

Carry out non high energy electrical system work on or near electric and hybrid vehicles

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**Overview**

This standard is for people who work on or near electric and hybrid vehicles but do not work on the vehicle's high energy electrical system.

Examples of these job roles include:

sales staff, cleaners/valeters or vehicle fitters. The standard includes essential knowledge of the hazards associated with electric and hybrid vehicles and the precautions to follow to avoid these.

Note: This standard does not deem someone competent to maintain, service or repair high energy electrical systems.

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## Performance criteria

You must be able to:

1. collect relevant information about the **electric/hybrid vehicle** and any potential hazards
2. wear personal protective equipment appropriate to the work activities you are carrying out
3. follow the correct procedures to ensure the electric/hybrid vehicle has been made safe prior to starting any work
4. carry out **work activities** in a way that avoids contact with, or damage to, **high energy electrical systems** and their components
5. refer any problems with the electric/hybrid vehicle to a relevant person in your workplace
6. report the work activities you have carried out on or near the electric /hybrid vehicle to relevant colleagues

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## Knowledge and understanding

You need to know and understand:

1. the hazards associated with high energy electrical vehicle components
2. the health and safety legislation and workplace procedures relevant to working on or near electric/hybrid vehicles, including the appropriate personal protective equipment and its use
3. your workplace procedures for:
  - 3.1 checking that the vehicle has been made safe as appropriate to the work you are carrying out
  - 3.2 referring/reporting problems when working with electric/hybrid vehicles
  - 3.3 making others aware of the work carried out on electric/hybrid vehicles
4. the differences between an electric/hybrid and non-electric vehicle
5. how to operate an electric/hybrid vehicle safely
6. how to charge an electric/hybrid vehicle with plug-in capability
7. the precautions necessary when using plug-in charging equipment
8. how to make an electric/hybrid vehicle safe, including isolating high energy electrical systems where required within your level of training
9. the implications of electrical conductivity through the human body and other potential medical conditions that can occur regardless of current type present in the electric/hybrid vehicle
10. how to find, interpret and use sources of information applicable to electric/hybrid vehicles as appropriate to your job role
11. the hazards associated with electric/hybrid vehicle batteries when exposed to extreme temperatures, impact and other adverse conditions

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### Scope/range

Scope of this standard

1. **Electric/hybrid vehicle** - any vehicle that is powered wholly or in part by an electrical drive train. This includes electric hybrid plug-in vehicles.
2. **High energy electrical/high voltage** – typical voltages used for a range of Electric and Hybrid Vehicles 100-650V ECE R100(relating to vehicle regulations) paragraph 2.14 clearly defines high voltage: “High Voltage” means the classification of an electric component or circuit, if its working voltage is > 60 V and 1500 V DC or > 30 V and 1000 V AC root mean square (rms).’
3. **Work activities** – not involving work on the high energy electrical system and its components.

Carry out non high energy electrical system work on or near electric and hybrid vehicles

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<b>Status</b>	Original
<b>Originating Organisation</b>	IMI
<b>Original URN</b>	IMIEV1
<b>Relevant Occupations</b>	Sales Executive (Automotive); Sales Controller (Automotive); Vehicle Fitting Operations (Automotive); Vehicle Valet (Automotive); Specialist Tyre Fitting Operations (Automotive); Hire and Rental Delivery and Collection Operations; Hire and Rental Operations; Hire and Rental Counter Operations; Rental and Leasing Customer Service Advisor (Automotive); Rental and Leasing Maintenance Advisors (Automotive); Rental and Leasing Technical Service Advisor (Automotive); Body Repair Technician (Automotive); Body Repair and Alignment Technician (Automotive); Cosmetic Refinishing Technician (Automotive); Cosmetic Senior Refinishing Technician (Automotive); PDR Senior Technician (Automotive); PDR Technician (Automotive); Body Builder (Automotive); Body Builder Workshop Controller (Automotive); Vehicle Damage Assessment Operators; Vehicle Damage Assessor (Automotive); Vehicle Fitters; Insurance Engineer (Automotive)
<b>Suite</b>	Electric and Hybrid Vehicles
<b>Keywords</b>	electric; vehicle; hybrid; high energy; status; hazards; work activities

## IMIEV2

# Carry out work on broken down and damaged electric and hybrid vehicles



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### Overview

This standard is designed for staff who deal with broken down or accident damaged electric and hybrid vehicles, for example, those working for roadside recovery operators and the emergency services. It contains the knowledge and competence required to carry out a risk assessment and work safely around an electric/hybrid vehicle that may have damage to its high and/or low energy age electrical systems.

**Note:** *This standard does not deem someone competent to maintain, service or repair high energy electrical systems and their components.*

## IMIEV2

### Carry out work on broken down and damaged electric and hybrid vehicles

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#### Performance criteria

*You must be able to:*

- P1 wear personal protective equipment appropriate to the work activities you are carrying out
- P2 collect and evaluate relevant information about the **electric/hybrid vehicle** and any potential hazards
- P3 identify the hazards and assess the risks presented by the **electric/hybrid vehicle**
- P4 follow the correct procedures to make the **electric/hybrid vehicle** safe prior to starting any **work activities**, including where necessary, isolating **high energy electrical** systems, within your level of training
- P5 carry out **work activities** in a way that minimises risks to yourself and other people
- P6 refer any problems with the **electric/hybrid vehicle** that you cannot deal with yourself to a relevant person in your organisation and follow their instructions
- P7 report the **work activities** you have carried out on or near the **electric/hybrid vehicle** to relevant colleagues

# IMIEV2

## Carry out work on broken down and damaged electric and hybrid vehicles

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### Knowledge and understanding

*You need to know and understand:*

### Safety precautions

- K1 the potential hazards associated with high and low voltage systems including batteries and other **high energy electrical** vehicle components
- K2 the health and safety legislation and workplace procedures relevant to working with **electric/hybrid vehicles**, as appropriate to your work role, including the appropriate personal protective equipment and its use
- K3 the legislation relevant to the **work activities** described in the scoping statement for this standard.
- K4 your organisation's procedures for the:
  - K4.1 referral/reporting of problems when working with **electric/hybrid vehicles**
  - K4.2 reporting work carried out on **electric/hybrid vehicles**
- K5 the differences between an on **electric/hybrid vehicle** and non-electric vehicle
- K6 how to operate an on **electric/hybrid vehicle** safely
- K7 the charging systems associated with **electric/hybrid vehicles** and how to charge them safely, including the use of plug-in charging equipment
- K8 how to carry out a risk assessment on damaged and broken down on **electric/hybrid vehicles**
- K9 how to make electric vehicles safe in order to carry **out work activities**, including isolating **high energy electrical** systems, where required, within your level of training
- K10 how to reduce the risk of hazards when working on and around on **electric/hybrid vehicles**
- K11 the hazards associated with on **electric/hybrid vehicle** batteries when exposed to extreme temperatures, impact and other adverse conditions
- K12 the specific vehicle manufacturer restrictions regarding non-start and recovery, for example jump starting (hybrid only) and towing/lifting



## IMIEV2

### Carry out work on broken down and damaged electric and hybrid vehicles

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K13 the implications of electrical conductivity through the human body and the potential medical conditions that can occur regardless of voltage or current type present in an **electric/hybrid vehicle**

#### Use of technical information

*You need to know and understand:*

K14 how to find, interpret and use sources of information applicable to a **electric/hybrid vehicle** as relevant to your job role

#### High Energy Electrical component construction

*You need to know and understand:*

K15 how **high energy electrical** components function and are constructed, including battery modules, electric motors and associated electrical components

#### Systems

*You need to know and understand:*

K16 how to identify the typical location of **high energy electrical** cables and components, for example, labelling and colour

K17 the different types of energy storage systems and voltages associated with on **electric/hybrid vehicles**

# IMIEV2

## Carry out work on broken down and damaged electric and hybrid vehicles

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### Additional Information

#### Scope/range

- 1 **Electric/hybrid vehicles**– any vehicle that is powered wholly or in part by an electrical drive train. This includes electric hybrid plug-in vehicles
- 2 **High energy electrical/high voltage** – typical voltages used for a range of Electric and Hybrid Vehicles 100-650V **ECE R100** (relating to vehicle regulations) paragraph 2.14 clearly defines high voltage: "High Voltage" means the classification of an electric component or circuit, if its working voltage is  $> 60 \text{ V}$  and  $\leq 1500 \text{ V DC}$  or  $> 30 \text{ V}$  and  $\leq 1000 \text{ V AC}$  root mean square (rms).
- 3 **Status of vehicle** – broken down or with damage which may present high or low voltage electrical hazards.
- 4 **Work activities** – recovering or dealing with electric/hybrid vehicles as part of an emergency response.

## IMIEV2

Carry out work on broken down and damaged electric and hybrid vehicles

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**Developed by** The Institute of The Motor Industry (IMI)

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**Status** Original

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**Originating organisation** The Institute of The Motor Industry (IMI)

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**Original URN** IMIEV2

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**Relevant occupations** Roadside Recovery Operator (Automotive); Roadside Assistance Senior Operator (Automotive); Roadside Assistance; Roadside Assistance Manager (Automotive); Vehicle Recovery Operator (Automotive); Vehicle Recovery Technical Operator (Automotive); Supervisory Vehicle Recovery Technical Operator (Automotive)

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**Suite** Electric and Hybrid Vehicles; Vehicle Recovery; Roadside Assistance

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**Key words** Electric vehicles; hybrid vehicles; high energy electrical; status of vehicle; hazards; work activities

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## IMIEV3

# Service and repair non-live electric and hybrid vehicle systems



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### Overview

This unit covers the competence and knowledge technicians need to carry out servicing and general repairs on non-live high energy electrical systems and components on electric and hybrid vehicles safely. The unit also ensures that the technician is aware of the effect that high energy electrical component technology has on other vehicle systems.

**Note:** *This unit only covers the competence and knowledge required to work on **non-live** high energy electrical components and associated systems. It does not enable a candidate to dismantle 'live' components, for example battery packs.*

# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

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### Performance criteria

- You must be able to:*
- P1 wear suitable personal protective equipment and use appropriate vehicle coverings throughout all **work activities**
  - P2 ensure the **electric/hybrid vehicle** is safe to work on
  - P3 support your work activities by reviewing:
    - P3.1 vehicle technical data
    - P3.2 removal and replacement procedures
    - P3.3 legal requirements
  - P4 prepare, test and use all the test and diagnostic **equipment** required following manufacturers' instructions
  - P5 carry out all removal and replacement activities following:
    - P5.1 manufacturers' instructions
    - P5.2 recognised researched repair methods
    - P5.3 health and safety requirements
  - P6 work in a way which minimises the risk of:
    - P6.1 damage to other vehicle systems, components and units
    - P6.2 damage to your working environment and injury to yourself and others
  - P7 ensure replaced **high energy electrical components** meet the manufacturers' recommendations or conform to operating specification
  - P8 record and report any additional faults you notice during the course of your work
  - P9 use suitable **testing methods** to evaluate the performance of the reassembled **high energy electrical** system accurately
  - P10 ensure the reassembled system performs to the vehicle operating specification and legal requirements before return to the customer
  - P11 ensure your records are accurate, complete and passed to the relevant person(s) promptly in the format required
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# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

### Safety Precautions

#### Knowledge and understanding

*You need to know and understand:*

- K1 the health and safety legislation and workplace procedures relevant to working with **electric/hybrid vehicles** including appropriate personal protective equipment and its use
  - K2 the legislation relevant to the activities described in the Scoping Statement for this NOS
  - K3 your workplace procedures for the:
    - 3.1 referral/reporting of problems when working with **electric/hybrid vehicles**
    - K3.2 how to make others aware of the work carried out **on electric/hybrid vehicles**
  - K4 the differences between an **electric/hybrid vehicle** and non-electric vehicles
  - K5 the charging systems associated with **electric/hybrid vehicles** and how to charge **electric/hybrid vehicles** safely
  - K6 the precautions necessary when using plug-in charging equipment.
  - K7 how to carry out a risk assessment on damaged and broken down **electric/hybrid vehicles**
  - K8 how to make **electric/hybrid vehicles** safe in order to carry out work activities, including isolating **high energy electrical** systems, where required, within your level of training
  - K9 how to safely ensure that **high energy electrical** system is not live
  - K10 how to reduce the risk of hazards when working on and around **electric/hybrid vehicles**
  - K11 the hazards associated with **electric/hybrid vehicle** batteries when exposed to extreme temperatures, impact and other adverse conditions
  - K12 the specific vehicle manufacturer restrictions regarding non-start and recovery, for example jump starting (hybrid only) and towing/lifting
  - K13 the implications of electrical conductivity through the human body and the potential medical conditions that can occur regardless of voltage or current type present in an **electric/hybrid vehicle**
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# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

K14 the disposal of waste materials including recycling obligations, as well as COSHH regulations with regards to hazardous battery chemicals and compounds

K15 how to reduce the risk of hazards when working on and around **electric/hybrid vehicles**

K16 how to work safely avoiding damage to other vehicle systems, components and units and contact with leakage and hazardous substances

### Use of technical information

*You need to know and understand:*

K17 how to find, interpret and use sources of information applicable to component repair and replacement within **high energy electrical** systems

K18 the importance of using the correct sources of technical information

### Electrical/hybrid vehicle component construction

*You need to know and understand:*

K19 how **high energy electrical** components function and are constructed, including battery modules, electric motors and associated electrical components

### Electrical/hybrid vehicle systems and component removal and replacement

*You need to know and understand:*

K20 how to identify the components that make up the **high energy electrical** system

K21 how to identify the typical location of **high energy electrical** cabling and associated components including using wiring labelling and colour.

K22 the different types of energy storage systems and voltages associated with **electric/hybrid vehicles**.

K23 the manufacturer's specification for the type and quality of components to be used.

K24 how to store, dispose of, recycle and return any removed **high energy electrical** components in line with legislation and organisational procedures.

# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

### Electrical and electronic principles

*You need to know and understand:*

K25 vehicle earthing principles and earthing methods as appropriate to **electric/hybrid vehicles**

K26 basic electrical and electronic principles, including ohms law, voltage, power, current (ac/dc), resistance, magnetism, electromagnetism and electromagnetic induction

K27 specific high energy circuit protection

K28 electrical and electronic principles associated with ancillary systems, including types of sensors and actuators, their application and operation

K29 the interaction between electrical, electronic and mechanical components within **electric/hybrid vehicle** systems

K30 how electric vehicle systems interlink and interact, including multiplexing

### Use of electrical testing equipment and electrical testing techniques

*You need to know and understand:*

K31 how to use the electrical testing equipment required

K32 how to prepare, test and use all the repair and replacement equipment required

K33 how to conduct tests on non-live **high energy electrical** systems following electrical safety and workplace procedures

K34 how to determine the serviceability of a component in a **high energy electrical** system

K35 how to interpret the results of your tests and make recommendations based on these results

K36 the importance of basing your recommendations on test results

K37 how to perform safety and operational checks on the tools and equipment required to remove and replace electrical components



## IMIEV3

### Service and repair non-live electric and hybrid vehicle systems

#### Vehicle electrical equipment faults and their correction

*You need to know and understand:*

K38 how to identify faults and damage in **electric/hybrid vehicle high energy electrical** systems

K39 the common underlying causes of faults and damage in **high energy electrical** components

K40 how to test and evaluate the performance of replacement components and the reassembled system against operating specifications and legal requirements

K41 the importance of ensuring electrical components are functioning correctly before release to the customer

# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

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### Additional Information

#### Scope/range

- 1 **Electric/hybrid vehicle** – any vehicle that is powered wholly or in part by an electrical drive train. This includes electric hybrid plug-in vehicles.
- 2 **High energy electrical/high voltage** – typical voltages used for a range of Electric and Hybrid Vehicles 100-650V **ECE R100** (relating to vehicle regulations) paragraph 2.14 clearly defines high voltage: "High Voltage" means the classification of an electric component or circuit, if its working voltage is > 60 V and ≤ 1500 V DC or > 30 V and ≤ 1000 V AC root mean square (rms).<sup>1</sup>
- 3 **Additional equipment includes:**
  - 3.1 hand tools
  - 3.2 code readers
  - 3.3 specialist tools, for example manufacturer specific software
  - 3.4 safe and appropriate electrical testing equipment
  - 3.5 relevant safety equipment
- 4 **Testing methods include:**
  - 4.1 visual
  - 4.2 aural
  - 4.3 functional
  - 4.4 measurement
- 5 **Components include:**
  - 5.1 batteries/stack, pod, module
  - 5.2 motors

# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

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- 5.3 cabling
- 5.4 relays/control units
- 5.5 charger and charging points
- 5.6 isolators
- 5.7 inverters
- 5.8 battery management interface
- 5.9 ignition/key-on control switch
- 5.10 driver display panel
- 5.11 multi-battery server unit
- 5.12 drive trains
- 5.13 power sources
- 5.14 ancillary systems and components

### **6. Work activities**

- 6.1 servicing non-live high energy electrical systems and components
- 6.2 general repair of non-live high energy electrical systems and components

### **7. Diagnostic testing as defined by:**

- 7.1 verifying the fault
- 7.2 collecting further information
- 7.3 evaluating the evidence
- 7.4 carrying out further tests in a logical sequence
- 7.5 rectifying the problem
- 7.6 checking all systems

# IMIEV3

## Service and repair non-live electric and hybrid vehicle systems

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<b>Originating organisation</b>	The Institute of The Motor Industry (IMI)
<b>Original URN</b>	IMIEV3
<b>Relevant occupations</b>	Heavy Vehicle Trailer Service Technician (Automotive); Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Light Vehicle Service Technician (Automotive); Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Mechanical, Electrical and Trim Assistant Technician (Automotive); Mechanical, Electrical and Trim Technician (Automotive); Motorcycle Service Technician (Automotive); Motorcycle Diagnostic Technician (Automotive); Motorcycle Master Technician (Automotive); Motorcycle Fleet/Service Manager (Automotive); Lift Truck Service Technician (Automotive); Lift Truck Trailer Diagnostic Technician (Automotive); Lift Truck Trailer Master Technician (Automotive); Lift Truck Workshop Controller (Automotive); Auto-electrical Technician (Automotive); Automotive Aftermarket Electrical Enhancement Technician (Automotive); Workshop Supervisor (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Light Vehicle Service Technician (Automotive); Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Master technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive)
<b>Suite</b>	Electric and Hybrid Vehicles; Maintenance & Repair - Light Vehicle; Maintenance & Repair – Motorcycle; Maintenance and Repair - Heavy Vehicle;

## **IMIEV3**

### **Service and repair non-live electric and hybrid vehicle systems**

Maintenance and Repair - Heavy Vehicle Trailer; Maintenance and Repair - Lift Truck; Auto Electrical & Mobile Electrical Installation; Accident Repair - Mechanical, Electrical and Trim; Maintenance and Repair – Heavy Vehicle; Maintenance and Repair – Light Vehicle

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#### **Key words**

Electric vehicle; hybrid vehicle; high energy electrical; status of vehicle; hazards; work activities; Heavy; commercial; service; maintenance; repair; Light; service; maintenance; repair

## Overview

This standard is about assessing an electric and hybrid vehicle and isolating it to make it safe to work on. It also covers how to reinstate the vehicle once the required work has been carried out.

**Warning: It has been recommended by industry experts that only those with suitable training and experience on working with electric and hybrid vehicles should carry out the functions below.**

## Isolate and reinstate an electric and hybrid vehicle

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### Performance criteria

You must be able to:

#### **Isolating the vehicle**

1. locate relevant information about the electric and hybrid vehicle and use it to determine any potential hazards
2. identify any potential hazards by carrying out a visual assessment of the vehicle
3. identify high voltage components and cabling
4. notify relevant colleagues of your intention to work on a high voltage vehicle
5. select and use correct personal protective equipment in order to carry out the isolation process
6. follow the correct procedures to isolate the high voltage system
7. work in a way which minimises the risk of:
  - 7.1 injury to yourself and others
  - 7.2 damage to your working environment
  - 7.3 damage to other vehicle systems, components and units
8. carry out an appropriate test to ensure the residual voltage is below manufacturers' specification and therefore the vehicle is safe to work on
9. refer any problems with the electric and hybrid vehicle to a relevant person in your workplace
10. ensure that test equipment operates correctly

#### **Reinstating the high voltage system**

11. select and use correct personal protective equipment in order to carry out the reinstatement process
12. follow the correct procedures for reinstatement of the high voltage system
13. use suitable testing methods to evaluate the performance of the reassembled high energy electrical vehicle system accurately
14. ensure the reassembled system performs to the vehicle manufacturers' operating specification and legal requirements before the vehicle is returned to the customer
15. ensure records are accurate, complete and passed to the relevant person(s) promptly in the format required

## Isolate and reinstate an electric and hybrid vehicle

### Knowledge and understanding

You need to know and understand:

#### Isolating a vehicle

1. the importance of knowing how and where to access relevant information on the specific electric and hybrid vehicle systems
2. the potential hazards associated with working high energy vehicles and how to identify them
3. how to determine the location and route of the high voltage components and cabling
4. how to select and use the correct electrical testing equipment required
5. the terminology used within electric/hybrid vehicle systems
6. the current health and safety legislation and specific vehicle manufacturers' repair and safety procedures relevant to working with electric/hybrid vehicles
7. how to select and use appropriate and correct personal protective equipment
8. the legislation relevant to the activities described in the Scope for this standard
9. how to work in a way which minimises the risk of:
  - 9.1 injury to yourself and others
  - 9.2 damage to your working environment
  - 9.3 damage to other vehicle systems, components and units
10. your workplace procedures for the referral/reporting of problems when working with electric/hybrid vehicles
11. how to make others aware of the work carried out on electric/hybrid vehicles
12. the precautions necessary when charging, jump starting or towing an electric/hybrid vehicle
13. how to make electric/hybrid vehicles safe in order to carry out work activities, including isolating high energy electrical vehicle systems
14. how to accurately test that the residual voltage is below manufacturer's specification following the isolation process
15. the hazards associated with electric/hybrid high energy vehicle system batteries when exposed to extreme temperatures, impact and other adverse conditions
16. specific high energy vehicle safety systems
17. how to interpret test results and make recommendations based on these results and the importance of basing recommendations on test results
18. how to calibrate and test equipment prior to use

#### Reinstating the vehicle

19. how to select and use appropriate and correct personal protective equipment to carry out the reinstatement process



Isolate and reinstate an electric and hybrid vehicle

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20. the correct procedures for reinstating the vehicle
21. how to test and evaluate the performance of replacement components and the reassembled system against manufacturers' operating specifications and legal requirements
22. the importance of ensuring all high energy electrical vehicle systems are functioning correctly and safely before the vehicle is released to the customer
23. how to ensure records of work are accurate complete and passed to the relevant person in the format required

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**Scope/range****Range of this standard****1. Testing methods include:**

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

**2. Components include:**

- a. batteries/stack, pod, module
- b. motors
- c. cables
- d. wiring

**Scope of this standard**

**Electric/Hybrid vehicle** – any vehicle that is powered wholly or in part by an electrical drive train. This includes electric hybrid plug-in vehicles.

**High energy electrical/high voltage** – typical voltages used for a range of Electric and Hybrid Vehicles 100-650V ECE R100 (relating to vehicle regulations) paragraph 2.14 clearly defines high voltage: “High Voltage” means the classification of an electric component or circuit, if its working voltage is > 60 V and 1500 V DC or > 30 V and 1000 V AC root mean square (rms).’

**This definition should not be confused with commercial high voltage systems**

IMIEV4

Isolate and reinstate an electric and hybrid vehicle



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## Glossary

## Isolate and reinstate an electric and hybrid vehicle

<b>Developed by</b>	IMI
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<b>Originating Organisation</b>	IMI
<b>Original URN</b>	IMIEV4
<b>Relevant Occupations</b>	Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Service Technician (Automotive); Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician (Automotive); Mechanical, Electrical and Trim Assistant Technician (Automotive); Mechanical, Electrical and Trim Technician (Automotive); Auto-electrical Technician (Automotive); Automotive Aftermarket Electrical Enhancement Technician (Automotive)
<b>Suite</b>	Electric and Hybrid Vehicles
<b>Keywords</b>	isolate reinstate electric hybrid vehicle hazard electrical safe

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## Overview

This standard is about working on live or potentially live battery systems and the related high voltage components in electric and hybrid vehicles.

**Warning: It has been recommended by industry experts that only those with appropriate training and experience on working with high voltage components of electric and hybrid vehicles should carry out the functions below.**

## Performance criteria

You must be able to:

### Health and safety procedures

1. observe safety information prior to commencing work on the high voltage vehicle
2. carry out a dynamic risk assessment of the vehicle and the work to be carried out
3. select and wear correct and appropriate personal protective clothing and equipment as advised by the manufacturer
4. carry out thorough inspection of the external and visible parts of the high voltage battery for signs of damage
5. check for external damage to high voltage connections or cables
6. follow your organisation's and manufacturer's instructions if damage to the high voltage components has been found

### Diagnosing and repairing damaged batteries and components

7. use diagnostic and test equipment in line with manufacturer's guidelines to ensure the integrity of the high voltage battery and the high voltage system prior to commencing any repairs
8. interpret the results obtained from the diagnostic test equipment
9. ensure all work carried out takes place immediately following inspection where possible. Re-inspection is recommended following timescales recommended by manufacturers.
10. isolate the high voltage system as per manufacturer's guidance
11. select appropriate tools/lifting equipment in line with manufacturer's guidelines and specification
12. carry out a visual inspection of the lifting/supporting tools and equipment prior to use
13. remove the high voltage battery following manufacturers' guidelines and place in a suitable, isolated area with restricted access
14. remove the battery housing or inspection covers to carry out a visual inspection avoiding contact with any components. When possible, never leave the battery unattended.
15. ensure the high voltage battery is made safe and access to the storage area restricted if the battery is to be left unattended
16. reduce the battery voltage to a safe working limit in line with manufacturers guidelines where possible
17. select and wear appropriate Personal Protective Equipment (PPE) when the battery voltage cannot be reduced to a safe working limit
18. inspect all new components for damage prior to installation using visual inspection methods

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19. carry out all removal and replacement activities following:
    - 19.1 manufacturer's instructions
    - 19.2 recognised researched repair methods
    - 19.3 health and safety requirements
  20. carry out a thorough inspection where possible, along with a suitably experienced colleague, to ensure the integrity of the repair prior to reestablishing the normal operating battery system voltage
  21. re-establish the normal operating battery voltage in line with manufacturers guidelines
  22. reassemble the battery housing/inspection covers
  23. recommission the battery in line with manufacturers guidelines using specialist, high voltage test equipment
  24. reinstall the battery following manufacturers recommended guidelines with particular attention to any potential equalisation connections
  25. reinstate the vehicle following manufacturers guidelines
  26. carry out diagnostic test prior the handover of the vehicle
  27. ensure records of work are accurate complete and passed to the relevant person in the format required

## Knowledge and understanding

You need to know and understand:

### Health and safety procedures

1. the procedure for authorisation to allow an individual to work on high voltage systems
2. how to carry out a dynamic risk assessment of the vehicle and the work to be carried out
3. the current health and safety legislation and specific vehicle manufacturers repair and safety procedures relevant to working with electric and hybrid vehicles
4. how and where to access relevant information on the specific electric and hybrid vehicle systems
5. the terminology used within electric and hybrid vehicle systems
6. how to inform and make others aware of the potential hazards prior to and when work is being carried out on high voltage systems
7. how to work in a way that minimises the risk of:
  - 7.1 injury to yourself and others
  - 7.2 damage to your working environment
  - 7.3 damage to other vehicle systems, components and units
8. the hazards associated with electric/hybrid high energy vehicle systems, batteries when exposed to extreme temperatures, impact and other adverse conditions
9. how to identify high voltage components and/or parts that are connected to the high voltage system within the battery

### Diagnosing and repairing damaged batteries and components

10. how to identify any damage to the battery and the high voltage connections and cables
11. how to use diagnostic and test equipment and interpret the results to ensure the integrity of the high voltage system
12. series circuits and connection of multiple battery cells and the effect on voltage levels
13. how to safely isolate the vehicle following manufacturer's guidelines
14. how to select and visually inspect the appropriate tools and lifting equipment for battery removal
15. the procedure for the safe removal and storage of the high voltage battery
16. the importance of storing the high voltage battery in a safe, restricted area if left unattended
17. how to reduce the battery voltage to a safe working limit in line with manufacturers guidelines



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18. the correct recognised repair methods for batteries and how to carry them out observing health and safety requirements
  19. how to ensure the integrity of the repair prior to re-establishing the normal operating battery system voltage
  20. how to use specialist, high voltage equipment to recommission the battery
  21. how to reinstate the vehicle following manufacturer's guidelines
  22. basic first aid and safety training including the correct procedures that must be followed in the event of electric shock
  23. how to safely dispose of or recycle battery components inline with legislation and organisation procedures
  24. how to accurately report the work that has been carried out on the vehicle to relevant persons

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**Scope/range**

Scope of this standard

**Battery damage** includes:

- a. over heating
- b. physical impact damage
- c. chemical leakage
- d. smoke
- e. water damage

**High voltage tests and equipment** includes:

- a. pressure testing equipment to ensure the battery is properly sealed (IP Testing)
- b. isolation/dielectric test to ensure the integrity of the high voltage system
- c. cell symmetry test

**Protective clothing/equipment** includes:

- a. insulated high voltage gloves
- b. face shield
- c. fire resistant clothing/apron
- d. insulated tools

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## Glossary

**Electric/hybrid vehicle** – any vehicle that is powered wholly or in part by an electrical drive train

**High energy electrical/high voltage** – typical voltages used for a range of Electric and Hybrid Vehicles 100-650V ECE R100 (relating to vehicle regulations) paragraph 2.14 clearly defines high voltage: “High Voltage” means the classification of an electric component or circuit, if its working voltage is > 60 V and 1500 V DC or > 30 V and 1000 V AC root mean square (rms).’

**Live:** Equipment that is at a voltage by being connected to a source of electricity. This implies that, unless otherwise stated, the live parts are exposed so that they can be touched either directly or indirectly by means of some conducting object and that they are either live at a dangerous energy level or dangerous potential, ie over 50 V ac or 120 V dc in dry conditions - see BSI publication PD 6519:5

## Links to other NOS

IMIEV4 Isolate and reinstate electric and hybrid vehicles

Diagnose, test and repair electric and hybrid vehicle high voltage batteries

<b>Developed by</b>	IMI
<b>Version Number</b>	1
<b>Date Approved</b>	December 2014
<b>Indicative Review Date</b>	December 2017
<b>Validity</b>	Current
<b>Status</b>	Original
<b>Originating Organisation</b>	IMI
<b>Original URN</b>	IMIEV5
<b>Relevant Occupations</b>	Auto-electrical Technician (Automotive); Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician (Automotive)
<b>Suite</b>	Electric and Hybrid Vehicles
<b>Keywords</b>	diagnose repair test electric hybrid vehicle high voltage batteries

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**Overview**

This NOS is about the routine maintenance of the workplace, carrying out basic, non-specialist checks of relevant workplace equipment, cleaning the work area and using resources as directed.

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## Performance criteria

You must be able to:

1. select and use suitable personal protective equipment throughout all housekeeping and equipment maintenance activities
2. select and use cleaning equipment which is of the right type and suitable for the task
3. use resources as directed and for their intended purpose only following workplace procedures
4. follow workplace policies, schedules and manufacturers' instructions when cleaning and maintaining equipment
5. ensure your equipment maintenance activities keep your equipment fit for purpose
6. clean the work area(s), for which you are responsible, at the specified time and frequency
7. store your equipment in a safe manner which permits ease of access and identification for use
8. carry out housekeeping activities safely and in a way which minimises inconvenience to customers and staff
9. ensure your housekeeping activities keep your work area clean and free from debris and waste materials
10. dispose of used cleaning agents, materials and debris to comply with relevant legal, environmental and workplace requirements
11. report any faulty or damaged equipment to the relevant person(s) clearly and promptly
12. report any anticipated delays in completion to the relevant person(s) promptly

## Knowledge and understanding

You need to know and understand:

1. the scope of your job responsibilities for the use and maintenance of equipment and your work area
2. workplace policies, schedules and legislation for housekeeping activities and equipment maintenance
3. the manufacturer's requirements for the cleaning and general, non-specialist maintenance of the 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
7. how to select and use equipment appropriate to the task
8. how to store equipment safely and accessibly
9. how to report faulty or damaged equipment
10. how to work safely when cleaning and maintaining equipment
11. how to select and use work area cleaning equipment, materials and agents
12. how to clean and maintain the equipment and work areas for which you are responsible
13. how to dispose of unused cleaning agents, materials and debris to comply with relevant legal, environmental and workplace requirements
14. the properties and hazards associated with the use of cleaning agents and materials
15. the importance of wearing personal protective equipment
16. the importance of using resources as directed and for their intended purpose only

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**Scope/range**

1. Equipment maintenance covers:
  - a. routine checks on equipment
  - b. cleaning equipment
  - c. 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 taking into account relevant environmental factors
  
3. Motor Vehicle could include:
  - a. Light Vehicles
  - b. Heavy Vehicles/Commercial Vehicles
  - c. Motorcycles
  - d. Lift Trucks
  - e. Heavy Vehicle Trailers
  - f. Caravan and Motorhomes



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**Developed by** IMI

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**Version Number** 2

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**Date Approved** October 2014

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**Indicative Review Date** October 2017

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**Validity** Current

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**Status** Original

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**Originating Organisation** IMI

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**Original URN** IMIARBG1

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**Relevant Occupations** Accident Repair Technicians; Automotive Aftermarket Electrical Enhancement Technician (Automotive); Auto-electrical Technician (Automotive); Auto and Mobile Installation Technicians; Automotive Paint Supervisor; Automotive Paint Technician; Body Builder (Automotive); Body Builder Workshop Controller (Automotive); Body Repair and Alignment Technician (Automotive); Body Repair Technician (Automotive); Caravan and Motorhome Diagnostic Technician (Automotive); Caravan and Motorhome Service Technician (Automotive); Caravans and Motorhomes Diagnostic Technician (Automotive); Caravans and Motorhomes Service Technician (Automotive); Cosmetic Refinishing Technician (Automotive); Cosmetic Senior Refinishing Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Service Technician (Automotive); Lift Truck Service Technician (Automotive); Lift Truck Trailer Diagnostic Technician (Automotive);

Contribute to Housekeeping in Motor Vehicle Environments
 

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Lift Truck Trailer Master Technician (Automotive); Lift Truck Workshop Controller ; Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician (Automotive); Maintenance and Repair Technicians; Maintenance Team Technician; Maintenance Fitter; Mechanical Fitter; Mechanical Maintenance Technician; Mechanical Supervisor; Mechanical, Electrical and Trim Assistant Technician (Automotive); Mechanical, Electrical and Trim Technician (Automotive); Motor Repair and Rewind Electrician; Motor Vehicle Valeting (Automotive); Motorcycle Diagnostic Technician; Motorcycle Fleet/Service Manager (Automotive); Motorcycle Master Technician (Automotive); Motorcycle Service Technician; Motorsport Technician; PDR Senior Technician (Automotive); PDR Technician (Automotive); Rental and Leasing Customer Service Advisor (Automotive); Rental and Leasing Maintenance Advisors (Automotive); Rental and Leasing Technical Service Advisor (Automotive); Roadside Assistance Manager; Roadside Assistance Operator; Roadside Assistance Operators; Roadside Assistance Senior Operator; Roadside Assistance Senior Technician; Roadside Assistance Technician; Sales Executive (Automotive); Sales Controller (Automotive); Tyre Fitting Operations (Automotive); Tyre exhaust and windscreen fitters ; Vehicle Damage Assessment Operators; Vehicle Damage Assessor (Automotive); Vehicle Fitters; Vehicle Fitting Operations (Automotive); Vehicle Parts Operative; Vehicle Parts Operators; Vehicle Parts Supervisor; Vehicle Recovery Operator; Vehicle Recovery Operators; Vehicle Recovery Technical Operator; Vehicle Sales Operators; Vehicle Trades; Vehicle Valet (Automotive)

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**Suite**

Accident Repair - Body; Accident Repair - Joining; Accident Repair - Paint; Accident Repair - SMART - Cosmetic; Accident Repair - SMART - PDR; Accident Repair - Mechanical, Electrical and Trim; Body Building; Maintenance and Repair - Caravans and Motorhomes; Maintenance and Repair - Heavy Vehicle; Maintenance and Repair - Heavy Vehicle Trailer; Maintenance and Repair - Lift Truck; Maintenance and Repair - Light Vehicle; Maintenance and Repair - Motorcycle; Auto Electrical and Mobile Electrical Installation; Roadside Assistance; Vehicle Damage Assessment Operations; Vehicle Fitting; Vehicle Parts Operations; Vehicle Recovery; Vehicle Sales v3

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**Keywords**

Contribute, Housekeeping, Motor Vehicle Environments

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## Overview

This NOS covers the basic, legally required health and safety duties of everyone in the workplace. This NOS does **not** require a full Risk Assessment to be undertaken. This NOS is about identifying hazards and evaluating risk(s) in the workplace as well as reducing the risk(s) to health and safety in the workplace. This NOS is about having an appreciation of identifiable risk(s) in the workplace and knowing how to identify them and deal with them.

It describes the competence required to ensure that:

- actions or lack of action do not create any health and safety risk(s)
- identifiable risk(s) in the workplace are not ignored
- sensible action is taken to put things right, including reporting situations which pose an identifiable risk(s) to people in the workplace, and seeking advice from others

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## Performance criteria

You must be able to:

1. carry out your working practices in accordance with relevant legislative requirements
2. identify the correct personal and vehicle protective equipment required to correctly carry out your workplace practices
3. carry out your workplace practices and workplace policies using the correct personal protective equipment
4. rectify health and safety risk(s) that are within your capability and scope of your job responsibilities
5. pass on any suggestions for reducing risk(s) to health and safety within your job role to the responsible persons
6. ensure your personal conduct in the workplace does not endanger the health and safety of yourself or other persons
7. follow the workplace policies and suppliers' or manufacturers' instructions for the safe use of equipment, materials and products and report any differences identified
8. ensure your personal presentation at work ensures the health and safety of yourself and others, meets any relevant legislative duties and is in accordance with workplace policies

## Knowledge and understanding

You need to know and understand:

1. the current health and safety legislation, regulations and workplace policies that govern your working practices
2. your duties and responsibilities for current health and safety as defined by any specific legislation covering your job role and where to access the information
3. agreed workplace policies relating to controlling risk(s) to health and safety the responsible person(s) to whom you report health and safety concerns
4. what hazards may exist in your workplace
5. health and safety risk(s) which may be present in your own job role and the precautions you must take
6. the importance of remaining alert to the presence of hazards in the whole workplace
7. how to deal with and report risk(s)
8. the requirements and guidance on the precautions
9. the specific workplace policies including safe working practices covering your job role
10. suppliers' and manufacturers' instructions for the safe use of equipment, materials and products
11. the importance of personal presentation in maintaining health and safety in the workplace
12. the importance of personal conduct in maintaining the health and safety of yourself and others
13. the importance of personal protective equipment, when and where it should be used and the importance of maintaining it correctly
14. your scope and responsibility for rectifying risk(s)

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## Scope/range

1. Risk(s) resulting from:
  - a. use of tools and equipment relevant to the task
  - 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
  
3. Motor Vehicle could include:
  - a. Light Vehicles
  - b. Heavy Vehicles/Commercial Vehicles
  - c. Motorcycles
  - d. Lift Trucks
  - e. Heavy Vehicle Trailers
  - f. Caravan and Motorhomes

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**Developed by** IMI

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**Version Number** 2

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**Date Approved** October 2014

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**Indicative Review Date** October 2017

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**Validity** Current

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**Status** Original

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**Originating Organisation** IMI

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**Original URN** IMIARB2

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**Relevant Occupations** Auto-electrical Technician (Automotive); Auto and Mobile Installation Technicians; Automotive Aftermarket Electrical Enhancement Technician (Automotive); Automotive Paint Supervisor; Automotive Paint Technician; Body Builder (Automotive); Body Builder Workshop Controller (Automotive); Body Repair and Alignment Technician (Automotive); Body Repair Technician (Automotive); Caravan and Motorhome Diagnostic Technician (Automotive); Caravan and Motorhome Service Technician (Automotive); Caravans and Motorhomes Diagnostic Technician (Automotive); Caravans and Motorhomes Service Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Service Technician (Automotive); Lift Truck Service Technician (Automotive); Lift Truck Trailer Diagnostic Technician (Automotive); Lift Truck Trailer Master Technician (Automotive); Lift Truck Workshop Controller ; Light Vehicle Diagnostic

Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician (Automotive); Maintenance and Repair Technicians; Maintenance Fitter; Maintenance Team Technician; Mechanical, Electrical and Trim Technician (Automotive); Mechanical, Electrical and Trim Assistant Technician (Automotive); Motorcycle Diagnostic Technician; Motor Vehicle Valeting (Automotive); Motorcycle Fleet/Service Manager (Automotive); Motorcycle Master Technician (Automotive); Motorcycle Service Technician; Motorsport Technician; PDR Senior Technician (Automotive); PDR Technician (Automotive); Rental and Leasing Customer Service Advisor (Automotive); Rental and Leasing Maintenance Advisors (Automotive); Rental and Leasing Technical Service Advisor (Automotive); Roadside Assistance Manager; Roadside Assistance Operator; Roadside Assistance Operators; Roadside Assistance Senior Operator; Roadside Assistance Senior Technician; Roadside Assistance Technician; Sales Controller (Automotive); Sales Executive (Automotive); Senior Automotive Paint Technician; Tyre Fitting Operations (Automotive); Tyre exhaust and windscreen fitters ; Vehicle Damage Assessment Operators; Vehicle Damage Assessor (Automotive); Vehicle Fitters; Vehicle Fitting Operations (Automotive); Vehicle Parts Operative; Vehicle Parts Operators; Vehicle Parts Supervisor; Vehicle Recovery Operator; Vehicle Recovery Operators; Vehicle Recovery Technical Operator; Vehicle Sales Operators; Vehicle Trades; Vehicle Valet (Automotive)

### Suite

Accident Repair - Body; Accident Repair - Joining; Accident Repair - Mechanical, Electrical and Trim; Accident Repair - Paint; Accident Repair - SMART - Cosmetic; Accident Repair - SMART - PDR; Auto Electrical and Mobile Electrical Installation; Body Building; Maintenance and Repair - Caravans and Motorhomes; Maintenance and Repair - Heavy Vehicle; Maintenance and Repair - Heavy Vehicle Trailer; Maintenance and Repair - Lift Truck; Maintenance and Repair - Light Vehicle; Maintenance and Repair - Motorcycle; Vehicle Damage Assessment Operations; Vehicle Fitting; Vehicle Parts Operations; Vehicle Recovery; Vehicle Sales v3

### Keywords

Identify, Agree, Motor Vehicle, Customer Needs



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**Overview**

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

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## Performance criteria

You must be able to:

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

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## Knowledge and understanding

You need to know and understand:

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
4. how to use suitable and effective communication skills when responding to and interacting with others
5. how to adapt communication methods to satisfy the needs of colleagues
6. how to report problems using appropriate 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 acknowledging other peoples' views and opinions
9. the importance of making and honouring realistic commitments to colleagues
10. the implications of inappropriate communication

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**Scope/range**

1. Colleagues are:
  - a. immediate work colleagues
  - b. supervisors and managers
  
2. Requests for assistance covering:
  - a. technical assistance
  - b. personal assistance
  
3. Motor Vehicle could include:
  - a. Light Vehicles
  - b. Heavy Vehicles/Commercial Vehicles
  - c. Motorcycles
  - d. Lift Trucks
  - e. Heavy Vehicle Trailers
  - f. Caravan and Motorhomes

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**Developed by** IMI

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**Version Number** 2

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**Date Approved** October 2014

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**Indicative Review Date** October 2017

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**Validity** Current

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**Status** Original

---

**Originating Organisation** IMI

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**Original URN** IMIARB3

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**Relevant Occupations** Accident Repair Technicians; Automotive Aftermarket Electrical Enhancement Technician (Automotive); Auto and Mobile Installation Technicians; Auto-electrical Technician (Automotive); Automotive Paint Supervisor; Automotive Paint Technician; Body Builder (Automotive); Body Builder Workshop Controller (Automotive); Body Repair and Alignment Technician (Automotive); Body Repair Technician (Automotive); Caravan and Motorhome Diagnostic Technician (Automotive); Caravan and Motorhome Service Technician (Automotive); Caravans and Motorhomes Diagnostic Technician (Automotive); Caravans and Motorhomes Service Technician (Automotive); Cosmetic Senior Refinishing Technician (Automotive); Cosmetic Refinishing Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Service Technician (Automotive); Lift Truck Service Technician (Automotive); Lift Truck Trailer Diagnostic Technician (Automotive);

Lift Truck Trailer Master Technician (Automotive); Lift Truck Workshop Controller ; Light Vehicle Diagnostic Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive); Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician (Automotive); Maintenance and Repair Technicians; Mechanical, Electrical and Trim Technician (Automotive); Mechanical, Electrical and Trim Assistant Technician (Automotive); Motor Repair and Rewind Electrician; Motor Vehicle Valeting (Automotive); Motorcycle Diagnostic Technician; Motorcycle Fleet/Service Manager (Automotive); Motorcycle Master Technician (Automotive); Motorcycle Service Technician; Motorsport Technician; PDR Senior Technician (Automotive); PDR Technician (Automotive); Rental and Leasing Customer Service Advisor (Automotive); Rental and Leasing Maintenance Advisors (Automotive); Rental and Leasing Technical Service Advisor (Automotive); Roadside Assistance Manager; Roadside Assistance Operator; Roadside Assistance Operators; Roadside Assistance Senior Operator; Roadside Assistance Senior Technician; Roadside Assistance Technician; Sales Executive (Automotive); Sales Controller (Automotive); Tyre exhaust and windscreen fitters ; Tyre Fitting Operations (Automotive); Vehicle Damage Assessment Operators; Vehicle Damage Assessor (Automotive); Vehicle Fitters; Vehicle Fitting Operations (Automotive); Vehicle Parts Operative; Vehicle Parts Operators; Vehicle Parts Supervisor; Vehicle Recovery Operators; Vehicle Recovery Operator; Vehicle Recovery Technical Operator; Vehicle Valet (Automotive)

### Suite

2010 Incremental change to the NOS in Interpreting; Accident Repair - Body; Accident Repair - Joining; Accident Repair - Mechanical, Electrical and Trim; Accident Repair - Paint; Accident Repair - SMART - Cosmetic; Accident Repair - SMART - PDR; Auto Electrical and Mobile Electrical Installation; Automotive Glazing; Maintenance and Repair - Caravans and Motorhomes; Maintenance and Repair - Heavy Vehicle; Maintenance and Repair - Heavy Vehicle Trailer; Maintenance and Repair - Lift Truck; Maintenance and Repair - Light Vehicle; Maintenance and Repair - Motorcycle; Roadside Assistance; Vehicle Damage Assessment Operations; Vehicle Fitting; Vehicle Sales v3; Vehicle Recovery; Vehicle Parts Operations

### Keywords

Maintain Working Relationships, Motor Vehicle Environment

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## Overview

This NOS is about the basic use of tools, materials and fabrications relevant to the Automotive Sector. This NOS is also about interpreting information, adopting safe and healthy working practices and selecting tools, materials and equipment. This NOS is for those working in technical support roles and is also appropriate for workshop planners.

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## Performance criteria

You must be able to:

1. select and use suitable personal protective equipment appropriate to the task
2. interpret the information supplied relating to the task
3. carry out pre-start preparation inspections on tools and equipment in accordance with approved procedures
4. carry out operations using tools and equipment in accordance with safe working practices to achieve the work outcome
5. highlight and identify problems associated with tools and equipment to the relevant person
6. demonstrate work skills to manufacture and repair components using measure, mark out, file, fit, tap, thread, cut, drill, finish, position and secure
7. use and maintain the relevant tools and equipment
8. dispose of waste in accordance with relevant legislation including environmental to maintain a clean work space
9. carry out checks in accordance with manufacturer's/operator's guidance, schedules, relevant legislation and official guidance and relevant organisational requirements.
10. demonstrate correct selection of materials for manufacture or repair
11. inspect, clean and store tools and equipment after use



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## Knowledge and understanding

You need to know and understand:

1. the relevant organisational procedures developed to report and rectify inappropriate information and unsuitable resources, and how they are implemented
2. the types of information, their source and how they are interpreted
3. the relevant organisational procedures to solve problems with the information and why it is important they are followed
4. the relevant legislation and official guidance and how it is applied
5. what the accident reporting procedures are and who is responsible for making the reports
6. why and when personal protective equipment (PPE) should be used
7. the relevant requirements for the disposal of waste, used materials and debris taking into account relevant environmental factors
8. material properties relevant to the task and their appropriate applications
9. the appropriate use of materials for fabrication and repair
10. how to file, fit, tap, thread, cut and drill materials you are working on
11. how to select and use gaskets, sealants, seals, fittings and fasteners

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**Scope/range**

1. Tools and equipment are:
  - a. hand tools
  - b. electrical
  - c. mechanical
  - d. pneumatic
  - e. hydraulic
  
2. Motor Vehicle could include:
  - a. Light Vehicles
  - b. Heavy Vehicles/Commercial Vehicles
  - c. Motorcycles
  - d. Lift Trucks
  - e. Heavy Vehicle Trailers
  - f. Caravan and Motorhomes

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**Developed by** IMI

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**Status** Original

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**Originating Organisation** IMIARB4

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**Original URN** IMIARB4

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**Relevant Occupations** Automotive Aftermarket Electrical Enhancement Technician (Automotive); Auto-electrical Technician (Automotive); Body Builder (Automotive); Body Builder Workshop Controller (Automotive); Body Repair and Alignment Technician (Automotive); Body Repair Technician (Automotive); Caravan and Motorhome Diagnostic Technician (Automotive); Caravan and Motorhome Service Technician (Automotive); Caravans and Motorhomes Diagnostic Technician (Automotive); Caravans and Motorhomes Service Technician (Automotive); Cosmetic Refinishing Technician (Automotive); Cosmetic Senior Refinishing Technician (Automotive); Heavy Vehicle Diagnostic Technician (Automotive); Heavy Vehicle Fleet/Service Manager (Automotive); Heavy Vehicle Master Technician (Automotive); Heavy Vehicle Service Technician (Automotive); Heavy Vehicle Trailer Diagnostic Technician (Automotive); Heavy Vehicle Trailer Fleet/Service Manager (Automotive); Heavy Vehicle Trailer Master Technician (Automotive); Heavy Vehicle Trailer Service Technician (Automotive); Lift Truck Service Technician (Automotive); Lift Truck Trailer Diagnostic Technician (Automotive); Lift Truck Trailer Master Technician (Automotive); Lift Truck Workshop Controller ; Light Vehicle Diagnostic

Use of tools and equipment in Motor Vehicle Environments
 

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Technician (Automotive); Light Vehicle Fleet/Service Manager (Automotive);  
 Light Vehicle Master Technician (Automotive); Light Vehicle Service Technician  
 (Automotive); Maintenance and Repair Technicians; Maintenance Electrician;  
 Mechanical, Electrical and Trim Assistant Technician (Automotive); Mechanical,  
 Electrical and Trim Technician (Automotive); Motor Repair and Rewind  
 Electrician; Motorcycle Diagnostic Technician; Motorcycle Master Technician  
 (Automotive); Motorcycle Service Technician; PDR Technician (Automotive);  
 PDR Senior Technician (Automotive); Roadside Assistance Operator; Roadside  
 Assistance Operators; Roadside Assistance Senior Operator; Roadside  
 Assistance Senior Technician; Roadside Assistance Technician; Tyre Fitting  
 Operations (Automotive); Tyre exhaust and windscreen fitters ; Vehicle Fitters;  
 Vehicle Fitting Operations (Automotive); Vehicle Recovery Operator; Vehicle  
 Recovery Operators; Vehicle Recovery Technical Operator

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**Suite**

Accident Repair - Body; Accident Repair - Joining; Accident Repair -  
 Mechanical, Electrical and Trim; Accident Repair - SMART - Cosmetic;  
 Accident Repair - SMART - PDR; Auto Electrical and Mobile Electrical  
 Installation; Body Building; Maintenance and Repair - Heavy Vehicle;  
 Maintenance and Repair - Heavy Vehicle Trailer; Maintenance and Repair - Lift  
 Truck; Maintenance and Repair - Light Vehicle; Maintenance and Repair -  
 Motorcycle; Maintenance and Repair - Caravans and Motorhomes;  
 Maintenance and Repair - Motorcycle; Vehicle Recovery; Vehicle Fitting

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**Keywords**

Tools, Equipment, Motor Vehicle Engineering

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### Overview

This NOS 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.

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

# IMIARBG11

## Supervisory skills

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### Performance criteria

*You must be able to:*

- P1 confirm the work required in your area of responsibility with your manager and seek clarification, where necessary, on any outstanding points and issues
- P2 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
- P3 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 opportunities for development
- P4 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
- P5 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
- P6 encourage individuals and/or team members to ask questions, make suggestions and seek clarification in relation to allocated work
- P7 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
- P8 support individuals and/or teams in identifying and dealing with problems and unforeseen events
- P9 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
- P10 monitor your area for conflict, identifying the cause(s) when it occurs and dealing with it promptly and effectively
- P11 identify unacceptable or poor performance, discuss the cause(s) and agree ways of improving performance with individuals and/or teams
- P12 recognise successful completion of significant pieces of work or work activities by individuals and/or teams
- P13 use information collected on the performance of individuals and/or teams in any formal appraisals of performance
- P14 review and update plans of work for your area, clearly communicating any changes to those affected

# IMIARBG11

## Supervisory skills

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### Knowledge and understanding

*You need to know and understand:*

- K1 how to select and successfully apply different methods for communicating with people across an area of responsibility
- K2 the importance of confirming/clarifying the work required in your area of responsibility with your manager and how to do this effectively
- K3 how to identify and take due account of health and safety issues in the planning, allocation and monitoring of work
- K4 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
- K5 how to identify sustainable resources and ensure their effective use when planning the work for your area of responsibility
- K6 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
- K7 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
- K8 why it is important to allocate work to individuals and/or teams on a fair basis and how to do so effectively
- K9 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
- K10 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
- K11 ways of encouraging individuals and/or teams to ask questions and/or seek clarification in relation to the work which they have been allocated
- K12 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
- K13 how to provide prompt and constructive feedback to individuals and/or teams
- K14 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 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
- K15 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
- K16 the type of problems and unforeseen events that may occur and how to

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## Supervisory skills

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- support individuals and/or teams in dealing with them
- K17 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
- K18 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
- K19 how to log information on the ongoing performance of individuals and/or teams and use this information for formal performance appraisal purposes

### **Industry/sector specific knowledge and understanding**

- K20 industry/sector requirements for the development or maintenance of knowledge, understanding and skills
- K21 industry/sector specific legislation, regulations, guidelines, codes of practice relating to carrying out work



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### Additional Information

#### 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 NOS and are listed here as additional information.

1. Communicating
2. Consulting
3. Decision making
4. Delegating
5. Information management
6. Leadership
7. Managing conflict
8. Monitoring
9. Motivating
10. Planning
11. Problem solving
12. Providing feedback
13. Prioritising
14. Reviewing
15. Setting objectives
16. Stress management
17. Valuing and supporting others.

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## Supervisory skills

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