

Qualification Pack



Test Technician

QP Code: ASC/Q8401

Version: 1.0

NSQF Level: 4

Automotive Skills Development Council || Automotive Skills Development Council, Sat Paul Mittal Building, 1/6, Siri Institutional Area
August Kranti Marg (Khel Gaon Marg) New Delhi - 110049

Qualification Pack

Contents

ASC/Q8401: Test Technician	3
<i>Brief Job Description</i>	3
Applicable National Occupational Standards (NOS)	3
<i>Compulsory NOS</i>	3
<i>Qualification Pack (QP) Parameters</i>	3
ASC/N0006: Maintain a safe and healthy working environment	5
ASC/N0021: Maintain 5S at the work premises	10
ASC/N8401: Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles	17
ASC/N8402: Carry the testing process, note observations and make modifications in the test setup ...	23
Assessment Guidelines and Weightage	32
<i>Assessment Guidelines</i>	32
<i>Assessment Weightage</i>	32
Acronyms	34
Glossary	35

Qualification Pack

ASC/Q8401: Test Technician

Brief Job Description

This role is responsible for conducting various types of tests inside the laboratory as well as supporting on road testing. The role holder is responsible for setting the test apparatus on the test bench, connecting the aggregates/ vehicle under test to the test bench, support the engineer in taking readings during tests procedures, making minor modifications to the test setup and keeping the test areas and apparatus in a clean and working condition.

Personal Attributes

The individual should be willing to work in a risky and physically enduring environment of long hours and repetitive work. The role holder should have good physique, dexterity in operating machine tools, ability to fix the right parts at the right places, hand and eye coordination, sense of time management, proper vision and no colour blindness, ability to provide correct feedback, high level of alertness, quick decision making, taking personal responsibility and orientation to safety, quality management and 5S.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ASC/N0006: Maintain a safe and healthy working environment](#)
2. [ASC/N0021: Maintain 5S at the work premises](#)
3. [ASC/N8401: Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles](#)
4. [ASC/N8402: Carry the testing process, note observations and make modifications in the test setup](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Testing
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7231.0201

Qualification Pack

Minimum Educational Qualification & Experience	I.T.I (Mechanical) with 2-3 years of experience Testing/assembly in the automobile sector
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Fundamentals of automobile working Testing apparatus and automobile instrumentation Usage of different tools for assembly operations Quality, 5S and Safety aspects Problem solving techniques
Minimum Job Entry Age	18 Years
Last Reviewed On	20/01/2014
Next Review Date	30/06/2020
Deactivation Date	30/06/2020
NSQC Approval Date	05/08/2015
Version	1.0

Qualification Pack

ASC/N0006: Maintain a safe and healthy working environment

Description

This NOS is about creating a Safe and Healthy work place, adhering to the safety guidelines in the working area, following practices which are not impacting the environment in a negative manner and training team members on health and safety related issues

Scope

The role holder will be responsible for identifying and reporting of risks creating and sustaining a safe, clean and environment friendly work place This NOS will be applicable to all Automotive sector manufacturing job roles

Elements and Performance Criteria

Identify and report the risks identified

To be competent, the user/individual on the job must be able to:

- PC1..** Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise
- PC2.** Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc
- PC3.** Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations
- PC4.** Create awareness amongst other by sharing information on the identified risks

Create and sustain a Safe, clean and environment friendly work place

To be competent, the user/individual on the job must be able to:

- PC5..** Follow the instructions given on the equipment manual describing the operating process of the equipments
- PC6..** Follow the Safety, Health and Environment related practices developed by the organization
- PC7.** Operate the machine using the recommended Personal Protective Equipments (PPE)
- PC8. .** Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc
- PC9.** Maintain high standards of personal hygiene at the work place
- PC10.** Ensure that the waste disposal is done in the designated area and manner as per organization SOP.
- PC11.** Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to Health, Safety and Environment followed in the company

Qualification Pack

- KU2.** basic knowledge of Safety procedures(fire fighting, first aid) within the organization
- KU3.** knowledge of various types of PPEs and their usage
- KU4.** basic knowledge of risks/hazards associated with each occupation in the organization
- KU5.** how to safely operate various tools and machines and risks associated with the tools/ equipment
- KU6.** knowledge of personal hygiene and how an individual can contribute towards creating a highly safe and clean working environment

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** read safety instructions put up across the plant premises
- GS3.** read safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- GS4.** effectively communicate information to team members
- GS5.** inform employees in the plant and concerned functions about events, incidents & potential risks observed related to Safety, Health and Environment.
- GS6.** question operator/ supervisor in order to understand the safety related issues
- GS7.** attentively listen with full attention and comprehend the information given by the speaker during safety drills and training programs
- GS8.** use common sense and make judgments during day to day basis
- GS9.** use reasoning skills to identify and resolve basic problems
- GS10.** use common sense and make judgments during day to day basis
- GS11.** use reasoning skills to identify and resolve basic problems

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Identify and report the risks identified</i>	8	23	-	-
PC1.. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	3	6	-	-
PC2. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc	2	6	-	-
PC3. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations	2	6	-	-
PC4. Create awareness amongst other by sharing information on the identified risks	1	5	-	-
<i>Create and sustain a Safe, clean and environment friendly work place</i>	17	52	-	-
PC5.. Follow the instructions given on the equipment manual describing the operating process of the equipments	3	7	-	-
PC6.. Follow the Safety, Health and Environment related practices developed by the organization	3	8	-	-
PC7. Operate the machine using the recommended Personal Protective Equipments (PPE)	3	8	-	-
PC8. . Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc	2	8	-	-
PC9. Maintain high standards of personal hygiene at the work place	2	7	-	-
PC10. Ensure that the waste disposal is done in the designated area and manner as per organization SOP.	3	8	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others	1	6	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0006
NOS Name	Maintain a safe and healthy working environment
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	15/09/2013
Next Review Date	15/09/2015
NSQC Clearance Date	20/07/2015

Qualification Pack

ASC/N0021: Maintain 5S at the work premises

Description

This NOS is about ensuring all 5 S activities both at the shop floor and the office area to facilitate increase in work productivity

Scope

The individual needs to. Ensure sorting, streamlining & organizing, storage and documentation, cleaning, standardization and sustenance across the plant and office premises of the organization

Elements and Performance Criteria

Ensure sorting

To be competent, the user/individual on the job must be able to:

- PC1..** follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.
- PC2..** ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions
- PC3..** follow the technique of waste disposal and waste storage in the proper bins as per sop
- PC4..** segregate the items which are labelled as red tag items for the process area and keep them in the correct places
- PC5.** sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions
- PC6. .** ensure that areas of material storage areas are not overflowing
- PC7.** properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required
- PC8.** return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area
- PC9.** follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards
- PC10.** follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists

Ensure proper documentation and storage (organizing , streamlining)

To be competent, the user/individual on the job must be able to:

- PC11.** check that the items in the respective areas have been identified as broken or damaged
- PC12.** follow the given instructions and check for labelling of fluids, oils. lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc
- PC13.** make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions

Ensure cleaning of self and the work place

To be competent, the user/individual on the job must be able to:

Qualification Pack

- PC14.** check whether safety glasses are clean and in good condition
- PC15.** keep all outside surfaces of recycling containers are clean
- PC16..** ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards
- PC17..** check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up
- PC18..** ensure workbenches and work surfaces are clean and in good condition
- PC19.** follow the cleaning schedule for the lighting system to ensure proper illumination
- PC20.** store the cleaning material and equipment in the correct location and in good condition
- PC21.** ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene

Ensure sustenance

To be competent, the user/individual on the job must be able to:

- PC22.** follow the daily cleaning standards and schedules to create a clean working environment
- PC23.** attend all training programs for employees on 5 s
- PC24.** support the team during the audit of 5 s
- PC25.** participate actively in employee work groups on 5s and encourage team members for active participation
- PC26.** follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to 5S followed in the company
- KU2.** have basic knowledge of 5S procedures
- KU3.** know various types 5s practices followed in various areas
- KU4.** understand the 5S checklists provided in the department/ team
- KU5.** have skills to identify useful & non useful items
- KU6.** have knowledge of labels , signs & colours used as indicators
- KU7.** knowledge on how to sort and store various types of tools, equipment, material etc.
- KU8.** know , how to identify various types of waste products
- KU9.** understand the impact of waste/ dirt/ dust/unwanted substances on the process/ environment/ machinery/ human body
- KU10.** have knowledge of best ways of cleaning & waste disposal
- KU11.** understand the importance of standardization in processes
- KU12.** understand the importance of sustainability in 5S
- KU13.** have knowledge of TQM process
- KU14.** have knowledge of various materials and storage norms
- KU15.** understand visual controls, symbols, graphs etc.

Qualification Pack

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** note down observations (if any) related to the process
- GS3.** read 5S instructions put up across the plant premises
- GS4.** effectively communicate information to team members inform employees in the plant and concerned functions about 5S
- GS5.** question the process head in order to understand the 5S related issues
- GS6.** attentively listen with full attention and comprehend the information given by the speaker during 5S training programs
- GS7.** use common sense and make judgments during day to day basis
- GS8.** use reasoning skills to identify and resolve basic problems using 5S
- GS9.** persuade co team members to follow 5 S
- GS10.** ensure that the co team members understand the importance of using 5 S tool
- GS11.** use innovative skills to perform and manage 5 S activities at the work desk and the shop floor
- GS12.** exhibit inquisitive behaviour to seek feedback and question on the existing set patterns of work
- GS13.** do what is right, not what is a popular practices
- GS14.** follow shop floor rules& regulations and avoid deviations; make 5S an integral way of life
- GS15.** ensure self-cleanliness on a daily basis
- GS16.** demonstrate the will to keep the work area in a clean and orderly manner

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure sorting</i>	10	30	-	-
PC1.. follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.	1	3	-	-
PC2.. ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions	1	3	-	-
PC3.. follow the technique of waste disposal and waste storage in the proper bins as per sop	1	3	-	-
PC4.. segregate the items which are labelled as red tag items for the process area and keep them in the correct places	1	3	-	-
PC5. sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions	1	3	-	-
PC6. . ensure that areas of material storage areas are not overflowing	1	3	-	-
PC7. properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required	1	3	-	-
PC8. return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1	3	-	-
PC9. follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards	1	3	-	-
PC10. follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists	1	3	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure proper documentation and storage (organizing , streamlining)</i>	3	9	-	-
PC11. check that the items in the respective areas have been identified as broken or damaged	1	3	-	-
PC12. follow the given instructions and check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc	1	3	-	-
PC13. make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions	1	3	-	-
<i>Ensure cleaning of self and the work place</i>	8	24	-	-
PC14. check whether safety glasses are clean and in good condition	1	3	-	-
PC15. keep all outside surfaces of recycling containers are clean	1	3	-	-
PC16.. ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards	1	3	-	-
PC17.. check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up	1	3	-	-
PC18.. ensure workbenches and work surfaces are clean and in good condition	1	3	-	-
PC19. follow the cleaning schedule for the lighting system to ensure proper illumination	1	3	-	-
PC20. store the cleaning material and equipment in the correct location and in good condition	1	3	-	-
PC21. ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene	1	3	-	-
<i>Ensure sustenance</i>	4	12	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. follow the daily cleaning standards and schedules to create a clean working environment	1	3	-	-
PC23. attend all training programs for employees on 5 s	0.5	2	-	-
PC24. support the team during the audit of 5 s	1	3	-	-
PC25. participate actively in employee work groups on 5s and encourage team members for active participation	0.5	2	-	-
PC26. follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions	1	2	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0021
NOS Name	Maintain 5S at the work premises
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	15/03/2014
Next Review Date	15/03/2016
NSQC Clearance Date	

Qualification Pack

ASC/N8401: Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles

Description

This NOS is about understanding the various tests which need to be undertaken to complete the testing of aggregates and vehicles in various system evaluation laboratories and on road testing of vehicles

Scope

The role holder will be responsible for: understanding the testing requirement and the process escalation of the queries to relevant stakeholders

Elements and Performance Criteria

Understand the testing requirements, test equipment and parameters to be checked during the test procedure

To be competent, the user/individual on the job must be able to:

- PC1..** understand the type of test which needs to be conducted on the component or the vehicle
- PC2..** clearly understanding the does and donts of the manufacturing process as defined in sops/ work instructions or defined by supervisors
- PC3..** ensure understanding of the type and specification of the component or the prototype vehicle under test procedure so that the correct test equipment/ test bench can be arranged
- PC4..** understand from the testing engineer the parameters which need to be measured during the test procedure
- PC5..** understand the material required and the equipment availability for executing the activity
- PC6..** ensure that the required material is procured from the store before starting the testing process availability of greases, lubricant oil, adhesives, marking equipment, id stickers/ labels
- PC7..** ensure that the correct equipment is selected by the technician as per the specification and testing sheet shared by the testing engineer
- PC8..** ensure availability of tools required for the assembly process as per the components to be assembled. tool sizes as mentioned in the work instructions/ sops for assembly
- PC9..** understand key joining activities like welding and soldering which may be required during the test procedure
- PC10..** understand the various assembling process parameters like cycle time, pressure, torque etc. before starting the test apparatus assembling process, as mentioned in the work instructions/ sop manual
- PC11..** understand the right assembling methodology and process(bolting, tightening, riveting, fastening, adhesive clamping, crimping etc.) for arranging the test assembly through discussions with the testing engineer and also by reading the process manuals/ work instructions/standard operating procedures available
- PC12..** understand 5 s and safety related aspects related to the testing process

Escalations of queries on the given job

To be competent, the user/individual on the job must be able to:

Qualification Pack

- PC13..** refer the queries to a competent internal specialist/ testing engineer if they cannot be resolved by the technician on own
- PC14..** obtain help or advice from specialist if the problem is outside his/her area of competence or experience
- PC15..** confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** products manufactured by the company
- KU2.** internal product standards finalized within the organization
- KU3.** quality norms and standards prescribed in the Quality Manual by the organization
- KU4.** 5S and Safety norms practiced in the organization
- KU5.** the working of the internal combustion engine (Petrol/ Diesel)/ CNG engines
- KU6.** different parts of the automobile and basic working principle of automobile aggregates
- KU7.** different parameters used to evaluate the performance of the automobile
- KU8.** process for setting up of test benches, test platforms and test apparatus
- KU9.** basic laws of physics, chemistry, metallurgy & mathematics
- KU10.** basic laws of geometry and product design
- KU11.** the methods of using instruments like Vernier callipers, micrometres, rulers and other inspection tools
- KU12.** how to read and interpret sketches and engineering drawings
- KU13.** different types of assembling and joining processes and associated equipment
- KU14.** the method of reading and interpreting the various gauges
- KU15.** how to visualize the final product output
- KU16.** the impact of various physical parameters like torqueing and tightening on the properties of final output product like durability, surface finish, part movement, aesthetics etc.
- KU17.** various defects related to running automobiles and potential impact on the working of the final vehicle
- KU18.** various sources of noise and vibrations in the vehicle and potential causes of the noise and vibrations
- KU19.** mandatory checks which need to be conducted on the vehicle before trial run
- KU20.** potential health and safety hazards and related safety precautions

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** document information from the manuals, discussion notes, process charts etc
- GS2.** create small notes/ work documents/ diagrams/ maps for selfhelp to understand the process

Qualification Pack

- GS3.** read equipment manuals and process documents to understand the equipment and processes better
- GS4.** read internal information memos sent by internal customers (other functions within the organization)
- GS5.** discuss task lists, schedules, and work-loads with the test engineer
- GS6.** answer the queries raised by the engineer as well as intercompany departments
- GS7.** attentively listen with full attention to the speaker and comprehend the information given by the speaker
- GS8.** break the problem into smaller issues and tasks to arrive at a solution
- GS9.** understand inter process relationship and establish relationship between various parts of the problem
- GS10.** leverage experience to find effective solutions to problems
- GS11.** use basic analytical tools to arrive at solutions
- GS12.** plan and organize the work order and jobs received from the Operator
- GS13.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS14.** keep fixtures, tools, drawings, Work Instructions, SOP manuals as per the part number, colour codes etc as defined under the 5S systems
- GS15.** validate all process/ equipment manuals so that the final process selected is correct
- GS16.** use common sense and make judgments during day to day basis
- GS17.** use reasoning skills to identify and resolve basic problems
- GS18.** use intuition and keen observation skills to detect any potential problems which could arise during operations
- GS19.** identify faulty / flawed part and processes during the process and highlight the same to the concerned persons with the required time framework
- GS20.** link the fault observed with the overall impact on the performance of the component/ automobile
- GS21.** support and contribute in monitoring and delivering high quality output from self and others
- GS22.** gather information skilfully from multiple sources
- GS23.** analyse information in depth and identifies the problem in a timely manner
- GS24.** Work tireless in spite of repeat activities in a diligent manner to resolve problems on a day to day basis
- GS25.** use previous experience in resolving problems and taking decisions
- GS26.** use previous experience in resolving problems and taking decisions
- GS27.** contribute to building a positive team spirit
- GS28.** exhibit objectivity & openness to others views
- GS29.** collaborate with stakeholders to achieve the desired state of final result
- GS30.** familiarise with leading practices available in the market
- GS31.** think independently on new approaches to manufacturing process, material management, data management and team management
- GS32.** represent any new ideas/ approaches on process improvement and productivity improvement to the seniors in the team

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Understand the testing requirements, test equipment and parameters to be checked during the test procedure</i>	27	61	-	-
PC1.. understand the type of test which needs to be conducted on the component or the vehicle	3	6	-	-
PC2.. clearly understanding the does and donts of the manufacturing process as defined in sops/ work instructions or defined by supervisors	3	5	-	-
PC3.. ensure understanding of the type and specification of the component or the prototype vehicle under test procedure so that the correct test equipment/ test bench can be arranged	3	6	-	-
PC4.. understand from the testing engineer the parameters which need to be measured during the test procedure	2	5	-	-
PC5.. understand the material required and the equipment availability for executing the activity	2	5	-	-
PC6.. ensure that the required material is procured from the store before starting the testing process availability of greases, lubricant oil, adhesives, marking equipment, id stickers/ labels	2	5	-	-
PC7.. ensure that the correct equipment is selected by the technician as per the specification and testing sheet shared by the testing engineer	2	5	-	-
PC8.. ensure availability of tools required for the assembly process as per the components to be assembled. tool sizes as mentioned in the work instructions/ sops for assembly	2	5	-	-
PC9.. understand key joining activities like welding and soldering which may be required during the test procedure	2	5	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10.. understand the various assembling process parameters like cycle time, pressure, torque etc. before starting the test apparatus assembling process, as mentioned in the work instructions/ sop manual	2	5	-	-
PC11.. understand the right assembling methodology and process(bolting, tightening, riveting, fastening, adhesive clamping, crimping etc.) for arranging the test assembly through discussions with the testing engineer and also by reading the process manuals/ work instructions/standard operating procedures available	2	5	-	-
PC12.. understand 5 s and safety related aspects related to the testing process	2	4	-	-
<i>Escalations of queries on the given job</i>	3	9	-	-
PC13.. refer the queries to a competent internal specialist/ testing engineer if they cannot be resolved by the technician on own	1	3	-	-
PC14.. obtain help or advice from specialist if the problem is outside his/her area of competence or experience	1	3	-	-
PC15.. confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution	1	3	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N8401
NOS Name	Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	test technician
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/01/2014
Next Review Date	20/01/2016
NSQC Clearance Date	

Qualification Pack

ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

Description

This NOS is about conducting the test procedure as per the instructions given by the testing engineer and the work instructions, supporting the engineer in noting observations and make modifications to the set up to accommodate the various testing scenario and arrive at the final outcomes

Scope

The role holder will be responsible for: set up the test apparatus and test vehicles for the testing procedure conduct the actual testing process as per the given instructions noting the observations and make minor modifications in the setup

Elements and Performance Criteria

Setup the test apparatus and test vehicle or component for the testing process

To be competent, the user/individual on the job must be able to:

- PC1..** conduct a thorough check up of the testing equipment and the external connections for the test apparatus
- PC2..** setup the test apparatus as per the selected testing process and the internal sops/ work instructions and the setting standards for the testing machine
- PC3..** ensure that the surface of the assembling gun/ bolting gun is cleaned to remove dust and any other impurities
- PC4..** ensure that the hoists & cranes for lifting the parts are working in order as per the process requirement
- PC5..** ensure drop of sub-assemblies like frame , gear box, axles, car frame, etc. at the respective testing platforms/ benches without damaging the components
- PC6..** ensure that hoists are used to lift the right material from the conveyors, bins, part trolleys etc.
- PC7..** ensure part clearances as specified in the work instructions/ standard operating processes
- PC8..** pick the right fastening part and right tightening tool from the right tray/ kit trolley as identified in the drawing/ standard operating procedure/ work instruction and is correctly placed in the designated slot/ space as indicated in the work instructions/ sop to fastening the component/ vehicle under test
- PC9..** conduct design and fabrication of the fixtures for conducting the durability tests
- PC10..** conduct test setup for components undergoing repeated vibrations and subjecting to frequent stresses like fuel tank, fuel system, crankshaft, connecting rods, suspension, powertrain and axle system
- PC11..** conduct proper connection of instruments like strain gauge, load cell and other servo hydraulics machines to induce and measure stress levels on the components
- PC12..** make required connections of data logger/ data acquisition system as mentioned in the standard operating procedure manual/ work instructions

Qualification Pack

- PC13..** conduct visual inspection of the bundled electrical and electronics wiring, circuits and harness
- PC14..** check for orientation of terminals and connectors used for connecting the testing process
- PC15..** test for any short circuit/ open circuit for the electrical/ electronic connections in the test apparatus
- PC16..** check the working of the test apparatus post connecting the test component/ vehicle to ensure error free testing activity
- PC17..** ensure regular cleaning and maintenance of fatigue lab equipment like fatigue testing machines, servo hydraulic actuators, material testing machine, impact testing machine, bending machines, torsional machines

Conduct actual test procedure under supervision of the test engineer

To be competent, the user/individual on the job must be able to:

- PC18..** ensure development of the test bogey for conducting the structural durability tests/ fatigue test/ stress test to be conducted in the structure durability laboratory
- PC19..** start/ stop the test activity as per the instructions given by the test engineer and the steps mentioned in the testing manual/ work instructions
- PC20..** support the testing engineer in taking different observations/ readings as per the parameters mentioned in the testing manual/ work instructions
- PC21..** under supervision of the test engineer, make minor modification in the test setup/ vehicle/ component under testing to take reading under different scenarios
- PC22..** observe any deviations during the test process. observe any noise or vibrations during the testing process. inform the testing engineer of any deviations observed
- PC23..** change parts as directed by the testing engineer, fit new parts and continue the testing process under the supervision of the testing engineer
- PC24..** note the modifications which have been made to the original setup in order to derive comparisons between test scenarios
- PC25..** make connections of the various data capturing meters and instrumentation such as load cells, pneumatic/ plc testing gauges, strain gauges, displacement transducers, accelerometers, gps data collection devices and data loggers to capture the data points during the vehicle running condition
- PC26..** check all the safety features required for the vehicle under running condition are working and are checked as per the vehicle safety check list provided as per the checklist given in the testing manual
- PC27..** check the fuel level, oil/ lubricant level, cooling water level, tyre pressure etc. are checked before starting the on road testing of the vehicle prototype as per the checklist given in the testing manual
- PC28..** check for all system warning indicators showing system failures, loose connections, malfunctioning etc. are addressed before starting the various types of tests as per the checklist given in the testing manual.
- PC29..** tabulate and record observations of phenomena, test results, data log etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

Qualification Pack

- KU1.** new products manufactured by the company
- KU2.** internal product standards finalized within the organization
- KU3.** 5S and Safety norms practiced in the organization
- KU4.** the working of the internal combustion engine (Petrol/ Diesel)/ CNG engines
- KU5.** different parts of the automobile and basic working principle of automobile aggregates
- KU6.** different parameters used to evaluate the performance of the automobile
- KU7.** process for setting up of test benches, test platforms and test apparatus
- KU8.** basic laws of physics, chemistry, metallurgy & mathematics
- KU9.** basic laws of geometry and product design
- KU10.** the methods of using instruments like Vernier callipers, micrometres, rulers and other inspection tools
- KU11.** how to read and interpret sketches and engineering drawings
- KU12.** different types of assembling and joining processes and associated equipment
- KU13.** fundamentals of servo hydraulics, acoustics holography, sound meters, vibration meters
- KU14.** working of load cells and strain gauges and connecting them for test process
- KU15.** fundamental structure and working of anechoic chambers and reverberation chambers
- KU16.** fundamentals of instrumentation and usage of flow meters for checking fuel and lubrication flow, smoke meters, power transducers, temperature sensors, particle sensors process for setting up of test
- KU17.** benches, test platforms and test apparatus various types of tests used to
- KU18.** evaluate the design and performance of various automotive components different parameters used to evaluate the performance of the components
- KU19.** the method of reading and interpreting the various gauges
- KU20.** how to visualize the final product output
- KU21.** the impact of various physical parameters like torqueing and tightening on the properties of final output product like durability, surface finish, part movement, aesthetics etc.
- KU22.** various defects related to running automobiles and potential impact on the working of the final vehicle
- KU23.** various sources of noise and vibrations in the vehicle and potential causes of the noise and vibrations
- KU24.** basic road driving skills and fundamentals of vehicle movement in various conditions
- KU25.** mandatory checks which need to be conducted on the vehicle before trial run
- KU26.** potential health and safety hazards and related safety precautions

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** document information from the manuals, discussion notes, process charts etc.
- GS2.** create small notes/ work documents/ diagrams/ maps for self-help to understand the process
- GS3.** read equipment manuals and process documents to understand the equipment and processes better

Qualification Pack

- GS4.** read internal information memos send by internal customers (other functions within the organization
- GS5.** discuss task lists, schedules, and work-loads with the testing engineer
- GS6.** answer the queries raised by the engineer as well as intercompany departments
- GS7.** attentively listen with full attention to the speaker and comprehend the information given by the speaker
- GS8.** break the problem into smaller issues and tasks to arrive at a solution
- GS9.** understand inter process relationship and establish relationship between various parts of the problem
- GS10.** leverage experience to find effective solutions to problems
- GS11.** use basic analytical tools to arrive at solutions
- GS12.** plan and organize the work order and jobs received from the Operator
- GS13.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS14.** keep fixtures, tools, drawings, Work Instructions, SOP manuals as per the part number, colour codes etc as defined under the 5S systems
- GS15.** validate all process/ equipment manuals so that the final process selected is correct
- GS16.** use common sense and make judgments during day to day basis
- GS17.** use reasoning skills to identify and resolve problems
- GS18.** use intuition to detect any potential problems which could arise during operations
- GS19.** gather information skilfully from multiple sources
- GS20.** analyse information in depth and identifies the problem in a timely manner
- GS21.** develop alternate solutions and resolves problems in early stages
- GS22.** work tireless in spite of repeat activities in a diligent manner to resolve problems on a day to day basis
- GS23.** use previous experience in resolving problems and taking decisions
- GS24.** familiarise with leading practices available in the market
- GS25.** represent any new ideas/ approaches on process improvement and productivity improvement to the seniors in the team
- GS26.** exhibit objectivity & openness to others views
- GS27.** collaborate with stakeholders to achieve the desired state of final result

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Setup the test apparatus and test vehicle or component for the testing process</i>	18	46	-	-
PC1.. conduct a thorough check up of the testing equipment and the external connections for the test apparatus	1	3	-	-
PC2.. setup the test apparatus as per the selected testing process and the internal sops/ work instructions and the setting standards for the testing machine	2	4	-	-
PC3.. ensure that the surface of the assembling gun/ bolting gun is cleaned to remove dust and any other impurities	1	3	-	-
PC4.. ensure that the hoists & cranes for lifting the parts are working in order as per the process requirement	1	3	-	-
PC5.. ensure drop of sub-assemblies like frame , gear box, axles, car frame, etc. at the respective testing platforms/ benches without damaging the components	1	3	-	-
PC6.. ensure that hoists are used to lift the right material from the conveyors, bins, part trolleys etc.	1	2	-	-
PC7.. ensure part clearances as specified in the work instructions/ standard operating processes	1	3	-	-
PC8.. pick the right fastening part and right tightening tool from the right tray/ kit trolley as identified in the drawing/ standard operating procedure/ work instruction and is correctly placed in the designated slot/ space as indicated in the work instructions/ sop to fastening the component/ vehicle under test	1	3	-	-
PC9.. conduct design and fabrication of the fixtures for conducting the durability tests	1	4	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10.. conduct test setup for components undergoing repeated vibrations and subjecting to frequent stresses like fuel tank, fuel system, crankshaft, connecting rods, suspension, powertrain and axle system	1	2	-	-
PC11.. conduct proper connection of instruments like strain gauge, load cell and other servo hydraulics machines to induce and measure stress levels on the components	1	3	-	-
PC12.. make required connections of data logger/ data acquisition system as mentioned in the standard operating procedure manual/ work instructions	1	2	-	-
PC13.. conduct visual inspection of the bundled electrical and electronics wiring, circuits and harness	1	3	-	-
PC14.. check for orientation of terminals and connectors used for connecting the testing process	1	2	-	-
PC15.. test for any short circuit/ open circuit for the electrical/ electronic connections in the test apparatus	1	2	-	-
PC16.. check the working of the test apparatus post connecting the test component/ vehicle to ensure error free testing activity	1	2	-	-
PC17.. ensure regular cleaning and maintenance of fatigue lab equipment like fatigue testing machines, servo hydraulic actuators, material testing machine, impact testing machine, bending machines, torsional machines	1	2	-	-
<i>Conduct actual test procedure under supervision of the test engineer</i>	12	24	-	-
PC18.. ensure development of the test bogey for conducting the structural durability tests/ fatigue test/ stress test to be conducted in the structure durability laboratory	1	2	-	-
PC19.. start/ stop the test activity as per the instructions given by the test engineer and the steps mentioned in the testing manual/ work instructions	1	2	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC20.. support the testing engineer in taking different observations/ readings as per the parameters mentioned in the testing manual/ work instructions	1	2	-	-
PC21.. under supervision of the test engineer, make minor modification in the test setup/ vehicle/ component under testing to take reading under different scenarios	1	2	-	-
PC22.. observe any deviations during the test process. observe any noise or vibrations during the testing process. inform the testing engineer of any deviations observed	1	2	-	-
PC23.. change parts as directed by the testing engineer, fit new parts and continue the testing process under the supervision of the testing engineer	1	2	-	-
PC24.. note the modifications which have been made to the original setup in order to derive comparisons between test scenarios	1	2	-	-
PC25.. make connections of the various data capturing meters and instrumentation such as load cells, pneumatic/ plc testing gauges, strain gauges, displacement transducers, accelerometers, gps data collection devices and data loggers to capture the data points during the vehicle running condition	1	2	-	-
PC26.. check all the safety features required for the vehicle under running condition are working and are checked as per the vehicle safety check list provided as per the checklist given in the testing manual	1	2	-	-
PC27.. check the fuel level, oil/ lubricant level, cooling water level, tyre pressure etc. are checked before starting the on road testing of the vehicle prototype as per the checklist given in the testing manual	1	2	-	-
PC28.. check for all system warning indicators showing system failures, loose connections, malfunctioning etc. are addressed before starting the various types of tests as per the checklist given in the testing manual.	1	2	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC29.. tabulate and record observations of phenomena, test results, data log etc.	1	2	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N8402
NOS Name	Carry the testing process, note observations and make modifications in the test setup
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	test technician
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/01/2014
Next Review Date	20/01/2016
NSQC Clearance Date	

Qualification Pack

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Recommended Pass % : 70

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	15
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	15
ASC/N8401.Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles	30	70	-	-	100	35

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N8402.Carry the testing process, note observations and make modifications in the test setup	30	70	-	-	100	35
Total	110	290	-	-	400	100

Qualification Pack

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Qualification Pack

Glossary

Sector	Sector is a conglomeration of different business operations having similar business 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.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
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 OS they are looking for.
Scope	Scope is a 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 quality of performance required.

Qualification Pack

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) 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.
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.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.