Automotive Skills Development Council

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR AUTOMOTIVE INDUSTRY

Contents

What are Occupational Standards (OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

Contact Us:
ASDC, 1/6,
Siri Institutional Area,
Khel Gaon Road,
New Delhi-110049 (India)

E-mail:
skc@asdc.org.in

Introduction

Qualifications Pack-Automotive Electrician

SECTOR: AUTOMOTIVE

SUB-SECTOR: AUTOMOTIVE VEHICLE SERVICE

OCCUPATION: TECHNICAL SERVICE & REPAIR

JOB ROLE: AUTOMOTIVE ELECTRICIAN

REFERENCE ID: ASC/Q 1408

ALIGNED TO: NCO-2004/7241.70

Auto Electrician is also known as Electrician, Electrical Technician and Electrical mechanic.

Brief Job Description: An Auto Electrician is responsible for service and repair of electrical and electronic faults in the vehicle across the various sub-systems and aggregates.

Personal Attributes: An individual on this job must have good communication and interpersonal skills in addition to being a team player, as the job requires coordination with other technicians as well. The individual must have a technical bend of mind to understand the technical (electrical and electronics) aspects of a vehicle. Keeping oneself abreast of the latest developments in the electronics and electrical circuits (including the Electronic Control Unit-ECU) incorporated in the vehicles (especially after the BS-3/ BS-4 emission mandate forces OEMs to incorporate more use of computers, chips and electronic circuits in the vehicles) is desirable.

Job Details

Qualifications Pack Code	**ASC/ Q 1408**		
Job Role	**Automotive Electrician**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Automotive**	**Drafted on**	**12/06/13**
Sub-sector	**Automotive Vehicle Service**	**Last reviewed on**	**12/06/13**
Occupation	**Technical Service & Repair**	**Next review date**	**Under revision expected date of revised version 31-Dec-15**
NSQC Clearance on	**20/07/15**		

Job Role	**Automotive Electrician**
Role Description	Responsible for repair of electrical and electronic faults in the vehicle across the various sub-systems and aggregates
NSQF level	4
Minimum Educational Qualifications	Class XII
Maximum Educational Qualifications	ITI or Diploma in Electrical/Automobile Engineering
Training	On the job training: • Desirable for ASDC Auto Electrician Certificate OR Diploma in Electrical/ Automobile Engineering • Compulsory for all other qualifications
Minimum Job Entry Age	1 ASDC recommends that candidates should seek full employment not before attaining an age of 18 years 2 However, as per Factories Act 1948 and Shops & Establishment Act 1953: - No one can be employed before attaining the age of 14 3 Please note that under the Factories Act 1948, and Shops & Establishment Act 1953 different States may have slightly varying provision, which need to be adhered to.
Experience	• 1-2years for ASDC Auto Electrician Certificate or Diploma in Electrical/ Automobile Engineering • 3 – 5 years for other qualifications
Occupational Standards (OS)	**Compulsory:** 1. ASC/N 1406:Carry out service and repairs of electrical and electronic faults in a vehicle 2. ASC/N 0001:Plan and organise work to meet expected outcomes 3. ASC/N 0002:Work effectively in a team 4. ASC/N 0003:Maintain a healthy, safe and secure working environment **Optional:** N.A.
Performance Criteria	As described in the relevant NOS units

Definitions

Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.
Dealership	A business established or operated under an authorisation to sell or distribute an automotive company's goods and services
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate NOS they are looking for.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in the Indian context.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organisational Context	Organisational Context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub-Sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Unit Code	Unit Code is a unique identifier for an NOS unit, which can be denoted with an '**N**'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Vehicle	Mode of personal transport including 2-wheelers, 3-wheelers and 4-wheelers (including passenger vehicles and commercial vehicles). This includes gasoline, petrol, CNG, electrical and hybrid vehicles
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.

Acronyms

Keywords /Terms	Description
NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
OEM	Original Equipment Manufacturer
OS	Occupational Standard(s)
QP	Qualifications Pack

National Occupational Standards

Overview

This Occupational Standard describes the knowledge, understanding and skills required of an individual to carry out service and repairs within the electrical and electronic systems of a vehicle. This also includes petrol, diesel, CNG, electrical and hybrid vehicles.

National Occupational Standard

Unit Code	ASC/ N 1406
Unit Title (Task)	Carry out service and repairs of electrical and electronic faults in a vehicle
Description	This NOS unit is about an individual carrying out service and repairs within the electrical and electronic systems of a vehicle.
Scope	This unit/task covers the following: • identify the need for any repairs in the aggregates having any electrical or electronic sub-systems (including electronics within the engines, gear box etc.) • repair electrical and electronic systems fault within the aggregate affecting the overall performance of the vehicle • service any electrical/ electronic part within an aggregate
Performance Criteria (PC) w.r.t the Scope	
Element	**Performance Criteria**
Service and repairs in electrical & electronic aggregates	To be competent, the user/individual on the job must be able to: PC1. understand the auto component manufacturer specifications related to the various electrical and electronic components and allied aggregates PC2. follow standard operating procedures for using workshop tools and equipment for repair of electrical/ electronic components in a vehicle PC3. review the job card and understand work to be carried out in the electrical/ electronic aggregates as indicated by the supervisor or service advisor PC4. ensure that the correct spare parts tools and other materials required for service and repair of the electrical/ electronic components have been obtained PC5. repair and overhaul: • stability/steering/ suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) • electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc.) • engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems) • transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) • braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) • safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll

over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control)

- monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems)
- convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems)
- theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems)
- electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems)
- climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems)
- gearbox, drive-train assembly and transmission systems (manual, automatic etc.)
- electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc.
- electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems
- electronic control unit
- hydraulic and pneumatic system

PC6. repair all electrical and electronic faults including direct faults in:

- input sensors
- output actuators
- wiring harnesses
- computer systems
- calibration/adjustment specifications
- component specifications
- component assembly
- component damage
- system modifications

PC7. repair indirect faults caused on the major mechanical or other aggregates by the influence of electrical and electronic aggregate (e.g. influence of improper working on the ECU might have damaged the charging of the alternator

PC8. remove, refit and test electrical components for normal operation following

	major/ minor body repair activities PC9. dismantle, assess, repair, clean, replace, adjust and reassemble vehicle electric and electronic units PC10. ensure all dismantled components (other than the electrical or electronic components) are cleaned and conditioned prior to reassembly PC11. ensure disposal of materials (including scrap of failed parts/ aggregates) in accordance with the organisation's policies PC12. understand the various precautions to be taken to avoid damage to other components/ aggregates of a vehicle while working on electrical/ electronic aggregates PC13. record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure PC14. ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary PC15. ensure any malfunctions observed in tools and equipment are reported to the concerned persons PC16. request assistance from a senior technician or aggregate specialist when required PC17. inform the relevant persons where repairs are economically or technically infeasible PC18. ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organisational Context (Knowledge of the Company/ Organisation and its processes)	The user/individual on the job needs to know and understand: KA1. standard operating procedures for servicing, repair and replacement of electrical/ electronic parts (including those related to various mechanical aggregates) KA2. standard operating procedures recommended by the dealership/manufacturer/OEM for using tools and equipment for electrical/ electronic components KA3. safety requirements for equipment within the tolerance limits used for service/ repair of electrical/ electronic components as prescribed by the OEM KA4. identification codes, nomenclature of various electrical/ electronic components and aggregates KA5. standard operating procedures for rectification of errors in information (e.g. rectification of job card, reissue of correct tools and equipment etc.) KA6. documentation requirements for each procedure carried out as part of roles and responsibilities as specified by OEM/ auto component manufacturer KA7. organisational and professional code of ethics and standards of practice KA8. safety, health and environmental policies and regulations for the workplace as well as for automotive trade in general(e.g. safe working practices inside pits/

	under vehicles) KA9. regulatory requirements for vehicles including road safety, refrigerant handling, fuel storage and other requirements KA10. operating specifications provided by the OEM for limits, fits and tolerances relating to engine electrical, electronic and hydraulic and fluid systems for the vehicle
B Technical Knowledge	The user/individual on the job needs to know and understand: KB1. the basic technology used in and functioning of various components and aggregates of the vehicle including: • engines and fuel system (diesel, petrol, electrical, gas etc.) • radiator • emission and exhaust system • brake system • clutch assembly • gearbox, drive-train assembly and transmission systems (manual, automatic etc.) • steering system • suspension system • electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. • electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems • electronic control unit • tyres and wheels • cooling system • hydraulic and pneumatic system • various lubrication systems KB2. basic principles of: • ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction etc. • vehicle earthing and earthing methods • vehicle engine systems (e.g. types, applications and operation of sensors, actuators, etc.) • types of circuit protection and their use • electrical safety procedures • the operation of warning, charging and starter circuits • symbols, units and terms associated with electric systems and components • battery charging • electrical/electronic control systems

- operation of electronic and electric engine systems (including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fiber optics principles)
- electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetic, inductance, discrete electronic components, logic families, and radio frequency

KB3. the tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of:

- organic light emitting displays — anti-lock braking system abs/air bag scan tools, automotive scanners, graphing scanners, modular diagnostic information systems
- pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges
- pullers: ball joint separators, bearing pullers, gear puller tools, slide hammers
- specialty wrenches: alignment wrenches, chain wrenches, locking wrenches, lug wrenches
- trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoons
- measuring equipment: vernier calipers, micrometer, feeler gauges, flow metre, temp gauge, dial gauge, analogue and digitalmulti-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators etc.
- electrical and electronic testing equipment: volt meters, ammeters, ohmmeters, battery testing equipment, dedicated and computer based diagnostic equipment, oscilloscopes etc.
- other tools: hand tools, power tools, lifting and jacking equipment, tensioning equipment, laptops, brake roller tester, chassis dynamometer, suspension activation, security activator etc.
- tools for other tasks such as cleaning of vehicles, tools, equipment and workshop

KB4. how to modify and repair electric and electronic systems to correct faults including:

- varying the performance of DC motors to meet changes in operational requirements
- varying the performance of alternators to meet changes in operational requirements
- changing the electrical sequenced operating order of electric over hydraulic systems
- converting vehicle from ground to insulated return
- external modification (not within the computer) to a digital computer management system that enhances the system performance(e.g.

	modification to an electronic engine management system, improving the performance of an ECU controlled engine cooling fan system that necessitates changes to relay circuitry) • external modification (not within the computer) to a digital computer management system, utilizing electronic circuit design, development, manufacture, trial, evaluation, improvement, and commissioning, that enhances the system performance (e.g. development of an electronic control unit to delay engine crank whilst sounding an alarm warning of impending start of hazardous equipment) • internal modification (within the computer) to a digital computer management system, utilizing electronic circuit design, reprogramming, development, manufacture, trial, evaluation, improvement, and commissioning that enhances the system performance (e.g. rectifying an original internal computer design/operating deficiency, disabling a function no longer required by customer etc.) KB5. the various sources of information available for assessing serviceability of the vehicle including: • diagnostic displays • visual inspections • vehicle/equipment manufacturer specifications • standard operating procedures KB6. how to dismantle, assess, repair, clean, condition, replace, adjust and reassemble and test electronic and electric components for correct operation KB7. the functioning of the vehicle battery and its schedule for change of water (as indicated by the battery manufacturer) and ensure that overcharging of the battery is avoided KB8. how to dispose off replaced failed electrical/ electronic components in accordance with safety, health and environmental policies and regulations KB9. precautions to be taken to ensure the following while working (including specific precautions to be taken when working with alternative fuel/ hybrid vehicles): • no damage to the electrical / other advanced systems (in case of hybrid/ electrical vehicles) • no damage to the vehicle on which work is being done along with other vehicles parked besides • no damage to vehicle component sub-assemblies and other systems • no contact with hazardous materials
Skills (S) w.r.t. the Scope	
Element	**Skills**
A. Core Skills/	**Writing Skills**

ASC/ N 1406 **Carry out service and repairs of electrical and electronic faults in a vehicle**

Generic Skills	The user/ individual on the job needs to know and understand how to: SA1. create documentation required on the job (including job cards, work sheets, etc.) regarding the basic details of repair and maintenance done on the electrical/ electronic components SA2. record all diagnostic performed on the electrical/ electronic components in vehicle SA3. write in at least one language SA4. write any additional requirement of work on the vehicle other than the one mentioned in the job card
	Reading skills
	The user/individual on the job needs to know and understand how to: SA5. read job cards and instructions from supervisors and the service advisor related to the work on the electrical/ electronic faults in a vehicle SA6. read various sources of information available regarding the service and repair requirements of the electrical/ electronic sub-systems of the vehicle including service manual and diagnostic and visual displays put up in the workshop SA7. read policies and regulations pertinent to the job, including OEM guidelines, health and safety instructions etc. related to work on the electrical/ electronic components and equipment
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA8. clearly communicate workplace information and ideas with colleagues(verbal & non-verbal) SA9. use terms, names, grades and other nomenclature pertaining to the automotive trade, tools, specific workshop equipment etc. SA10. communicate with colleagues and customers to handle verbal enquiries, such as clarifying instructions and responding to requests for information SA11. interact with the customer through service advisor/ supervisor in case any additional work needs to be done related to the electrical/ electronic components which may not have been indicated in the job card
B. Professional Skills	**Decision making**
	The user/individual on the job needs to know and understand how to: SB1. analyse information and evaluate results to choose the best solution and solve problems SB2. decide on whether to repair or replace any electrical/ electronic aggregate post the diagnosis SB3. judge when to ask for help from a colleague (Eq. regarding BS-3engine, taking help from an engine specialist to solve the electrical issues related to the engine electronics)
	Plan and Organise

	The user/individual on the job needs to know and understand how to: SB4. plan work according to the required schedule and location SB5. organise the schedule to complete work on the vehicle timely in case other aggregate repairs/ maintenance work is also required to be done
	Customer centricity
	The user/individual on the job needs to know and understand how to: SB6. interpret the needs of customers by evaluating job cards and talking to service advisor and superiors SB7. ensure that the service provided is of the highest order to ensure higher levels of customer satisfaction SB8. ensure timely communication of the additional requirements in a vehicle related to the electrical/ electronic components (including battery, headlight bulb change etc.) to the service advisor who in turn communicates it to the customer SB9. follow up with the Service Advisor on any unfavourable feedback received from customer
	Problem solving
	The user/individual on the job needs to know and understand how to: SB1. recognise a workplace problem or a potential problem and take action (e.g. open wires while getting the battery charged) SB2. determine problems needing priority action (e.g. any short circuit in any of the electrical circuit which may impact the performance of other aggregates esp. in a BS-3/ BS-4 vehicle which is entirely driven by electronic circuits) SB3. refer problems outside area of responsibility to appropriate person (e.g. some defect in the ECU itself which would require special diagnosis by the senior technician/ supervisor) SB4. gather information while working on electrical/ electronic aggregates and take appropriate action by consulting superiors (if needed)
	Analytical thinking
	The user/individual on the job needs to know and understand how to: SB5. assess repairs required based on technical faults identified as specified in the job card/ supervisor notes SB6. refer complex problems (outside the current scope of work) to a superior in case any additional work requirement comes up
	Critical thinking
	The user/individual on the job needs to know and understand how to: SB7. analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently SB8. use the diagnosis results to take an appropriate decision on repair/ replacement of an electrical/ electronic aggregates

NOS Version Control

NOS Code	**ASC/ N 1406**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Automotive**	**Drafted on**	**12/06/13**
Industry Sub-sector	**Automotive Vehicle Service**	**Last reviewed on**	**12/06/13**
Occupation	**Technical Service & Repair**	**Next review date**	**Under revision expected date of revised version 31-Dec-15**

ASC/ N 0001 **Plan and organise work to meet expected outcomes**

National Occupational Standards

Overview

This unit is about planning and organising an individual's work in order to complete it to the required standards, on time and within budget in terms of cost and material.

ASC/ N 0001 **Plan and organise work to meet expected outcomes**

National Occupational Standard

Unit Code	ASC/ N 0001
Unit Title (Task)	**Plan and organise work to meet expected outcomes**
Description	This NOS unit is about planning and organising an individual's work in order to complete it to the required standards on time.
Scope	This unit/task covers the following: • work requirements including various activities, deliverables or work output required in the given time, maintain set quality standards • appropriate use of resources (both material / equipment's and manpower)
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Work requirements including various activities within the given time and set quality standards	To be competent, the user/individual on the job must be able to: PC1. keep immediate work area clean and tidy PC2. treat confidential information as per the organisation's guidelines PC3. work in line with organisation's policies and procedures PC4. work within the limits of job role PC5. obtain guidance from appropriate people, where necessary PC6. ensure work meets the agreed requirements
Appropriate use of resources	PC7. establish and agree on work requirements with appropriate people PC8. manage time, materials and cost effectively PC9. use resources in a responsible manner
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organisational Context (Knowledge of the Company/Organisation and its processes)	The user/individual on the job needs to know and understand: KA1. the organisation's policies, procedures and priorities for area of work, role and responsibilities in carrying out that work KA2. the limits of responsibilities and when to involve others KA3. specific work requirements and who these must be agreed with KA4. the importance of having a tidy work area and how to do this KA5. how to prioritize workload according to urgency and importance and the benefits of this KA6. the organisation's policies and procedures for dealing with confidential information and the importance of complying with these KA7. the purpose of keeping others updated with the progress of work KA8. who to obtain guidance from and the typical circumstances when this may be required

ASC/ N 0001 **Plan and organise work to meet expected outcomes**

	KA9. the purpose and value of being flexible and adapting work plans to reflect change
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. how to complete tasks accurately by following standard procedures KB2. technical resources needed for work and how to obtain and use these
Skills (S) w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. write in at least one language
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read instructions, guidelines/procedures
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA3. ask for clarification and advice from appropriate persons SA4. communicate orally with colleagues
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make a decision on a suitable course of action appropriate for accurately completing the task within resources
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB2. agree objectives and work requirements SB3. plan and organise work to achieve targets and deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB4. deliver consistent and reliable service to customers SB5. check own work and ensure it meets customer requirements
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB6. refer anomalies to the concerned persons
	Analytical Thinking
	The user/individual on the job needs to know and understand how to:

ASC/ N 0001 **Plan and organise work to meet expected outcomes**

	SB7. analyse problems and identify work -around taking help from concerned persons where required
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB8. apply own judgement to identify solutions in different situations

ASC/ N 0001 **Plan and organise work to meet expected outcomes**

NOS Version Control

NOS Code	**ASC/ N 0001**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Automotive**	**Drafted on**	**10/06/13**
Industry Sub-sector	**Automotive Vehicle Service**	**Last reviewed on**	**10/06/13**
Occupation	**Technical Service & Repair**	**Next review date**	**Under revision expected date of revised version 31-Dec-15**

National Occupational Standards

Overview

This unit is about working effectively with colleagues, either in own work group or in other work groups within organisation.

National Occupational Standard

Unit Code	ASC/ N 0002
Unit Title (Task)	**Work effectively in a team**
Description	This NOS unit is about working effectively within a team, either in individual's own work group or in other work groups outside the organisation.
Scope	This unit/task covers the following: Colleagues: • Interact & communicate effectively with colleagues including member in the own group as well as other groups
Performance Criteria (PC) wart. the Scope	
Element	**Performance Criteria**
Interact & communicate effectively with colleagues including member in the own group as well as other groups	To be competent, the user/individual on the job must be able to: PC1. maintain clear communication with colleagues (by all means including face-to-face, telephonic as well as written) PC2. work with colleagues to integrate work PC3. pass on information to colleagues in line with organisational requirements both through verbal as well as non-verbal means PC4. work in ways that show respect for colleagues PC5. carry out commitments made to colleagues PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons PC7. identify problems in working with colleagues and take the initiative to solve these problems PC8. follow the organisation's policies and procedures for working with colleagues
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organisational Context (Knowledge of the Company/Organisation and its processes)	The user/individual on the job needs to know and understand: KA1. the organisation's policies and procedures for working with colleagues, role and responsibilities in relation to this KA2. the importance of effective communication and establishing good working relationships with colleagues KA3. different methods of communication and the circumstances in which it is appropriate to use these KA4. the importance of creating an environment of trust and mutual respect KA5. the implications of own work on the work and schedule of others

ASC/ N 0002 **Work effectively in a team**

B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. different types of information that colleagues might need and the importance of providing this information when it is required KB2. the importance of helping colleagues with problems, in order to meet quality and time standards as a team
Skills (S)w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. complete written work with attention to detail
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read instructions, guidelines/procedures
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA3. listen effectively and orally communicate information SA4. ask for clarification and advice from the concerned person
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB2. plan and organise work to achieve targets and deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB3. check that the work meets customer requirements SB4. deliver consistent and reliable service to customers
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. apply problem solving approaches in different situations
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB6. apply balanced judgements to different situations

NOS Version Control

NOS Code	**ASC/ N 0002**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Automotive**	**Drafted on**	**10/06/13**
Industry Sub-sector	**Automotive Vehicle Service**	**Last reviewed on**	**10/06/13**
Occupation	**Technical Service & Repair**	**Next review date**	**Under revision expected date of revised version 31-Dec-15**

National Occupational Standards

Overview

This unit is about monitoring work place practices and making sure they meet requirements for health, safety, security and environmental concerns.

National Occupational Standard

Unit Code	ASC/ N 0003
Unit Title (Task)	**Maintain a healthy, safe and secure working environment**
Description	This NOS unit is about monitoring the working environment and making sure it meets requirements for health, safety and security.
Scope	This unit/task covers the following: • Resources (both material & manpower) needed to maintain a safe working environment as per the prevalent norms & government policies including emergency procedures for Illness, accidents, fires or any other reason which may involve evacuation of the premises
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Resources needed to maintain a safe, secure working environment	To be competent, the user/individual on the job must be able to: PC1. comply with organisation's current health, safety and security policies and procedures PC2. report any identified breaches in health, safety, and security policies and procedures to the designated person PC3. Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all incorporating all government norms esp. for emergency situations like fires, earthquakes etc. PC4. identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individual's authority PC5. report any hazards outside the individual's authority to the relevant person in line with organisational procedures and warn other people who may be affected PC6. follow organisation's emergency procedures for accidents, fires or any other natural calamity PC7. identify and recommend opportunities for improving health, safety, and security to the designated person PC8. complete all health and safety records are updates and procedures well defined
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organisational Context (Knowledge of the Company/Organisation and its processes)	The user/individual on the job needs to know and understand: KA1. legislative requirements and organisation's procedures for health, safety and security and individual's role and responsibilities in relation to this KA2. what is meant by a hazard, including the different types of health and safety hazards that can be found in the workplace

	KA3. how and when to report hazards KA4. the limits of responsibility for dealing with hazards KA5. the organisation's emergency procedures for different emergency situations and the importance of following these KA6. the importance of maintaining high standards of health, safety and security KA7. implications that any non-compliance with health, safety and security may have on individuals and the organisation
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. different types of breaches in health, safety and security and how and when to report these KB2. evacuation procedures for workers and visitors KB3. how to summon medical assistance and the emergency services, where necessary KB4. how to use the health, safety and accident reporting Procedures and the importance of these
Skills (S) w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. complete accurate, well written work with attention to detail
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read instructions, guidelines/procedures/rules
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA3. listen to and orally communicate information with all concerned
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on a suitable course of action or response
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB2. plan and organise work to achieve targets and deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB3. build and maintain positive and effective relationships with colleagues and customers
	Problem Solving

ASC/ N 0003 **Maintain a healthy, safe and secure working environment**

	The user/individual on the job needs to know and understand how to: SB4. apply problem solving approaches in different situations
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB5. analyse data and activities
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB6. apply balanced judgements to different situations

ASC/ N 0003 **Maintain a healthy, safe and secure working environment**

NOS Version Control

NOS Code	**ASC/ N 0003**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Automotive**	**Drafted on**	**10/06/13**
Industry Sub-sector	**Automotive Vehicle Service**	**Last reviewed on**	**10/06/13**
Occupation	**Technical Service & Repair**	**Next review date**	**Under revision expected date of revised version 31-Dec-15**

Criteria for assessment of Trainees

JOB ROLE	Auto Electrician L4
Qualification Pack	ASC/Q 1408
No. Of NOS	1 Role specific ,3 generic

NOS Title/ NOS Elements	NOS & Performance Criterion Description	Marks allocation		
ASC/N 1406	**Carry out Service &major repair of the electrical & electronic faults in a vehicle**	**Theory**	**Viva**	**Practical**
Service and repairs in electrical & electronic aggregates	To be competent, the user/individual on the job must be able to: PC1. understand the auto component manufacturer specifications related to the various electrical and electronic components and allied aggregates PC2. follow standard operating procedures for using workshop tools and equipment for repair of electrical/ electronic components in a vehicle PC3. review the job card and understand work to be carried out in the electrical/ electronic aggregates as indicated by the supervisor or service advisor PC4. ensure that the correct spare parts tools and other materials required for service and repair of the electrical/ electronic components have been obtained PC5. repair and overhaul: • stability/steering/ suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) • Electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc). • engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop		5 15	15 30

	diesel engine management systems) • transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) • braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) • safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control) • monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems) • convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems) • theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems) • electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems,		20	40

	electronic protection systems and multi-class Bus systems) • climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems) • Gearbox, drive-train assembly and transmission systems (manual, automatic etc). • Electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. • electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems • electronic control unit • hydraulic and pneumatic system			
	PC6. repair all electrical and electronic faults including direct faults in: • input sensors • output actuators • wiring harnesses • computer systems • calibration/adjustment specifications • component specifications • component assembly • component damage • system modifications		10	30
	PC7. repair indirect faults caused on the major mechanical or other aggregates by the influence of electrical and electronic aggregate (e.g. influence of improper working on the ECU might have damaged the charging of the alternator		10	25
	PC8. remove, refit and test electrical components for normal operation following major/ minor body repair activities			
	PC9. dismantle, assess, repair, clean, replace, adjust and reassemble vehicle electric and electronic units			
	PC10. ensure all dismantled components (other than the electrical or electronic components) are cleaned and conditioned prior to reassembly			
	PC11. ensure disposal of materials (including scrap of			

	failed parts/ aggregates) in accordance with the organisation's policies PC12. understand the various precautions to be taken to avoid damage to other components/ aggregates of a vehicle while working on electrical/ electronic aggregates PC13. record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure PC14. ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary PC15. ensure any malfunctions observed in tools and equipment are reported to the concerned persons PC16. request assistance from a senior technician or aggregate specialist when required PC17. inform the relevant persons where repairs are economically or technically infeasible PC18. ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)			
	Subtotal		**60**	**140**
ASC/N 0001	**Plan & organize work to meet expected outcome**	**Theory**	**Viva**	**Practical**
Work requirements including various activities within the given time and set quality standards	To be competent, the user/individual on the job must be able to: PC1. keep immediate work area clean and tidy PC2. treat confidential information as per the organisation's guidelines PC3. work in line with organisation's policies and procedures PC4. work within the limits of job role PC5. obtain guidance from appropriate people, where necessary PC6. ensure work meets the agreed requirements		15	30
Appropriate use of resources	PC7. establish and agree on work requirements with appropriate people PC8. manage time, materials and cost effectively PC9. use resources in a responsible manner		20	40
	Subtotal		**35**	**70**
ASC/N 0002	**Work effectively in a team**	**Theory**	**Viva**	**Practical**
Interact &	To be competent, the user/individual on the job must			

communicate effectively with colleagues including member in the own group as well as other groups	be able to: PC1. maintain clear communication with colleagues (by all means including face-to-face, telephonic as well as written) PC2. work with colleagues to integrate work PC3. pass on information to colleagues in line with organisational requirements both through verbal as well as non-verbal means PC4. work in ways that show respect for colleagues PC5. carry out commitments made to colleagues PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons PC7. identify problems in working with colleagues and take the initiative to solve these problems PC8. follow the organisation's policies and procedures for working with colleagues		30	70
	Subtotal		**30**	**70**
ASC/N 0003	**Maintain a healthy, safe and secure working environment**	**Theory**	**Viva**	**Practical**
Resources needed to maintain a safe, secure working environment	To be competent, the user/individual on the job must be able to: PC1. comply with organisation's current health, safety and security policies and procedures PC2. report any identified breaches in health, safety, and security policies and procedures to the designated person PC3. Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all incorporating all government norms esp. for emergency situations like fires, earthquakes etc. PC4. identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individual's authority PC5. report any hazards outside the individual's authority to the relevant person in line with organisational procedures and warn other people who may be affected PC6. follow organisation's emergency procedures for accidents, fires or any other natural calamity PC7. identify and recommend opportunities for improving health, safety, and security to the		30	65

	designated person PC8. complete all health and safety records are updates and procedures well defined			
	Subtotal		**30**	**65**
	Total	**15**	**155**	**345**