

Forging Operator

QP Code: ASC/Q4501

NSQF Level: 4

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Qualification Pack

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ASC/Q4501: Forging Operator

Brief Job Description

This role primarily involves managing the specifications of the metal bars, setting up and operating the machinery for forging and producing the output in line with the desired specifications.

Personal Attributes

Reading, writing and communication skills, ability to plan and prioritize, quality consciousness, safety orientation, Physique to sustain strenuous conditions, ability and desire to work in high temperature areas, ability to use fingers and both hands and feet with ease to complete the assigned task (Dexterity), high precision and sensitivity to problem solving and sensitivity towards safety for self and equipment.

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/N4501: Understand job requirements and related processes](#)
4. [ASC/N4502: Perform pre forging operations](#)
5. [ASC/N4503: Perform the forging related operations and monitor process parameters](#)
6. [ASC/N4504: Perform the post forging related operations](#)
7. [ASC/N4505: Conduct quality checks and inspection of the finished goods](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Forging
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7221.0301

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Minimum Educational Qualification & Experience	I.T.I with 2-3 years of experience Forging or L3 Forging Technician OR I.T.I OR I.T.I
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Latest Forging techniques and methodologies Metallurgical properties of materials Reading and writing skills Safety and 5S
Minimum Job Entry Age	18 Years
Last Reviewed On	30/10/2013
Next Review Date	31/03/2020
NSQC Approval Date	20/07/2015
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:

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

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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	-	-

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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	-	-

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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

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:

- 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

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- 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.

Generic Skills (GS)

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

- GS1.** write basic level notes and observations

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- 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

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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	-	-

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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	-	-

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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	-	-

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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/N4501: Understand job requirements and related processes

Description

This NOS is about understanding the job requirement, what processes need to be executed, what equipment will be used and what is the required output considering the standards specified

Scope

The role holder will be responsible for understanding the work order and the forging process requirements arranging for the required materials and tools cleaning the machinery and tools before starting the process escalations of queries to the concerned The role holder will interact with the machine shop, heat treatment shop, maintenance team and material management team

- understanding the work order and the forging process requirements
- arranging for the required materials and tools
- cleaning the machinery and tools before starting the process
- escalations of queries to the concerned

Elements and Performance Criteria

Understand the work order and the process requirements

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

- PC1..** understand the work order (work output) required from the process and discuss the same with the supervisor/ metallurgist
- PC2..** refer all sketches/ work orders/ process related documents to understand dimensions and properties of the required work output
- PC3..** understand the process requirements in terms of temperature of the furnace, cycle time for various temperature levels & time duration during the heating stages, pressing, cooling and quality check operations as mentioned in the work instruction/ sop/ control diagrams
- PC4..** understand from the work instructions the type of die to be used for the forging process
- PC5..** clearly understanding the does and donts of the manufacturing process as defined in SOPs/ work instructions or defined by supervisors

Arrange for the material to be forged and apparatus required for the same

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

- PC6..** understand forging techniques and their order of operations to be adopted for completing the work order from the supervisor by referring the work instruction document/ sop manual
- PC7..** note down the various parameters like temperature of the furnace, cycle time for various temperature levels & time duration during the heating, pressing, cooling etc. before starting the process
- PC8..** understand the material required (like metal bars for forging) and the equipment availability i.e. dies, stampings, lifting equipment etc. for executing the activity
- PC9..** ensure that the required material is procured from the store before starting the process

Clean the various machines involved in the forging process

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

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- PC10..** ensure cleaning of dies by spraying or brushing surfaces with parting agents to ensure smoothness and prevent sticking or seepage
- PC11..** ensure that the various machines like cutters, robots, presses, etc. are free from oil, grease, dirt at the start
- PC12..** clean the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident

Check materials and apparatus for Operations

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

- PC13..** set the parameters in line with the work instructions/ sops
- PC14..** setup the apparatus as per the selected forging requirements and the forging standards used in the automobile industry
- PC15..** adjust the temperature, pressure and other parameters of the apparatus as per the values given in work instructions/ sops

Escalations of queries on the given job

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

- PC16..** refer the queries to a competent internal specialist if they cannot be resolved by the operator on own
- PC17..** obtain help or advice from specialist if the problem is outside his/her area of competence or experience
- PC18..** confirm self-understanding to the specialist once the query is resolved 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.** relevant standards and procedures followed in the company
- KU2.** different types of products manufactured by the company
- KU3.** functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
- KU4.** different types of forging techniques like Hot forging, Warm Forging and Cold forging and the difference between different processes
- KU5.** different parameters pertinent to forging process like temperature of the furnace, cycle time for various temperature levels & time duration during the heating, pressing, cooling etc. and the impact of these parameters on the process and properties of output
- KU6.** different types of tools and machinery for forging
- KU7.** metallurgical properties of the metals used for the forging process
- KU8.** geometry and dimension measurement using various techniques
- KU9.** sketches and engineering drawings
- KU10.** final product output and hence decide on the key steps to be followed
- KU11.** different types of cleaning techniques, forging processes and associated equipment
- KU12.** measuring instruments like verniercalipers, micrometres
- KU13.** hazards and safety aspects involved in moulding activities and usage of relevant PPEs

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Generic Skills (GS)

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

- GS1.** note down observations (if any) related to heating and pressing of the metal bars and share the same with the supervisor
- GS2.** note down the production data for the respective shifts in the log sheets/ online ERP as per applicability in the organization
- GS3.** write drawings to internal customers on the requirement of apparatus, hand toolsetc.
- GS4.** read and interpret engineering drawing and sketches
- GS5.** read and interpret symbols and measurements instruments
- GS6.** read equipment manuals and process documents to understand the equipment and processes better
- GS7.** read internal information drawings sent by internal customers (other functions within the organization)
- GS8.** discuss task lists, schedules, and work-loads with co-workers
- GS9.** effectively communicate with the team members
- GS10.** question internal customers/ Forging shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS11.** attentively listen with full attention and comprehend the information given by the speaker
- GS12.** plan and organize the work order and jobs received from the internal customers
- GS13.** organize all process/ equipment manuals so that sorting out information is fast
- GS14.** support the supervisor in scheduling tasks for helper grade
- GS15.** use common sense and make judgments during day to day basis
- GS16.** use reasoning skills to identify and resolve basic problems
- GS17.** use intuition to detect any potential problems which could arise during operations
- GS18.** follow instructions and work on areas of improvement identified
- GS19.** complete the assigned tasks with minimum supervision
- GS20.** complete the job defined by the supervisor within the timelines and quality norms
- GS21.** detect problems in day to day tasks
- GS22.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS23.** discuss possible solution with the supervisor for problem solving
- GS24.** make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Understand the work order and the process requirements</i>	10	20	-	-
PC1.. understand the work order (work output) required from the process and discuss the same with the supervisor/ metallurgist	2	4	-	-
PC2.. refer all sketches/ work orders/ process related documents to understand dimensions and properties of the required work output	2	4	-	-
PC3.. understand the process requirements in terms of temperature of the furnace, cycle time for various temperature levels & time duration during the heating stages, pressing, cooling and quality check operations as mentioned in the work instruction/ sop/ control diagrams	2	4	-	-
PC4.. understand from the work instructions the type of die to be used for the forging process	2	4	-	-
PC5.. clearly understanding the does and donts of the manufacturing process as defined in SOPs/ work instructions or defined by supervisors	2	4	-	-
<i>Arrange for the material to be forged and apparatus required for the same</i>	7	15	-	-
PC6.. understand forging techniques and their order of operations to be adopted for completing the work order from the supervisor by referring the work instruction document/ sop manual	2	4	-	-
PC7.. note down the various parameters like temperature of the furnace, cycle time for various temperature levels & time duration during the heating, pressing, cooling etc. before starting the process	2	4	-	-
PC8.. understand the material required (like metal bars for forging) and the equipment availability i.e. dies, stampings, lifting equipment etc. for executing the activity	2	4	-	-
PC9.. ensure that the required material is procured from the store before starting the process	1	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Clean the various machines involved in the forging process</i>	4	9	-	-
PC10.. ensure cleaning of dies by spraying or brushing surfaces with parting agents to ensure smoothness and prevent sticking or seepage	1	3	-	-
PC11.. ensure that the various machines like cutters, robots, presses, etc. are free from oil, grease, dirt at the start	2	3	-	-
PC12.. clean the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident	1	3	-	-
<i>Check materials and apparatus for Operations</i>	6	17	-	-
PC13.. set the parameters in line with the work instructions/ sops	2	6	-	-
PC14.. setup the apparatus as per the selected forging requirements and the forging standards used in the automobile industry	2	6	-	-
PC15.. adjust the temperature, pressure and other parameters of the apparatus as per the values given in work instructions/ sops	2	5	-	-
<i>Escalations of queries on the given job</i>	3	9	-	-
PC16.. refer the queries to a competent internal specialist if they cannot be resolved by the operator on own	1	3	-	-
PC17.. obtain help or advice from specialist if the problem is outside his/her area of competence or experience	1	3	-	-
PC18.. confirm self-understanding to the specialist once the query is resolved so that all doubts & queries can be resolved before the actual process execution	1	3	-	-
NOS Total	30	70	-	-

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National Occupational Standards (NOS) Parameters

NOS Code	ASC/N4501
NOS Name	Understand job requirements and related processes
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Forging
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/10/2013
Next Review Date	30/10/2015
NSQC Clearance Date	

Qualification Pack

ASC/N4502: Perform pre forging operations

Description

This NOS is about cutting the metal bars and heat the bars to prepare them for forging operations in line with the required specifications and industry standards

Scope

The role holder will be responsible for checking the working of equipment before start of the process proper sizing of metal bars/ billets before heating in furnace heating the metal bars/ billets in the furnace The role holder will interact with the machine shop, heat treatment shop, maintenance team and material management team

- checking the working of equipment before start of the process
- proper sizing of metal bars/ billets before heating in furnace
- heating the metal bars/ billets in the furnace

Elements and Performance Criteria

Check the operations of the equipment used in the forging process and conduct a test process

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

- PC1..** check for operation of forging apparatus like furnaces, presses, dies etc.
- PC2..** understand the work order and select the parameters as per the desired outcomes. parameters are mentioned in the work instructions/ sop manuals
- PC3..** make modifications in the forging parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards

Ensure cutting of the metal bars/ billets as per the required specifications

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

- PC4..** ensure that the right parameters are selected for the plc machine, and ensure that the right cutting blades/ hacksaw are selected as per the given work instructions/ SOPs
- PC5..** ensure proper alignment of blades and selection of right speed of the cutting machine
- PC6..** cut the billets/ bars into smaller components. ensure that the size is as per the given work instructions
- PC7..** perform visual inspection of the cut metal bar/ billet to ensure the specifications are in line with the required specifications

Heat the metal bars at a specified temperature before performing the pressing operations

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

- PC8..** understand the desired temperature setting and cycle time within the furnace for the type of forging process selected
- PC9..** select the right parameters for furnace operations from the program list
- PC10..** ensure setting of the parameters of induction heaters/ furnace at a desired temperature range for preheating, heating as well as post heating zones
- PC11..** load the furnace with the billets using manual techniques or by using hoists, cranes, magnetic lifters etc.

Qualification Pack

- PC12..** ensure that each thermal/ heating zone reaches the desired temperature levels when the billets are passing through the furnace
- PC13..** observe the uniform heating of metal as per the desired specifications
- PC14..** using hoists, cranes, magnetic lifters ensure that the hot metal is lifted from the furnace end and is loaded into a compressing machine
- PC15..** ensure that the compression machine reduces the diameter of the hot billet and increases the length of the hot billet to suit the process requirements of the forging stage. the compression machine stage improves the yield of the metal billets
- PC16..** inspect the billets coming out of the compression machine for its shape and form. bad quality billets are removed from the main production line, cooled down separately and put back in the furnace after detailed observations
- PC17..** check the first piece for geometry, material & dimensional parameters as per the control plan before starting the production

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards and procedures followed in the company
- KU2.** different types of products manufactured by the company
- KU3.** functional processes like Procurement, Store management, Inventory Management, Quality Management and key contact points for query resolution
- KU4.** quality norms prescribed by the organization for forging jobs
- KU5.** different types of processes involved in the forging process (like heating, pressing etc.) and associated equipment
- KU6.** different types of tools/ machines like PLCs, Saws, Blades etc. to cut the metal
- KU7.** different types of parameters of cutting machines like cutting speed, alignment of cutting blades etc.
- KU8.** different types of temperature ranges used for various metals and their impact on the properties of output
- KU9.** forging defects and how they are generated, how they can be prevented, knowledge of different metals, ferro alloys etc
- KU10.** furnace/heater operation, cutting processes and safety process of handling hot metal bars
- KU11.** measuring instruments like vernier callipers, micrometer and others
- KU12.** effect of operators work on forging quality at in house and at customers, how to improve customers satisfaction
- KU13.** geometry and dimension measurement
- KU14.** sketches and engineering drawings
- KU15.** final product output and hence decide on the key steps to be followed
- KU16.** safety precautions to be taken for all types of forging activities
- KU17.** mechanical laws and working of forging machines like cutters, heaters etc

Generic Skills (GS)

Qualification Pack

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

- GS1.** document information from the sketches and engineering drawings
- GS2.** write log book in terms of output quantity, set up parameters, machine setting parameters and loss details etc.
- GS3.** write drawings to internal customers on the requirement of metal, apparatus etc
- GS4.** note measurements, equipment panel readings for various process parameters in the required reporting formats
- GS5.** read and interpret engineering drawing and sketches
- GS6.** read equipment manuals and process documents to understand the equipment and processes better
- GS7.** read instructions especially safety instructions especially symbols while using the equipment in the plant area
- GS8.** read internal drawings send by internal customers / other departments
- GS9.** discuss task lists, schedules, and work-loads with co-workers
- GS10.** question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS11.** plan and organize the work order and jobs received from the internal customers
- GS12.** plan and organize the design documents received from internal customers
- GS13.** organize all process/ equipment manuals so that sorting out information is fast
- GS14.** organize apparatus etc. in an orderly manner at proper designated areas
- GS15.** visualize the final job product after understanding the given drawing/ sketches
- GS16.** carefully measure the work piece so in terms of the geometrical dimensions so that the final output is as per the given drawing
- GS17.** finalize the optimum levels of physical parameters so that the job output meets the prescribed job standards
- GS18.** detect problems in day to day tasks
- GS19.** support supervisor in using specific problem solving techniques discuss possible solution with the supervisor for problem solving
- GS20.** make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Check the operations of the equipment used in the forging process and conduct a test process</i>	6	13	-	-
PC1.. check for operation of forging apparatus like furnaces, presses, dies etc.	2	4	-	-
PC2.. understand the work order and select the parameters as per the desired outcomes. parameters are mentioned in the work instructions/ sop manuals	2	4	-	-
PC3.. make modifications in the forging parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards	2	5	-	-
<i>Ensure cutting of the metal bars/ billets as per the required specifications</i>	7	17	-	-
PC4.. ensure that the right parameters are selected for the plc machine, and ensure that the right cutting blades/ hacksaw are selected as per the given work instructions/ SOPs	2	5	-	-
PC5.. ensure proper alignment of blades and selection of right speed of the cutting machine	2	4	-	-
PC6.. cut the billets/ bars into smaller components. ensure that the size is as per the given work instructions	2	4	-	-
PC7.. perform visual inspection of the cut metal bar/ billet to ensure the specifications are in line with the required specifications	1	4	-	-
<i>Heat the metal bars at a specified temperature before performing the pressing operations</i>	17	40	-	-
PC8.. understand the desired temperature setting and cycle time within the furnace for the type of forging process selected	2	4	-	-
PC9.. select the right parameters for furnace operations from the program list	2	4	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10.. ensure setting of the parameters of induction heaters/ furnace at a desired temperature range for preheating, heating as well as post heating zones	2	4	-	-
PC11.. load the furnace with the billets using manual techniques or by using hoists, cranes, magnetic lifters etc.	1	4	-	-
PC12.. ensure that each thermal/ heating zone reaches the desired temperature levels when the billets are passing through the furnace	2	4	-	-
PC13.. observe the uniform heating of metal as per the desired specifications	2	4	-	-
PC14.. using hoists, cranes, magnetic lifters ensure that the hot metal is lifted from the furnace end and is loaded into a compressing machine	1	4	-	-
PC15.. ensure that the compression machine reduces the diameter of the hot billet and increases the length of the hot billet to suit the process requirements of the forging stage. the compression machine stage improves the yield of the metal billets	2	4	-	-
PC16.. inspect the billets coming out of the compression machine for its shape and form. bad quality billets are removed from the main production line, cooled down separately and put back in the furnace after detailed observations	2	4	-	-
PC17.. check the first piece for geometry, material & dimensional parameters as per the control plan before starting the production	1	4	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N4502
NOS Name	Perform pre forging operations
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Forging
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/10/2013
Next Review Date	30/10/2015
NSQC Clearance Date	

Qualification Pack

ASC/N4503: Perform the forging related operations and monitor process parameters

Description

This NOS is about performing the forging operations to shape the heated metal bars and perform finishing of the same in line with the required specifications and industry standards

Scope

The role holder will be responsible for checking the working of equipment before start of the process feeding the hot bars/ billets into the forging press setting up of dies as per process requirement conduct the forging process by operating the presses and die The role holder will interact with the machine shop, heat treatment shop, maintenance team and material management team

- checking the working of equipment before start of the process
- feeding the hot bars/ billets into the forging press
- setting up of dies as per process requirement
- conduct the forging process by operating the presses and die

Elements and Performance Criteria

Check the operations of the equipment used in the process and conduct a test process

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

PC1.. check for operation of magnetic robots, forging presses, dies and auxiliary apparatus

PC2.. make modifications in the pressing, lifting or finishing machines parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards

Feed the metal bars into forging presses with the help of magnetic robots

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

PC3.. feed the operation code/ select the right program for the magnetic robot to lift the heated metal bar and drops it at the press for forging operation

PC4.. ensure that the robot lifts and drops the metal bars as per the desired specifications (in terms of speed, cycle time, etc.)

Conduct the actual forging process

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

PC5.. select the appropriate die as per the required output specifications and fit the same into the machine

PC6.. ensure that the die temperature is raised before it is loaded/ fit into the press

PC7.. adjust temperature of die to ensure uniform heating of the work piece

PC8.. before the pressing operation, ensure that the die is sprayed with water, graphite and air mixture. the mixture will act as a lubricant for the die. ensure that the spraying process is as per the instructions given in the sop/ control plan/ work instructions

PC9.. adjust various parameters of main press machine including blocker, finisher and trimmer (like pressure, cycle time, etc.) as per the output requirement

Qualification Pack

- PC10..** ensure that the correct pressure is applied by the press on the die for the required cycle time
- PC11..** ensure that the output from the press is removed from the press area using hoists, cranes, magnetic lifters as mentioned in the work instructions/ sop/ control plan
- PC12..** cool the final output work piece; perform a quality check on its dimensions like diameter, length etc.and compare the dimensions as prescribed in the work order or the engineering drawing given by the supervisor
- PC13..** in case the parts are not as per the given measurements, send the same for further processing
- PC14..** ensure that the dies are being sprayed with coolants after every operation
- PC15..** clean and lubricate the machinery and the die.
- PC16..** stamp the output with the identifying information (wherever required)

Finishing the output work piece

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

- PC17..** ensure correct identification of necessary finishing operations (if required) like twisting, straightening etc.
- PC18..** check the first piece for geometry, material & dimensional parameters as per the control plan before starting the production
- PC19..** adjust the parameters of the corresponding presses as per the identified finishing operations i.e. twisting, straightening
- PC20..** perform a quality check on output in terms of the required dimensions

Check measurement instruments for monitoring process parameters

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

- PC21..** monitor the process (parameters like force, cycle time etc) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations from desired specifications
- PC22..** observe and analyze any irregularity in the process and take preventive steps
- PC23..** check the in line composition/ soundness of the output work piece
- PC24..** in case of any emergencies/ deviations from the work instructions/ control panel/ SOP inform the supervisor immediately

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards and procedures followed in the company
- KU2.** different types of products manufactured by the company
- KU3.** functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
- KU4.** quality norms prescribed by the organization for forging jobs
- KU5.** different types of forging processes like hot, cold and warm and their respective operating parameters
- KU6.** metallurgical properties of the material used
- KU7.** different types of cranes, lifts or robots which can be used for lifting the metal bars

Qualification Pack

- KU8.** parameters related to magnetic lifting like cycle time, etc
- KU9.** dimensions pertinent to pressing operations like diameter and length of the metal bars
- KU10.** different types of dies to be used for forging operations and their setting up mechanism
- KU11.** different parameters pertinent to pressing process like cycle time, force applied, gear and pinion movements, friction, torque etc
- KU12.** forging defects and how they are generated, how they can be prevented, different metals, ferro alloys etc
- KU13.** magnetic robots, presses and dies operation and safety process of handling hot metal bars
- KU14.** measuring instruments like vernier callipers, micrometer and other
- KU15.** effect of operators work on work piece quality at in house and at customers, how to improve customers satisfaction
- KU16.** geometry and dimension measurements
- KU17.** how to read sketches and engineering drawings
- KU18.** final product output and hence decide on the key steps to be followed
- KU19.** safety precautions to be taken for all types of forging pertinent activities like lifting, pressing, finishing etc
- KU20.** mechanical laws and working of machines within forging apparatus etc.

Generic Skills (GS)

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

- GS1.** document information from the sketches and engineering drawings
- GS2.** write log book in terms of output quantity, set up parameters, machine setting parameters and loss details etc.
- GS3.** prepare draft drawings for the final output product
- GS4.** write drawings to internal customers on the requirement of metal, apparatus etc.
- GS5.** note measurements, equipment panel readings for various process parameters in the required reporting formats
- GS6.** read and interpret engineering drawing and sketches
- GS7.** read equipment manuals and process documents to understand the equipment and processes better
- GS8.** read instructions especially safety instructions especially symbols while using the equipment in the plant area
- GS9.** read internal drawings send by internal customers (other functions within the organization)
- GS10.** discuss task lists, schedules, and work-loads with co-workers
- GS11.** question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS12.** plan and organize the work order and jobs received from the internal customers
- GS13.** plan and organize the design documents received from internal customers
- GS14.** organize all process/ equipment manuals so that sorting out information is fast
- GS15.** organize apparatus etc. in an orderly manner at proper designated areas
- GS16.** visualize the final job product after understanding the given drawing/ sketches

Qualification Pack

- GS17.** carefully measure the work piece so in terms of the geometrical dimensions so that the final output is as per the given drawing
- GS18.** finalize the optimum levels of physical parameters so that the job output meets the prescribed job standards
- GS19.** detect problems in day to day tasks
- GS20.** support supervisor in using specific problem solving techniques discuss possible solution with the supervisor for problem solving
- GS21.** make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Check the operations of the equipment used in the process and conduct a test process</i>	3	7	-	-
PC1.. check for operation of magnetic robots, forging presses, dies and auxiliary apparatus	1	3	-	-
PC2.. make modifications in the pressing, lifting or finishing machines parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards	2	4	-	-
<i>Feed the metal bars into forging presses with the help of magnetic robots</i>	3	7	-	-
PC3.. feed the operation code/ select the right program for the magnetic robot to lift the heated metal bar and drops it at the press for forging operation	2	4	-	-
PC4.. ensure that the robot lifts and drops the metal bars as per the desired specifications (in terms of speed, cycle time, etc.)	1	3	-	-
<i>Conduct the actual forging process</i>	16	35	-	-
PC5.. select the appropriate die as per the required output specifications and fit the same into the machine	2	3	-	-
PC6.. ensure that the die temperature is raised before it is loaded/ fit into the press	1	3	-	-
PC7.. adjust temperature of die to ensure uniform heating of the work piece	2	3	-	-
PC8.. before the pressing operation, ensure that the die is sprayed with water, graphite and air mixture. the mixture will act as a lubricant for the die. ensure that the spraying process is as per the instructions given in the sop/ control plan/ work instructions	1	4	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9.. adjust various parameters of main press machine including blocker, finisher and trimmer (like pressure, cycle time, etc.) as per the output requirement	2	5	-	-
PC10.. ensure that the correct pressure is applied by the press on the die for the required cycle time	1	5	-	-
PC11.. ensure that the output from the press is removed from the press area using hoists, cranes, magnetic lifters as mentioned in the work instructions/ sop/ control plan	1	2	-	-
PC12.. cool the final output work piece; perform a quality check on its dimensions like diameter, length etc.and compare the dimensions as prescribed in the work order or the engineering drawing given by the supervisor	1	3	-	-
PC13.. in case the parts are not as per the given measurements, send the same for further processing	1	1	-	-
PC14.. ensure that the dies are being sprayed with coolants after every operation	1	2	-	-
PC15.. clean and lubricate the machinery and the die.	1	2	-	-
PC16.. stamp the output with the identifying information (wherever required)	2	2	-	-
<i>Finishing the output work piece</i>	4	11	-	-
PC17.. ensure correct identification of necessary finishing operations (if required) like twisting, straightening etc.	1	2	-	-
PC18.. check the first piece for geometry, material & dimensional parameters as per the control plan before starting the production	1	3	-	-
PC19.. adjust the parameters of the corresponding presses as per the identified finishing operations i.e. twisting, straightening	1	3	-	-
PC20.. perform a quality check on output in terms of the required dimensions	1	3	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Check measurement instruments for monitoring process parameters</i>	4	10	-	-
PC21.. monitor the process (parameters like force, cycle time etc) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations from desired specifications	1	3	-	-
PC22.. observe and analyze any irregularity in the process and take preventive steps	1	3	-	-
PC23.. check the in line composition/ soundness of the output work piece	1	3	-	-
PC24.. in case of any emergencies/ deviations from the work instructions/ control panel/ SOP inform the supervisor immediately	1	1	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N4503
NOS Name	Perform the forging related operations and monitor process parameters
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Forging
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/10/2013
Next Review Date	30/10/2015
NSQC Clearance Date	

Qualification Pack

ASC/N4504: Perform the post forging related operations

Description

This NOS is about performing the forging operations to finish the final output work piece with the required specifications and industry standards

Scope

The role holder will be responsible for conducting shot blasting process inspecting the forged parts using eddy current testing and Magnetic Particle Inspection technique The role holder will interact with the machine shop, heat treatment shop, maintenance team and material management team

- conducting shot blasting process
- inspecting the forged parts using eddy current testing and Magnetic Particle Inspection technique

Elements and Performance Criteria

Remove surface imperfections using Shot Blasting technique

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

- PC1..** clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material
- PC2..** check the turbine impeller of the shot blasting machine before the operations
- PC3..** load the components and the shots in the chamber of the shot blasting machine. in case robotic conveyor belt is used for loading the shot blasting machine, ensure that the right program is selected for the conveyor belt movement
- PC4..** ensure that the door of the shot blasting machine is tightly closed
- PC5..** switch on the shot blasting machine and ensure that all auxiliary motors are in the on position
- PC6..** keep the machine in the moving position till the cycle time prescribed in the work instructions/ SOP manual
- PC7..** switch off the machine and inspect the parts. turn the parts into the opposite side. ensure that all the parts in the current position are completely turned in the opposite direction
- PC8..** keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.
- PC9..** open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley
- PC10..** ensure that the machine is again cleaned using an AIR blasting machine

Check the flaws in the work piece through Eddy Current Testing

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

- PC11..** adjust the parameters of receiver and excitation coils to be used for eddy current testing (like current, voltage etc.)
- PC12..** place the work piece in the desired position and monitor the variations in phase and amplitude of the current to identify the flaws

Check the surface and sub-surface discontinuities in the work piece through Magnetic Particle Inspection

Qualification Pack

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

- PC13..** place the work piece at the desired position and adjust the parameters of the apparatus (mpi machine/ other machinery) like current to be passed, power cycles, time duration, intensity of magnetic flux etc.
- PC14..** ensure that the right methodology is used as per the work instructions/ control plan/ sops to detect the surface discontinuities like cracks in the forged pieces
- PC15..** ensure that the parts are first magnetized and then demagnetized as per the magnetic cycles set for the machine
- PC16..** support the quality team and production team in non-destructive testing to inspect the part to identify the discontinuities using techniques like UV testing etc. and perform related calculations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards and procedures followed in the company
- KU2.** different types of products manufactured by the company
- KU3.** functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
- KU4.** quality norms prescribed by the organization for forging jobs
- KU5.** different types of ferromagnetic materials and their properties
- KU6.** parameters pertinent to eddy current process like amplitude and phase of the current and intensity of magnetic flux generated
- KU7.** processes like electromagnetic induction, magnetization and demagnetization of metals
- KU8.** various eddy current testing techniques and materials to be used for measurement
- KU9.** various standards used for magnetic particle inspection like EN473, ISO9712
- KU10.** Different types of current and their usage for magnetizing and demagnetizing the metal and corresponding techniques & apparatus required
- KU11.** types of magnetic particles used in magnetic particle inspection
- KU12.** calculations and measurements performed to detect flaws and surface discontinuities in the metal
- KU13.** types of defects and how they are generated, how they can be prevented
- KU14.** operation of various apparatus for shot blasting, MPI, Eddy Current Testing etc.
- KU15.** impact of operators work on output quality at in house and at customers, how to improve customers satisfaction
- KU16.** final product output and hence decide on the key steps to be followed
- KU17.** safety precautions to be taken for all types of testing activities like handling various types of currents, magnetic fields, magnetic particles etc.

Generic Skills (GS)

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

Qualification Pack

- GS1.** document information from the sketches and engineering drawings
- GS2.** write log book in terms of output quantity, set up parameters, machine setting parameters and loss details etc
- GS3.** prepare draft drawings for the final output product
- GS4.** write drawings to internal customers on the requirement of metal, apparatus etc.
- GS5.** note measurements, equipment panel readings for various process parameters in the required reporting formats
- GS6.** read equipment manuals and process documents to understand the equipment and processes better
- GS7.** read instructions especially safety instructions especially symbols while using the equipment in the plant area
- GS8.** read internal drawings send by internal customers (other functions within the organization)
- GS9.** discuss task lists, schedules, and work-loads with co-workers
- GS10.** question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS11.** plan and organize the work order and jobs received from the internal customers
- GS12.** plan and organize the design documents received from internal customers
- GS13.** organize all manuals so that sorting out information is fast
- GS14.** organize apparatus etc. in an orderly manner at proper designated areas
- GS15.** visualize the final job product after understanding the given drawing/ sketches
- GS16.** carefully measure the work piece so in terms of the geometrical dimensions so that the final output is as per the given drawing
- GS17.** finalize the optimum levels of physical parameters so that the job output meets the prescribed job standards
- GS18.** detect problems in day to day tasks
- GS19.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS20.** discuss possible solution with the supervisor for problem solving
- GS21.** make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Remove surface imperfections using Shot Blasting technique</i>	13	34	-	-
PC1.. clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material	1	3	-	-
PC2.. check the turbine impeller of the shot blasting machine before the operations	1	3	-	-
PC3.. load the components and the shots in the chamber of the shot blasting machine. in case robotic conveyor belt is used for loading the shot blasting machine, ensure that the right program is selected for the conveyor belt movement	1	4	-	-
PC4.. ensure that the door of the shot blasting machine is tightly closed	1	3	-	-
PC5.. switch on the shot blasting machine and ensure that all auxiliary motors are in the on position	1	3	-	-
PC6.. keep the machine in the moving position till the cycle time prescribed in the work instructions/ SOP manual	1	3	-	-
PC7.. switch off the machine and inspect the parts. turn the parts into the opposite side. ensure that all the parts in the current position are completely turned in the opposite direction	1	3	-	-
PC8.. keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.	2	4	-	-
PC9.. open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley	2	4	-	-
PC10.. ensure that the machine is again cleaned using an AIR blasting machine	2	4	-	-
<i>Check the flaws in the work piece through Eddy Current Testing</i>	4	14	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11.. adjust the parameters of receiver and excitation coils to be used for eddy current testing (like current, voltage etc.)	2	7	-	-
PC12.. place the work piece in the desired position and monitor the variations in phase and amplitude of the current to identify the flaws	2	7	-	-
<i>Check the surface and sub-surface discontinuities in the work piece through Magnetic Particle Inspection</i>	8	27	-	-
PC13.. place the work piece at the desired position and adjust the parameters of the apparatus (mpi machine/ other machinery) like current to be passed, power cycles, time duration, intensity of magnetic flux etc.	2	7	-	-
PC14.. ensure that the right methodology is used as per the work instructions/ control plan/ sops to detect the surface discontinuities like cracks in the forged pieces	2	7	-	-
PC15.. ensure that the parts are first magnetized and then demagnetized as per the magnetic cycles set for the machine	2	7	-	-
PC16.. support the quality team and production team in non-destructive testing to inspect the part to identify the discontinuities using techniques like UV testing etc. and perform related calculations	2	6	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N4504
NOS Name	Perform the post forging related operations
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Forging
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/10/2013
Next Review Date	30/10/2015
NSQC Clearance Date	

Qualification Pack

ASC/N4505: Conduct quality checks and inspection of the finished goods

Description

This NOS is about inspecting the finished goods produced for any damages, deformities and further repairing the parts produced so that the damaged/ defective pieces can be corrected and right quality components are supplied to 1. The customer/ end user 2. Internal manufacturing team

Scope

The role holder will be responsible for inspecting the finished goods keeping records of finished production and defective pieces repair components with minor defects in the forge shop The role holder will interact with the machine shop, heat treatment shop, maintenance team and material management team

- inspecting the finished goods
- keeping records of finished production and defective pieces
- repair components with minor defects in the forge shop

Elements and Performance Criteria

Inspection of finished goods to detect any deviations from the product design

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

- PC1..** measure the specifications of the finished product using devices like micrometer, verniercalipers, gauges, rulers, weighing scales and any other inspection equipment and compare with the parameters given in the work order
- PC2..** compare texture, color, surface properties, hardness and strength with the given product specifications

Record log of defective products and discard defective pieces

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

- PC3..** note down the observations of the basic inspection process and identify pieces which are ok and also not meeting the specified standards
- PC4..** separate the defective pieces into two categories pieces which can be repaired/ modified and pieces which are beyond repair
- PC5..** discard the pieces which are beyond repair and repair the ones which need minor modifications/ rework
- PC6..** maintain records of each category of work outputs as per the batch/ cavity etc. so that correction can be organized.
- PC7..** establish linkage between rejection of output and the pertinent causes for the same (process/ material etc.); recommend the means for rejection control

Repair the pieces with minor defects

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

- PC8..** rectify minor defects like shape deformation, sharp edges, rough surfaces, extra material for grooves, holes, parting line area etc.
- PC9..** escalate all issues related to change in color, surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the specified output

Qualification Pack

Perform Batch Quality Procedure

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

- PC10..** provide first and last work piece from each batch to the lab for quality check on its composition, soundness, metallography / grain structure etc.
- PC11..** obtain batch clearance from the lab

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards specified for the manufacturing process
- KU2.** basic process followed for inspection of the pieces
- KU3.** quality Management policy of the organization
- KU4.** processes and procedures followed for manufacturing the components/ prices/ products
- KU5.** techniques of using measurement instruments like rulers, verniercalipers, micrometer, weighing scales etc.
- KU6.** methods to identify quality defects in work pieces
- KU7.** impact of defects on the overall working of the component
- KU8.** methods used for cutting, finishing which can repair pieces with minor defects
- KU9.** various quality standards in India (ISO) used by the organization

Generic Skills (GS)

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

- GS1.** note the number of pieces with defects which can be repaired to number of pieces which will be discarded
- GS2.** read process and equipment manuals to understand the working of the equipment
- GS3.** read measuring instruments reading to identify any deviations from the dimensions given in the product engineering drawing
- GS4.** inform supervisor of any quality related defects arising out of the manufacturing process
- GS5.** question internal customers/ Shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS6.** plan and organize the work order and jobs received from the operator
- GS7.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS8.** visualize the final job product after understanding the given drawing/ sketches
- GS9.** co relate the type of job output required with the methodology to be used
- GS10.** use common sense and make judgments during day to day basis
- GS11.** use reasoning skills to identify and resolve basic problems
- GS12.** identify defective parts in the manufacturing line by comparing manufactured pieces with the work standard
- GS13.** link the defect observed with the overall impact on the performance of the component

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Inspection of finished goods to detect any deviations from the product design</i>	5	19	-	-
PC1.. measure the specifications of the finished product using devices like micrometer, verniercalipers, gauges, rulers, weighing scales and any other inspection equipment and compare with the parameters given in the work order	2	10	-	-
PC2.. compare texture, color, surface properties, hardness and strength with the given product specifications	3	9	-	-
<i>Record log of defective products and discard defective pieces</i>	11	33	-	-
PC3.. note down the observations of the basic inspection process and identify pieces which are ok and also not meeting the specified standards	2	6	-	-
PC4.. separate the defective pieces into two categories pieces which can be repaired/ modified and pieces which are beyond repair	2	8	-	-
PC5.. discard the pieces which are beyond repair and repair the ones which need minor modifications/ rework	2	6	-	-
PC6.. maintain records of each category of work outputs as per the batch/ cavity etc. so that correction can be organized.	2	6	-	-
PC7.. establish linkage between rejection of output and the pertinent causes for the same (process/ material etc.); recommend the means for rejection control	3	7	-	-
<i>Repair the pieces with minor defects</i>	5	13	-	-
PC8.. rectify minor defects like shape deformation, sharp edges, rough surfaces, extra material for grooves, holes , parting line area etc.	3	8	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9.. escalate all issues related to change in color, surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the specified output	2	5	-	-
<i>Perform Batch Quality Procedure</i>	4	10	-	-
PC10.. provide first and last work piece from each batch to the lab for quality check on its composition, soundness, metallography / grain structure etc.	2	5	-	-
PC11.. obtain batch clearance from the lab	2	5	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N4505
NOS Name	Conduct quality checks and inspection of the finished goods
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Forging
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/08/2013
Next Review Date	20/08/2015
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 % aggregate for QP : 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/N4501.Understand job requirements and related processes	30	70	-	-	100	15
ASC/N4502.Perform pre forging operations	30	70	-	-	100	10

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N4503.Perform the forging related operations and monitor process parameters	30	70	-	-	100	20
ASC/N4504.Perform the post forging related operations	25	75	-	-	100	10
ASC/N4505.Conduct quality checks and inspection of the finished goods	25	75	-	-	100	15
Total	190	510	-	-	700	100

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.