

National Unit Specification: General Information

UNIT Automotive: Wheels and Tyres (Intermediate 2)

NUMBER 2210308

COURSE

SUMMARY

A unit designed to develop knowledge of wheels and tyres and associated components fitted to a vehicle, how they operate on the vehicle and the areas of potential failure. The candidate will be able to deliver constructive reasoning/interpretation of the possible cause of the failure, the methods used for correct/safe removal/replacement and balancing procedures for wheels and tyres.

OUTCOMES

- 1 Identify the types of wheels, tyre construction and tyre identification marks.
- 2 Outline the current legislation for the use of tyres on a vehicle.
- 3 Outline the principal causes of wheel imbalance.
- 4 Identify driving situations, incorrect service procedures/practices and vehicle components which, when subject to wear or mis-alignment, can contribute to tyre wear.
- 5 Demonstrate the procedure for removal, fitting and balancing of a wheel/tyre assembly.

RECOMMENDED ENTRY

Access to this unit is at the discretion of the centre, however no entry prerequisites are envisaged.

CREDIT VALUE

1.0 Credit at Intermediate 2.

CORE SKILLS

Information on the automatic certification of the core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999)

Administrative Information

Superclass: XS

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National unit specification: statement of standards

UNIT Automotive: Wheels and Tyres (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Identify the types of wheels, tyre construction and tyre identification marks.

Performance Criteria

- a) The constructional detail and fixing of road wheels are correctly identified.
- b) The constructional differences between cross ply and radial ply tyres are correctly identified.
- c) The constructional differences between tube and tubeless tyres are correctly identified.
- d) The tyre size, speed rating, aspect ratio, type (tubeless/tube), design (radial/crossply) and rim diameter are correctly identified.

Evidence Requirements

Written and/or oral evidence of the candidate's ability to correctly identify from diagrams, slides, video or actual units, constructional details and fixing of road wheels, constructional differences between cross ply and radial tyres, tube and tubeless tyres and the type of markings relating to type, speed rating, load, aspect ratio and dimensions.

The candidate should be able to correctly identify for:

- PC (a) 4 constructional details/fixings of road wheels.
- PC (b) 3 constructional differences between crossply and radial.
- PC (c) 3 constructional differences between tube and tubeless tyres.
- PC (d) 3 tyre identification markings.

OUTCOME 2

Outline the current legislation for the use of tyres on a vehicle.

Performance Criteria

- a) The current legislation on mixing of radial and cross ply is correctly outlined.
- b) The current legislation for tread depth and condition is correctly outlined.
- c) The current legislation for wheels and tyres in relation to Ministry of Transport vehicle test requirements are correctly outlined.

National unit specification: statement of standards (cont)

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Evidence Requirements

Written and/or oral evidence of the candidate's ability to correctly outline from diagrams, slides, video or actual units, the legislation relating to tyre mixing, tread requirements and operational requirements/condition of the tyre.

The candidate should be able to correctly outline for:

PC (a) 1 current legislation requirement on tyre mixing.

PC (b) 3 current legislation requirements on tyre tread depth and condition.

PC (c) 4 current legislation requirements on wheels and tyres in relation to the MOT.

OUTCOME 3

Outline the principal causes of wheel imbalance.

Performance Criteria

- a) The main causes of static imbalance are identified correctly.
- b) The main causes of dynamic imbalance are identified correctly.
- c) A method of correcting static imbalance is outlined correctly.
- d) A method of correcting dynamic imbalance is outlined correctly.

Evidence Requirements

Written and/or oral evidence of the candidate's ability to correctly identify from diagrams, slides, video or actual units, the main causes of static and dynamic imbalance and the methods used to correct static and dynamic imbalance.

The candidate should be able to correctly outline/identify for:

PC (a) 3 causes of static imbalance.

PC (b) 2 causes of dynamic imbalance.

PC (c) 3 methods of correcting static imbalance.

PC (d) 2 methods of correcting dynamic imbalance.

OUTCOME 4

Identify driving situations, incorrect service procedures/practices and vehicle components which, when subject to wear or mis-alignment, can contribute to tyre wear.

Performance Criteria

- a) The suspension components that can contribute to tyre wear are identified correctly.
- b) The steering components that can contribute to tyre wear are identified correctly.
- c) The steering components that, if mis-aligned, can contribute to tyre wear are identified correctly.

National unit specification: statement of standards (cont)

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- d) The tyre wear that can be attributed to adverse driving situations are correctly identified.
- e) The tyre wear that can be attributed to incorrect service procedures/practices are identified correctly.

Evidence Requirements

Written and/or oral evidence of the candidate's ability to correctly identify from diagrams, slides, video or actual units, the suspension, steering, components, due to wear or mis-alignment that can cause tyre wear.

The candidate should be able to correctly identify for:

PC (a) 2 suspension components that can contribute to tyre wear.

PC (b) 3 steering components that can contribute to tyre wear.

PC (c) 3 steering components that if mis-aligned can contribute to tyre wear.

PC (d) 3 adverse driving situations that can contribute to tyre wear.

PC (e) 3 incorrect service procedures that can contribute to tyre wear.

OUTCOME 5

Demonstrate the procedure for removal, fitting and balancing of a wheel/tyre assembly.

Performance Criteria

- a) Tools/equipment are used in accordance with manufacturers' or companies' set procedures.
- b) The procedures for removal, fitting a tyre and balancing a wheel and tyre assembly are followed correctly.
- c) Balancing of the assembly is within the set specifications for the given task.
- d) Wheel stud torque setting is within the set specifications for the given task.
- e) The relevant/set safety requirements for the given task are correctly followed.

Evidence Requirements

Evidence of actual performance of the candidate's ability to follow instructions (manufacturers' or company set procedures), use tools, observe relevant/set safety requirements for the given task and meet set times scales within defined performance criteria.

National unit specification: support notes

UNIT Automotive: Wheels and Tyres (Intermediate 2)

This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

GUIDANCE ON CONTENT AND CONTEXT

A unit designed to operate in conjunction with the SVQ Level II, 'Vehicle Mechanical: Unit Replacement' building the underpinning theory which will assist in the attainment of the SVQ, the PDA Certificate in Motor Vehicle Systems and Intermediate level 2 of the Higher Still programme, or as a freestanding unit.

Tyre materials, construction and tread patterns, on road and off road type tyres, identification codes and radial and crossply design, tubeless and tube type fitments, load carrying capacity.

Construction and use regulations, kept brief but containing the critical parts of the legislation that the day to day motor vehicle person will require to put into practice or use to advise a customer. Tread depth, cuts, bulged, mixing of crossply and radial ply on the same axle, including front to rear mixing.

Use of a variety of technical publications including manufacturers' manuals and service bulletins and the requirement of the candidate to follow instructions should be stressed. Identification of the effects of incorrectly fitted/aligned tyres, balance weights that have not been removed, non-removal of the build up of foreign matter at the rear of the wheel, uneven wear on the tyres, worn/loose wheel bearings, swivel joints worn, steering mis-alignment, worn track rod ends, worn/leaking shock absorbers and the effects on vehicle handling and tyre wear.

Safe working practices as per laid down/set out instructions/procedures, and work in a manner that promotes safety to themselves, others and the vehicle should be related throughout the unit and stressed at critical points as they arise.

GUIDANCE ON TEACHING AND LEARNING APPROACHES

Candidates could be given the opportunity to examine, wheels and tyres, to identify the main construction, identify the markings, in a practical situation/location with video and other demonstration aids used as reinforcement to the practical demonstration.

Outcome 1

Identification of the tyre materials, construction and tread patterns, on road and off road type tyres, identification codes and radial and crossply design, tubeless and tube type fitments, load carrying capacity. Construction of the valve used on light and heavy vehicle.

National unit specification: support notes (cont)

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Outcome 2

The current legislation contained within the construction and use regulations should be used, kept brief but containing the critical parts of the legislation that the day to day mechanic will require to put into practice or advise a customer. Tread depth, cuts, bulged, mixing of crossply and radial ply on the same axle, including front to rear mixing.

Requirements for tyre pressures for vehicle applications and the dangers associated when carrying out tyre inflation. Use of safety cages, regular checks on and storage of tyre pressure equipment and MOT requirements should be stressed.

Outcome 3

Option open to the type of balance equipment that the candidate normally deals with. Should be able to balance at least one type of wheel and tyre assembly. The wheel balance carried out in a safe manner and according to the recommended procedures which may be found in a variety of technical publications including manufacturers' manuals and service bulletins.

Outcome 4

Uneven wear on the tyre's patterns, worn/mis-adjusted wheel bearings, worn swivel joints, steering mis-alignment, worn track rod ends, worn/leaking shock absorbers. The effect of incorrect inflation pressures and the resultant tyre wear. Driving conditions such as rapid acceleration from standstill, hard cornering, continuous sharp cornering to one side (ie into a driveway), overloading the vehicle, hard braking, roundabouts, etc.

Outcome 5

The candidate should be dressed as specified in the assessment standards (specifications), and demonstrate a safe working practice before, during and at the end of the given task.

Practical exercise where the candidate can remove, refit a tyre and balance a tyre/wheel assembly. Safe inflation techniques should be stressed, especially relating to gauges and pressures.

Removal/refitting and wheel balance according to the recommended procedures which may be found in a variety of technical publications including manufacturers' manuals and service bulletins.

National unit specification: support notes (cont)

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Demonstrations of the methods used to check/set adjustments, such as wheel alignment pre loads, end float and the importance of correct/accurate adjustment. The ability of the candidate to follow instruction, select the correct information, select the correct tools and or equipment, check that the tools are in a safe condition to use or report that the tools are suspect, calibrate if required the tools before use to achieve a correct reading or setting, connect the equipment and or tools in accordance with laid down/set out instructions/procedures. Correctly and consciously align components as per laid down/set out instructions/procedures, and work in a manner that promotes safety to themselves, others and the vehicle especially when inflating tyres.

At the end of the task, all tools and equipment cleaned and replaced in the approved manner in the store or stored area, and the work area is cleaned and left safe to meet health and safety at work regulations.

Reference to 'equipment/tools' within the performance criteria means that in some tasks specialist tools or equipment or both may be used.

Note:

The criteria or the critical points, (what the candidate must do for each performance criterion, to achieve that performance criterion when doing the task – the instruments or specifications for the task), relating to performance criteria (a) to (e), against which the candidate is measured in order to achieve the outcome should be clearly set out and recorded on a checklist.

GUIDANCE ON APPROACHES TO ASSESSMENT

All assessment packs should contain the following:

- Clear indication that the assessment and the Marking schedule have undergone internal verification.
- Main assessment (or first assessment) – A clear statement of what the candidate must do to achieve a pass.
- Marking schedule for the Main assessment, of all the required and acceptable responses against which the assessor will mark the candidate.
- Reassessment (or second, third etc assessment depending on centre policy), indicating clearly that it is re-assessment, again, with a clear statement of what the candidate must do to achieve a pass.
- Marking schedule of all the required and acceptable responses against which the assessor will mark the candidate.

National unit specification: support notes (cont)

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Outcome 1

Written and/or oral evidence which may be in the form of multi-choice type questions, a matching exercise, from diagrams, slides, video or actual units/vehicles, which allows the candidate to identify the tyre construction, types of wheel construction and identification markings.

Outcome 2

Written and/or oral evidence which may be in the form of multi-choice type questions, short answer or gapped responses could be used which allows the candidate to explain the critical points of wheels and tyre legislation.

Outcome 3

Written and/or oral evidence which may be in the form of multi-choice type questions, short answer or gapped responses could be used which allows the candidate to outline the critical points of wheel tyre assembly balancing.

Outcome 4

Written and/or oral evidence which may be in the form of multi-choice type questions, a matching exercise, from diagrams, slides, video or actual units/vehicles, which allows the candidate to identify driving situations, incorrect service procedures/practices, mis-alignment of components, the vehicle components that could lead to tyre wear.

Outcome 5

A practical exercise either in the candidate's normal place of work, when being assessed during his/her SVQ, or in the centre on actual units or vehicles, with access to all the relevant tools, equipment, data and clean/safe work area.

Set tasks should have direct specifications against which he/she will be measured, directly related to the task that the candidate must achieve to pass.