Qualification Structure
Light Vehicle & Repair Operations

	Service Technician	Diagnostic Technician	Master Technician	Corkshop Controller
ROUTES - UNITS	**Level 2**	**Level 3**	**Level 4**	**Level 4**
Generic Units				
G1 - Contribute to Workplace Good Housekeeping	M	M	M	M
G2 - Ensure Your Own Actions Reduce Risks to Health and Safety	M	M	M	M
G3 - Maintain Positive Working Relationships	M	M	M	M
G4 - Use of hand tools and equipment – basic engineering skills	M	M		
G6 - Enable Learning Through Demonstration and Instruction		M	M	
G8 - Identify and Agree Customer Needs	O	O	M	M
G9 - How Components Work	M	M		
G11 - Supervisory Skills				M
G12 - Developing Staff				M
G13 - Business Management				M
Technical Units				
LV01 - Carry Out Routine Vehicle Maintenance	M			
LVR02 - Remove and Replace Engine Units and Components	M			
LV03 - Remove and Replace Electrical Units and Components	M			
LV04 - Remove and Replace Vehicle Chassis Units and Components	M			
LV05 - Inspect Vehicles using Prescribed Inspection Methods	M			
LV06 - Inspect Vehicles		M	M	M
LV07 - Diagnose and Rectify Vehicle Engine and Component Faults		M		
LV08 - Diagnose and Rectify Vehicle Chassis System Faults		M		
LV11 - Overhaul Mechanical Units	O	O		
LV12 - Remove and Replace Vehicle Driveline Units and Components	O			
LV13 - Diagnose and Rectify Vehicle Transmission and Driveline System Faults		O		
AE06 - Diagnose and Rectify Auxiliary Equipment Electrical Faults		M		
BP18 - Remove and Fit Basic Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels	O	O		
LV14 - Diagnose Faults Where no Prescribed Process or Format is Available			M	M
LV15 - Assist Workshop Operations By Providing Technical Support			M	M
LV16 - Liaise With Vehicle And Product Manufacturers On Technical Matters			M	M
LV17 - Provide Diagnostic Equipment And Technical Information System Support			M	M
LV18 - Conduct Diagnostic Consultations With Customers			M	M

M = Mandatory Units
O = Optional Units

Unit G1 – Contribute to Workplace Good Housekeeping

UNIT OVERVIEW

This unit is about the routine maintenance of the workplace, carrying out basic, nonspecialist checks of work tools and equipment, cleaning the work area and using resources economically.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Equipment maintenance covers
- a. routine checks on work tools and equipment
- b. cleaning work tools and equipment
- c. replacing minor parts
- d. visual inspection of electrical equipment

2. Housekeeping activities cover
- a. day to day work area cleaning
- b. clearing away
- c. dealing with spillages
- d. disposal of waste, used materials and debris

3. Work tools and equipment are
- a. hand
- b. electrical
- c. mechanical
- d. pneumatic
- e. hydraulic

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the scope of your job responsibilities for the use and maintenance of hand tools, equipment and your work area.
2. workplace policies and schedules for **housekeeping activities** and **equipment maintenance.**
3. the manufacturer's requirements for the cleaning and general, non- specialist maintenance of the tools and equipment for which you are responsible.
4. the regulations and information sources applicable to workshop cleaning and maintenance activities for which you are responsible.
5. the importance of reporting faults quickly to the relevant person.
6. the importance of reporting anticipated delays to the relevant person(s) promptly.

Equipment maintenance

7. how to select and use equipment used for basic hand tool maintenance activities.
8. how to store hand tools safely and accessibly.
9. how to report faulty or damaged **work tools and equipment.**
10. how to work safely when cleaning and maintaining **work tools and equipment**.

General work area housekeeping

11. how to select and use cleaning equipment
12. how to use resources economically.
13. how to use work area cleaning materials and agents.
14. how to clean and maintain the **work tools and equipment** and work areas for which you are responsible.
15. how to dispose of unused cleaning agents, materials and debris.
16. the properties and hazards associated with the use of cleaning agents and materials.
17. the importance of wearing personal protective equipment.
18. the importance of using resources economically and for their intended purpose only.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment throughout all **housekeeping** and **equipment maintenance activities**.
b. select and use cleaning equipment which is:
   - of the right type
   - suitable for the task.
c. use resources economically and for their intended purpose only, following manufacturers' instructions and workplace procedures.
d. follow workplace policies, schedules and manufacturers' instructions when cleaning and maintaining hand tools and equipment.
e. clean the work area(s), for which you are responsible, at the specified time and frequency.
f. carry out **housekeeping activities** safely and in a way which minimises inconvenience to customers and staff.
g. follow the manufacturer's instructions when using cleaning and sanitising agents.
h. ensure your **housekeeping activities** keep your work area clean and free from debris and waste materials.
i. ensure your **equipment maintenance** activities keep your **work tools and equipment** fit for purpose.
j. dispose of used cleaning agents, materials and debris to comply with legal and workplace requirements.
k. store your **work tools and equipment** in a safe manner which permits ease of access and identification for use.
l. report any faulty or damaged tools and equipment to the relevant person(s) clearly and promptly.
m. report any anticipated delays in completion to the relevant person(s) promptly.

Unit G2 – Ensure Your Own Actions Reduce Risks to Health and Safety

UNIT OVERVIEW

This unit covers the basic, legally required health and safety duties of everyone in the workplace. It describes the competence required to ensure that:

- your own actions do not create any health and safety risks
- you do not ignore significant risks in your workplace, and
- you take sensible action to put things right, including reporting situations which pose a danger to people in the workplace, and seeking advice from others

This unit does **not** require you to undertake a full Risk Assessment. It is about having an appreciation of significant risks in the workplace and knowing how to identify them and deal with them.

When you have completed this unit, you will have proved you can:

1. Identify hazards and evaluate risks in your workplace
2. Reduce the risks to health and safety in your workplace

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Risks resulting from

a. the use and maintenance of machinery or equipment
b. the use of materials or substances
c. working practices which do not conform to laid down policies
d. unsafe behaviour
e. accidental breakages and spillages
f. environmental factors
g. working at height
h. lifting operations and manual handling
i. incorrect use of personal protective equipment

2. Workplace policies covering

a. the use of safe working methods and equipment
b. the safe use of hazardous substances
c. smoking, eating, drinking and drugs
d. what to do in the event of an emergency
e. personal presentation
f. personal protective equipment
g. lifting operations and manual handling
h. working at height
i. mobile phones and personal stereo equipment

ESSENTIAL KNOWLEDGE

You need to understand:

Health and Safety Legislation and Workplace Policies

1. your legal duties for health and safety in the workplace as required by the Health and Safety at Work Act 1974, and any other policies or procedures that govern your working practices.
2. your duties for health and safety as defined by any specific legislation covering your job role
3. **agreed workplace policies relating to controlling risks to health and safety**
4. responsibilities for health and safety in your job description
5. the responsible persons to whom you report health and safety matters

Risks to Health and Safety

6. what hazards may exist in your workplace, (eg. Slips, trips and falls).
7. health and safety risks which may be present in your own job role and the precautions you must take
8. the importance of remaining alert to the presence of hazards in the whole workplace
9. how to deal with and report risks
10. the importance of dealing with or promptly reporting risks
11. the requirements and guidance on the precautions
12. the specific workplace policies covering your job role
13. suppliers' and manufacturers' instructions for the safe use of equipment, materials and products
14. safe working practices for your own job role
15. the importance of personal presentation in maintaining health and safety in the workplace
16. the importance of personal conduct in maintaining the health and safety of yourself and others
17. the importance of personal protective equipment, when and where it should be used and the importance of maintaining it correctly.
18. your scope and responsibility for rectifying risks
19. workplace procedures for handling risks which you are unable to deal with

PERFORMANCE OBJECTIVES

1. **Identify the hazards and evaluate the risks**

To be competent you must:

a. name correctly and locate the persons responsible for health and safety in the workplace
b. identify correctly **all** workplace polices relevant to your working practices
c. identify working practices in your job role which could harm yourself or other persons
d. identify those aspects of the workplace which could harm yourself or other persons
e. evaluate which of the potentially harmful working practices and the potentially harmful aspects of the workplace pose the highest **risk** to yourself or to others f. report those hazards which present a high **risk** to the persons responsible for health and safety in the workplace
g. identify and deal with low **risk** hazards in accordance with workplace policies and legal requirements.

2. Reduce the risks to health & safety in your workplace:

To be competent you must:

a carry out your working practices in accordance with legal requirements
b identify the correct personal and vehicle protective equipment required to correctly carry out your workplace practices
c carry out your workplace practices using the correct personal protective equipment
d follow the most recent **workplace policies** for your job role
e rectify health and safety **risks** that are within your capability and scope of your job responsibilities
f pass on any suggestions for reducing **risks** to health and safety within your job role to the responsible persons
g ensure your personal conduct in the workplace does not endanger the health and safety of yourself or other persons
h follow the **workplace policies** and suppliers' or manufacturers' instructions for the safe use of equipment, materials and products
i report any differences between **workplace policies** and suppliers' or manufacturers' instructions as appropriate
j ensure your personal presentation at work:

- ensures the health and safety of yourself and others,
- meets any legal duties, and
- is in accordance with workplace policies

Unit G3 – Maintain Positive Working Relationships

UNIT OVERVIEW

This unit is about maintaining good working relationships with all colleagues in the working environment by using effective communication and support skills.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Colleagues are
   a. immediate work colleagues
   b. supervisors and managers

2. Requests for assistance covering
   a. technical assistance
   b. personal assistance

ESSENTIAL KNOWLEDGE

You need to understand:

Your responsibilities and constraints

1. your own and your colleague's job role and limits of responsibility for giving advice and support.
2. the operational constraints which may affect interaction with colleagues.
3. lines of communication within your workplace.

Communication skills and working relationships

4. how to use suitable and effective spoken communication skills when responding to and interacting with others.
5. how to adapt written and spoken communication methods to satisfy the needs of colleagues.
6. how to report problems using written and spoken methods of communication.
7. the importance of developing positive working relationships with colleagues – the effect on morale, productivity, and company image.
8. the importance of accepting other peoples' views and opinions.
9. the importance of making and honouring realistic commitments to colleagues.

PERFORMANCE OBJECTIVES

To be competent you must:

a. contribute actively to team working by initiating ideas and co-operating with colleagues.
b. respond promptly and willingly to requests for assistance from **colleagues** which fall within the limits of your own job responsibilities and capabilities.
c. where requests fall outside your responsibility and capability, refer colleagues to the relevant person(s).
d. give colleagues sufficient, accurate information and support to meet their work needs.
e. make **requests for assistance** to **colleagues** clearly and courteously.
f. use methods of communication which meet the needs of colleagues.
g. treat colleagues in a way which shows respect for their views and opinions and promotes goodwill.
h. make and keep achievable commitments to **colleagues**
i.. inform colleagues promptly of any problems or information likely to affect their own work.

Unit G4 – Use of Tools, Materials and Fabrication

UNIT OVERVIEW

What this unit is about

This unit is about the basic use of tools, materials and fabrications relevant to the Automotive Sector.
This unit is about:

- interpreting information
- adopting safe and healthy working practices
- selecting materials and equipment

Who this unit is for

This unit is those working in technical support roles. It is also appropriate for workshop planners.

Performance Requirements

You must be able to:

1. Interpret the given information relating to the work and resources to confirm its relevance
2. Carry out pre-start preparation inspections on power tools and equipment in accordance with approved procedures
3. Carry out operations using power tools and equipment in accordance with safe working practices to achieve the work outcome
4. Identify problems as*sociated with power tools and equipment which need to be referred to authorised personnel
5. Demonstrate work skills to:
   - measure, mark out, fit, finish, position and secure.
6. Use and maintain:
   - hand tools
   - ancillary equipment
   - safety aids
7. Disposal of waste in accordance with legislation to maintain a clean work space 8. Checks carried out in accordance with

Knowledge and Understanding Requirements

You must know and understand:

a. The organisational procedures developed to report and rectify inappropriate information and unsuitable resources, and how they are implemented.
b. The types of information, their source and how they are interpreted.
c. The organisational procedures to solve problems with the information and why it is important they are followed.
d. The level of understanding operatives must have of information for relevant, current legislation and official guidance and how it is applied.
e. What the accident reporting procedures are and who is responsible for making the reports.
f. Why and when personal protective equipment (PPE) should be used.
g. Why disposal of waste should be carried out safely and how it is achieved
h. Demonstrate an understanding of material properties manufacturer's/operator's guidance, legislation and official guidance and organisational requirements
9. Demonstrate work skills to select correct materials and fabrication for project
i. Investigate the use of materials and fabrication

Unit G6 – Enable Learning through Demonstrations and Instruction

(ENTO Unit L11)

UNIT OVERVIEW

This unit is about demonstrating skills and methods to learners and instructing learners in procedures and processes.

KEY WORDS AND PHRASES

Demonstration and instruction activities

These include; demonstrating how equipment is used, showing a learner how to do something, giving learners instructions on what to do or how to carry out a particular activity, deciding when you should use demonstration or instruction to encourage learning, reviewing the potential use of technology-based learning, checking on the progress of learners and giving feedback to learners.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard None has been defined for this unit.

ESSENTIAL KNOWLEDGE

You need to understand:

The nature and role of demonstrations and instruction

1. the separate areas of demonstrations which encourage learning
2. which types of learning are best achieved and supported through demonstrations
3. how to identify and use different learning opportunities
4. how to structure demonstrations and instruction sessions
5. how to choose from a range of demonstration techniques

Principles and concepts

6. how to put learners at their ease and encourage them to take part
7. how to choose between demonstration and instruction as learning methods
8. how to identify individual learning needs
9. which factors are likely to prevent learning and how to overcome them
10. how to check learners' understanding and progress
11. how to put information in order and decide whether the language you will be using is appropriate
12. how to choose and prepare appropriate materials, including technology based materials
13. the separate areas of instructional techniques which encourage learning
14. which types of learning are best achieved and supported through instruction

External factors influencing human resource development

15. how to make sure everybody acts in line with health, safety and environmental protection l legislation and best practice.
16. how to analyse and use developments in learning and new ways of delivery, including technology-based learning.

PERFORMANCE OBJECTIVES

1. Demonstrate skills and methods to learners

To be competent you must:

a. base the demonstration on an analysis of the skills needed and the order they must be learned in.
b. ensure that the demonstration is accurate and realistic.
c. structure the demonstration so the learner can get the most out of it.
d. encourage learners to ask questions and get explanation at appropriate stages in the demonstration.
e. give learners the opportunities to practise the skill being demonstrated and give them positive feedback.
f. give extra demonstrations of the skills being taught to reinforce learning.
g. ensure that demonstrations take place in a safe environment and allow learners to see the demonstration clearly.
h. respond to the needs of learners during the demonstration.
i. reduce distractions and disruptions as much as possible.

2. Instruct learners

To be competent you must:

a. match instruction to the needs of the learners.
b. identify which learning outcomes will be achieved through instruction.
c. ensure that the manner, level and speed of the instruction encourages learners to take part.
d. regularly check that learners understand and adapt instruction as appropriate.
e. give learners positive feedback on the learning experience and the outcomes achieved.
f. identify anything that prevents learning and review this with the learners.

Unit G8 – Identify and Agree Customer Service Needs

UNIT OVERVIEW

This unit is about: gaining information from customers on their perceived needs; giving advice and information and agreeing a course of action; contracting for the agreed work and completing all necessary records and instructions.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the fundamental legal requirements of current consumer legislation and the consequences of your own actions in respect of this legislation.
2. the content and limitations of company and product warranties for the vehicles dealt with by your company.
3. the limits of your own authority for accepting vehicles.
4. the importance of keeping customers informed of progress.
5. your workplace requirements for the completion of records.
6. how to complete and process all the necessary documentation.

Customer communication and care

7. how to communicate effectively with, and listen to, customers.
8. how to adapt your language when explaining technical matters to nontechnical customers.
9. how to use effective questioning techniques.
10. how to care for customers and achieve customer satisfaction.

Company products and services

11. the range of options available to resolve vehicle problems.
12. the range and type of services offered by your company.
13. the effect of resource availability upon the receipt of customer vehicles and the completion work.
14. how to access costing and work completion time information.

PERFORMANCE OBJECTIVES

To be competent you must:

a. obtain sufficient, relevant information from the customer to make an assessment of their own and perceived vehicle needs.

b. provide customers with accurate, current and relevant advice and information on:
   - suitable vehicle inspection, repair and/or service procedures
   - potential courses of action
   - the implications of courses of action
   - the estimated costs.

c. provide advice and information clearly and in a form and manner which the customer will understand.

d. actively encourage customers to ask questions and seek clarification during your conversation.

e. support the accurate identification and clarification of customer and vehicle needs, by referring to:
   - vehicle data
   - operating procedures.

f. before accepting the vehicle, agree with the customer and record:
   - the extent and nature of the work to be undertaken
   - the terms and conditions of acceptance
   - the cost
   - the timescale.

g. confirm your customer's understanding of the agreement you have made.

h. ensure your recording systems are complete, accurate, in the format required and signed by the customer where necessary.

i. pass all completed records to the next person in the process promptly.

j. gain further customer approval where the contracted agreement is likely to be exceeded.

Unit G9 - How Vehicle Units and Components Work

UNIT OVERVIEW

This unit identifies the knowledge and understanding of how vehicle units and components work. You will need to understand how each individual unit and component operates and how they interact with other units to make up more complex systems.

ESSENTIAL KNOWLEDGE

You need to know and understand:

1. the health, safety and legal requirements relating to working within the automotive sector.
2. the four stroke cycle for Si and Ci
3. the two stroke cycle for Si and Ci
4. types of fuel used for internal combustion engines
5. alternative power plant systems for vehicles
6. construction, design and operation of four stroke and two stroke engines
7. construction, design and operation of hydrogen fuel cells
8. construction, design and operation of electrically powered vehicles
9. cooling systems for internal combustion engines - air, oil and water
10. ignition systems for Si engines
11. power generating systems used within vehicles
12. construction, design and operation of braking systems (including regenerative braking)
13. construction, design and operation of suspension systems (mechanical, electrical and fluid. Linear magnetic system variable viscosity fluid to be included)
14. construction, design and operation of steering systems mechanical electrical and hydraulic
15. construction, design and operation of vehicle starting systems
16. construction, design and operation of vehicle electrical and electronic systems including data transfer / bus systems
17. construction, design and operation of sensors and actuators
18. construction, design and operation of vehicle transmission driveline units and components

Unit G11 - Supervisory Skills

(Imported MSC Unit D6)

UNIT OVERVIEW

What is the unit about?

This unit is about ensuring that the work required in your area of responsibility is effectively planned and fairly allocated to individuals and/or teams. It also involves monitoring the progress and quality of the work of individuals and/or teams to ensure that the required level or standard of performance is being met and reviewing and updating plans of work in the light of developments.

The 'area of responsibility' may be, for example, a branch or department or functional area or an operating site within an organisation.

Who is the unit for?

The unit is recommended for first line managers and middle managers.

Skills

Listed below are the main generic 'skills' which need to be applied in allocating and monitoring the progress and quality of work in your area of responsibility. These skills are explicit/implicit in the detailed content of the unit and are listed here as additional information.

- Communicating
- Consulting
- Decision making
- Delegating
- Information management
- Leadership
- Managing conflict
- Monitoring
- Motivating
- Planning
- Problem solving
- Providing feedback
- Prioritising
- Reviewing
- Setting objectives
- Stress management
- Valuing and supporting others.

Performance Objectives

Outcomes of effective performance

You must be able to do the following:

1. Confirm the work required in your area of responsibility with your manager and seek clarification, where necessary, on any outstanding points and issues.
2. Plan how the work will be undertaken, seeking views from people in your area of responsibility, identifying any priorities or critical activities and making best use of the available resources.
3. Ensure that work is allocated to individuals and/or teams on a fair basis taking account of skills, knowledge and understanding, experience and workloads and the opportunity for development.
4. Ensure that individuals and/or teams are briefed on allocated work, showing how it fits with the vision and objectives for the area and the overall organisation, and the standard or level of expected performance.
5. Recognise and seek to find out about differences in expectations and working methods of any team members from a different country or culture and promote ways of working that take account of their expectations and maximise productivity.
6. Encourage individuals and/or team members to ask questions, make suggestions and seek clarification in relation to allocated work.
7. Monitor the progress and quality of the work of individuals and/or teams on a regular and fair basis against the standard or level of expected performance and provide prompt and constructive feedback.
8. Support individuals and/or teams in identifying and dealing with problems and unforeseen events.
9. Motivate individual and/or teams to complete the work they have been allocated and provide, where requested and where possible, any additional support and/or resources to help completion.
10. Monitor your area for conflict, identifying the cause(s) when it occurs and dealing with it promptly and effectively.
11. Identify unacceptable or poor performance, discuss the cause(s) and agree ways of improving performance with individuals and/or teams.
12. Recognise successful completion of significant pieces of work or work activities by individuals and/or teams.
13. Use information collected on the performance of individuals and/or teams in any formal appraisals of performance.
14. Review and update plans of work for your area, clearly communicating any changes to those affected.

Behaviours which underpin effective performance

1. You recognise changes in circumstances promptly and adjust plans and activities accordingly.
2. You prioritise objectives and plan work to make best use of time and resources.
3. You make time available to support others.
4. You take personal responsibility for making things happen.
5. You show an awareness of your own values, motivations and emotions.
6. You show integrity, fairness and consistency in decision-making.
7. You clearly agree what is expected of others and hold them to account.
8. You seek to understand people's needs and motivations.
9. You take pride in delivering high quality work.
10. You are vigilant for possible risks and hazards.
11. You encourage and support others to make the best use of their abilities.
12. You use a range of leadership styles appropriate to different people and situations.

Knowledge and Understanding

You need to know and understand the following:

General knowledge and understanding

1. How to select and successfully apply different methods for communicating with people across an area of responsibility
2. The importance of confirming/clarifying the work required in your area of responsibility with your manager and how to do this effectively
3. How to identify and take due account of health and safety issues in the planning, allocation and monitoring of work
4. How to produce a plan of work for your area of responsibility, including how to identify any priorities or critical activities and the available resources
5. How to identify sustainable resources and ensure their effective use when planning the work for your area of responsibility
6. The importance of seeking views from people working in your area and how to take account of their views in producing the plan of work
7. The values, ethics, beliefs, faith, cultural conventions, perceptions and expectations of any team members from a different country or culture and how your own values, ethics, beliefs, faith, cultural conventions, perceptions, expectations, use of language, tone of voice and body language may appear to them
8. Why it is important to allocate work to individuals and/or teams on a fair basis and how to do so effectively
9. Why it is important that individuals and/or teams are briefed on allocated work and the standard or level of expected performance and how to do so effectively
10. The importance of showing individuals and/or teams how their work fits with the vision and objectives of the area and those of the organisation
11. Ways of encouraging individuals and/or teams to ask questions and/or seek clarification in relation to the work which they have been allocated.
12. Effective ways of regularly and fairly monitoring the progress and quality of work of individuals and/or teams against the standards or level of expected performance
13. How to provide prompt and constructive feedback to individuals and/or teams
14. Why it is important to monitor your area for conflict and how to identify the cause(s) of conflict when it occurs and deal with it promptly and effectively
15. How to take account of diversity and inclusion issues when supporting and encouraging individuals and/or teams to complete the work they have been allocated
16. Why it is important to identify unacceptable or poor performance by individuals and/or teams and how to discuss the cause(s) and agree ways of improving performance with them
17. The type of problems and unforeseen events that may occur and how to support individuals and/or teams in dealing with them
18. The additional support and/or resources which individuals and/or teams might require to help them complete their work and how to assist in providing this
19. How to select and successfully apply different methods for encouraging, motivating and supporting individuals and/or teams to complete the work they have been allocated, improve their performance and for recognising their achievements
20. How to log information on the ongoing performance of individuals and/or teams and use this information for formal performance appraisal purposes
21. The importance of reviewing and updating plans of work for your area in the light of developments, how to reallocate work and resources and clearly communicate the changes to those affected

Industry/sector specific knowledge and understanding

1. Industry/sector requirements for the development or maintenance of knowledge, understanding and skills
2. Industry/sector specific legislation, regulations, guidelines, codes of practice relating to carrying out work

Context specific knowledge and understanding

1. The individuals and/or teams in your area of responsibility
2. The vision and objectives for your area of responsibility
3. The vision and objectives of the overall organisation
4. The work required in your area of responsibility
5. The available resources for undertaking the required work
6. The plan of work for your area of responsibility
7. The organisation's written health and safety policy statement and associated information and requirements
8. Your organisation's policy and procedures in terms of personal development
9. Organisational standards or level of expected performance
10. Organisational policies and procedures for dealing with poor performance
11. Organisational grievance and disciplinary policies and procedures
12. Organisational performance appraisal systems

Unit G12 – Developing Staff

(Imported MSC Unit D8)

UNIT OVERVIEW

What is the unit about?

This unit is about helping members of yo/ur team address problems affecting their performance. These may be work-related problems or problems arising from their personal circumstances.

The unit involves identifying problems affecting people's performance and discussing these in a timely way with the team members concerned to help them find a suitable solution to their problem. Sometimes you may need to refer the team member to specialist support services.

Who is the unit for?

The unit is recommended particularly for first line managers and middle managers.

Skills

Listed below are the main generic 'skills' which need to be applied in helping team members address problems affecting their performance. These skills are explicit/implicit in the detailed content of the unit and are listed here as additional information.

Acting assertively
Communicating
Consulting
Decision-making
Empathising
Information management
Managing conflict
Monitoring
Problem solving
Providing feedback
Reviewing
Setting objectives
Team building
Valuing and supporting others.

PERFORMANCE CRITERIA

Outcomes of effective performance

You must be able to do the following:

a. Give team members opportunities to approach you with problems affecting their performance.
b. Identify performance issues and bring these promptly to the attention of the team members concerned.
c. Discuss problems with team members at a time and place appropriate to the type, seriousness and complexity of the problem.
d. Gather and check information to accurately identify the problem and its cause.
e. Discuss the range of alternative courses of action and agree with the team member a timely and effective way of dealing with the problem.
f. Refer the team member to support services or specialists, where necessary.
g. Keep a confidential record of your discussions with team members about problems affecting their performance.
h. Ensure your actions are in line with your organisation's policies for managing people.

Behaviours which underpin effective performance

1. You find practical ways to overcome barriers.
2. You show empathy with others' needs, feelings and motivations and take an active interest in their concerns.
3. You make time available to support others.
4. You comply with, and ensure others comply with, legal requirements, industry regulations, organisational policies and professional codes.
5. You show integrity, fairness and consistency in decision-making.
6. You confront performance issues and resolve them directly with the people involved.
7. You keep confidential information secure.
8. You check the validity and reliability of information.
9. You identify the implications or consequences of a situation.
10. You take timely decisions that are realistic for the situation.

ESSENTIAL KNOWLEDGE

You need to know and understand the following:

General knowledge and understanding

1. The importance in giving team members opportunities to approach you with problems affecting their performance.
2. How to encourage team members to approach you with problems affecting their performance.
3. The importance of identifying performance issues and bringing these promptly to the attention of the team members concerned.
4. The importance of discussing problems with team members at a time and place appropriate to the type, seriousness and complexity of the problem.
5. How to gather and check the information you need to identify the problem and its cause.
6. The importance of identifying the problem accurately.
7. The range of alternative courses of action to deal with the problem.
8. The importance of discussing and agreeing with the team member a timely and effective way of dealing with the problem.
9. When to refer the team member to support services or specialists.
10. The importance of keeping a confidential record of your discussions with team members about problems affecting their performance, and how to do so.
11. The importance of ensuring your actions are in line with your organisation's policies for managing people and their performance.

Industry/sector specific knowledge and understanding

1. Industry/sector requirements for helping team members address problems affecting their performance.

Context specific knowledge and understanding

1. The types of problems that your team members may encounter which can affect their performance.
2. Your role, responsibilities and limits of authority when dealing with team members' problems.
3. The range of support services or specialists that exist inside and outside your organisation.
4. Your organisation's policies for managing people and their performance.

Unit G13 – Business Management

(Imported MSC Unit F3)

Unit Overview

What is the unit about?

This unit is about managing business processes to make sure the organisation delivers outputs that meet customers' needs and stakeholders' needs, and organisational and legal requirements.

Who is the unit for?

The unit is recommended for middle managers.

Skills

Listed below are the main generic 'skills' which need to be applied in managing business processes.

These skills are explicit/implicit in the detailed content of the unit and are listed here as additional information.

- Communicating
- Information management
- Analysing
- Assessing
- Presenting information
- Influencing
- Persuading
- Negotiating
- Problem solving
- Prioritising
- Thinking systematically
- Thinking creatively
- Reviewing

Performance Objectives

Outcomes of effective performance

You must be able to do the following:

1. Design processes that deliver outcomes based on organisational goals and aims.
2. Ensure processes and resources are sustainable and effective in their use.
3. Identify and provide the resources you need.
4. Take account of influences that may affect and shape how processes work.
5. Link processes so that they interact across the organisation to form a complete system.
6. Provide information and support for staff and other stakeholders involved.
7. Define process responsibilities.
8. Develop process measures that are affordable and provide enough information for people to decide how to manage the process.
9. Establish and use effective methods to review and improve the process.

Behaviours which underpin effective performance

1. You keep people informed of plans and developments.
2. You clearly agree what is expected of others and hold them to account.
3. You take repeated or different actions to overcome obstacles and respond positively and creatively to setbacks.
4. You comply with, and ensure others comply with, legal requirements, industry regulations, organisational policies and professional codes.
5. You monitor the quality of work and progress against plans and take appropriate corrective action, where necessary.
6. You focus personal attention on specific details that are critical to achieving successful results.
7. You identify systemic issues and trends and recognise their impact upon current and future work.
8. You take opportunities when they arise to achieve longer-term aims.

Knowledge and Understanding

You need to know and understand the following:

General knowledge and understanding

1. Principles and models of effective process management.
2. How to define business processes
3. Types of business process measures and how to assess their suitability
4. How to ensure processes and resources are sustainable and effective in their use, and the importance of doing so
5. The difference between process outputs and outcomes
6. How to assess process changes for risk and reward against their potential investment cost
7. How to carry out cost and benefit analysis
8. Types of analytical and problem-solving tools that you can use when developing business processes
9. How to measure the effect of changes in the business process

Industry/sector specific knowledge and understanding

1. The sector and market in which your organisation works
2. Relevant sector trends, developments and competitor performance that affect your business processes

Context specific knowledge and understanding

1. Your organisation's aims and goals
2. Your organisation's structure, values and culture
3. How your organisation adds value through delivering its products, services and processes
4. The needs of your actual and potential customers and other key stakeholders
5. Your organisation's products, services and processes and the interdependencies between them
6. Measures of process performance that are relevant to your organisation.

Unit LV01 – Carry Out Routine Vehicle Maintenance

UNIT OVERVIEW

This unit is about conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of vehicles.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard.

1. Sources of technical information are:
- a. vehicle technical data
- b. schedules of inspection
- c. regulations

2. Examination methods are:
- a. aural
- b. visual
- c. functional
- d. measurements

3. Assessments are for:
- a. malfunction
- b. damage
- c. fluid levels
- d. leaks
- e. wear
- f. security
- g. condition and serviceability
- h. conformity
- i. necessity for adjustment(s)

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the manufacturer's and legal requirements relating to routine maintenance activities for vehicle systems and components.
2. the legal requirements relating to the vehicle
3. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities including PPE
4. your workplace procedures for
   - recording vehicle maintenance work and any variations from the original vehicle specification
   - the referral of problems
   - reporting delays to the completion of work
5. the importance of documenting vehicle maintenance information
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time and costs.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

9. how to find, interpret and use **sources of technical information** for scheduled maintenance activities, including on-board diagnostic displays.
10. the importance of using the correct **sources of technical information.**
11. the purpose of and how to use identification codes.

Vehicle system operation

12. how engines, cooling systems, air supply and exhaust systems, fuel systems and ignition systems operate for the type(s) of vehicle on which you are working.
13. how clutch assemblies, clutch operating systems, manual gear boxes, automatic gear boxes, drivelines and hubs (if appropriate) and final drive assemblies operate for the type of vehicle on which you are working.
14. how suspension systems, steering systems, braking systems, non- electrical body systems, wheels and tyres operate for the type of vehicle on which you are working.
15. the purpose, operating principles and location of power storage systems (including batteries), power generating systems,(including vehicle charging systems), starting systems, lighting systems and ancillary equipment for the type of vehicle on which you are working.
16. the operating specifications and tolerances for the type(s) of vehicles on which you are working.

Routine maintenance requirements

17. how to conduct scheduled, routine **examination methods** and **assessments** against vehicle specifications to identify damage, corrosion, inadequate fluid levels, leaks, wear, security problems and general condition and serviceability.
18. check and make adjustments to clearances, gaps, settings, alignment, pressures, tension, speeds and levels relevant to the engine area, transmission area, chassis area, electrical area and body (including to valves, ignition, fuel and emissions, brakes, transmission, lights, tyres, steering and body fittings).
19. how to replenish and replace routine service components and materials, including filters, drive, belts, wiper blades, brake linings and pads, lubricants and fluids.
20. how to recognise and report cosmetic damage to vehicle components and units outside normal service items
21. how to identify codes and grades of lubricants.
22. how to work safely avoiding damage to the vehicle and its systems.

PERFORMANCE OBJECTIVES

To be competent you must:

a. use suitable personal protective equipment and vehicle coverings throughout all vehicle maintenance activities.
b. use suitable **sources of technical information** to support all your vehicle maintenance activities.
c. adhere to the correct specifications and tolerances for the vehicle when making **assessments** of system and component performance.
d. where the customer's vehicle falls outside the manufacturer's original specification, record details accurately and use this adapted specification as the basis for your examination and assessment.
e. examine the vehicle's systems and components following:
   - the manufacturer's approved **examination methods**
   - recognised researched repair methods(see guidance document)
   - health and safety requirements.
f. ensure your **examination methods** identify accurately any vehicle system and component problems falling outside the maintenance schedule specified.
g. carry out adjustments, replacement of vehicle components and replenishment of consumable materials following the manufacturer's current specification for:
   - the particular maintenance interval
   - working methods and procedures
   - use of equipment
   - the tolerances for the vehicle.
h. where system adjustments cannot be made within the manufacturer's specification, record the details accurately and take action which complies with the customer's instructions.
i. work in a way which minimises the risk of damage to the vehicle and its systems and the surrounding area.

j. use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately, prior to returning the vehicle to the customer.
k. report any problems or issues relating to the vehicle's condition or conformity to the relevant person(s) promptly.
l. ensure your maintenance records are accurate, complete and passed to the relevant person(s) promptly in the format required.
m. complete all vehicle maintenance activities within the agreed timescale.
n. report any anticipated delays in completion to the relevant persons(s) promptly.

Unit LV02 – Remove and Replace Engine Units and Components

UNIT OVERVIEW

This unit is about removing and replacing units and components where dismantling and reassembly of engine systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Equipment is
- a. hand tools
- b. special workshop tools
- c. general workshop equipment
- d. electrical testing equipment

2. Testing methods are:
- a. visual
- b. aural
- c. functional
- d. measurement

3. Unit and components are
- a. mechanical
- b. electrical

4. Engine systems are
- a. engine mechanical systems
- b. cooling, heating and ventilation systems
- c. air supply and exhaust systems
- d. fuel and ignition systems
- e. engine electrical systems
- f. lubrication systems

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **unit and component** removal and replacement within **engine systems.**
9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes.

Electrical principles

11. vehicle earthing principles and earthing methods.
12. principles associated with vehicle engine systems, including types of sensors, actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. how warning, charging and starter circuits work.
16. electric symbols, units and terms.
17. battery charging.
18. electronic/electronic control system principles.

Engine system operation and construction

19. how **engine systems** and their related **units and components** are constructed, dismantled and reassembled for the classification of vehicle worked upon.
20. how **engine systems** and their related **units and components** operate for the classification of vehicle worked upon.

Equipment

21. how to prepare, test and use all the removal and replacement **equipment** required.

Engine unit and component removal and replacement

22. how to remove and replace **engine system** mechanical and electrical units and components for the classification of vehicle worked upon.
23. how to file, fit, tap, thread, cut and drill plastics and metals.
24. how to select and fit gaskets, sealants, fittings and fasteners.
25. how to test and evaluate the performance of replacement engine **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.
26. the relationship between testing methods and the engine **units and components** replaced – the use of appropriate test methods.
27. the properties of jointing materials and when and where they should be used.
28. the manufacturer's specification for the type and quality of engine **units and components** to be used.
29. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.

b. support your removal and replacement activities by reviewing
- vehicle technical data
- removal and replacement procedures
- legal requirements.

c. prepare, test and use all the **equipment** required following manufacturers' instructions.

d. carry out all removal and replacement activities following;
- manufacturers' instructions
- Recognised researched repair methods(see guidance document)
- health and safety requirements.

e. you work in a way which minimises the risk of:
- damage to other vehicle systems
- damage to other vehicle components and units
- contact with leakage
- contact with hazardous substances.
- damage to your working environment

f. ensure replaced engine **units and components** conform to the vehicle operating specification and any legal requirements.

g. record and report any additional faults you notice during the course of your work promptly.

h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.

i. ensure the reassembled **system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.

j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

k. complete all removal and replacement activities within the agreed timescale.

l. you report any expected delays in completion to the relevant person(s) promptly.

Unit LV03 - Remove and Replace Electrical Units and Components

UNIT OVERVIEW

This unit is about removing and replacing units and components previously identified as faulty or damaged or where the customer has requested replacements. It is also about evaluating the performance of replaced units and components. The units and components concerned are those outside those replaced as part of normal routine vehicle maintenance.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Equipment is
- a. hand tools
- b. special workshop tools
- c. general workshop equipment
- d. electrical meters

2. Testing methods are:
- a. visual
- b. aural
- c. functional
- d. measurement

3. Electrical units and components are
- a. lighting systems
- b. wiper systems
- c. security and alarm systems
- d. comfort and convenience systems
- e. infotainment systems
- f. communication systems
- g. electric window systems
- h. monitoring and instrumentation systems

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle (including road safety and refrigerant handling requirements).
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **electrical unit and component** removal and replacement.
9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes

Electrical auxiliary system operation and construction

11. how **electrical units and components** are constructed, removed and replaced for the classification of vehicle worked upon.
12. how **electrical units and components** operate for the classification of vehicle worked upon.

Equipment

13. how to prepare, test and use all the removal and replacement **equipment** required.

Electrical and electronic principles

14. vehicle earthing principles and earthing methods.
15. electrical and electronic principles associated with electrical systems, including types of sensors and actuators, their application and operation
16. types of circuit protection and why these are necessary.
17. electrical safety procedures.
18. how lighting, warning, charging and starter circuits work.
19. electric symbols, units and terms.
20. electrical/electronic control system principles

Electrical unit and component removal and replacement

21. how to remove and replace **electrical units and components** for the classification of vehicle worked upon.
22. how to test and evaluate the performance of replacement **electrical units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.
23. the relationship between testing methods and the **electrical units and components** replaced – the use of appropriate test methods.
24. the manufacturer's specification for the type and quality of **electrical units and components** to be used.
25. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

l. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.

m. support your removal and replacement activities by reviewing
- vehicle technical data
- removal and replacement procedures
- legal requirements.

n. prepare, test and use all the **equipment** required following manufacturers' instructions.

o. carry out all removal and replacement activities following;
- manufacturers' instructions
- your workplace procedures
- health and safety requirements.

p. you work in a way which minimises the risk of:
- damage to other vehicle systems
- damage to other vehicle components and units
- contact with leakage
- contact with hazardous substances.

q. ensure replaced **electrical auxiliary units and components** conform to the vehicle operating specification and any legal requirements.

r. record and report any additional faults you notice during the course of your work promptly.

s. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.

t. ensure the reassembled system performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.

u. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

v. complete all removal and replacement activities within the agreed timescale.

l. you report any expected delays in completion to the relevant person(s) promptly

Unit LV04 – Remove and Replace Vehicle Chassis Units and Components

UNIT OVERVIEW

This unit is about removing and replacing units and components where dismantling and reassembly of chassis systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Equipment is
- a. hand tools
- b. special workshop tools
- c. general workshop equipment
- d. electrical testing equipment

2. Testing methods are:
- a. visual
- b. aural
- c. functional
- d. measurement

3. Units and components are:
- a. mechanical
- b. electrical
- c. hydraulic

4. Chassis systems are
- a. steering
- b. suspension
- c. braking

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use technical information applicable to **unit and component** removal and replacement within **chassis systems.**
9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes.

Electrical and electronic principles

11. vehicle earthing principles and earthing methods.
12. electrical and electronic principles associated with chassis and transmission systems, including types of sensors and actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. electric symbols, units and terms.
16. electrical and electronic control system principles.

Chassis system operation and construction

17. how **chassis systems** and their related **units and components** are constructed, removed and replaced for the classification of vehicle worked upon.
18. how **chassis systems** and their related **units and components** operate for the classification of vehicle worked upon.

Equipment

19. how to prepare, test and use all the removal and replacement **equipment** required.

Chassis system unit and component removal and replacement

20. how to remove and replace **chassis system** mechanical, electrical and hydraulic units and components for the classification of vehicle worked upon .
21. how to file, fit, tap, thread, cut and drill plastics and metals.
22. how to select and use gaskets, sealants, seals, fittings and fasteners.
23. how to test and evaluate the performance of replacement chassis system **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.
24. the relationship between testing methods and the chassis system **units and components** replaced – the use of appropriate test methods.
25. when replacement units and components must meet the original equipment specification (OES) for warranty or other requirements.
26. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.

b. support your removal and replacement activities by reviewing
- vehicle technical data
- removal and replacement procedures
- legal requirements.

c. prepare, set up, test and use all the **equipment** required following manufacturers' instructions.

d. carry out all removal and replacement activities following;
- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- your workplace procedures
- health and safety requirements.

e. you work in a way which minimises the risk of:
- damage to other vehicle systems
- damage to other vehicle components and units
- contact with leakage
- contact with hazardous substances.
- damage to your working environment

f. ensure replaced chassis **units and components** conform to the vehicle operating specification and any legal requirements.

g. record and report any additional faults you notice during the course of your work promptly.

h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.

i. ensure the reassembled **chassis system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.

j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

k. complete all removal and replacement activities within the agreed timescale.

l. you report any expected delays in completion to the relevant person(s) promptly

Unit LV05 – Inspect Vehicles using Prescribed Inspection Methods

UNIT OVERVIEW

This unit is about carrying out a range of inspections on vehicles using a variety of prescribed testing and inspection methods.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Vehicle inspections are

a. pre-work
b. post work
c. pre-delivery
d. maintenance Inspection

Examples of maintenance inspection at this level include: Brake inspections, Seasonal Inspections, Tyre inspections etc.

2. Test methods are

a. visual
b. aural
c. functional
d. measurement

3. Examples of Equipment Includes:

Appropriate test equipment to correctly confirm the functionality of the system that you are inspecting; this may include measuring equipment, specialist diagnostic equipment or any type of tool required.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to conducting **vehicle inspections** and personal and vehicle protection.
2. the legislation relevant to the **activities** described in the Scoping Statement for this unit.
3. your workplace procedures for
   - recording **vehicle inspections** and any variations from acceptable tolerances
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of making accurate records of the results of your tests and inspections and interpreting them correctly.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Sources of information

8. how to find, interpret and use technical information .
9. the importance of using technical information to inform your inspection and testing of vehicles.

Testing methods and the conduct of Inspections

10. how vehicle systems operate (including the engine area, transmission area, chassis / frame area and electrical area) and the operational tolerances for the vehicle(s) on which you are working.
11. how to follow procedures to carry out the systematic inspections described in the scoping statement above.
12. how to confirm the correct operation of vehicle systems and vehicle condition.
13. how to compare test and inspection results against vehicle specifications and legal requirements.
14. how to record test and inspection results in the format required.
15. how to make recommendations based upon the results of your inspections.
16. the implications of failing to carry out inspections activities correctly.
17. the implications of signing workplace documentation and vehicle records.

PERFORMANCE OBJECTIVES

To be competent you must:

a. use suitable personal protective equipment throughout all **vehicle inspection** activities.
b. use suitable sources of technical information to support your **vehicle inspection** activities.
c. carry out systematic vehicle inspections following:
   - manufacturer's approved procedures
   - Recognised researched repair methods(see guidance document)
   - health and safety requirements.
   - prescribed documentation
d. confirm all systems and components inspected, function correctly following the manufacturer's specifications.
e. ensure your comparison of the vehicle against specification accurately identifies any:
   - differences from the vehicle specification
   - vehicle appearance and condition faults
f. work in a way which minimises the risk of damage to the vehicle and its systems, other people and their property.
g. make suitable recommendations for **future action** based upon the results of your tests and inspections.
h. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required. (This includes all vehicle related paperwork).
i. complete all inspection activities within the agreed timescale and to specification.
j. report any anticipated delays in completion to the relevant person(s) promptly.

Unit LV06 – Inspect Vehicles

UNIT OVERVIEW

This unit is about carrying out a range of inspections of vehicles using a variety of testing methods and equipment.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Vehicle inspections are
- a. pre-purchase
- b. pre-MOT test
- c. safety
- d. post-accident, pre-repair
- e. post accident, post-repair

2. Test methods are
- a. visual
- b. aural
- c. functional
- d. measurement

3. Examples of Equipment Include
- a. emissions testing
- b. brake testing
- c. headlamp alignment
- d. wheel alignment
- e. torque setting
- f. specialist diagnostic equipment
- g. measuring equipment (eg. vernier calipers, micrometer, feeler blades etc.)

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to conducting **vehicle inspections** and personal and vehicle protection.
2. the legislation relevant to the types of **vehicle inspections** described in the Scoping Statement for this unit.
3. your workplace procedures for
   - recording **vehicle inspections** and any variations from acceptable tolerances
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of making accurate records of the results of your tests and inspections and interpreting them correctly.
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time, costs and profitability.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Sources of information

8. how to find, interpret and use technical information .
9. the importance of using technical information to inform your inspection and testing of vehicles.

Testing methods and the conduct of Inspections

10. how vehicle systems operate (including the engine area, transmission area, chassis or frame area and electrical area) and the operational tolerances for the vehicle(s) on which you are working.
11. how to follow procedures and processes to enable a logical and systematic inspection of vehicles to take place.
12. how to test the operation and tolerances of vehicle systems and how to assess vehicle condition; including workshop based and road tests.
13. how to compare test and inspection results against vehicle specifications and legal requirements.
14. how to record test and inspection results in the format required.
15. how to make recommendations based upon the results of your inspections.
16. the full implications of failing to carry out an inspection correctly.

PERFORMANCE OBJECTIVES

To be competent you must:

a. use suitable personal protective equipment throughout all **vehicle inspection** activities.
b. use suitable sources of technical information to support your **vehicle inspection** activities.
c. where necessary, confirm that **equipment** has been calibrated to meet manufacturers' and legal requirements.
d. conduct all vehicle inspections and testing following:
   - the manufacturer's approved **examination methods**
   - Recognised researched methods(see guidance document)
   - your workplace procedures
   - health and safety requirements.
e. ensure your inspection and testing of the vehicle against specification accurately identifies:
   - differences from the vehicle specification
   - vehicle appearance and condition faults
   - non-compliance with statutory requirements
f. work in a way which minimises the risk of damage to the vehicle and its systems, other people and their property and your working environment.
g. make suitable recommendations for future action based upon the results of your tests and inspections
h. explain the reasons for your recommendations to the relevant person(s).
i. offer alternative options from your recommendations if the customer does not agree to your plan for future action.
j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
k. complete all inspection activities within the agreed timescale.
l. report any anticipated delays in completion to the relevant person(s) promptly.

Unit LV07 – Diagnose and Rectify Vehicle Engine and Component Faults

UNIT OVERVIEW

This unit is about diagnosing and rectifying faults occurring in the vehicle engine mechanical, electrical and hydraulic and fluid systems.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Faults occur within
- a. the engine mechanical system
- b. the engine electrical and electronic systems
- c. the engine hydraulic and fluid systems

2. Diagnostic methods are
- a. measurement
- b. functional testing
- c. electrical and electronic systems testing

3. Diagnostic Testing is defined as:
- a. Verify the fault
- b. Collect further information
- c. Evaluate the evidence
- d. Carry out further tests in a logical sequence
- e. Rectify the problem
- f. Check all systems

4. Equipment is
- a. diagnostic and rectification equipment for engine mechanical systems
- b. diagnostic and rectification equipment for engine electrical systems
- c. diagnostic and rectification equipment for engine hydraulic and fluid systems
- d. specialist repair tools
- e. general workshop equipment

5. Rectification activities are defined as:

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying engine faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of working to recognised diagnostic and rectification procedures and processes and obtaining the correct information for diagnostic and rectification activities to proceed
5. the importance of, documenting diagnostic and rectification information.

6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles associated with engine systems, including types of sensors and actuators, their application and operation
10. how electrical and electronic engine systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical components within vehicle engine systems
12. how engine electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification **equipment** for engine mechanical, electrical, electronic, hydraulic and fluid systems; specialist engine repair tools and general workshop equipment

Engine electrical faults, their diagnosis and correction

17. how engine mechanical, electrical, electronic and hydraulic and fluid systems are constructed, operate, dismantled and reassembled.
18. the types and causes of engine mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures.
19. engine mechanical, electrical, electronic and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on engine electrical and electronic operating specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to engine mechanical, electrical, electronic and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of engine mechanical, electrical and electronic, hydraulic and fluid systems using prescribed processes or formats.
24. how to assess the condition of mechanical, electrical, electronic, hydraulic and fluid components and units.
25. how to interpret test results and vehicle data in order to identify the location and cause of engine system faults.
26. how to carry out the **rectification activities** in order to correct faults in the engine mechanical, electrical, electronic and hydraulic and fluid systems.
27. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
28. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.

b. support the identification of **faults**, by reviewing vehicle:
- technical data
- diagnostic test procedures.

c. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.

d. use **diagnostic methods** which are relevant to the symptoms presented.

e. collect sufficient diagnostic information in a systematic way to enable an accurate diagnosis of engine system faults.

f. identify and record any system deviation from acceptable limits accurately.

g. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.

h. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.

i. use the **equipment** required, correctly and safely throughout all **diagnostic and rectification activities**.

j. carry out all **diagnostic and rectification activities** following:
- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- your workplace procedures
- health and safety requirements

k. work in a way which minimises the risk of :
- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

l. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.

m. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.

n. record and report any additional faults you notice during the course of work promptly.

o. use testing methods which are suitable for assessing the performance of the system rectified.

p. ensure the engine system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.

q. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

r. complete all system diagnostic activities within the agreed timescale.

s. report any anticipated delays in completion to the relevant person(s) promptly.

Unit LV08 – Diagnose and Rectify Vehicle Chassis System Faults

UNIT OVERVIEW

This unit is about diagnosing and rectifying faults occurring within vehicle steering, suspension systems and braking systems.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Chassis systems are
- a. steering
- b. suspension
- c. braking

2. Diagnostic methods are
- a. measurement
- b. functional testing
- c. electrical and electronic systems testing

3. Diagnostic Testing is defined as:
- a. verify the fault
- b. collect further information
- c. evaluate the evidence
- d. carry out further tests in a logical sequence
- e. rectify the problem
- f. check all systems

4. Equipment is
- a. diagnostic and rectification equipment for chassis mechanical systems
- b. diagnostic and rectification equipment for chassis electrical systems
- c. diagnostic and rectification equipment for chassis hydraulic and fluid systems
- d. specialist repair tools
- e. general workshop equipment

5. Faults are
- a. mechanical
- b. electrical and electronic
- c. hydraulic and fluid

6. Rectification activities are defined as:

A suitable repair or replacement that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying chassis faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of working to recognised diagnostic and rectification procedures and processes and obtaining the correct information for diagnostic and rectification activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles associated with chassis systems, including types of sensors and actuators, their application and operation.
10. how electrical and electronic chassis systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical components within vehicle chassis systems.
12. how chassis electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification **equipment** for chassis mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Chassis faults, their diagnosis and correction

17. how chassis mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of chassis mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. chassis mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on chassis electrical operating specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to chassis mechanical, electrical, electronic and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
21. how to carry out systematic diagnostic testing of chassis mechanical, electrical and electronic, hydraulic and fluid systems using a prescribed process or format .
22. how to assess the condition evident within chassis mechanical, electrical, electronic, hydraulic and fluid components and units.
23. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.

24. how to carry out the **rectification activities** in order to correct faults in the chassis mechanical, electrical, electronic and hydraulic and fluid systems.
25. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
26. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.
b. support the identification of **faults**, by reviewing vehicle:
- technical data
- diagnostic test procedures.

c. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.
d. use **diagnostic methods** which are relevant to the symptoms presented.
e. collect diagnostic information in a systematic way relevant to the diagnostic methods used.
f. collect sufficient diagnostic information to enable an accurate diagnosis of chassis system faults.
g. identify and record any system deviation from acceptable limits accurately.
h. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.
i. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
j. use the **equipment** required, correctly and safely throughout all **rectification activities**.
k. carry out all **rectification activities** following:
- manufacturers' instructions
- your workplace procedures
- health and safety requirements.

l. work in a way which minimises the risk of :
- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

m. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.
n. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.
o. record and report any additional faults you notice during the course of work promptly.
p. use testing methods which are suitable for assessing the performance of the system rectified.
q. ensure the chassis system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.
r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
s. complete all system diagnostic activities within the agreed timescale.
t. report any anticipated delays in completion to the relevant person(s) promptly.

Unit LV11 – Overhaul Mechanical Units

UNIT OVERVIEW

This unit is about the overhaul of mechanical units, involving dismantling, assessment, repair, replacement or adjustment of internal components together with re-assembly and testing.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Overhaul activities are

a. dismantling
b. assessment,
c. repair
d. replacement
e. adjustment of internal components
f. re-assembly
g. functional testing

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements applicable to the units and assemblies overhauled (including road safety requirements).
2. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection.
3. your workplace procedures for
   - recording **overhaul activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of working to recognised overhauling and repair procedures and processes and obtaining the correct information for overhauling and repair activities to proceed
5. the importance of, documenting repair information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the importance of reporting any anticipated delays to the relevant person(s) promptly.

Equipment

7. how to prepare, and assess the accuracy and operation of all the overhauling and testing equipment required.
8. how to use all the overhauling and testing equipment required.

Mechanical unit overhauling activities

9. how to find, interpret and use sources of information on overhauling procedures and statutory requirements.
10. how vehicle mechanical units and assemblies operate.
11. how mechanical units and assemblies are constructed, dismantled and reassembled.
12. the possible causes of faults in mechanical units and assemblies.
13. vehicle operating specification for limits, fits and tolerances and where this information can be sourced.
14. how to assess the condition evident within unit sub-assemblies and components.
15. the cost-benefit / relationship between the reconditioning, repair and replacement of components.
16. how to carry out **overhauling activities** for the type(s) of unit worked upon.

17. the relationship between test methodology and the faults repaired – the use of appropriate testing methods.
18. how to test and evaluate the performance of overhauled units against the operating specification.
19. how to interpret test results.
20. how to identify the types and causes of mechanical unit and assembly failure.
21. how to make suitable adjustments to components and units.
22. how to work safely avoiding personal injury, damage to components leakage and hazardous substances.
23. how to make cost effective recommendations based upon the cost-benefit / relationship between the reconditioning, repair and replacement of components.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment throughout all **overhauling activities**.
b. use suitable sources of technical information to support your **overhauling activities**.
c. assess and prepare all the equipment required, following manufacturers' instructions, prior to use.
d. use the tools and equipment required correctly and safely throughout all **overhauling activities**.
e. carry out all **overhauling activities** following:
   - manufacturers' instructions
   - recognised researched repair methods(see guidance document)
   - your workplace procedures
   - health and safety requirements
f. work in a way which minimises the risk of:
   - damage to other components
   - leakages
   - contact with hazardous substances.
g. ensure your assessment of the dismantled unit identifies accurately its condition and suitability for overhaul.
h. inform the relevant person(s) promptly where an overhaul is uneconomic or unsatisfactory to perform
i. use testing methods which comply with the manufacturer's requirements.
j. when necessary, adjust the unit's components correctly to ensure that they operate to meet the vehicle operating requirements.
k. ensure the overhauled units and assemblies conform to the vehicle operating specification and any legal requirements.
l. ensure your overhaul records are accurate, complete and passed to the relevant person(s) promptly in the format required.
m. complete all **overhauling activities** within the agreed timescale.
n. report any anticipated delays in completion to the relevant person(s) promptly.

Unit LV12 – Remove and Replace Vehicle Driveline Units and Components

UNIT OVERVIEW

This unit is about removing and replacing units and components where dismantling and reassembly of transmission and driveline systems is required. It is also about evaluating the performance of replaced units and components. The units and components concerned are those **outside those replaced as part of normal routine, vehicle maintenance (servicing) activities**.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Equipment is
- a. hand tools
- b. special workshop tools
- c. general workshop equipment
- d. electrical testing equipment

2. Testing methods are:
- a. visual
- b. aural
- c. functional
- d. measurement

3. Units and components are:
- a. mechanical
- b. electrical
- c. hydraulic

4. Transmission and driveline systems are
- a. gearbox
- b. hubs and bearings
- c. final drive assembly
- d. driveline components (including prop and drive shafts)
- e. clutch

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the legal requirements relating to the vehicle
2. the health and safety legislation and workplace procedures relevant to vehicle maintenance activities and personal and vehicle protection.
3. your workplace procedures for
   - recording removal and replacement information
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of documenting removal and replacement information
5. the importance of working to agreed timescales and keeping others informed of progress.
6. the relationship between time and costs.
7. the importance of reporting anticipated delays to the relevant person(s) promptly.

Use of technical information

8. how to find, interpret and use sources of information applicable to **unit and component** removal and replacement within **driveline systems.**

9. the importance of using the correct sources of technical information
10. the purpose of and how to use identification codes.

Electrical and electronic principles

11. vehicle earthing principles and earthing methods.
12. electrical and electronic principles associated with transmission and driveline systems, including types of sensors and actuators, their application and operation.
13. types of circuit protection and why these are necessary.
14. electrical safety procedures.
15. electric symbols, units and terms.
16. electrical and electronic control system principles.

Transmission and driveline system operation and construction

17. how **driveline systems** and their related **units and components** are constructed, removed and replaced for the classification of vehicle worked upon.
18. how **driveline systems** and their related **units and components** operate for the classification of vehicle worked upon.

Equipment

19. how to prepare, test and use all the removal and replacement **equipment** required.

Driveline system unit and component removal and replacement

20. how to remove and replace **driveline system** mechanical, electrical and hydraulic units and components for the classification of vehicle worked upon .
21. how to file, fit, tap, thread, cut and drill plastics and metals.
22. how to select and use gaskets, sealants, seals, fittings and fasteners.
23. how to test and evaluate the performance of replacement driveline system **units and components** and the reassembled system against the vehicle operating specifications and any legal requirements.
24. the relationship between testing methods and the driveline system **units and components** replaced – the use of appropriate test methods.
25. when replacement units and components must meet the original equipment specification (OES) for warranty or other requirements.
26. how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings throughout all removal and replacement activities.

b. support your removal and replacement activities by reviewing
- vehicle technical data
- removal and replacement procedures
- legal requirements.

c. prepare, set up, test and use all the **equipment** required following manufacturers' instructions.

d. carry out all removal and replacement activities following;
- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- health and safety requirements.

e. you work in a way which minimises the risk of:
- damage to other vehicle systems
- damage to other vehicle components and units
- contact with leakage
- contact with hazardous substances.
- damage to your working environment

f. ensure replaced driveline **units and components** conform to the vehicle operating specification and any legal requirements.

g. record and report any additional faults you notice during the course of your work promptly.

h. use suitable **testing methods** to evaluate the performance of the reassembled system accurately.

i. ensure the reassembled **driveline system** performs to the vehicle operating specification and meets any legal requirements prior to return to the customer.

j. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

k. complete all removal and replacement activities within the agreed timescale.

l. you report any expected delays in completion to the relevant person(s) promptly

Unit LV13 – Diagnose and Rectify Vehicle Transmission and Driveline System Faults

UNIT OVERVIEW

This unit is about diagnosing and rectifying faults occurring within vehicle gearboxes, hubs and bearings, driveline shafts, clutches, differentials and final drive units.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Transmission and driveline systems are
- a. gearbox
- b. hubs and bearings
- c. final drive assembly
- d. driveline components
- e. clutch

2. Diagnostic methods are
- a. measurement
- b. functional testing
- c. electrical and electronic systems testing

3. Diagnostic Testing is defined as:
- a. verify the fault
- b. collect further information
- c. evaluate the evidence
- d. carry out further tests in a logical sequence
- e. rectify the problem
- f. check all systems

4. Equipment is
- a. diagnostic and rectification equipment for transmission mechanical systems
- b. diagnostic and rectification equipment for transmission electrical systems
- c. diagnostic and rectification equipment for transmission hydraulic and fluid systems
- d. specialist repair tools
- e. general workshop equipment

5. Faults are
- a. mechanical
- b. electrical and electronic
- c. hydraulic and fluid

6. Rectification activities are defined as:

A suitable repair of replacement that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles associated with transmission and driveline systems, including types of sensors and actuators, their application and operation.
10. how electrical and electronic transmission and driveline systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical components within vehicle transmission and driveline systems.
12. how transmission and driveline electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification **equipment** for transmission and driveline mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Transmission and driveline faults, their diagnosis and correction

17. how transmission and driveline mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of transmission and driveline mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. transmission and driveline mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on transmission and driveline electrical operating specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to transmission and driveline mechanical, electrical, electronic and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of transmission and driveline mechanical, electrical and electronic, hydraulic and fluid systems using a prescribed process or format.
24. how to assess the condition evident within transmission and driveline mechanical, electrical, electronic, hydraulic and fluid components and units.

25. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the transmission and driveline mechanical, electrical, electronic and hydraulic and fluid systems.
27. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
28. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

g. wear suitable personal protective equipment and use vehicle coverings when using **diagnostic methods** and carrying out **rectification activities**.
h. support the identification of **faults**, by reviewing vehicle:
- technical data
- diagnostic test procedures.

i. prepare, connect and test all the required **equipment** following manufacturers' instructions prior to use.
j. use **diagnostic methods** which are relevant to the symptoms presented.
k. collect diagnostic information in a systematic way relevant to the diagnostic methods used.
l. collect sufficient diagnostic information to enable an accurate diagnosis of transmission and driveline system faults.
m. identify and record any system deviation from acceptable limits accurately.
h. ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately.
i. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
j. use the **equipment** required, correctly and safely throughout all diagnostic and **rectification activities**.
k. carry out all **diagnostic and rectification activities** following:
- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- your workplace procedures
- health and safety requirements

l. work in a way which minimises the risk of :
- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

m. ensure all repaired and replaced components and units conform to the vehicle operating specification and any legal requirements.
n. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.
o. record and report any additional faults you notice during the course of work promptly.
p. use testing methods which are suitable for assessing the performance of the system rectified.
q. ensure the transmission and driveline system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.
r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.
s. complete all system diagnostic activities within the agreed timescale.
t. report any anticipated delays in completion to the relevant person(s) promptly.

LV 14 - Diagnose Faults Where no Prescribed Process or Format is Available

This unit is about devising and implementing strategies to diagnose faults when the application of standard manufacturer diagnostic procedures has failed to reveal the source and cause of problems. You are also required to identify the best course of action to be taken to correct problems.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Causes of faults are:

- mechanical
- electrical
- electronic
- hydraulic

2. Faults cover the:

a. vehicle engine area
b. transmission and driveline area
c. chassis system area
d. electrical units and components area

3. Diagnostic methods are:

a. measurement
b. functional testing
c. electrical and electronic systems testing

4. Diagnostic Testing is defined as:

a. Verify the fault
b. Collect further information
c. Evaluate the evidence
d. Carry out further tests in a logical sequence
e. Rectify the problem
f. Check all systems

5. Equipment is

a. diagnostic and rectification equipment for mechanical systems
b. diagnostic and rectification equipment for electrical systems
c. diagnostic and rectification equipment for hydraulic and fluid systems
d. specialist repair tools
e. general workshop equipment

6. Rectification activities are defined as:

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Transmission and driveline faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition of the systems and components within vehicle mechanical, electrical and hydraulic and fluid systems
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.

26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you wear suitable personal protective equipment and use vehicle coverings throughout all diagnostic related activities in the workshop.
b. you confirm with the relevant people that all standard diagnostic procedures and techniques have been systematically and correctly applied to the vehicle prior to undertaking further work.
c. you analyse all previous system fault information, diagnostic test methods and results correctly to verify the inconclusive results prior to undertaking further work.
d. when necessary, you liaise with the relevant manufacturer's representative to obtain up to date information, advice and guidance relevant to the identified **fault**.
d. use diagnostic methods which are relevant to the symptoms presented.
e. collect diagnostic information in a systematic and structured way which progressively eliminates all possible **causes** of the **fault.**
f. you apply the checks and tests that are most likely to be effective in revealing the **cause** of the **fault**.
g. carry out all diagnostic activities following:
    - your workplace procedures
    - health and safety requirements
h. work in a way which minimises the risk of :
    - damage to other vehicle systems
    - damage to other components and units
    - contact with leakages
    - contact with hazardous substances.
i. use any equipment required, correctly and safely throughout all diagnostic and rectification activities.
j. collect sufficient diagnostic information to enable an accurate diagnosis of the **fault**.
k. you correctly identify the **cause(s)** of the **fault**.
l. identify and record any system deviation from acceptable limits accurately.

m. ensure your assessment of dismantled sub-assemblies, components and units
identifies their condition and suitability for repair or replacement, accurately.
n. you make clear recommendations for a suitable course of action to rectify the **fault.**
o. inform the relevant person(s) promptly where repairs are uneconomic or unsatisfactory to perform.
p. you complete all system checks and tests in the most cost and time effective way for the **fault** presented.
q. complete all system diagnostic activities within the agreed timescale.
r. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required
s. you report any anticipated delays in completion to the relevant person(s) promptly.

LV15 - Provide Technical Support and Advice to Colleagues

UNIT OVERVIEW

This unit is about providing a range of technical support to other workshop colleagues. It includes ensuring technical information is up to date and giving technical advice, instruction and briefings to colleagues.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Information, Advice and Guidance may be about any of the following:

- mechanical fault finding
- electrical fault finding
- electronic fault finding
- hydraulic fault finding
- customer handling
- road testing
- time
- tools
- equipment
- materials
- technical information

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
   - gaining up to date technical information and repair methods
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures, repair procedures and legal requirements.

21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

Personal Skills

30. give straightforward presentations on technical matters
31. file and store technical information
32. instruct colleagues and demonstrate tasks clearly and correctly
33. conduct effective checks of your colleague's work
34. choose the best action to take when work is not in line with requirements
35. discuss colleagues' work with them in a way that will encourage them to be positive and not lead to conflict
36. give advice and guidance in a way that is appropriate to the colleague you are supporting
37. recognise a training need
38. what might happen if you undermine colleagues' self confidence when correcting mistakes
39. the importance of liaising with your manager when evaluating others' work and giving feedback
40. the importance of continuous development and learning

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. vehicle technical information is up to date and accessible to workshop staff
b. you check staff have the correct technical **resources** to carry out their work
c. you identify any additional **resources** required correctly and promptly
d. you report any problems affecting the operation of the workshop to your manager promptly
e. you respond to requests for technical help and advice promptly and positively
f. you provide colleagues with clear instruction on
- product updates
- technical tasks
- what the results should be
- how they should perform tasks and
- the standard that must be achieved

g. you deliver technical instruction and demonstrations in a manner and at a speed that is appropriate to the individual concerned
h. you give on-going technical support and advice to colleagues
i. your support and advice is technically accurate and in line with manufacturers' instructions and your organisation's requirements
j. you choose the most effective situation for giving support and advice to colleagues
k. you give colleagues time to consider your response and give further explanation when appropriate, checking they have fully understood
l. you identify and correct mistakes in a way that supports your colleagues' self confidence and praise them when they perform tasks correctly
m. you check the work of colleagues at regular intervals and take prompt action to resolve problems
n. you suggest possible methods for improving the work of colleagues to your manager, when necessary
o. you carry out your checks in a cost effective and efficient manner that is not detrimental to the smooth running of the workshop

LV16 - Liaise With Vehicle And Product Manufacturers On Technical Matters

UNIT OVERVIEW

This unit covers obtaining and providing information to and from manufacturers and suppliers for diagnostic activities, warranty activities, repairs and to support product development.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Information, Advice and Guidance may be about any of the following:

- mechanical fault finding
- electrical fault finding
- electronic fault finding
- hydraulic fault finding
- customer handling
- road testing
- time
- tools
- equipment
- materials
- technical information

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
   - gaining up to date technical information and repair methods
   - recording contact with suppliers, manufacturers and suppliers
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures,repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
28. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

Personal Skills

41. communicate effectively with manufacturers, managers, colleagues and customers
42. access the reporting system
43. process information and compile reports
44. when it is appropriate to contact the manufacturer and or supplier
45. the limits of your authority and that of the designated personnel when liaising with the manufacturer or supplier

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you are aware of current technical developments and information for the vehicles you handle
b. you seek assistance from manufacturers only when the prescribed diagnostic processes have failed
c. you provide information at the level of detail necessary and in a form and manner which the recipient will understand and accept
d. you report technical problems and quality issues promptly in line with manufacturer's requirements
e. you collect sufficient, detailed information on the vehicle, the problem and action taken prior to contacting the manufacturer
f. requests for information to manufacturers are made clearly and promptly
g. you respond to requests for information from manufacturers within the specified timescale
h. all information received from manufacturers is passed on to the relevant person(s) promptly.
i. you report any anticipated delays in obtaining or providing information to the relevant person(s) promptly
j. your reports and technical information are complete, accurate and in the format required
k. you suggest possible methods for improving the reporting process to your manager, when necessary
l. you carry out your reporting in an effective and efficient manner that is not detrimental to the smooth running of the workshop

LV17 - Provide Diagnostic Equipment And Technical Information System Support

UNIT OVERVIEW

This unit covers the skills and knowledge involved in updating technical information systems and diagnostic equipment. It also includes testing for, and rectifying, equipment and system problems.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Causes of faults are:

- mechanical
- electrical
- electronic

2. Faults cover:

- software
- hardware

3. **Rectification activities are defined as:**

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified

ESSENTIAL KNOWLEDGE

You need to understand:

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. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - obtaining diagnostic software updates
   - loading technical information system and diagnostic software to specified destinations
   - ordering and fitting diagnostic equipment and technical system equipment replacement and spare parts
   - informing others that a technical / software update has taken place
4. the importance of recording the version number / issue date of the software and updates used
5. how to effectively solve minor errors in the loading of technical information system and diagnostic software
6. how to accurately complete product registration procedures
7. how to set the configuration options
8. how to identify faults using the self test function(s)
9. how to resolve equipment and technical information system problems using the self test function(s) and external support services
10. how to access system support services
11. diagnostic equipment and technical information system software loading instructions
12. the types and causes of errors that can arise during loading of diagnostic equipment and technical information systems software
13. the need for correct configuration settings
14. the procedures for reporting problems
15. the legal requirements governing the use of software
16. why the prompt installation of software is important
17. when to apply self test function(s)
18. the importance of advising people of changes to diagnostic equipment functionality promptly
19. the importance of reporting equipment / software faults and failures to the relevant person(s) promptly

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you use safe working practices when dealing with diagnostic equipment and technical information systems
b. installation of updates is carried out promptly following delivery
c. you load software correctly following the manufacturer's instructions
d. you set the configuration options according to
   - manufacturers specification
   - your workplace procedures
   - your workplace preferences
e. you take prompt and effective corrective actions to resolve any errors occurring during the loading of the software within the limits of your workplace responsibilities
f. when necessary, you complete any specified product registration procedures promptly and accurately
g. you inform all relevant persons of the completion of the software installation promptly h. you advise the relevant people of any new features and changes to existing functionality promptly
i. in the event of a **fault,** you effectively test the diagnostic equipment and technical information system using the specified self test function(s) to identify the cause and solution
j. you take prompt and effective actions to resolve any identified problems in diagnostic equipment and technical information systems using the self test instructions
k. you contact external support services only when the self test function fails to identify the cause of and solution to problems.
l. you promptly and clearly inform the relevant person(s) of any unresolved loading errors and equipment problems
m. you source alternative diagnostic equipment if equipment has to be sent away for repair
n. you inform the relevant person(s) promptly if equipment has to be sent away for repair.
o. you inform the relevant person(s) promptly if alternative diagnostic equipment needs to be used / sourced.

LV18 - Conduct Diagnostic Consultations With Customers

UNIT OVERVIEW

This unit is about carrying out a diagnostic consultation with customers to investigate their concerns relating to their vehicle. It also includes making recommendations to ensure that the customer's concerns are addressed and explaining the results of diagnostic activities so that customers fully understand what the problem with their vehicle is.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying transmission and driveline faults.
2. legal requirements relating to the vehicle (including road safety requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
   - gaining up to date technical information and repair methods
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed and how to formulate and construct your own diagnostic procedures and processes in order for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles including types of sensors and actuators, their application and operation.
10. how electrical and electronic vehicle systems operate, including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles.
11. the interaction between electrical, electronic and mechanical and hydraulic components within a vehicle.
12. how mechanical, hydraulic and electrical systems interlink and interact, including multiplexing
13. electrical symbols, units and terms.
14. electrical safety procedures.

Use of diagnostic and rectification equipment

15. how to prepare and test the accuracy of diagnostic testing equipment.
16. how to use diagnostic and rectification equipment for mechanical, electrical, hydraulic and fluid systems, specialist repair tools and general workshop equipment

Vehicle faults, their diagnosis and correction

17. how vehicle mechanical, electrical, electronic and hydraulic and fluid systems are constructed, dismantled, reassembled and operate.
18. the types and causes of vehicle mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
19. vehicle mechanical, electrical and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.

20. how to find, interpret and use sources of information on vehicle mechanical, electrical and hydraulic and fluid system specifications, diagnostic test procedures, repair procedures and legal requirements.
21. vehicle operating specifications for limits, fits and tolerances relating to vehicle mechanical, electrical and hydraulic and fluid systems for the vehicle(s) on which you work.
22. how to select the most appropriate diagnostic testing method for the symptoms presented.
23. how to carry out systematic diagnostic testing of vehicle mechanical, electrical and hydraulic and fluid systems.
24. how to assess the condition evident within vehicle mechanical, electrical and hydraulic and fluid
25. how to interpret, evaluate and analyse test results and vehicle data in order to identify the location and cause of vehicle system faults.
26. how to carry out the **rectification activities** in order to correct faults in the vehicle mechanical, electrical and hydraulic and fluid systems.
27. your workplace procedure, policy and procedure for
    - work carried out under warranty
    - liaising with manufacturers and outside agencies
28. the relationship between test methodology and the faults repaired – the use of appropriate testing methods
29. how to make cost effective recommendations for rectification.

Personal Skills

30. how to give straightforward presentations on technical matters
31. how to communicate effectively with and listen to customers
32. how to present yourself in a positive and professional manner to customers
33. how to recognise and handle different customer reactions
34. how to adapt your language when explaining technical matters to customers
35. how to use effective questioning techniques
36. how to care for customers and achieve customer satisfaction
37. your organisation's requirements for personal appearance and conduct when dealing with customers
38. how successful resolution of customer concerns and problems contributes to customer loyalty and improves relationships

PERFORMANCE OBJECTIVES

To be competent you must ensure that:

a. you respond to customer's concerns in a positive and friendly manner
b. you give a positive impression of yourself and your organisation when dealing with customers
c. you obtain sufficient, detailed information using suitably structured questions
d. when appropriate, you carry out a suitable road test to obtain further detailed information on, or clarification of, customer's concerns
e. you provide customers with accurate, current and relevant advice and information on any further investigation(s) needed
f. you explain the implications of any investigation(s) that may be needed clearly
g. you give technical advice and information accurately, clearly and in a form and manner which the customer will understand
h. you make clear and relevant recommendations for the next course of action
i. you liaise with the customer and or other relevant person(s) to agree the next course of action
j. when appropriate, you explain to customers the action that has been taken regarding their vehicle clearly
k. your records are complete, accurate, in the format required and signed by the customer, when necessary
l. you suggest possible methods for improving the customer care process to your manager, when necessary

Unit BP18 - Remove and Fit Basic Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels

UNIT OVERVIEW

This unit is about the straightforward removal and fitting of basic mechanical, electrical and trim (MET) components to vehicles. It is also about checking the operation of the components fitted.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard.

1. Basic MET components includes:

a. bumpers
b. headlamp units
c. road wheels
d. batteries
e. bonnet and boot lid trim
f. interior trim components
g. exterior trim components

2. Non permanently attached body panels are

a. wings
b. doors
c. bonnets
d. boot lids and tailgates
e. bumper bars, covers and components

3. Tools and equipment are

a. spanners
b. socket set
c. screwdrivers
d. manufacturer's specified specialist tools
e. pliers and self locking grips
f. power drill and drill bits
g. trolley jack
h. axle stands
i. vehicle lifts
j. torque wrench

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health, safety and legal requirements relating to the removal and fitting of **basic MET components and non welded non-structural body panels**
2. your workplace procedures for:
   - the referral of problems
   - reporting of delays to the completion of work
   - completion of work records
3. the work that needs to be done and the standard required
4. the requirements for protecting the vehicle and contents from damage before, during and after removing and fitting activities
5. the importance of selecting, using and maintaining the appropriate personal protective equipment when removing and fitting **basic MET components and non welded nonstructural body panels**

Removing and fitting basic MET components

6. how to find, interpret and use sources of information applicable to the removal and fitting of **basic MET components and non welded non-structural body panels**
7. how to select, check and use all the **tools and equipment** required to remove and fit **basic MET components and non welded non-structural body panels**
8. the correct procedures for removing and fitting **basic MET components and non welded non-structural body panels.**
9. the correct procedures for working with supplementary safety systems when fitting and removing **basic MET components and non welded non-structural body panels**.
10. the correct procedures for working with Gas Discharge headlight systems and when fitting and removing **basic MET components and non welded non-structural body panels**.
11. the methods of storing removed panels and components and the importance of storing them correctly
12. the different types of fastenings and fixings and the reasons for their use
13. the need for correct alignment of panels and components and the correct methods used to achieve this
14. the types of quality checks that can be used to ensure correct alignment and operation of components to manufacturer's specification and their purpose

PERFORMANCE OBJECTIVES

To be competent you must:

a use the appropriate personal protective equipment when removing and fitting **basic MET components and non welded non-structural body panels**

b protect the vehicle and its contents effectively when removing and fitting **basic MET components and non welded non-structural body panels**

c select and use the correct **tools and equipment** for the panels or components you are going to remove or fit

d ensure that the **tools and equipment** you require are in a safe working condition e remove and fit **basic MET components and non welded non-structural body panels** following:

- removal and fitting procedures
- manufacturers' instructions
- your workplace procedures
- health, safety and legal requirements

f avoid damaging other components, units and panels on the vehicle

g store all removed panels and components safely in the correct location

h realign the panels and components you have fitted correctly in a way which regains their original manufactured gaps

i check that the components you have fitted operate correctly following the manufacturer's specification

j report any additional faults you find during the course of your work to the relevant person(s) promptly

k report any delays in completing your work to the relevant person(s) promptly

l remove and fit **basic MET components or non welded non-structural body panels** within the agreed timescale

m complete work records accurately, in the format required and pass them to the relevant person(s) promptly

Unit AE06 – Diagnose and Rectify Electrical Unit and Component Faults

UNIT OVERVIEW

This unit is about identifying and rectifying electrical faults occurring within a variety of electrical systems.

SCOPE OF THIS UNIT:

All of the items listed below form part of this National Occupational Standard

1. Electrical faults occurring within
- a. Infotainment
- b. Comfort and Convenience
- c. Supplementary Restraint Systems, SRS
- d. Networking Systems
- e. Body Electric Systems

2. Electrical and electronic testing equipment covers:
- a. volt meters,
- b. ammeters,
- c. ohmmeters
- d. multimeters
- f. battery testing equipment
- h. dedicated and computer based diagnostic equipment
- i. oscilloscopes

3. Tools and equipment:
- a. hand tools
- b. special purpose tools
- c. general workshop equipment

4. Diagnostic Testing is defined as:
- g. Verify the fault
- h. Collect further information
- i. Evaluate the evidence
- j. Carry out further tests in a logical sequence
- k. Rectify the problem
- l. Check all systems

5. Electrical and electronic testing techniques are:
- a. voltage, resistance and current measuring
- b. frequency measuring
- c. visual
- d. dedicated and computer based testing

6. Rectification activities are defined as:

A suitable repair of replacement that rectifies the fault(s) identified form the diagnostic activities carried out.

ESSENTIAL KNOWLEDGE

You need to understand:

Legislative and organisational requirements and procedures

1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection when diagnosing and rectifying complex electrical faults.
2. legal requirements relating to the vehicle electrics (including road safety and refrigerant handling requirements).
3. your workplace procedures for
   - recording fault location and **correction activities**
   - reporting the results of tests.
   - the referral of problems
   - reporting delays to the completion of work
4. the importance of working to recognised diagnostic procedures and processes and obtaining the correct information for diagnostic activities to proceed
5. the importance of, documenting diagnostic and rectification information.
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, costs and profitability.
8. the importance of reporting anticipated delays to the relevant person(s) promptly.

Electrical and electronic principles

9. electrical and electronic principles, including Ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction, digital and fibre optics principles.
10. electrical symbols, units and terms.
11. electrical safety procedures.
12. how electrical and electronic units and components are constructed, dismantled and reassembled.
13. how electrical and electronic units and components operate, including electrical component function, electrical inputs, outputs, voltages and patterns.
14. the interaction between electrical, electronic and mechanical components within the systems defined.
15. how electrical systems interlink and interact, including multiplexing.
16. the operation of the electrical and electronic systems for electric, hybrid and alternative fuel vehicles. (including regenerative braking systems).

Use of electrical testing equipment

17. how to prepare and test the accuracy of diagnostic testing equipment.
18. how to use **electrical and electronic testing equipment** to correctly and safely diagnose electrical faults

Auxiliary equipment electrical faults, their diagnosis and correction

19. the types and causes of electrical system, component and unit faults and failures.
20. electrical component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action.
21. how to find, interpret and use sources of information on electrical operating specifications, diagnostic test procedures, repair procedures and legal requirements.
22. how to carry out systematic diagnostic testing of electrical and electronic systems using **electrical testing techniques.**
23. how to select the most appropriate diagnostic testing method for the symptoms presented.
24. how to interpret test results and vehicle data in order to identify the location and cause of vehicle system faults.
25. how to rectify electrical and electronic faults
26. how to make suitable adjustments to components and units.
27. how to make cost effective recommendations for rectification.

PERFORMANCE OBJECTIVES

To be competent you must:

a. wear suitable personal protective equipment and use vehicle coverings when using **electrical testing techniques** and carrying out **rectification activities**.

b. support the identification of **electrical faults**, by reviewing vehicle:
- technical data
- diagnostic test procedures.

c. prepare, connect and test all the required **electrical and electronic testing equipment** following manufacturers' instructions prior to use.

d. use **electrical and electronic testing techniques** which are relevant to the symptoms presented.

e. collect sufficient diagnostic information in a systematic way to enable an accurate diagnosis of electrical system faults.

f. identify and record any system deviation from acceptable limits accurately.

g. make cost effective recommendations for rectification based upon your analysis of the diagnostic information gained.

h. use all **tools and equipment** required for your diagnostic and rectification activities, correctly and safely throughout.

i. carry out all **diagnostic & rectification activities** following:
- manufacturers' instructions
- recognised researched repair methods(see guidance document)
- health and safety requirements.

j. work in a way which minimises the risk of :
- damage to other vehicle systems
- damage to other components and units
- contact with leakages
- contact with hazardous substances.

k. ensure all repaired and replaced electrical components and units conform to the vehicle operating specification and any legal requirements.

l. when necessary, adjust components and units correctly to ensure that they operate to meet system requirements.

m. ensure the electrical system rectified performs to the vehicle operating specification and any legal requirements prior to return to the customer.

n. ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required.

o. complete all diagnostic and rectification activities within the agreed timescale.

p. report any anticipated delays in completion to the relevant person(s) promptly.