
| Date: | |

I confirm that this candidate has achieved all the requirements of the selected units with the evidence listed. Assessment was conducted under the specified conditions and context, and is valid, authentic, reliable, current and sufficient.

| | |
|----------------------------|--|
| Assessor Name: | |
| Assessor Signature: | |
| Date: | |

| | |
|----------------------|--|
| IV Name: | |
| IV Signature: | |
| Date: | |

Unit 326

Maintain and diagnose faults on heating and ventilating industrial and commercial systems

Level: 3

Credit value: 5

UAN: R/502/8193

| Outcome 1 | Be able to complete preparation work for industrial and commercial heating and ventilation systems service and maintenance activities | | | |
|-----------|--|--------------------|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | assess the work location and report factors that will impact on the work to one of the following: | | | |
| | <ul style="list-style-type: none"> • supervisor/line manager | | | |
| | <ul style="list-style-type: none"> • customer/clients | | | |
| 2 | confirm that job information and documentation for hot and cold water systems service and maintenance is available and appropriate including: | | | |
| | <ul style="list-style-type: none"> • cold water systems, one of the following: <ul style="list-style-type: none"> - boosted - high rise building systems | | | |
| | <ul style="list-style-type: none"> • hot water systems, one of the following: <ul style="list-style-type: none"> - storage (indirect) - unvented - secondary circulation - instantaneous (plate heat exchanger) | | | |
| | <ul style="list-style-type: none"> • heating, one of the following: <ul style="list-style-type: none"> - low temperature hot water - medium temperature hot water | | | |
| | <ul style="list-style-type: none"> • ventilation, one of the following: <ul style="list-style-type: none"> - tempered warm air supply - supply - extract - balanced | | | |
| | <ul style="list-style-type: none"> • air conditioning systems, one of the following: <ul style="list-style-type: none"> - all air - air - water - refrigerant – air | | | |

| | | | | |
|----|---|--|--|--|
| | <ul style="list-style-type: none"> • job information and documentation: <ul style="list-style-type: none"> - statutory regulations - codes of practice - industry standards - industry guides/good practice guides - verbal instructions | | | |
| 3 | <p>use job information and documentation to ensure that the following are fit for purpose:</p> <ul style="list-style-type: none"> • equipment • tools • labour resources | | | |
| 4 | <p>confirm the points in the work process where liaison with other persons will be required from one of the following:</p> <ul style="list-style-type: none"> • customer/client • other site worker • supervisor/line manager | | | |
| 5 | demonstrate that job information on key aspects of the work has been issued to relevant people including user instructions or manufacturer's instructions | | | |
| 6 | <p>demonstrate that authorisation has been obtained from the relevant person(s) prior to commencement of the work, from one of the following:</p> <ul style="list-style-type: none"> • contractor/consultant • other site workers • site visitors • supervisor or line manager | | | |
| 7 | <p>identify any pre work damage or defects to existing equipment or building features, record and report it to one of the following:</p> <ul style="list-style-type: none"> • customer/client • other site workers • supervisor or line manager | | | |
| 8 | demonstrate that suitable personal protective equipment has been worn throughout the duration of work preparation activities | | | |
| 9 | verify that the resources needed to complete the job are free from damage and take appropriate action should any defects be found | | | |
| 10 | <p>complete preparatory work for the service and maintenance of H&V systems, to include:</p> <ul style="list-style-type: none"> • use of material and equipment requisites where appropriate | | | |

| | | | | |
|--|--|--|--|--|
| | <ul style="list-style-type: none"> confirmation that the selection of material, equipment and components are compatible to the installation | | | |
| | <ul style="list-style-type: none"> confirmation that the work location is ready for service and maintenance activities | | | |
| | <ul style="list-style-type: none"> confirmation of secure site storage for tools, equipment, materials and components | | | |
| | <ul style="list-style-type: none"> confirmation of suitable access equipment | | | |
| | <ul style="list-style-type: none"> confirmation of suitable lifting equipment where required | | | |
| | <ul style="list-style-type: none"> completion of risk assessments | | | |
| | <ul style="list-style-type: none"> completion of method statements. | | | |

| Outcome 2 | Be able to identify industrial and commercial heating and ventilation systems, equipment and components | | | |
|------------------|--|--------------------|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | verify that documentation and the work location is in accordance with the specific service and maintenance requirements for heating and ventilation systems | | | |
| 2 | confirm that the job specification for heating and ventilation systems comply with: | | | |
| | <ul style="list-style-type: none"> statutory regulations | | | |
| | <ul style="list-style-type: none"> codes of practice | | | |
| | <ul style="list-style-type: none"> industry standards | | | |
| | <ul style="list-style-type: none"> industry guides/good practice guides | | | |
| 3 | confirm that relevant persons have been notified and agreement achieved on any changes required to the job specification prior to commencement of the work from one of the following: | | | |
| | <ul style="list-style-type: none"> customer/client | | | |
| | <ul style="list-style-type: none"> supervisor/line manager. | | | |

| Outcome 3 | Be able to service industrial and commercial heating and ventilation systems, equipment and components | | | |
|-----------|---|--------------------|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | verify that maintenance schedule activities are compatible with the system components | | | |
| 2 | implement a method statement for planning routine and non-routine maintenance work to include: | | | |
| | <ul style="list-style-type: none"> • provision for minimising disruption to system operation | | | |
| | <ul style="list-style-type: none"> • confirmation that materials, tools and equipment will be available as required | | | |
| | <ul style="list-style-type: none"> • confirmation that maintenance activities comply with industry requirements | | | |
| 3 | verify that liaison has taken place at the key points within the routine and non-routine maintenance activities to minimise disruption to work routines including one from: | | | |
| | <ul style="list-style-type: none"> • customer/clients | | | |
| | <ul style="list-style-type: none"> • other site workers | | | |
| | <ul style="list-style-type: none"> • supervisor/line manager | | | |
| 4 | implement work procedures for routine and non-routine maintenance activities that comply with industry specifications and manufacturer's instructions, for the following including: | | | |
| | <ul style="list-style-type: none"> • systems: | | | |
| | <ul style="list-style-type: none"> - cold water: one of the following: | | | |
| | <ul style="list-style-type: none"> > boosted | | | |
| | <ul style="list-style-type: none"> > high rise building systems | | | |
| | <ul style="list-style-type: none"> - hot water: one of the following: | | | |
| | <ul style="list-style-type: none"> > storage (indirect) | | | |
| | <ul style="list-style-type: none"> > unvented | | | |
| | <ul style="list-style-type: none"> > secondary circulation | | | |
| | <ul style="list-style-type: none"> > instantaneous (plate heat exchanger) | | | |

| | | | | |
|---|---|--|--|--|
| | <ul style="list-style-type: none"> • components, for at least 10 of the following: | | | |
| | - storage cisterns | | | |
| | - hot water storage vessels | | | |
| | - electric and gas water heaters | | | |
| | - appliance control valve or tap, terminal fittings | | | |
| | - stop valves | | | |
| | - float operated valves | | | |
| | - single and double check valves | | | |
| | - pressure reducing valves | | | |
| | - gate valves | | | |
| | - RPZ valves | | | |
| | - servicing valves | | | |
| | - drain taps | | | |
| | - shower mixer valves | | | |
| | - blending valves | | | |
| | - circulating pumps (bronze) | | | |
| | - booster pumps | | | |
| | - line strainer | | | |
| | - temperature and pressure relief valve | | | |
| | - expansion vessels | | | |
| 5 | implement work procedures for routine and non-routine maintenance activities that ensure the continued effective operation of the following hot and cold water system components: | | | |
| | <ul style="list-style-type: none"> • components, at least 10 of the following: | | | |
| | - storage cisterns | | | |
| | - hot water storage vessels including high to low temperature calorifiers | | | |
| | - electric and gas water heaters | | | |
| | - appliance control valve or tap, terminal fittings | | | |
| | - stop valves | | | |
| | - float operated valves | | | |
| | - single and double check valves | | | |
| | - pressure reducing valves | | | |
| | - gate valves | | | |

| | | | | |
|---|---|--|--|--|
| | - RPZ valves | | | |
| | - servicing valves | | | |
| | - drain taps | | | |
| | - shower mixer valves | | | |
| | - blending valves | | | |
| | - circulating pumps (bronze) | | | |
| | - booster pumps | | | |
| | - line strainer | | | |
| | - temperature and pressure relief valve | | | |
| | - expansion vessels | | | |
| 6 | implement work procedures for routine and non-routine maintenance activities that comply with industry specifications and manufacturer's instructions, for the following heating: | | | |
| | • systems: | | | |
| | - low temperature hot water | | | |
| | - medium temperature hot water | | | |
| | - key regulations relevant to the installation | | | |
| | • boilers, fired by solid fuel, gas or oil including one from: | | | |
| | - high efficiency | | | |
| | - modular | | | |
| | - cast iron sectional | | | |
| | - steel shell | | | |
| | - copper or steel water tube | | | |
| | - compliance with building and water regulations | | | |
| | • components, six from: | | | |
| | - hot water storage vessels | | | |
| | - radiators | | | |
| | - convector heaters, natural and assisted | | | |
| | - panel heaters | | | |
| | - ceiling coils | | | |
| | - thermostatic control of hot water heating systems | | | |
| | - time control of hot water heating systems | | | |
| | - energy management systems | | | |
| | - motorised valves | | | |

| | | | | |
|---|--|--|--|--|
| | - pumps/accelerators | | | |
| | - temperature and pressure relief valves | | | |
| | - expansion vessels | | | |
| 7 | implement work procedures for routine and non-routine maintenance activities that ensure the continued effective operation of at least six of the following heating components: | | | |
| | • hot water storage vessels | | | |
| | • radiators | | | |
| | • convector heaters, natural and assisted | | | |
| | • panel heaters | | | |
| | • ceiling coils | | | |
| | • thermostatic control of hot water heating systems | | | |
| | • time control of hot water heating systems | | | |
| | • energy management systems | | | |
| | • motorised valves | | | |
| | • pumps/accelerators | | | |
| | • temperature and pressure relief valves | | | |
| | • expansion vessels | | | |
| 8 | implement work procedures for routine and non-routine maintenance activities that comply with industry specifications and manufacturer's instructions, for the following ventilation: | | | |
| | • systems: | | | |
| | - tempered warm air supply | | | |
| | - supply | | | |
| | - extract | | | |
| | - balanced | | | |
| | • components: | | | |
| | - filters | | | |
| | - fans | | | |
| | - air inlet grilles | | | |
| | - dampers | | | |
| | - attenuators | | | |
| | - automatic controls | | | |
| | - time control ventilating systems | | | |
| | - energy management systems | | | |

| | | | | |
|----|--|--|--|--|
| | - motorised dampers | | | |
| | - air handling units | | | |
| | - canopies | | | |
| | - air to water heat exchangers | | | |
| | - air to gas heat exchangers | | | |
| | - air to refrigerant heat exchangers | | | |
| 9 | implement work procedures for routine and non-routine maintenance activities that ensure the continued effective operation of at least six of the following ventilation components: | | | |
| | • filters | | | |
| | • fans | | | |
| | • air inlet grilles | | | |
| | • dampers | | | |
| | • attenuators | | | |
| | • automatic controls | | | |
| | • time control ventilating systems | | | |
| | • energy management systems | | | |
| | • motorised dampers | | | |
| | • air handling units | | | |
| | • canopies | | | |
| | • air to water heat exchangers | | | |
| | • air to gas heat exchangers | | | |
| | • air to refrigerant heat exchangers | | | |
| 10 | implement work procedures for routine and non-routine maintenance activities that comply with industry specifications and manufacturer's instructions for air conditioning: | | | |
| | • systems: | | | |
| | - all air | | | |
| | - air-water | | | |
| | - refrigerant air conditioning | | | |
| | • components: | | | |
| | - filters | | | |
| | - fans | | | |
| | - humidifiers | | | |
| | - heater batteries | | | |
| | - cooling batteries | | | |
| | - air inlet grilles | | | |

| | | | | |
|----|---|--|--|--|
| | - grilles | | | |
| | - dampers | | | |
| | - attenuators | | | |
| | - automatic controls | | | |
| | - time control for air conditioning systems | | | |
| | - energy management systems | | | |
| | - motorised dampers | | | |
| | - condensers | | | |
| | - cooling towers | | | |
| | - refrigeration units | | | |
| | - chillers | | | |
| 11 | implement work procedures for routine and non-routine maintenance activities that ensure the continued effective operation of at least six of the following air conditioning components: | | | |
| | • filters | | | |
| | • fans | | | |
| | • humidifiers | | | |
| | • heater batteries | | | |
| | • cooling batteries | | | |
| | • air inlet grilles | | | |
| | • grilles | | | |
| | • dampers | | | |
| | • attenuators | | | |
| | • automatic controls | | | |
| | • time control for air conditioning systems | | | |
| | • energy management systems | | | |
| | • motorised dampers | | | |
| | • condensers | | | |
| | • cooling towers | | | |
| | • refrigeration units | | | |
| | • chillers | | | |
| 12 | confirm that maintenance records have been completed accurately. | | | |

| Outcome 4 | Be able to complete soundness tests on industrial and commercial heating and ventilation systems | | | |
|---|---|--------------------|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | confirm through visual inspections that the following systems conform with industry requirements: | | | |
| | <ul style="list-style-type: none"> • cold water (one of the following): | | | |
| | <ul style="list-style-type: none"> - boosted | | | |
| | <ul style="list-style-type: none"> - high rise building systems | | | |
| | <ul style="list-style-type: none"> • hot water (one of the following): | | | |
| | <ul style="list-style-type: none"> - unvented | | | |
| | <ul style="list-style-type: none"> - secondary circulation | | | |
| | <ul style="list-style-type: none"> - instantaneous (plate heat exchanger) | | | |
| | <ul style="list-style-type: none"> • heating (one of the following): | | | |
| | <ul style="list-style-type: none"> - low temperature hot water | | | |
| | <ul style="list-style-type: none"> - medium temperature hot water | | | |
| | <ul style="list-style-type: none"> • Ventilation (one of the following): | | | |
| | <ul style="list-style-type: none"> - tempered warm air supply | | | |
| | <ul style="list-style-type: none"> - Supply | | | |
| | <ul style="list-style-type: none"> - extract | | | |
| | <ul style="list-style-type: none"> - balanced | | | |
| <ul style="list-style-type: none"> • air conditioning systems (one of the following): | | | | |
| <ul style="list-style-type: none"> - all air | | | | |
| <ul style="list-style-type: none"> - air – water | | | | |
| <ul style="list-style-type: none"> - refrigerant - air | | | | |
| 2 | confirm the heating and ventilation system is ready to receive soundness tests to cover: | | | |
| | <ul style="list-style-type: none"> • pipework | | | |
| | <ul style="list-style-type: none"> • ductwork | | | |
| | <ul style="list-style-type: none"> • appliances | | | |
| <ul style="list-style-type: none"> • components | | | | |
| 3 | verify that procedures for: | | | |
| | <ul style="list-style-type: none"> • cleaning | | | |
| | <ul style="list-style-type: none"> • flushing | | | |
| | <ul style="list-style-type: none"> • charging systems have been carried out in accordance with industry requirements | | | |

| | | | | |
|---|--|--|--|--|
| 4 | confirm procedures for establishing that input services to the system components are suited to the intended purpose for two of the following: | | | |
| | <ul style="list-style-type: none"> • water company mains | | | |
| | <ul style="list-style-type: none"> • mains fed, direct, or indirect | | | |
| | <ul style="list-style-type: none"> • gas | | | |
| 5 | verify that a soundness test for two of the following systems conforms with appropriate industry standards, guides and good practice guides: | | | |
| | <ul style="list-style-type: none"> • cold water | | | |
| | <ul style="list-style-type: none"> • hot water | | | |
| | <ul style="list-style-type: none"> • heating | | | |
| | <ul style="list-style-type: none"> • ventilation | | | |
| 6 | implement pre-commissioning tests and checks in accordance with appropriate industry requirements, including: | | | |
| | <ul style="list-style-type: none"> • statutory regulations | | | |
| | <ul style="list-style-type: none"> • codes of practice | | | |
| | <ul style="list-style-type: none"> • industry standards | | | |
| | <ul style="list-style-type: none"> • industry guides/good practice guides | | | |
| | <ul style="list-style-type: none"> • verbal instructions | | | |
| 7 | implement checks to confirm: | | | |
| | <ul style="list-style-type: none"> • system cleanliness | | | |
| | <ul style="list-style-type: none"> • system is charged | | | |
| | <ul style="list-style-type: none"> • un-commissioned systems and components cannot be activated. | | | |

| Outcome 5 | Be able to complete commissioning of industrial and commercial heating and ventilation systems | | | |
|------------------|---|--------------------|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | verify the availability of the relevant industry specifications and guidelines on the performance of heating and ventilation systems including: | | | |
| | <ul style="list-style-type: none"> • cold water (one of the following): | | | |
| | <ul style="list-style-type: none"> - storage (indirect) | | | |
| | <ul style="list-style-type: none"> - non storage (direct) | | | |
| | <ul style="list-style-type: none"> - boosted | | | |
| | <ul style="list-style-type: none"> - high rise building systems | | | |

| | | | | |
|---|---|--|--|--|
| | <ul style="list-style-type: none"> • hot water (one of the following): | | | |
| | <ul style="list-style-type: none"> - open vented | | | |
| | <ul style="list-style-type: none"> - storage (indirect) | | | |
| | <ul style="list-style-type: none"> - unvented | | | |
| | <ul style="list-style-type: none"> - secondary circulation | | | |
| | <ul style="list-style-type: none"> - instantaneous (plate heat exchanger) | | | |
| | <ul style="list-style-type: none"> • heating (one of the following): | | | |
| | <ul style="list-style-type: none"> - low temperature hot water | | | |
| | <ul style="list-style-type: none"> - medium temperature hot water | | | |
| | <ul style="list-style-type: none"> • ventilation (one of the following): | | | |
| | <ul style="list-style-type: none"> - tempered warm air supply | | | |
| | <ul style="list-style-type: none"> - supply | | | |
| | <ul style="list-style-type: none"> - extract | | | |
| | <ul style="list-style-type: none"> - balanced | | | |
| | <ul style="list-style-type: none"> • air conditioning systems (one of the following): | | | |
| | <ul style="list-style-type: none"> - all air | | | |
| | <ul style="list-style-type: none"> - air - water | | | |
| | <ul style="list-style-type: none"> - refrigerant - air | | | |
| 2 | confirm that liaison has taken place during the commissioning process in order to minimise disturbance to work routines including liaison with one of the following: | | | |
| | <ul style="list-style-type: none"> • customer/client | | | |
| | <ul style="list-style-type: none"> • other site workers | | | |
| | <ul style="list-style-type: none"> • site visitors | | | |
| | <ul style="list-style-type: none"> • line manager | | | |
| 3 | conduct mechanical and control performance checks and adjustments in accordance with industry specifications for the following: | | | |
| | <ul style="list-style-type: none"> • hot and cold water system components (all of the following): | | | |
| | <ul style="list-style-type: none"> - cold water storage cistern | | | |
| | <ul style="list-style-type: none"> - pressure booster sets | | | |
| | <ul style="list-style-type: none"> - hot water storage vessels | | | |
| | <ul style="list-style-type: none"> - appliance control valve or tap, terminal fittings | | | |
| | and a minimum of any two from the following: | | | |
| | <ul style="list-style-type: none"> - electric and gas water heaters | | | |
| | <ul style="list-style-type: none"> - stop valves | | | |
| | <ul style="list-style-type: none"> - shower mixing valves | | | |
| | <ul style="list-style-type: none"> - blending valves | | | |
| | <ul style="list-style-type: none"> - mixing valves | | | |
| | <ul style="list-style-type: none"> - circulating pumps (bronze) | | | |
| | <ul style="list-style-type: none"> - expansion vessels | | | |

| | | | | |
|--------------------------------------|--|--|--|--|
| 4 | conduct mechanical and control performance checks and adjustments in accordance with industry specifications for six of the following heating system components | | | |
| | • hot water storage vessels | | | |
| | • radiators | | | |
| | • convector heaters, natural and assisted | | | |
| | • panel heaters | | | |
| | • ceiling coils | | | |
| | • thermostatic control of hot water heating systems | | | |
| | • time control of hot water heating systems | | | |
| | • energy management systems | | | |
| | • motorised valves | | | |
| | • pumps/accelerators | | | |
| | • temperature and pressure relief valves | | | |
| • expansion vessels | | | | |
| 5 | conduct mechanical and control performance checks and adjustments in accordance with industry specifications for six of the following ventilation system components: | | | |
| | • filters | | | |
| | • fans | | | |
| | • air inlet grilles | | | |
| | • dampers | | | |
| | • attenuators | | | |
| | • automatic controls | | | |
| | • time control ventilating systems | | | |
| | • energy management systems | | | |
| | • motorised dampers | | | |
| | • air handling units | | | |
| | • canopies | | | |
| | • air to water heat exchangers | | | |
| • air to gas heat exchangers | | | | |
| • air to refrigerant heat exchangers | | | | |
| 6 | conduct mechanical and control performance checks and adjustments in accordance with industry specifications for six of the following air conditioning system components: | | | |
| | • filters | | | |
| | • fans | | | |
| | • humidifiers | | | |
| | • heater batteries | | | |

| | | | | |
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| | <ul style="list-style-type: none"> • cooling batteries | | | |
| | <ul style="list-style-type: none"> • air inlet grilles | | | |
| | <ul style="list-style-type: none"> • grilles | | | |
| | <ul style="list-style-type: none"> • dampers | | | |
| | <ul style="list-style-type: none"> • attenuators | | | |
| | <ul style="list-style-type: none"> • automatic controls | | | |
| | <ul style="list-style-type: none"> • time control for air conditioning systems | | | |
| | <ul style="list-style-type: none"> • energy management systems | | | |
| | <ul style="list-style-type: none"> • motorised dampers | | | |
| | <ul style="list-style-type: none"> • condensers | | | |
| | <ul style="list-style-type: none"> • cooling towers | | | |
| | <ul style="list-style-type: none"> • refrigeration units | | | |
| | <ul style="list-style-type: none"> • chillers | | | |
| 7 | confirm that appropriate system information is available to the line manager. | | | |

| Outcome 6 | | Be able to complete fault identification on industrial and commercial heating and ventilation systems | | |
|---|--|--|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | obtain specific information on heating and ventilation system component faults from: | | | |
| | <ul style="list-style-type: none"> • system users | | | |
| | <ul style="list-style-type: none"> • visual inspections | | | |
| | <ul style="list-style-type: none"> • diagnostic tests | | | |
| 2 | confirm that the relevant persons have been advised that fault diagnosis and rectification activities can cause potential disruption, including one of the following: | | | |
| | <ul style="list-style-type: none"> • customers/clients | | | |
| | <ul style="list-style-type: none"> • other site workers | | | |
| | <ul style="list-style-type: none"> • supervisor/line manager | | | |
| 3 | implement procedures for diagnosing faults in system components in accordance with industry specifications including: | | | |
| | <ul style="list-style-type: none"> • any two from the following hot and cold water components: | | | |
| | <ul style="list-style-type: none"> - electric and gas water heaters | | | |
| | <ul style="list-style-type: none"> - stop valves | | | |
| | <ul style="list-style-type: none"> - shower mixing valves | | | |
| | <ul style="list-style-type: none"> - blending valves | | | |
| | <ul style="list-style-type: none"> - mixing valves | | | |
| | <ul style="list-style-type: none"> - circulating pumps (bronze) | | | |
| <ul style="list-style-type: none"> - expansion vessels | | | | |

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| | - RPZ valves | | | |
| | - feed and expansion cistern (primary system) | | | |
| | • any three from the following heating components: | | | |
| | - hot water storage vessels | | | |
| | - radiators | | | |
| | - convector heaters, natural and assisted | | | |
| | - panel heaters | | | |
| | - ceiling coils | | | |
| | - thermostatic control of hot water heating systems | | | |
| | - time control of hot water heating systems | | | |
| | - energy management systems | | | |
| | - motorised valves | | | |
| | - pumps/ accelerators | | | |
| | - temperature and pressure relief valves | | | |
| | - expansion vessels | | | |
| 4 | implement procedures for diagnosing faults in system components in accordance with industry specifications including: | | | |
| | • any three from the following ventilating components: | | | |
| | - filters | | | |
| | - fans | | | |
| | - air inlet grilles | | | |
| | - dampers | | | |
| | - attenuators | | | |
| | - automatic controls | | | |
| | - time control ventilating systems | | | |
| | - energy management systems | | | |
| | - motorised dampers | | | |
| | - air handling units | | | |
| | - canopies | | | |
| | - air to water heat exchangers | | | |
| | - air to gas heat exchangers | | | |
| | - air to refrigerant heat exchangers | | | |
| | • any three from the following air conditioning: | | | |
| | - filters | | | |
| | - fans | | | |
| | - humidifiers | | | |
| | - heater batteries | | | |

| | | | | |
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| | - cooling batteries | | | |
| | - air inlet grilles | | | |
| | - grilles | | | |
| | - dampers | | | |
| | - attenuators | | | |
| | - automatic controls | | | |
| | - time control for air conditioning systems | | | |
| | - energy management systems | | | |
| | - motorised dampers | | | |
| | - condensers | | | |
| | - cooling towers | | | |
| | - refrigeration units | | | |
| | - chillers | | | |
| 5 | confirm that procedures for reporting diagnosed faults in systems and components have been carried out in accordance with industry specifications. | | | |

| Outcome 7 | | Be able to rectify faults on industrial and commercial heating and ventilation systems | | |
|----------------------|---|---|-------------------|--------------------|
| Criteria | | Candidate initials | Assessor initials | Evidence reference |
| 1 | implement procedures for rectifying systems performance that: | | | |
| | • minimise risk to individuals | | | |
| | • minimise down time | | | |
| 2 | implement procedures for rectifying systems performance in accordance with the requirements of one of the following: | | | |
| | • customers/clients | | | |
| | • other site workers | | | |
| | • line manager | | | |
| 3 | demonstrate that systems or partial systems have been isolated prior to commencing of rectification work in accordance with industry requirements | | | |
| 4 | implement procedures for rectifying faults on systems including: | | | |
| | • cold water, one of the following: | | | |
| | - storage (indirect) | | | |
| | - non storage (direct) | | | |
| | - boosted | | | |
| | - high rise building systems | | | |
| | • hot water, one of the following: | | | |
| | - open vented | | | |
| - storage (indirect) | | | | |

| | | | | |
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| | - unvented | | | |
| | - secondary circulation | | | |
| | - instantaneous (plate heat exchanger) | | | |
| | • heating, one of the following: | | | |
| | - low temperature hot water | | | |
| | - medium temperature hot water | | | |
| | • ventilation, one of the following: | | | |
| | - tempered warm air supply | | | |
| | - supply | | | |
| | - extract | | | |
| | - balanced | | | |
| | • air conditioning systems, one of the following: | | | |
| | - all air | | | |
| | - air – water | | | |
| | - refrigerant - air | | | |
| 5 | demonstrate that actions taken to rectify system performance can be maintained | | | |
| 6 | confirm that the relevant system documentation has been completed accurately and forwarded to the line manager. | | | |

Unit 326

Maintain and diagnose faults on heating and ventilating industrial and commercial systems

Declaration

I confirm that the evidence supplied for this unit is authentic and a true representation of my own work. The work logged is my own work carried out during my normal work duties.

The answers in the question bank are my own work and discussed with my assessor on completion. I have been observed in my workplace by my assessor on several occasions.

| | |
|-----------------------------|--|
| Candidate Name: | |
| Candidate Signature: | |
| Date: | |

I confirm that this candidate has achieved all the requirements of this unit with the evidence listed. Assessment was conducted under the specified conditions and context, and is valid, authentic, reliable, current and sufficient.

| | |
|----------------------------|--|
| Assessor Name: | |
| Assessor Signature: | |
| Date: | |

| | |
|----------------------|--|
| IV Name: | |
| IV Signature: | |
| Date: | |

On Site Assessment Plan / Feedback



| | |
|---------------------|--|
| Evidence Reference: | |
|---------------------|--|

Qualification:
Level:

Qualification number:

Candidate name:
Assessor name:

Date:

| Candidate prepared for assessment (Provide details below) | Yes / No | Candidate requires support | Yes / No |
|---|-----------------|-----------------------------------|-----------------|
| Candidate briefed on appeals procedure | Yes / No | Support required | |

Assessment Location / Address and postcode:

Type of work to be carried out:

Assessor Feedback:
(Use Assessor continuation sheet if required)

Forward Planning:

| | | |
|----------------------|-------------------|-------|
| Candidate Signature: | | |
| Assessor Signature: | | Date: |
| IV/IQA Name: | IV/IQA Signature: | Date: |

Photographic Supplementary Evidence



| | |
|---------------------|--|
| Evidence Reference: | |
|---------------------|--|

Scheme / Award:

Scheme Number:

Level:

Candidate Name:

Unit Number:

Brief description of task being carried out in the photograph (to be completed by candidate):

(Attach Photo in this Box)

Location of photograph:

| | | |
|----------------------|-------------------|-------|
| Candidate Signature: | | |
| Assessor Signature: | | Date: |
| IV/IQA Name: | IV/IQA Signature: | Date: |

Workplace Recorder Details



I confirm I am suitably experienced or qualified in line with the industry requirements to act as a witness for this learner. I acknowledge that I will only counter sign documentation requested by the learner where to my knowledge only the learner has completed the work and on the understanding that the work has been carried out to the acceptable standard.

| | |
|-------------------------------|-------|
| Workplace Recorder Name: | |
| Workplace Recorder Signature: | Date: |

I confirm I am suitably experienced or qualified in line with the industry requirements to act as a witness for this learner. I acknowledge that I will only counter sign documentation requested by the learner where to my knowledge only the learner has completed the work and on the understanding that the work has been carried out to the acceptable standard.

| | |
|-------------------------------|-------|
| Workplace Recorder Name: | |
| Workplace Recorder Signature: | Date: |

I confirm I am suitably experienced or qualified in line with the industry requirements to act as a witness for this learner. I acknowledge that I will only counter sign documentation requested by the learner where to my knowledge only the learner has completed the work and on the understanding that the work has been carried out to the acceptable standard.

| | |
|-------------------------------|-------|
| Workplace Recorder Name: | |
| Workplace Recorder Signature: | Date: |

Appendix 1 Summary of City & Guilds assessment policies

Health and Safety

All centres have to make sure that they provide a safe and healthy environment for learning, including induction and assessment. City & Guilds external verifiers check this when they visit assessment centres.

Equal Opportunities

Your centre will have an equal opportunities policy. Your centre will explain this to you during your induction, and may give you a copy of the policy.

City & Guilds equal opportunities policy is available from our website www.cityandguilds.com, City & Guilds Customer Relations Team or your centre.

Access to assessment

City & Guilds qualifications are open to all candidates, whatever their gender, race, creed, age or special needs. Some candidates may need extra help with their assessment, for example, a person with a visual impairment may need a reader.

If you think you will need alternative assessment arrangements because you have special needs, you should discuss this with your centre during your induction, and record this on your assessment plan. City & Guilds will allow centres to make alternative arrangements for you if you are eligible and if the qualification allows for this. This must be agreed before you start your qualification.

City & Guilds guidance and regulations document *Access to assessment and qualifications* is available on the City & Guilds website www.cityandguilds.com, from the City & Guilds Customer Relations Team or your centre.

Complaints and appeals

Centres must have a policy and procedure to deal with any complaints you may have. You may feel you have not been assessed fairly, or may want to appeal against an assessment decision if you do not agree with your assessor.

These procedures will be explained during induction and you will be provided with information about the Quality Assurance Co-ordinator within your centre who is responsible for this.

Most complaints and appeals can be resolved within the centre, but if you follow the centre procedure and are still not satisfied you can complain to City & Guilds.

Our complaints policy is on our website www.cityandguilds.com or is available from the City & Guilds Customer Relations Team or your centre.

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

If you have a complaint, or any suggestions for improvement about any of the services that City & Guilds provides, email: feedbackandcomplaints@cityandguilds.com

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