Vehicle Fitting Units
(VF01-V58 to VF12-V69)

INDEX **Version**

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VF01/V58

Inspect Repair and Replace Standard Light Vehicle Tyres

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting 2 tyres.
2. Produce evidence of repairing a light vehicle tyre.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

7. You must produce evidence of inspecting, removing and replacing or refitting at least 1 of the 3* types of tyre in the Scoping Statement on at least 3 occasions.
8. You must produce evidence of repairing at least 1 of the 3* types of tyre in the Scoping Statement on at least 3 occasions.
9. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting a light vehicle tyre on at least 1 occasion
    - repairing a light vehicle tyre on at least 1 occasion.

*However, you must prove to your assessor that you have the necessary knowledge, understanding and skills to be able to perform competently in respect of all the types of tyres listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the task you are performing.

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If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting, removing and replacing refitting 1				
Inspecting, removing and replacing refitting 2				
Inspecting, removing and replacing refitting 3				
Repairing tyre 1				
Repairing tyre 2				
Repairing tyre 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…… Candidate signature:…… Date: ……..	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……..
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …… Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …… Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **tyres.**	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Tyres are	
a. radial	
b. cross ply	
c. bias belted.	
2.Tools and equipment are	
a. lifting and supporting equipment	
b. wheel removal and refitting tools	
c. tyre removal and refitting equipment	
d. measuring equipment	
e. tyre inflation equipment	
f. wheel balancing equipment	
g. specialist equipment for tyre removal	
h. tyre repair tools.	
3.Inspection covers	
a. wheel rim and fixings	
b. tyres	
c. valves.	
4.Inspection techniques are	
a. visual	
b. measurements of tread depth	
c. tyre pressures	
d. balance.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements for light vehicle tyres, and the relevant parts of the prevailing British and or European standard for the repair of light vehicle tyres. 3. How to isolate scrapped tyres and dispose of waste materials in your workplace. 4. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 5. The importance of selecting, using and maintaining the appropriate personal protective equipment then inspecting, repairing and replacing light vehicle tyres. 6. The agreed work specification. 7. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 8. The requirements for protecting the vehicle and contents from damage before, during and after removing and replacing wheels. 9. The importance of working to agreed timescales and keeping others informed of progress. 10. The relationship between time and cost. 11. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 12. How to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting light vehicle tyres.	
Materials 13. The types of tyre repair materials available (i.e. rubber only plug patch unit and rubber only patch and filler material). 14. The repair material manufacturer's instructions for the type(s) of tyres on which you are working.	
Tyre inspection, removal, repair and replacement 15. How to find and use suitable sources of information on standard light vehicle tyres. 16. The purpose, function and construction of standard light vehicle tyres. 17. The common faults associated with standard light vehicle tyres and their causes. 18. What a tyre inspection should cover. 19. The inspection techniques associated with light vehicle tyres and how to carry them out. 20. The importance of taking accurate measurements and ensuring any adjustments are within acceptable tolerances for the vehicle. 21. The importance of basing your decision to replace or repair tyres upon the results of your Inspection. 22. How to remove, repair, replace and refit light vehicle tyres, replace valves and remove and replace road wheels. 23. The importance of checking the safety and operation of equipment prior to use. 24. How to work safely avoiding injury to yourself, others and damage to tyres and wheels.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace Standard Light Vehicle Tyres

This unit is about inspecting standard light vehicle tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress.
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems.
   c) importance of accurate completion of records.
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings.

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) remoulds / retreads
    g) tread types as normal
        i) road use
        ii) off-road use
    h) appropriate for trailers and leisure accommodation vehicles (caravans).
2) identify tyres as being suitable for use by specific vehicle types
    a) light vehicles.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) load index
    d) tyre size
    e) trailers and leisure accommodation vehicles (caravans).
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators
    e) stating the reason for use of left and right hand threads when securing wheels.

7) State statutory requirements relating to fitting and use of tyres
   a) combinations of radial and cross ply tyres
   b) minimum tread depth and tyre conditions
   c) speed and load.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) describe the procedure for wheel removal and replacement
   a) positioning and operation of hydraulic jacks
   b) positioning of axle stands
   c) method of slackening and re-tightening wheel nuts
   d) setting torque.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) space saver assemblies.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting road wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) lubricating spare wheel mechanism
   f) repairing tubes and tyres
   g) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on the usual variety of vehicles.
5) State the procedure for carrying out static and dynamic balancing on and off the vehicle
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	Number of questions
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF02/V59

Inspect Repair and Replace High Performance Light Vehicle Tyres

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting 2 high performance tyres
2. Produce evidence of repairing a high performance light vehicle tyre.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must

7. Produce evidence of inspecting, removing and replacing or refitting at least 3 of the 5* types of tyre in the Scoping Statement on at least 3 occasions.
8. Produce evidence of repairing a high performance light vehicle tyre* on at least 3 different occasions.
9. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting a high performance light vehicle tyre on at least 1 occasion
    - repairing a high performance light vehicle tyre on at least 1 occasion.

*However, you must prove to your assessor that you have the necessary knowledge, understanding and skills to be able to perform competently in respect of all the types of tyres listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
High performance light vehicle tyre fitting 1				
High performance light vehicle tyre fitting 2				
High performance light vehicle tyre fitting 3				
Repair 1				
Repair 2				
Repair 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **high performance tyres.**	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **high performance tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.High performance light vehicle tyres are	
a. those with a V, W, Y or ZR rating	
b. those having an aspect ratio of 55% or below	
c. with flat run capability	
d. directional and asymmetric tread patterns	
e. composite tread patterns	
2.Tools and equipment are	
a. lifting and supporting equipment	
b. wheel removal and refitting tools	
c. tyre removal and refitting equipment	
d. measuring equipment	
e. tyre inflation equipment	
f. wheel balancing equipment	
g. specialist equipment for tyre removal	
h. tyre repair tools	
3.Inspection covers	
a. wheel rim and fixings	
b. tyres	
c. valves	
4.Inspection techniques are	
a. visual	
b. measurements of tread depth	
c. tyre pressures	
d. balance	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements for light vehicle tyres, and the relevant parts of the prevailing British and or European standard for the repair of high performance light vehicle tyres 3. How to isolate scrapped tyres and dispose of waste materials in your workplace 4. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 5. The importance of selecting, using and maintaining the appropriate personal protective equipment when inspecting, repairing and replacing high performance light vehicle tyres. 6. The agreed work specification. 7. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 8. The requirements for protecting the vehicle and contents from damage before, during and after removing and replacing wheels. 9. The importance of working to agreed timescales and keeping others informed of progress. 10. The relationship between time and cost. 11. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 12. How to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting high performance light vehicle tyres.	
Materials 13. The types of tyre repair materials available (i.e. rubber only plug patch unit and rubber only patch and filler material). 14. The repair material manufacturer's instructions for the application of repair materials for the type(s) of tyres on which you are working.	
Tyre inspection, removal, repair and replacement 15. How to find and use suitable sources of information on high performance light vehicle tyres. 16. The purpose, function and construction of high performance light vehicle tyres. 17. The types and functions of pressure monitoring systems. 18. The types of valves used in high performance light vehicle tyres and their installation techniques. 19. How run flat tyres function. 20. The common faults associated with high performance light vehicle tyres and their causes. 21. The manufacturer's recommendations on the 'reparability' of their tyres. 22. What a tyre inspection should cover. 23. The inspection techniques associated with high performance light vehicle tyres and how to conduct them. 24. The importance of taking accurate measurements and ensuring any adjustments are within acceptable tolerances for the vehicle. 25. The importance of basing your decision to replace or repair tyres upon the results of your inspection. 26. How to remove, repair, replace and refit high performance light vehicle tyres, wheels and valves. 27. The characteristics of composite tyres and how they are fitted. 28. The importance of checking the safety and operation of equipment prior to use. 29. How to work safely avoiding injury to yourself, others and damage to wheels when removing and refitting high performance light vehicle tyres.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace High Performance Light Vehicle Tyres

This unit is about inspecting high performance light vehicle tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) tread types as
        i) road use
        ii) off-road use
        iii) competition use
        iv) specialist use.
2) Identify tyres as being suitable for use by specific vehicle types
    a) light vehicles
    b) high performance vehicles.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) load index
    d) tyre size
    e) trailers and leisure accommodation vehicles (caravans).
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators

e) stating the reason for use of left and right hand threads when securing wheels.

7) State statutory requirements relating to fitting and use of tyres

a) combinations of radial and cross ply tyres

b) minimum tread depth and tyre conditions

c) speed and load.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres

Objectives

To achieve this outcome the candidate has to:

1) Describe the procedure for wheel removal and replacement
   a) positioning and operation of hydraulic jacks
   b) positioning of axle stands
   c) method of slackening and re-tightening wheel nuts
   d) setting torque
   e) nut position indicators.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) space saver assemblies.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting road wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) lubricating spare wheel mechanism
   f) repairing tubes and tyres
   g) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on high performance vehicles.
5) State the procedure for carrying out static and dynamic balancing on and off the vehicle.
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF03/V60

Inspect Repair and Replace Commercial Vehicle Tyres

Further guidance available	Observation of your task/work	Evidence recording	Computer based testing	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting a heavy vehicle tyre
2. Produce evidence of successfully re-grooving a tyre
3. Produce evidence of repairing a commercial vehicle tyre.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit .
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting, removing and replacing or refitting tyres to at least 3 of the 4* types of wheel rim in the Scoping Statement on at least 3 occasions.
8. Produce evidence of successfully re-grooving tyres on 3 different occasions.
9. You must produce evidence of repairing a commercial vehicle tyre* on at least 3 different occasions, one of which must include the repair of an inner tube.
10. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting a commercial vehicle tyre on at least 1 occasion
    - repairing a commercial vehicle tyre on at least 1 occasion.
    - Re-grooving 1 commercial vehicle tyre on at least 1 occasion

*However, you must prove to your assessor that you have the necessary knowledge, understanding and skills to be able to perform competently in respect of all the types of tyres listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

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Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Removing and replacing or refitting tyres1				
Removing and replacing or refitting tyres 2				
Removing and replacing or refitting tyres 3				
Re-grooving tyres 1				
Re-grooving tyres 2				
Re-grooving tyres 3				
Repairing a commercial vehicle tyre 1				
Repairing a commercial vehicle tyre 2				
Repairing a commercial vehicle tyre 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **high performance tyres**.	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **high performance tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Ensure re-grooved tyres meet manufacturer's and legal requirements prior to release to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Commercial vehicle tyres are fitted to	
a. 17.5, 19.5 and 22.5 diameter code rims	
b. external valve aperture or hole (EVA/EVH) rims	
c. split rims	
d. wide single rims.	
2.Tools and equipment are	
a. lifting and supporting equipment	
b. wheel removal and refitting tools	
c. tyre removal and refitting hand tools	
d. measuring	
e. tyre safety inflation equipment	
f. tyre re-grooving equipment	
g. tyre repair tools.	
3.Inspection covers	
a. wheel rim components and fixings	
b. tyres	
c. valves	
d. tubes.	
4.Inspection techniques are	
a. visual	
b. measurements of tread depth	
c. tyre pressures.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements for commercial vehicle tyres, and the relevant parts of the prevailing British and or European standard for the repair of commercial vehicle tyres. 3. How to isolate scrapped tyres and dispose of waste materials in your workplace. 4. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 5. The importance of selecting, using and maintaining the appropriate personal protective equipment when inspecting, repairing and replacing commercial vehicle tyres. 6. The agreed work specification. 7. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 8. The requirements for protecting the vehicle and contents from damage before, during and after removing and replacing wheels. 9. The importance of working to agreed timescales and keeping others informed of progress. 10. The relationship between time and cost. 11. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment how to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting commercial vehicle tyres, including the use of specialist bead unseating tools for EVA/AVH rims.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace Commercial Vehicle Tyres

This unit is about inspecting high performance heavy vehicle tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VOSA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.

5. Explain the need for vehicle protection prior to maintenance activities
    a) protection relating to:
        i. vehicle body panels
        ii. paint surfaces
        iii. seats
        iv. carpet
        v. floor mats.
6. Identify the current regulations relating to the repair and use of light vehicles
    a) Road Traffic Act
    b) VOSA regulations
    c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) remoulds / retreads
    g) tread types as
        i) road use
        ii) off-road use
        iii) specialist use.
2) Identify tyres as being suitable for use by specific vehicle types
    a) heavy vehicles
    b) trailers.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) load index
    d) tyre size.
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators

e) stating the reason for use of left and right hand threads when securing wheels.

7) State statutory requirements relating to fitting and use of tyres
   a) combinations of radial and cross ply tyres
   b) minimum tread depth and tyre conditions
   c) speed and load.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres

Objectives

To achieve this outcome the candidate has to:

1) Describe the procedure for wheel removal and replacement
   a) positioning and operation of hydraulic jacks
   b) positioning of axle stands
   c) method of slackening and re-tightening wheel nuts
   d) setting torque
   e) nut position indicators.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) divided rim wheels.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting road wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) lubricating spare wheel mechanism
   f) re-grooving / cutting treads using thermal equipment
   g) repairing tubes and tyres
   h) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on the usual variety of vehicles.
5) State the procedure for carrying out static and dynamic balancing.
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	Number of questions
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF04/V61

Inspect Repair and Replace Motorcycle Tyres

Further guidance available	Observation of your task/work	Evidence recording	Computer based testing	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting a motorcycle tyre
2. Produce evidence of repairing a motorcycle tyre.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting, removing and replacing or refitting motorcycle tyres on at least 3 different occasions which must include at least 1 tube type tyre.
8. You must produce evidence of repairing a motorcycle tyre on at least 3 different occasions, one of which must include the repair of an inner tube.
9. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting a motorcycle tyre on at least 1 occasion
    - repairing a motorcycle tyre on at least 1 occasion.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting, removing and replacing or refitting motorcycle tyres 1				
Inspecting, removing and replacing or refitting motorcycle tyres 2				
Inspecting, removing and replacing or refitting motorcycle tyres 3				
Repairing a motorcycle tyre 1				
Repairing a motorcycle tyre 2				
Repairing a motorcycle tyre 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **motorcycle tyres.**	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.,	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **motorcycle tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1. Motorcycle tyres are	
a. tube	
b. tubeless.	
2. Tools and equipment are	
a. lifting and supporting equipment	
b. tyre removal and refitting tools and equipment	
c. measuring equipment	
d. tyre inflation equipment	
e. wheel balancing equipment	
f. tyre repair tools.	
3. Inspection covers	
a. wheel rim and fixings	
b. tyres	
c. valves	
d. inner tubes.	
4. Inspection techniques are	
a. visual	
b. measurements of tread depth	
c. tyre pressures	
d. balance.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and motorcycle protection. 2. The legal requirements for motorcycle tyres, and the relevant parts of the prevailing British and or European standard for the repair of motorcycle tyres. 3. How to isolate scrapped tyres and dispose of waste materials in your workplace. 4. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 5. The importance of selecting, using and maintaining the appropriate personal protective equipment when inspecting, repairing and replacing motorcycle tyres. 6. The agreed work specification. 7. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection 8. The requirements for protecting the motorcycle and contents from damage before, during and after removing and replacing wheels. 9. The importance of working to agreed timescales and keeping others informed of progress. 10. The relationship between time and cost. 11. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 12. How to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting motorcycle tyres.	
Materials 13. The types of tyre repair materials available (i.e. rubber only plug patch unit and rubber only patch and filler material). 14. The repair material manufacturer's instructions for the application of repair materials for the type(s) of tyres on which you are working.	
Tyre inspection, removal, repair and replacement 15. How to find and use suitable sources of information on motorcycle tyres. 16. The purpose, function and construction of motorcycle tyres. 17. The types of valves used in motorcycle tyres and their installation techniques. 18. The common faults associated with motorcycle tyres and their causes (e.g. normal wear; abnormal wear due to misalignment; incorrect inflation, adjustment, installation and application; damage). 19. The manufacturer's recommendations on the 'repairability' of their tyres. 20. What a tyre inspection should cover. 21. The inspection techniques associated with motorcycle tyres and how to conduct them. 22. The importance of taking accurate measurements and ensuring any adjustments are within acceptable tolerances for the motorcycle. 23. The importance of basing your decision to replace or repair tyres upon the results of your inspection. 24. How to remove, repair, replace and refit motorcycle tyres, wheels, tubes and valves. 25. The importance of checking the safety and operation of equipment prior to use. 26. How to work safely avoiding injury to yourself, others and damage to wheels when removing and refitting motorcycle tyre.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace Motorcycle Tyres

This unit is about inspecting motorcycle tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings.

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) tread types as
        i) road use
        ii) off-road use
        iii) competition use.
2) Identify tyres as being suitable for use by specific vehicle types
    a) motorcycles
    b) mopeds
    c) scooters.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) tyre size
    d) motor cycles, mopeds and scooters.
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators.
7) State statutory requirements relating to fitting and use of tyres

a) minimum tread depth and tyre conditions

b) speed.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres.

Objectives

To achieve this outcome a student has to:

1) Describe the procedure for wheel removal and replacement
   a) positioning of motor cycle supports
   b) method of slackening and re-tightening wheel nuts / fixings
   c) setting torque.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) divided rim wheels
   c) space saver assemblies.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) repairing tubes and tyres
   f) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on the usual variety of vehicles.
5) State the procedure for carrying out static and dynamic balancing.
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	Number of questions
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF05/V62

Inspect Repair and Replace Plant Equipment Tyres

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting 2 plant equipment tyres.
2. Produce evidence of repairing a plant equipment tyre with an inner tube.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting, removing and replacing or refitting plant equipment tyres on at least 3 different occasions which must include at least 1 tube type tyre.
8. You must produce evidence of repairing a plant equipment tyre on at least 3 different occasions, one of which must include the repair of an inner tube.
9. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting an plant equipment tyre on at least 1 occasion
    - repairing an plant equipment tyre on at least 1 occasion.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Replacing or refitting plant equipment tyres 1				
Replacing or refitting plant equipment tyres 2				
Replacing or refitting plant equipment tyres 3				
Repairing a plant equipment tyre 1				
Repairing a plant equipment tyre 2				
Repairing a plant equipment tyre and inner tube				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…… Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…… Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……...

Performance objective checklist

To be competent you must ensure that:	**PRN**
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **agricultural tyres.**	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **agricultural tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	**PRN**
1.Plant tyres are	
a. tube	
b. tubeless.	
2.Tools and equipment are	
a. lifting and supporting equipment	
b. wheel removal and refitting tools	
c. tyre and refitting hand tools	
d. measuring equipment	
e. tyre repair tools.	
3.Inspection covers	
a. wheel rim and fixings	
b. tyres	
c. valves	
d. inner tubes.	
4.Inspection techniques are	
a. visual	
b. tyre pressures.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements relating to plant tyres and the movement of vehicles on a plant site. 3. The hazards and risks associated with working in plant environments. 4. How to isolate scrapped tyres and dispose of waste materials in your workplace. 5. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 6. The importance of selecting, using and maintaining the appropriate personal protective equipment when inspecting, repairing and replacing plant tyres. 7. The agreed work specification. 8. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 9. The requirements for protecting the vehicle and contents from damage before, during and after removing and replacing wheels. 10. The importance of working to agreed timescales and keeping others informed of progress. 11. The relationship between time and cost. 12. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 13. How to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting plant tyres, including the use of specialist bead unseating tools.	
Materials 14. The types of tyre repair materials available (i.e. rubber only plug patch unit and rubber only patch and filler material). 15. The repair material manufacturer's instructions for the application of repair materials for the type(s) of tyres on which you are working.	
Tyre inspection, removal, repair and replacement 16. How to find and use suitable sources of information on plant tyres. 17. The purpose, function and construction of plant tyres. 18. The difference between well base (WB) and double well base (DWB) and divided type wheel rims. 19. The types of valves used in plant tyres and their installation techniques. 20. How to calculate dynamic rolling radius in order to select the correct replacement tyres. 21. How to adjust wheel track to widen or reduce wheel positioning. 22. How to improve traction by the use of ballast (i.e. water ballasting, wheel weights, chassis weights). 23. The common faults associated with plant tyres and their causes (e.g. normal wear; abnormal wear due to misalignment; incorrect inflation, adjustment, installation and application; damage). 24. The manufacturer's recommendations on the 'repairability' of their tyres. 25. What a tyre inspection should cover. 26. The inspection techniques associated with plant tyres and how to conduct them. 27. The importance of taking accurate measurements and ensuring any adjustments are within acceptable tolerances for the vehicle. 28. The importance of basing your decision to replace or repair tyres upon the results of your inspection. 29. How to remove, repair, replace and refit plant tyres, wheels, valves and tubes. 30. How to make the vehicle safe in an outdoor plant environment. 31. Any biological hazards associated with working in your working environment. 32. The importance of checking the safety and operation of equipment prior to use. 33. How to work safely avoiding injury to yourself, others and damage to wheels when removing and refitting plant tyres.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace Agricultural Tyres

This unit is about inspecting agricultural tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) remoulds / retreads
    g) tread types as
        i) road use
        ii) specialist use
    h) appropriate for trailers.
2) Identify tyres as being suitable for use by specific vehicle types
    a) agricultural
    b) heavy vehicles.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) load index
    d) tyre size
    e) trailers.
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators

e) stating the reason for use of left and right hand threads when securing wheels.

7) State statutory requirements relating to fitting and use of tyres

a) combinations of radial and cross ply tyres

b) minimum tread depth and tyre conditions

c) speed and load.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) Describe the procedure for wheel removal and replacement
   a) positioning and operation of hydraulic jacks
   b) positioning of axle stands
   c) method of slackening and re-tightening wheel nuts
   d) setting torque
   e) nut position indicators.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) divided rim wheels.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting road wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) lubricating spare wheel mechanism
   f) cutting treads using thermal equipment
   g) repairing tubes and tyres
   h) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on the usual variety of vehicles.
5) State the procedure for carrying out static and dynamic balancing on and off the vehicle.
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	Number of questions
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF06/V63

Inspect Repair and Replace Industrial Equipment Tyres

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting, removing and replacing or refitting 2 industrial tyres.
2. Produce evidence of repairing a pneumatic industrial tyre.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting, removing and replacing or refitting at least 3 of the 4* types of tyre in the Scoping Statement on at least 3 occasions.
8. Produce evidence of repairing a pneumatic industrial tyre* on at least 3 different occasions.
9. Your assessor must physically observe you successfully:
    - inspecting and replacing or refitting an industrial tyre on at least 1 occasion
    - repairing an industrial tyre on at least 1 occasion.

*****However, you must prove to your assessor that you have the necessary knowledge, understanding and skills to be able to perform competently in respect of all the types of tyres listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting, removing and replacing or refitting 1				
Inspecting, removing and replacing or refitting 2				
Inspecting, removing and replacing or refitting 3				
Repairing a pneumatic industrial tyre 1				
Repairing a pneumatic industrial tyre 2				
Repairing a pneumatic industrial tyre 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…… Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: …….... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: …….... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **tyre inspection**, repair and replacement activities.	
Use suitable sources of technical information to support your **inspection**, repair and replacement of **industrial tyres.**	
Work in a way which minimizes the risk of damage to the vehicle and its systems.	
Confirm that all the **tools and equipment** required is safe prior to use.	
Ensure your **inspection techniques** are sufficiently in depth to identify the severity of all tyre and wheel defects.	
Conduct all **inspection**, repair and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements • the current industry standard for tyre repair.	
Carry out all **inspection**, repair and replacement activities using: • suitable **tools and equipment** • the correct **inspection techniques** • the correct type and size of component.	
Clearly identify and record the cause of any tyre, valve or wheel faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted **industrial tyres** and valves are correctly fitted and balanced and conform to legal requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Industrial tyres are	
a. pneumatic	
b. resilient	
c. press on band	
d. direct band.	
2.Tools and equipment are	
a. lifting and supporting equipment	
b. wheel removal and refitting tools	
c. tyre and refitting equipment	
d. measuring	
e. tyre safety inflation equipment	
f. tyre repair tools.	
3.Inspection covers	
a. wheel rim and fixings	
b. tyres	
c. valves.	
4.Inspection techniques are	
a. visual	
b. tyre pressure.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements relating to industrial tyres. 3. The specific health and safety requirements for the industrial environment(s) in which you are working. 4. How to isolate scrapped tyres and dispose of waste materials in your workplace. 5. The importance of disposing of waste safely and the consequences of not doing so to others and the environment. 6. The importance of selecting, using and maintaining the appropriate personal protective equipment when inspecting, repairing and replacing industrial tyres. 7. The agreed work specification. 8. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 9. The requirements for protecting the vehicle and contents from damage before, during and after removing and replacing wheels. 10. The importance of working to agreed timescales and keeping others informed of progress. 11. The relationship between time and cost. 12. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 13. How to select, prepare and use the tools and equipment necessary for inspecting, repairing, replacing and refitting industrial tyres, including the use of specialist bead unseating tools.	
Materials 14. The types of tyre repair materials available (i.e. rubber only plug patch unit and rubber only patch and filler material). 15. The repair material manufacturer's instructions for the application of repair materials for the type(s) of tyres on which you are working.	
Tyre inspection, removal, repair and replacement 16. How to find and use suitable sources of information on industrial tyres. 17. The purpose, function and construction of industrial tyres. 18. The difference between well base (WB) and double well base (DWB) and divided type wheel rims. 19. The types of valves used in industrial tyres and their installation techniques. 20. How to improve traction by the use of ballast (i.e. water ballasting, wheel weights, chassis weights). 21. The common faults associated with industrial tyres and their causes (e.g. normal wear; abnormal wear due to misalignment; incorrect inflation, adjustment, installation and application; damage). 22. The manufacturer's recommendations on the 'repairability' of their tyres. 23. What a tyre inspection should cover. 24. The inspection techniques associated with industrial tyres and how to conduct them. 25. The importance of taking accurate measurements and ensuring any adjustments are within acceptable tolerances for the vehicle. 26. The importance of basing your decision to replace or repair tyres upon the results of your inspection. 27. How to remove, repair, replace and refit industrial tyres, wheels and valves. 28. How to make the vehicle safe in an outdoor industrial environment. 29. The biological and environmental hazards associated with working in the industrial environment. 30. The importance of checking the safety and operation of equipment prior to use. 31. How to work safely avoiding injury to yourself, others and damage to wheels when removing and refitting industrial tyres.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2	**Numeracy**: Access 3, Outcomes 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Repair and Replace Industrial Equipment Tyres

This unit is about inspecting industrial tyres to assess their condition and suitability for repair and carrying out necessary repair, replacement or refitting activities.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Recognise wheel and tyre types and understand the significance of sidewall markings.
3. Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.
4. Remove and refit wheels and tyres.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Recognise wheel and tyre types and understand the significance of sidewall markings

Objectives

To achieve this outcome the candidate has to:

1) List tyre types and features as
    a) radial ply
    b) cross ply
    c) bias-belted
    d) tubed
    e) tubeless
    f) remoulds / retreads
    g) tread types as
        i) road use
        ii) off-road use
        iii) specialist use.
2) Identify tyres as being suitable for use by specific vehicle types
    a) industrial applications
    b) trailers.
3) State the significance of sidewall tyre markings relating to
    a) maximum speed
    b) type of construction
    c) load index
    d) tyre size
    e) trailers.
4) Identify wheel types and state the significance of wheel markings.
5) State the purpose and functional requirements of wheels and tyres as being to
    a) transmit drive to the road surface
    b) withstand forces during braking and cornering
    c) support vehicle weight
    d) absorb shock
    e) maintain grip in wet conditions
    f) permit removal and refitting
    g) run true
    h) minimise air loss.
6) Describe working principles which enable the functional requirements to be met
    a) tread patterns for various climatic conditions and operational requirements
    b) describing tyre types, tyre sizes and speed ratings
    c) stating the reason for wheel balancing
    d) describing the use of tread depth indicators

e) stating the reason for use of left and right hand threads when securing wheels.

7) State statutory requirements relating to fitting and use of tyres

a) combinations of radial and cross ply tyres

b) minimum tread depth and tyre conditions

c) speed and load.

Outcome 3

Identify types of workshop equipment and materials, and follow instructions for using hand tools to remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) State the purpose, use and maintenance of hand tools necessary to remove and re-fit wheels and tyres as
   a) levers to remove and refit tyres and valves
   b) specialist pliers to remove and refit balance weights
   c) brushes and associated items for removing debris
   d) torque wrenches
   e) wheel braces
   f) compressed air wrenches
   g) pressure gauges
   h) tread depth gauges
   i) hydraulic jacks and axle stands
   j) slide hammers
   k) bead breakers.
2) List the types, maintenance requirements and purpose of workshop equipment necessary to remove and refit tyres as
   a) pneumatically and electrically operated tyre removal and refitting equipment
   b) lubricants to aid refitting
   c) wheel balancing equipment
   d) inflation equipment
   e) pressure measuring equipment.

Outcome 4

Remove and refit wheels and tyres.

Objectives

To achieve this outcome the candidate has to:

1) Describe the procedure for wheel removal and replacement
   a) positioning and operation of hydraulic jacks
   b) positioning of axle stands
   c) method of slackening and re-tightening wheel nuts
   d) setting torque
   e) nut position indicators.
2) State the procedure for tyre removal and refitting
   a) well base wheels - steel and alloy types
   b) divided rim wheels
   c) split rims.
3) State the procedure for visually inspecting, checking and adjusting removed components
   a) checking tyres for tread depth, wear and damage
   b) checking and adjusting tyre pressures
   c) inspecting road wheels and associated location/securing devices for serviceability
   d) checking tyres for type and position
   e) lubricating spare wheel mechanism
   f) cutting treads using thermal equipment
   g) repairing tubes and tyres
   h) legal requirements and regulations.
4) State the procedure for removing and refitting tyres, inner tubes, wheels and studs on the usual variety of vehicles.
5) State the procedure for carrying out static and dynamic balancing on and off the vehicle.
6) State the procedure for disposing of waste materials.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	Number of questions
1	3
2	3
3	2
4	2
Test duration 15mins	Total 10

VF07/V64

Carry Out Light Vehicle Front Wheel Alignment

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of front wheel alignment on 2 different vehicles.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of front wheel alignment on 3 different vehicles on 3 different occasions.

Your assessor must physically observe you realigning wheels on at least 1 occasion.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the task you are performing.

?

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Front wheel alignment vehicle 1				
Front wheel alignment vehicle 2				
Front wheel alignment vehicle 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): sampling candidate and assessment evidence observation of assessment practice discussion with candidate other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …… Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **front wheel alignment** activities.	
Work in a way which minimises the risk of damage to the vehicle and its systems.	
Ensure that your measuring and adjustment equipment is safe, in good working order and, where necessary, calibrated, prior to use.	
Conduct all **front wheel alignment pre checks** and **front wheel alignment** activities following: • the correct technical data • the manufacturers' instructions • your workplace procedures • health and safety requirements.	
Carry out all **front wheel alignment** activities using suitable **tools and equipment** and the correct techniques.	
Ensure your final adjustments and settings are within the tolerances allowed for the vehicle and meet legal requirements.	
Inform the relevant person(s) when adjustments to within the tolerances allowed are not possible.	
Make clear and suitable recommendations for any further action to the relevant person(s) clearly and accurately.	
Complete all **front wheel alignment** activities within the agreed timescale.	
Report any anticipated delays in completion the to relevant person(s) promptly.	
Ensure your records of measurements taken and adjustments made are clear and accurate.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Front wheel alignment pre-checks cover	
a. tyre pressures	
b. wheel bearing and ball joint condition	
c. suspension condition and ride height.	
2.Front wheel alignment covers	
a. individual toe	
b. combined toe	
c. steering wheel position.	
3.Tools and equipment are	
a. hand tools	
b. lifting and supporting equipment	
c. specialist alignment measuring equipment	
d. turn plates	
e. steering clamp.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational procedures and requirements 1. Health and safety legislation and workplace procedures relevant to workshop practices, checking equipment and personal and vehicle protection. 2. Your workplace procedures for ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 3. The importance of working to agreed timescales and keeping others informed of progress. 4. The relationship between time and costs. 5. Your workplace requirements for recording measurements taken and adjustments made. 6. The importance of reporting anticipated delays to the relevant person(s) promptly.	
Tools and equipment 7. The tools and equipment used for the measurement and adjustment of front wheel alignment and how to select and use them. 8. The importance of checking - for safety and accuracy. 9. How to confirm that measuring and adjustment equipment is safe and, where necessary, calibrated, prior to use.	
Front wheel alignment 10. The Ackerman principle. 11. The principles of caster, camber, KPI/SAI, toe out on turns, thrust axis, set back, wheel run out and their effects on tyre wear and vehicle handling. 12. The purpose, function and location of steering system components and how wear can affect wheel alignment. 13. The abnormal tyre wear associated with misalignment. 14. The importance of taking accurate measurements. 15. How to find and use vehicle data relating to working tolerances. 16. How to carry front wheel alignment pre checks 17. Front wheel alignment and adjustment techniques, including the use of weights, how to apply them and record adjustments. 18. The importance of ensuring any adjustments are within acceptable tolerances for the vehicle. 19. The possible consequences of inaccurate adjustments and the effect on other items. 20. How to take and record accurate measurements. 21. The importance of checking the operation of adjusted items prior to return to the customer – the implications for safety and customer satisfaction. 22. How to check that the adjusted items function correctly. 23. How to work safely avoiding injury to yourself, others and damage to vehicles.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2; N1.3	**Numeracy**: Access 3, Outcomes 1, 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Carry Out Light Vehicle Front Wheel Alignment

This unit is about testing and adjusting front wheel alignment to meet required tolerances.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe the operating principles, components, service requirements and features of steering.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.

5. Explain the need for vehicle protection prior to maintenance activities
    a) protection relating to:
        i. vehicle body panels
        ii. paint surfaces
        iii. seats
        iv. carpet
        v. floor mats.
6. Identify the current regulations relating to the repair and use of light vehicles
    a) Road Traffic Act
    b) VOSA regulations
    c) Highway Code.

Outcome 2

Describe the operating principles, components, service requirements and features of steering.

Objectives

To achieve this outcome the candidate has to:

1. Identify and state the functions of
    a) steering systems
    b) components
        i. steering boxes (rack and pinion, worm and re-circulating ball)
        ii. steering arms and linkages
        iii. steering joints and bushes
        iv. idler gears
        v. bearings
        vi. steering columns (collapsible and absorbing)
        vii. hydraulic pump and control valves
        viii. electrical PAS systems.
2. State the meaning of
        i. slip angles
        ii. oversteer
        iii. understeer
        iv. neutral steer
        v. non-reversible
        vi. self-aligning torque.
3. Describe
    a) wheel alignment
        i. castor
        ii. camber
        iii. kingpin inclination / swivel axis inclination
        iv. Ackermann principle
        v. toe in / toe out
        vi. toe out on turns
        vii. front to rear
        viii. off set
    b) steering geometry measurement and adjustments.
4. State the safe use of tools and equipment associated with steering.
5. Describe the methods used to check and adjusts front wheel alignment.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10

VF08/V65

Inspect and Replace Light Vehicle Clutches

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting 4 clutch components.
2. Produce evidence of replacing 1 clutch assembly.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting 9 out of the 15* types of clutch component in the Scoping Statement for this unit.
8. Produce evidence of replacing 3 clutch assemblies.
9. Your assessor must physically observe you on at least 1 occasion undertaking a clutch replacement activity.

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of all the types of clutch component listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting clutch component 1				
Inspecting clutch component 2				
Inspecting clutch component 3				
Inspecting clutch component 4				
Inspecting clutch component 5				
Inspecting clutch component 6				
Inspecting clutch component 7				
Inspecting clutch component 8				
Inspecting clutch component 9				
Evidence of replacing clutch assemblies 1				
Evidence of replacing clutch assemblies 2				
Evidence of replacing clutch assemblies 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:……. Date: ……..	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:……. Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)……. Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)……. Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….. Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment throughout all clutch inspection and replacement activities.	
Use suitable sources of technical information to support your inspection and replacement of clutch components.	
Work in a way which minimises the risk of damage to the vehicle and its systems.	
Confirm that all the tools and equipment required are safe prior to use.	
Ensure your inspection techniques are sufficiently in depth to identify the severity of all clutch component defects.	
Conduct all inspection and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements.	
Carry out all inspection, repair and replacement activities using: • suitable tools and equipment • the correct inspection techniques • the correct type and size of component.	
Clearly identify and record the cause of any clutch component faults following your normal workplace procedures.	
Make clear and accurate recommendations for further action to the relevant person(s), when necessary.	
Ensure that replaced and refitted clutch components are correctly fitted and conform to requirements prior to releasing the vehicle to the customer.	
Dispose of removed components safely to meet legal and your workplace requirements.	
Complete all activities within the agreed timescale.	
Report any anticipated delays in completion and any additional faults identified to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.			PRN
1.	**Clutch components are**		
	a.	clutch assembly	
	b.	spigot bearing	
	c.	flywheel	
	d.	operating cable	
	e.	hydraulic clutch components	
	f.	automatic and manual adjusters	
	g.	clutch fork	
	h.	oil seals	
	i.	input shaft	
	j.	inspection cover	
	k.	clutch pedal	
	l.	bell housing	
	m.	gear box	
	n.	driveshaft	
	o.	propshaft	
2.	**Tools and equipment are**		
	a.	hand tools	
	b.	special purpose tools	
	c.	lifting and supporting equipment	
	d.	general workshop equipment	
3.	**Inspection covers**		
	a.	clutch operating systems	
	b.	clutch assembly	
	c.	flywheel	
	d.	oil leaks	
4.	**Inspection techniques are**		
	a.	visual	
	b.	aural	
	c.	measurement	
	d.	functional tests	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational procedures and requirements 1. health and safety legislation and workplace procedures relevant to workshop practices, checking equipment and personal and vehicle protection • *your workplace procedures for* • *the referral of problems* • *reporting of delays to the completion of work* *2.* personal protection 3. the importance of working to agreed timescales and keeping others informed of progress 4. the relationship between time and costs 5. your workplace requirements for recording measurements taken and adjustments made 6. the importance of reporting anticipated delays to the relevant person(s) promptly	
Tools and equipment 7. the types, function and use of clutch removal, alignment and replacement tools and equipment *8.* the importance of checking the safety and operation of equipment prior to use.	
Inspection and replacement of clutches 9. the different types of clutches and operating systems and how they and their associated components operate 10. the different types of inspection techniques and how to carry them out 11. the common faults associated with clutch systems (e.g. slip, drag, judder and noise), their cause, how to identify and rectify them 12. the purpose, function and layout of different types of manual transmission 13. the removal and replacement procedures associated with clutch systems, including the effective sequence of working 14. how to make checks and adjustments to clutch operating systems. 15. the importance of taking accurate measurements 16. how to find and use data relating to clutch working tolerances 17. the importance of ensuring any adjustments are within acceptable tolerances for the vehicle *18.* how to work safely avoiding injury to yourself, others and damage to wheels when inspecting and replacing clutches	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2; N1.3	**Numeracy**: Access 3, Outcomes 1, 2 and 4
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect and Repair Light Vehicle Clutches

This unit is about inspecting and replacing light vehicle clutch components.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe clutch operating principles, functions and removal, replacements and adjustment procedures.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Describe clutch operating principles, functions and removal, replacements and adjustment procedures.

Objectives

To achieve this outcome the candidate has to:

1. a) describe the functions of the clutch system
    i. provides a medium for transmitting torque
    ii. provides a method of gradual drive take-up
    iii. assists in gear changing
    iv. provides a temporary neutral

    b) state, for clutch systems the
    i. working principles
    ii. factors upon which friction depends
    iii. factors upon which torque transmitted by a clutch depends

2. Describe how to remove, replace and adjust clutch assemblies, clutch operating systems and components
    a) mechanically operated release mechanisms
    b) hydraulically operated release mechanisms
    c) cables and automatic adjusting mechanisms
    d) master and slave cylinders and associated pipes
    e) electrical/electronic release system components
    f) centre plates, pressure plates and release bearings.

3. Demonstrate an understanding of the appropriate tools, equipment and consumables needed to remove and refit system components
    a) basic hand tools
    b) measuring equipment
    i. feeler gauges
    ii. dial test indicators
    iii. internal and external micrometers
    iv. Vernier and depth gauges
    c) special purpose wrenches and stud removers
    d) vehicle and unit lifting devices and supports
    e) torque wrenches
    f) impact wrenches
    g) power tools
    h) brushes, solvents and other cleaning equipment
    i) lubricants, easing oils, and specialist fluids
    j) locking and joining devices and materials.

4. a) Describe how vehicle systems are evaluated for operational efficiency following component replacement
    i. workshop procedures

ii. road testing procedures

iii. manufacturers requirements

iv. legal requirements

v. dynamometers / rollers

b) describe the preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement.

5. State the currently acceptable and legal procedures for disposing of waste materials resulting from the above activities.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10

VF09/V66

Inspect and Replace Light Vehicle Exhaust Components

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of inspecting and replacing 2 different exhaust components across 2 separate jobs.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of inspecting and replacing 5 out of the 6* types of exhaust components listed in the Scoping Statement across a minimum of 3 separate jobs.
8. Produce evidence of using all the tools and equipment listed in the Scoping Statement.
9. Your assessor must physically observe you on at least 1 occasion which must include the inspection, removal and replacement of exhaust system components involving the safe use of equipment.

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of all the types of exhaust component listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting and replacing exhaust components 1				
Inspecting and replacing exhaust components 2				
Inspecting and replacing exhaust components 3				
Inspecting and replacing exhaust components 4				
Inspecting and replacing exhaust components 5				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:……... Candidate enrolment number:……..….. Candidate signature:……..…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…….. Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……...	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …….. Date: …….. Countersignature: (if relevant) …… Date: ……..

Performance objective checklist

To be competent you must ensure that:	PRN
Wear suitable personal protective equipment throughout all **exhaust system component** inspection and replacement activities.	
Seek confirmation that all equipment is safe prior to use.	
Carry out inspections on **exhaust system components** relevant to the faults reported.	
conduct all inspection and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements.	
Ensure your inspection clearly identifies the serviceability of the **exhaust system component** and the cause of any faults identified.	
Make clear and suitable recommendations for further action based upon the results of your inspection to the relevant person(s).	
Carry out removal and replacement activities using: • suitable **tools and equipment** • the correct techniques • suitable exhaust components and fixings.	
Ensure that the replacement **exhaust system components** are correctly fitted and aligned prior to releasing the vehicle to the customer.	
Dispose of removed **exhaust system components** safely to comply with legal requirements and your workplace procedures.	
Complete all inspection and replacement activities within the agreed timescale.	
Report any anticipated delays in completion to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Exhaust system components are	
a. complete exhaust system	
b. part system	
c. catalytic converters	
d. lambda sensor	
e. studs and nuts	
f. mountings and clamps.	
2.Tools and equipment are	
a. hand tools	
b. special purpose tools	
c. lifting and supporting equipment	
d. oxy-acetylene cutting equipment.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements relating to vehicle exhaust systems. 3. Your workplace procedures for: ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 4. How to dispose of removed components in line with health and safety and legal requirements. 5. The importance of working to agreed timescales and keeping others informed of progress. 6. The importance of reporting anticipated delays to the relevant person(s) promptly. 7. The relationship between time and costs.	
Tools and equipment 8. The tools and equipment used for the removal and replacement of exhausts and how to select and use them. 9. How to perform safety and operational checks on tools and equipment. 10. How to use oxy-acetylene cutting equipment to make straight through section cuts, female from male and male from female cuts.	
Exhaust inspection, removal and replacement operations 11. The purpose, function and layout of vehicle exhaust systems and their associated components. 12. The common faults associated with vehicle exhaust system components. 13. The fault identification methods and procedures associated with vehicle exhaust system components. 14. The removal and replacement procedures associated with vehicle exhaust systems, including health and safety requirements. 15. The construction of vehicle exhaust system components. 16. When and how to use heat to remove seized components. 17. How to check that replacement components are of the correct type and quality for the vehicle and conform to legal requirements where relevant. 18. How to make adjustments to exhaust system components. 19. How to check exhaust system components are functioning correctly after refitting and or replacement and the importance of doing so before release to the customer. 20. How to work safely avoiding injury to yourself and damage to vehicles.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.	
Assessor	Date
Candidate	Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1	**Numeracy**: Access 3, Outcomes 1
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect and Replace Light Vehicle Exhaust Components

This unit is about inspecting exhaust components for replacement or continued serviceability and removing and replacing components identified as being faulty, damaged, deteriorated or where the customer has requested replacement.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe exhaust system operating principles, functions and removal, replacements and adjustment procedures.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance.
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Describe exhaust system operating principles, functions and removal, replacements and adjustment procedures.

Objectives

To achieve this outcome the candidate has to:

1. Describe the components, operating principles, and functions of exhaust systems.

2. Describe how to remove, replace and adjust exhaust system components

a) air intake temperature control systems

b) manifolds

c) rigid and flexible pipes, joints, clamping and sealing arrangements

d) silencers and expansion boxes

e) catalytic converters and sensors

f) single, multi and branched pipe systems, flexible and resilient mountings.

3. Demonstrate an understanding of the appropriate tools, equipment and consumables needed to remove and refit system components

a) basic hand tools

b) special purpose wrenches and stud removers

c) vehicle and unit lifting devices and supports

d) torque wrenches

e) impact wrenches

f) power tools

g) brushes, solvents and other cleaning equipment

h) lubricants, easing oils, and specialist fluids

i) locking and joining devices and sealing materials.

4. a) describe how vehicle systems are evaluated for operational efficiency following component replacement

i) workshop procedures

ii) manufacturers requirements

iii) legal requirements

b) describe the preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement

i) exhaust gas emissions testers

ii) visual and audible inspections.

5. state the currently acceptable and legal procedures for disposing of waste materials resulting from the above activities.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10

VF10/V67

Inspect, Test and Replace Vehicle Batteries and Related Components

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of conducting an inspection and battery test
2. Produce evidence of competently replacing a battery.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit.
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of conducting at least 3 separate inspections and battery testing activities to cover all the battery and component items and 2 out of the 3* testing techniques listed in the Scoping Statement for this unit.
8. Produce evidence of competently replacing 3 batteries on separate occasions.
9. Your assessor must physically observe you competently inspecting, testing and replacing a battery on at least 1 occasion.

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of all the testing techniques listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspection and battery testing activity 1				
Inspection and battery testing activity 2				
Inspection and battery testing activity 3				
Replacing battery 1				
Replacing battery 2				
Replacing battery 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: ……..….. Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …… Internal verifier signature: …….. Date: ……... Countersignature: (if relevant) ……..….. Date: …….....

Performance objective checklist

To be competent you must ensure that:	PRN
Use suitable personal protective equipment and vehicle coverings throughout all **battery and component** testing and replacement activities.	
Work in a way which minimises the risk of damage to the vehicle and its systems.	
Carry out tests on **batteries and components** relevant to the faults reported.	
Conduct all testing and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements.	
Ensure your **testing techniques** clearly identify the type of battery or charging system fault(s).	
Make clear and suitable recommendations for further action based upon the results of your inspection to the relevant person(s).	
Carry out removal and replacement activities using: • suitable **tools and equipment** • the correct techniques • suitable replacement batteries and components.	
Ensure that the replacement battery and charging system function correctly prior to releasing the vehicle to the customer.	
Dispose of removed batteries safely to comply with legal requirements and your workplace procedures.	
Complete all testing, inspection and replacement activities within the agreed timescale.	
Report any anticipated delays in completion to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Batteries and components are	
a. automotive batteries	
b. battery connections	
c. battery supports	
d. battery hold down device	
e. generators	
f. drive belt.	
2.Testing techniques are	
a. visual	
b. use of hand held diagnostic equipment	
c. use of battery manufacturer's battery testing equipment.	
3.Tools and equipment	
a. hand tools	
b. diagnostic equipment.	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
1. The health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. The legal requirements relating to vehicle batteries and components. 3. Your workplace procedures for: ▪ the referral of problems ▪ reporting of delays to the completion of work ▪ personal protection. 4. How to dispose of removed components in line with health and safety and legal requirements. 5. The importance of working to agreed timescales and keeping others informed of progress. 6. The importance of reporting anticipated delays to the relevant person(s) promptly. 7. The relationship between time and costs.	
Tools and equipment 8. The function and use of battery testing equipment (e.g. voltmeter, multimeter, high rate discharge tester, hydrometer). 9. The tools and equipment used for replacing batteries and how to select and use them. 10. How to perform safety and operational checks on tools and equipment. 11. Code saving devices and how and when to use them.	
Battery fault finding and replacement 12. The purpose, function and layout of a standard battery and charging system. 13. Battery ratings and the circumstances in which differently rated batteries should be fitted. 14. The common faults associated with batteries and charging systems (eg. internal battery faults; lack of charge; damaged, worn or missing drive belt; poor condition of wiring and or connections; corroded or damaged battery mountings; terminal corrosion and cracked battery casing). 15. The fault identification methods and procedures and testing techniques associated with batteries and components (e.g. visual, use of hand held diagnostic equipment, use of battery manufacturer's battery testing equipment). 16. How to interpret test results. 17. The removal and replacement procedures associated with batteries and components, including electrolyte filling and health and safety requirements. 18. How to check that replacement batteries and components are of the correct type and quality for the vehicle. 19. How to check and adjust drive belt tension. 20. How to check that batteries and components are functioning correctly and the importance of doing so before release to the customer. 21. How to work safely avoiding injury to yourself and damage to vehicles.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2?	**Numeracy**: Access 3, Outcomes 1, 2 and 4?
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Test and Replace Vehicle Batteries and Related Components

This unit is about carrying out tests to identify faulty batteries, then replacing them.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the candidate must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe battery and related components operating principles, functions and removal, replacements and adjustment procedures.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome the candidate has to:

1. State the purpose of vehicle maintenance
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details.
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:
      i. vehicle body panels

ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Describe battery and related components operating principles, functions and removal, replacements and adjustment procedures.

Objectives

To achieve this outcome the candidate has to:

1. Describe the functions and working principles of batteries

    a) lead acid

    b) maintenance free.

2. Describe how to remove, replace and adjust vehicle batteries.

3. Demonstrate an understanding of the appropriate tools, equipment and consumables needed to remove and refit system components

    a) hand tools

    b) measuring equipment

        i) multimeters

        ii) code readers

    c) torque wrenches

    d) brushes, solvents and other cleaning equipment

    e) lubricants, easing oils, and specialist fluids

    f) locking and joining devices and materials.

4. a) describe how vehicle systems are evaluated for operational efficiency following component replacement

    i) workshop procedures

    ii) functional/operational tests

    iii) manufacturers requirements

    iv) legal requirements

    b) describe the preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement) electrical testers

    i) multimeters

    ii) battery testers

5. State the currently acceptable and legal procedures for disposing of waste materials resulting from the above activities.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10

VF11/V68

Inspect and Replace Light Vehicle Suspension Dampers

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests.

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. Produce evidence of competently inspecting, testing and replacing 2 out of the 4 types of suspension damper listed in the scope statements.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements

You must:

1. Produce evidence to show you meet all of the performance objectives consistently.
2. Produce evidence to show that you have covered all the items listed in the scope for this unit .
3. Produce evidence to show that you possess all the knowledge required.
4. Produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk.
5. Be observed by a qualified assessor carrying out work in your normal workplace.
6. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit

You must:

7. Produce evidence of competently inspecting, testing and replacing 3 out of the 4* types of suspension damper listed in the Scoping Statement on at least 1 occasion.
8. Your assessor must physically observe you inspecting, testing and replacing a suspension damper on at least 1 occasion.

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of all the testing techniques listed in the Scoping Statement for this unit.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

?

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
Inspecting, testing and replacing a suspension damper 1				
Inspecting, testing and replacing a suspension damper 2				
Inspecting, testing and replacing a suspension damper 3				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……..	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……..
VRQ Assessor declaration: 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: ……... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: ……... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …….... Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: …… Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……..

Performance objective checklist

To be competent you must ensure that:	PRN
use suitable personal protective equipment and vehicle coverings throughout all **suspension damper** testing and replacement activities.	
work in a way which minimises the risk of damage to the vehicle and its systems.	
carry out tests on **suspension dampers** relevant to the faults reported.	
conduct all testing and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements.	
ensure your **testing techniques** clearly identify the type of **suspension damper** fault(s).	
make clear and suitable recommendations for further action based upon the results of your inspection to the relevant person(s).	
carry out removal and replacement activities using: • suitable **tools and equipment** • the correct techniques • a suitable **suspension damper** for the vehicle	
ensure that the replacement **suspension damper** functions correctly prior to releasing the vehicle to the customer.	
dispose of removed **suspension dampers** safely to comply with your workplace procedures.	
complete all testing, inspection and replacement activities within the agreed timescale.	
report any anticipated delays in completion to the relevant person(s) promptly.	

Scope of this unit

All of the items listed below form part of this National Occupational Standard.	PRN
1.Suspension dampers are	
a. telescopic	
B .semi-strut	
c. MacPherson strut	
d. gas assisted	
2.Tools and equipment are	
a. hand tools	
b. lifting and supporting equipment	
c. specialist tools	
3.Testing techniques are	
a. damper operation (bounce test)	
b. visual	
c. aural	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1.the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2.your workplace procedures for: - the referral of problems - reporting of delays to the completion of work - personal protection 3.how to dispose of removed components in line with health and safety requirements. 4.the importance of working to agreed timescales and keeping others informed of progress. 5.the importance of reporting anticipated delays to the relevant person(s) promptly. 6.the relationship between time and costs.	
Tools and equipment 7.the tools used for the replacement of suspension dampers and how to select and use them 8.how to perform safety and operational checks on tools and equipment.	
Inspection and replacement of suspension dampers 9.the types, purpose, function and location of suspension dampers. 10.the common faults associated with suspension dampers (e.g. wear, leakage, damage, corrosion, deterioration of rubber components). 11.the testing techniques and procedures associated with suspension dampers. 12.the removal and refitting procedures associated with suspension dampers, including health and safety requirements. 13.the dangers and precautions to be taken when using spring compressors. 14.how to check that replacement components are of the correct type and quality for the vehicle and conform to legal requirements where relevant. 15.how to check that components are functioning correctly and the importance of doing so before release to the customer. 16.how to work safely avoiding injury to yourself and damage to vehicles.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.	
Assessor	Date
Candidate	Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2?	**Numeracy**: Access 3, Outcomes 1, 2 and 4?
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect and Replace Light Vehicle Suspension Dampers

This unit is about inspecting and replacing suspension dampers using a variety of equipment and testing techniques.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the student must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe suspension operating principles, functions and removal, replacements and adjustment procedures.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome a student has to:

1. State the purpose of vehicle maintenance
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Describe suspension operating principles, functions and removal, replacements and adjustment procedures.

Objectives

To achieve this outcome a student has to:

1) Describe the functions of the suspension system
    a) working principles
    b) materials used
    c) forces acting
    d) method of energy conversion
    e) graphical method of illustrating spring movement relative to time for damped and un-damped springs
    f) definitions of
        i. bump
        ii. rebound
        iii. float
        iv. dive
        v. pitch
        vi. roll
        vii. compliance
2) Describe how to remove, replace and adjust suspension systems and components
    a) struts
    b) wishbone
    c) dampers
    d) swivel pins and struts
    e) joints and bushes
    f) axles, hubs and struts acting as suspension members
    g) bump and rebound stops

3) demonstrate an understanding of the appropriate tools, equipment and consumables needed to remove and refit system components

4) describe how vehicle systems are evaluated for operational efficiency following component replacement
    a) workshop procedures
    b) road testing procedures
    c) special equipment
    d) manufacturers requirements
    e) legal requirements

5) state the currently acceptable and legal procedures for disposing of waste materials resulting from the above activities.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10

VF12/V69

Inspect, Adjust and Replace Light Vehicle Braking Systems and Components

	Further guidance available		Observation of your task/work		Evidence recording		Computer based testing	?	Verbal Questioning

Evidence requirements

To complete this unit you will be required to undertake knowledge and practical tests

For the knowledge test you must pass the City & Guilds computer based (GOLA) multiple choice knowledge test. This test will be arranged by your tutor or assessor.

If you are completing an apprenticeship which includes both N/SVQ & VRQ (Technical Certificate) you will only take this test once.

The practical tests will depend upon the qualification you are taking and are covered in the VRQ or NVQ information sections.

You must also complete the attached recording forms to the satisfaction of your assessor. These forms, when completed and signed by you and your assessor, provide confirmation that you have met both practical and knowledge requirements.

If you are undertaking an apprenticeship you need only complete one set which combines VRQ (Technical certificate) and N/SVQ evidence.

Your tutor or assessor will be able to offer you further guidance on the evidence you need to provide.

Information for VRQs (Technical Certificates).

VRQ

To complete this unit you must:

1. produce evidence of testing, replacing and adjusting 2 of the main types of braking system.

Your tutor or assessor will either set and observe a practical assessment task, which has been designed to cover the performance objectives, or you may be observed by your assessor in your workplace. If this qualification forms part of an **apprenticeship** workplace observation will also provide N/SVQ evidence.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task**.** Your tutor or assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

Your assessor will ask questions to ensure you understand the practical task you are performing.

Information for N/SVQs

NVQ

SVQ

General Requirements
You must:

2. produce evidence to show you meet all of the performance objectives consistently
3. produce evidence to show that you have covered all the items listed in the scope for this unit
4. produce evidence to show that you possess all the knowledge required
5. produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or in a realistic working environment (RWE) as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk
6. be observed by a qualified assessor carrying out work in your normal workplace
7. Evidence from simulated activities is not acceptable for this unit.

Specific Performance Evidence for this Unit
You must:

8. produce evidence of testing, replacing and adjusting all the types of braking systems across a minimum of 3 separate jobs.

Your assessor must physically observe you competently testing, replacing and adjusting at least 1 type of braking system.

With your assessor you must complete a suitable **City & Guilds evidence recording form** for **each** task. Your assessor will advise you on this. Other paperwork such as job cards, inspection sheets, servicing lists and reporting paperwork, appropriate to the task, should also be completed.

All work records/evidence should be numbered (portfolio reference number PRN) and entered where required on the recording forms. This evidence should be collected in a portfolio and may need to be made available to your internal verifier or the City & Guilds external verifier.

?

Your assessor will ask questions to ensure you understand the task you are performing.

If this qualification forms part of an **apprenticeship** workplace observation will also provide VRQ evidence.

Evidence reference summary

	Note: Refer to the General and Specific Performance Evidence requirements for details of locations and types of assessment for this unit.	Portfolio reference number (PRN)		
		VRQ	**N/SVQ**	**N/SVQ**
		Observed assessment	Approved centre or workplace	Observed assessment
testing, replacing and adjusting all the types of braking systems 1				
testing, replacing and adjusting all the types of braking systems 2				
testing, replacing and adjusting all the types of braking systems 3				
testing, replacing and adjusting all the types of braking systems 4				

Supplementary evidence (if used) PRN			

On line test reference for this unit PRN	

Unit assessment and verification declaration

VRQ Candidate declaration: I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……	**N/SVQ Candidate declaration:** I confirm that the evidence listed for this unit is authentic and a true representation of my own work Candidate name:…….. Candidate enrolment number:…….. Candidate signature:…… Date: ……
VRQ Assessor declaration: 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: …….... Countersignature: (if relevant)…… Date: ……	**N/SVQ Assessor declaration:** 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: …….... Countersignature: (if relevant)…… Date: ……
VRQ Internal verifier Declaration: (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …… Countersignature: (if relevant) …… Date: ……..	**N/SVQ Internal verifier Declaration:** (Leave blank if sampling of this unit did not take place.) I have internally verified the assessment work on this unit in the following ways (please tick): • sampling candidate and assessment evidence • observation of assessment practice • discussion with candidate • other – please state: I confirm that the candidate's work meets the standards specified for this unit and may be presented for external verification and/or certification. Internal verifier name: ……... Internal verifier signature: …… Date: …….. Countersignature: (if relevant) …… Date: ……

Performance objective checklist

To be competent you must ensure that:	PRN
use suitable personal protective equipment and vehicle coverings throughout all **braking system** testing and replacement activities.	
work in a way which minimises the risk of damage to the vehicle and its systems.	
carry out tests on **braking systems** relevant to the faults reported.	
conduct all testing and replacement activities following: • manufacturers' instructions • your workplace procedures • health and safety requirements.	
ensure your **testing techniques** clearly identify the cause of the **braking system** fault(s).	
make clear and suitable recommendations for further action based upon the results of your inspection to the relevant person(s).	
carry out removal and replacement activities using: • suitable **tools and equipment** • the correct techniques • the correct brake components for the vehicle	
ensure that the replacement **braking system** operates correctly and safely prior to releasing the vehicle to the customer.	
ensure customers are advised of the bedding in procedures for new brakes prior to leaving your premises.	
dispose of removed brake components safely to comply with your workplace procedures.	
complete all brake inspection, adjustment and replacement activities within the agreed timescale.	
report any anticipated delays in completion to the relevant person(s) promptly.	

Scope of the unit

All of the items listed below form part of this National Occupational Standard.	PRN
1. Braking systems are	
a. disc brakes	
b. drum brakes	
c. hydraulic	
d. hand brake	
2. Testing techniques are	
a. visual	
b. aural	
c. measurement	
d. functional	
3. Tools and equipment are	
a. hand tools	
b. lifting and supporting equipment	
c. special purpose tools	
d. brake bleeding equipment	
e. measuring	

In signing this sheet the Assessor and Candidate confirm that all the objectives and scope statements were met at least once during the practical assessment tasks by the named candidate and that the safe working practices were observed at all times.
Assessor Date
Candidate Date

Essential knowledge

You need to understand:	PRN
Legislative and organisational requirements and procedures 1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection. 2. the legal requirements relating to vehicle **braking systems.** 3. your workplace procedures for: • the referral of problems • reporting of delays to the completion of work • personal protection 4. how to dispose of removed components in line with health and safety and legal requirements. 5. the importance of working to agreed timescales and keeping others informed of progress. 6. the importance of reporting anticipated delays to the relevant person(s) promptly. 7. the relationship between time and costs.	
Tools and equipment 8. the **tools and equipment** used for inspection, testing and replacing **braking system** components and how to select and use them. 9. how to perform safety and operational checks on tools and equipment	
Inspection, adjustment and replacement of braking systems and components 10. the purpose, function and layout of typical braking systems (i.e. single line systems; multi line systems; including diagonal, triangular and HI systems; disc and drum braking systems; transmission brakes; systems with load sensing valves; hand brake arrangements; hydraulic fluids) 11. the **testing techniques** and procedures associated with **braking systems**. 12. the removal and replacement procedures associated with brake components, including health and safety requirements. 13. how to identify ABS braking systems and how this affects the choice and use of brake components. 14. how to check that replacement components are of the correct type and quality for the vehicle and conform to legal requirements where relevant. 15. how to make adjustments to **braking systems** 16. how to check that components are functioning correctly and the importance of doing so before release to the customer. 17. how to work safely avoiding injury to yourself and damage to vehicles.	

In signing this sheet the Assessor and Candidate confirm that all the essential knowledge has been met by the named candidate.
Assessor Date
Candidate Date

Key and core skills signposting

Key Skills	Core Skills
Communication: C1.1; C1.2	**Communication**: Access 3, Outcomes 1 and 3
Application of Number: N1.1; N1.2?	**Numeracy**: Access 3, Outcomes 1, 2 and 4?
Information Technology: Not applicable	**Information Technology**: Not applicable
Working with Others: WO1.1; WO1.2	**Working with Others**: Access 3, Outcome 2
Improving Own Learning and Performance: Not applicable	*No parallel unit.*
Problem Solving: PS2.1	**Problem Solving**: Intermediate 1, Outcome 1

Syllabus

Inspect, Adjust and Replace Light Vehicle Braking Systems and Components

This unit is about inspecting light vehicle braking systems and replacing and adjusting braking system components.

Course Outline

To assist Centres in developing training courses, further guidance is given relating to the NVQ essential knowledge statements. The outline syllabus is a requirement for Technical Certificate courses. This is presented as a number of outcomes that in turn each have a number of objectives and expanded content detail.

Reference should also be made to the National Standards.

Outcomes

On completion of this unit, the student must be able to:

1. Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.
2. Describe brakes operating principles, functions and removal, replacements and adjustment procedures.

Outcome 1

Explain the purpose of routine maintenance; identify sources of information and regulations; describe the purpose of inspections.

Objectives

To achieve this outcome a student has to:

1. State the purpose of vehicle maintenance
2. State the
   a) reasons for observing time scales
      i. to adhere to completion times
      ii. keeping customers and management informed of progress
   b) types of documentation
      i. job cards
      ii. stores and material records
      iii. manufacturers warranty systems
   c) importance of accurate completion of records
   d) parts lists and identification codes.
3. Identify sources of information relating to vehicle maintenance
   a) information sources
      i. technical manuals
      ii. technical bulletins
      iii. servicing schedules
      iv. job card instructions
      v. inspection records
      vi. check lists
      vii. VSOA requirements (MOT)
      viii. repair procedures.
4. Describe the purpose and methods of vehicle inspection
   a) purpose of vehicle inspection:
      i. malfunction of systems and components
      ii. component and system wear and security
   b) vehicle inspection techniques
      i. aural
      ii. visual
      iii. functional assessments
   c) fault finding techniques
      i. road tests
      ii. questioning
      iii. review of symptoms
   d) importance of recording details
5. Explain the need for vehicle protection prior to maintenance activities
   a) protection relating to:

i. vehicle body panels
ii. paint surfaces
iii. seats
iv. carpet
v. floor mats.

6. Identify the current regulations relating to the repair and use of light vehicles
   a) Road Traffic Act
   b) VOSA regulations
   c) Highway Code.

Outcome 2

Describe brakes operating principles, functions and removal, replacements and adjustment procedures.

Objectives

To achieve this outcome a student has to:

1) Describe the functions of the braking system
    a) working principles
    b) use of friction to slow, stop or hold vehicle
    c) methods of transmitting, compensating and equalising driver's effort
    d) factors affecting
        i. stopping distance
        ii. weight transference
        iii. brake fade and vapour lock
        iv. vehicle stability
2) Describe how to remove, replace and adjust braking systems and components
    a) pedal/lever, master and wheel cylinders
    b) servo units and ABS components
    c) pads, discs and calipers
    d) drums, shoes and adjusting mechanisms
    e) cables, pipes and fluid
    f) switches and sensors
    g) wear, level and pressure indicating circuits
3) demonstrate an understanding of the appropriate tools, equipment and consumables needed to remove and refit system components
4) describe how vehicle systems are evaluated for operational efficiency following component replacement
    a) workshop procedures
    b) road testing procedures
    c) special equipment
    d) manufacturers requirements
    e) legal requirements
5) state the currently acceptable and legal procedures for disposing of waste materials resulting from the above activities.

Assessment

Essential knowledge assessment

Essential knowledge will be assessed using the GOLA system. The test specification is as follows:

Outcome	**Number of questions**
1	3
2	7
Test duration 15mins	Total 10