



Casting Technician-Sand Moulding

QP Code: ASC/Q3205

Version: 1.0

NSQF Level: 4

Automotive Skills Development Council || 153, Gr Floor, Okhla Industrial Area, Phase - III, Leela Building
New Delhi - 110020

Qualification Pack

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ASC/Q3205: Casting Technician-Sand Moulding

Brief Job Description

This role primarily involves managing the specifications of the sand and molten metal, setting up and operating the casting equipment and forming & finishing the final output

Personal Attributes

Reading, writing and communication skills, ability to plan and prioritize, quality consciousness, safety orientation, Physique to sustain strenuous conditions, Dexterity, Ability to use fingers, 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/N3214: Understand and interpret engineering drawings and sketches related to casting](#)
4. [ASC/N3215: Understand Casting and sand moulding processes and equipment requirement to complete the task](#)
5. [ASC/N3216: Prepare the machine \(apparatus\) and auxiliaries](#)
6. [ASC/N3217: Perform the sand making related operations and monitor process parameters](#)
7. [ASC/N3218: Perform the core making related operations and monitor process parameters](#)
8. [ASC/N3219: Perform the mould making related operations and monitor process parameters](#)
9. [ASC/N3220: Perform the sand casting related operations and monitor process parameters](#)
10. [ASC/N3221: Conduct quality checks and inspection of the finished sand cast products](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing

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Occupation	Casting
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7211.0201
Minimum Educational Qualification & Experience	I.T.I with 2-3 years of experience Sand Casting
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Latest Sand Mould preparation technology and casting techniques & methodologies Reading and writing skills Safety and 5S Quality Management
Minimum Job Entry Age	18 Years
Last Reviewed On	20/10/2013
Next Review Date	24/09/2021
Deactivation Date	24/09/2021
NSQC Approval Date	20/07/2015
Version	1.0
Reference code on NQR	2015/AUT/ASDC/00586
NQR 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

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:

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- 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.

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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

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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

Qualification Pack

ASC/N3214: Understand and interpret engineering drawings and sketches related to casting

Description

This NOS unit is about analysing the work/ job requirements by interpreting the drawings and sketches provided by the supervisor, understanding measurement dimensions and applying the knowledge to determine the mould and core specifications and the process which needs to be followed to create the output as per the specifications mentioned in the work order

Scope

The operator will be responsible for

- Identification and understanding the drawings
- Documentation of the drawings
- escalations of any queries regarding the job The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team

Elements and Performance Criteria

Identify the right drawing to be used for the process

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

- PC1.** . check the version of the engineering drawing provided.
- PC2.** . select the latest version of the available engineering drawing so that the final measurements and design is available with the team

Understand the engineering drawings, sketches and work order and identify required work steps

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

- PC3.** . thoroughly understand the work order (work output) required from the process
- PC4.** . clearly understanding the does and donts of the manufacturing process as defined in sops/ work instructions or defined by supervisors
- PC5.** . refer all engineering drawings and sketches related to the work output to understand the measurement dimensions and shape of the required work output
- PC6.** . identify the required activities which need to be executed in order achieve the final output as per the work order
- PC7.** . ensure that the process adopted is according to the work instructions/ standard operating procedures adopted

Documentation and storage of the drawings/ sketches

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

- PC8.** . store the drawings in a proper place where they cannot be damaged by moisture, chemicals, fire and can be easily accessed by the user
- PC9.** . observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization

Knowledge and Understanding (KU)

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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.** sketches and engineering drawings and how to interpret meaningful information from the drawings
- KU5.** dimensions and characteristics of the final product output
- KU6.** different types of sand making, core making and mould making processes and associated equipment
- KU7.** different types of tools and machinery for casting and trim the output
- KU8.** sketches and engineering drawings
- KU9.** basic principles of geometric and drawing
- KU10.** final product visualization from the drawing
- KU11.** impact of various physical parameters like temperature, etc on the properties of final output product like strength, shape etc

Generic Skills (GS)

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

- GS1.** document information from the sketches and engineering drawings
- GS2.** prepare draft drawings for the final output product
- GS3.** write drawings to internal customers on the requirement of apparatus, hand toolsetc
- GS4.** read and interpret engineering drawing and sketches
- GS5.** read equipment manuals and process documents to understand the equipment and processes better
- GS6.** read internal information drawings send by internal customers (other functions within the organization)
- GS7.** discuss task lists, schedules, and work-loads with co-workers
- GS8.** question internal customers/ casting shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS9.** avoid using jargon, slang or acronyms when communicating with a customer, unless it is required
- GS10.** plan and organize the work order and jobs received from the internal customers
- GS11.** plan and organize the design documents received from internal customers
- GS12.** organize all process/ equipment manuals so that sorting out information is fast
- GS13.** use common sense and make judgments during day to day basis
- GS14.** use reasoning skills to identify and resolve basic problems
- GS15.** use intuition to detect any potential problems which could arise during operations
- GS16.** follow instructions and work on areas of improvement identified
- GS17.** complete the assigned tasks with minimum supervision

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- GS18.** complete the job defined by the supervisor within the timelines and quality norms
- GS19.** detect problems in day to day tasks
- GS20.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS21.** discuss possible solution with the supervisor for problem solving
- GS22.** 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>Identify the right drawing to be used for the process</i>	5	14	-	-
PC1. . check the version of the engineering drawing provided.	2	7	-	-
PC2. . select the latest version of the available engineering drawing so that the final measurements and design is available with the team	3	7	-	-
<i>Understand the engineering drawings, sketches and work order and identify required work steps</i>	19	39	-	-
PC3. . thoroughly understand the work order (work output) required from the process	3	7	-	-
PC4. . clearly understanding the does and donts of the manufacturing process as defined in sops/ work instructions or defined by supervisors	3	7	-	-
PC5. . refer all engineering drawings and sketches related to the work output to understand the measurement dimensions and shape of the required work output	5	7	-	-
PC6. . identify the required activities which need to be executed in order achieve the final output as per the work order	4	9	-	-
PC7. . ensure that the process adopted is according to the work instructions/ standard operating procedures adopted	4	9	-	-
<i>Documentation and storage of the drawings/ sketches</i>	6	17	-	-
PC8. . store the drawings in a proper place where they cannot be damaged by moisture, chemicals, fire and can be easily accessed by the user	3	9	-	-
PC9. . observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization	3	8	-	-
NOS Total	30	70	-	-

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National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3214
NOS Name	Understand and interpret engineering drawings and sketches related to casting
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

Qualification Pack

ASC/N3215: Understand Casting and sand moulding processes and equipment requirement to complete the task

Description

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

Scope

The operator will be responsible for

- determining the type of sand, core and mould
- determine casting requirements and equipment
- escalations of any queries regarding the job The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team

Elements and Performance Criteria

Determine the type of sand, core and mould requirement

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

- PC1..** understand the specifications and dimensions of output and determine the type of sand to be used to prepare core and mould
- PC2. .** understand the specifications and dimensions of output and determine the dimensions of core and mould

Determine the sand casting requirements, equipment and parameters

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

- PC3. .** determine the casting methodology and process to be adopted for completing the work order
- PC4. .** determine the various casting parameters like temperature, pouring speed etc. before starting the process
- PC5. .** determine the equipment availability for executing the activity

Escalations of queries on the given job

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

- PC6. .** refer the queries to a competent internal specialist if they cannot be resolved by the operator on own
- PC7. .** obtain help or advice from specialist if the problem is outside his/her area of competence or experience
- PC8. .** 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

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- 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 specifications of sand to be used for preparing cores and moulds
- KU5.** different types of core making and mould making methodologies
- KU6.** different types of sand casting processes and associated equipments
- KU7.** different types of tools and machinery to prepare and trim the output
- KU8.** different types of automated processes pertinent to sand making, core making, mould making or casting
- KU9.** different types of metallurgical processes
- KU10.** sketches and engineering drawings
- KU11.** final product output and hence decide on the key steps to be followed for preparing output and trimming
- KU12.** impact of various physical parameters like temperature, etc on the properties of final output product like strength, shape etc
- KU13.** basic principles of geometric and drawing
- KU14.** hazards and safety aspects involved in handling molten metal

Generic Skills (GS)

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

- GS1.** document information from the sketches and engineering drawings
- GS2.** prepare draft drawings for the final output product
- GS3.** write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor
- GS4.** read and interpret engineering drawing and sketches
- GS5.** read equipment manuals and process documents to understand the equipment and processes better
- GS6.** read internal information drawings send by internal customers (other functions within the organization)
- GS7.** discuss task lists, schedules, and work-loads with co-workers
- GS8.** effectively communicate with the team members
- GS9.** question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS10.** avoid using jargon, slang or acronyms when communicating with a customer, unless it is required
- GS11.** plan and organize the work order and jobs received from the Operator
- GS12.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS13.** support the supervisor in scheduling tasks for helper and assistant supervisor
- GS14.** use common sense and make judgments during day to day basis
- GS15.** use reasoning skills to identify and resolve basic problems
- GS16.** use intuition to detect any potential problems which could arise during operations

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- GS17.** follow instructions and work on areas of improvement identified
- GS18.** complete the assigned tasks with minimum supervision
- GS19.** complete the job defined by the supervisor within timelines and quality norms
- GS20.** detect problems in day to day tasks
- GS21.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS22.** discuss possible solution with the supervisor for problem solving
- GS23.** 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>Determine the type of sand, core and mould requirement</i>	8	18	-	-
PC1. understand the specifications and dimensions of output and determine the type of sand to be used to prepare core and mould	4	9	-	-
PC2. understand the specifications and dimensions of output and determine the dimensions of core and mould	4	9	-	-
<i>Determine the sand casting requirements, equipment and parameters</i>	12	27	-	-
PC3. determine the casting methodology and process to be adopted for completing the work order	4	9	-	-
PC4. determine the various casting parameters like temperature, pouring speed etc. before starting the process	4	9	-	-
PC5. determine the equipment availability for executing the activity	4	9	-	-
<i>Escalations of queries on the given job</i>	10	25	-	-
PC6. refer the queries to a competent internal specialist if they cannot be resolved by the operator on own	4	9	-	-
PC7. obtain help or advice from specialist if the problem is outside his/her area of competence or experience	3	8	-	-
PC8. confirm self understanding to the specialist once the query is resolved so that all doubts & queries can be resolved before the actual process execution	3	8	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3215
NOS Name	Understand Casting and sand moulding processes and equipment requirement to complete the task
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

Qualification Pack

ASC/N3216: Prepare the machine (apparatus) and auxiliaries

Description

This NOS unit is about selecting the tools and apparatus for various activities within sand casting basis the work order received,

Scope

The operator will be responsible for

- determining the process parameters for making mould and core
- cleaning the dies and the shell
- preparing the sand mould and core
- escalations of any queries regarding the job The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team

Elements and Performance Criteria

Determine the process requirements, tools, equipment and parameters to be used for sand making, core making, mould making and sand casting

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

- PC1.** . determine the type of sand and apparatus to be used for making the same to produce desired moulds
- PC2.** . determine the right methodology to prepare cores and moulds and various parameters like temperature, geometric dimensions etc.
- PC3.** . determine the right casting and trimming methodology and process to be adopted for completing the work order
- PC4.** . correctly determine the various casting and trimming parameters like temperature, geometric dimensions etc. before starting the process
- PC5.** . determine the material required and the equipment availability for executing the activity

Clean the dies and equipment & tools before executing the sand making, core making, mould making and casting process and setup the equipment

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

- PC6.** . ensure cleaning of machinery like mixers, hoppers, feeders etc by spraying or brushing surfaces with parting agents to ensure smoothness and prevent sticking or seepage
- PC7.** . ensure cleaning of the other machine and tools, auxiliaries (spatulas, chippers etc) before the initiation of the process
- PC8.** . setup the respective apparatus as per the selected sand making/ core making/ mould making/ casting process and the standards used in the automobile industry

Prepare sand, core, mould and output as per the product specification

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

- PC9.** . correctly analyze the geometric specifications for the output and ensure the core, mould and output are in line with product drawing/ sketches available

Qualification Pack

PC10. . in case the output is not as per the given measurements, remove extra material by using chippers, grinders etc

Escalations of queries for the given job

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

PC11. . immediately refer the queries to a competent internal specialist if they cannot be resolved by the operator on own

PC12. . obtain help or advice from specialist if the problem is outside his/her area of competence or experience

PC13. . 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 cleaning techniques, sand making, core making, mould making and sand casting processes and associated equipment

KU5. different tools and equipment being used for sand making

KU6. different tools and equipment being used for core making

KU7. different tools and equipment being used for mould making

KU8. different tools and equipment being used for trimming and casting

KU9. different types of cleaning agents being commonly used

KU10. measuring instruments like verniercalipers, micrometers

KU11. sketches and engineering drawings

KU12. final product output and hence decide on the key steps to be followed for casting and trimming

KU13. basic principles of geometry and drawing

Generic Skills (GS)

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

GS1. document information from the sketches and engineering drawings

GS2. prepare draft drawings for the final output product

GS3. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor

GS4. read and interpret engineering drawing and sketches

GS5. read equipment manuals and process documents to understand the equipment and processes better

Qualification Pack

- GS6.** read internal information drawings sent by internal customers (other functions within the organization)
- GS7.** discuss task lists, schedules, and work-loads with co-workers
- GS8.** effectively communicate with the team members
- GS9.** question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis
- GS10.** attentively listen with full attention and comprehend the information given by the speaker
- GS11.** plan and organize the work order and jobs received from the Operator
- GS12.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS13.** visualize the final job product after understanding the given drawing/ sketches
- GS14.** analyze the final output and its alignment with the given drawing
- GS15.** finalize the optimum levels of physical parameters so that the job output meets the prescribed job standards
- GS16.** use common sense and make judgments during day to day basis
- GS17.** use reasoning skills to identify and resolve basic problems
- GS18.** follow instructions and work on areas of improvement identified complete the assigned tasks with minimum supervision
- GS19.** complete the job defined by the supervisor within the timelines and quality norms
- GS20.** take self initiatives in driving small projects with the supervisor like operation improvement, training of helpers and assistant operators, 5S, Kaizen etc

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Determine the process requirements, tools, equipment and parameters to be used for sand making, core making, mould making and sand casting</i>	11	31	-	-
PC1. . determine the type of sand and apparatus to be used for making the same to produce desired moulds	2	6	-	-
PC2. . determine the right methodology to prepare cores and moulds and various parameters like temperature, geometric dimensions etc.	2	6	-	-
PC3. . determine the right casting and trimming methodology and process to be adopted for completing the work order	2	6	-	-
PC4. . correctly determine the various casting and trimming parameters like temperature, geometric dimensions etc. before starting the process	3	7	-	-
PC5. . determine the material required and the equipment availability for executing the activity	2	6	-	-
<i>Clean the dies and equipment & tools before executing the sand making, core making, mould making and casting process and setup the equipment</i>	5	19	-	-
PC6. . ensure cleaning of machinery like mixers, hoppers, feeders etc by spraying or brushing surfaces with parting agents to ensure smoothness and prevent sticking or seepage	1	6	-	-
PC7. . ensure cleaning of the other machine and tools, auxiliaries (spatulas, chippers etc) before the initiation of the process	1	6	-	-
PC8. . setup the respective apparatus as per the selected sand making/ core making/ mould making/ casting process and the standards used in the automobile industry	3	7	-	-
<i>Prepare sand, core, mould and output as per the product specification</i>	5	13	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. . correctly analyze the geometric specifications for the output and ensure the core, mould and output are in line with product drawing/ sketches available	3	7	-	-
PC10. . in case the output is not as per the given measurements, remove extra material by using chippers, grinders etc	2	6	-	-
<i>Escalations of queries for the given job</i>	4	12	-	-
PC11. . immediately refer the queries to a competent internal specialist if they cannot be resolved by the operator on own	2	4	-	-
PC12. . obtain help or advice from specialist if the problem is outside his/her area of competence or experience	1	4	-	-
PC13. . 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	4	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3216
NOS Name	Prepare the machine (apparatus) and auxiliaries
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015
NSQC Clearance Date	20/07/2015

Qualification Pack

ASC/N3217: Perform the sand making related operations and monitor process parameters

Description

This NOS is about preparing and mixing the sand in line with the required specifications and industry standards

Scope

The operator will be responsible for

- checking the operations of the equipment
- pour the sand into the mixer and prepare the sand
- inspecting the sand of the parameters The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team

Elements and Performance Criteria

Check the operations of the equipment used in the sand making

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

- PC1..** check for operation of apparatus for sand feeding and mixing like hoppers, mixers etc. as per the instructions mentioned in the work instructions/ SOPs
- PC2. .** make modifications in the machine parameters if required and ensure alignment with the prescribed standards

Pour the sand into mixer

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

- PC3. .** instruct assistant operator to turn valves of machines to regulate speed and quantity of the sand
- PC4. .** ensure pouring in line with the defined standards and specifications

Prepare the sand in line with the defined standards

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

- PC5. .** feed the mixer with the required additives in the right quantities. the quantity of additives added in the sand should be as per the process requirements mentioned in the work instructions/ SOPs
- PC6. .** feed the required operation code in the mixer
- PC7. .** clean and lubricate the machinery to prevent any sand sticking on the mixer/ hopper surface

Check measurement instruments for monitoring process parameters

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

- PC8. .** monitor the sand feeding and mixing process by observing and analyzing the readings on various panels/ meters to prevent machine breakdown/ process stoppage and deviations of the cast from desired specifications
- PC9. .** observe and analyze any irregularity in the process and take preventive steps

Perform the inspection of the sand

Qualification Pack

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

PC10. . perform the quality check on output sand in terms of grain compressive strength etc

PC11. . in case there are any inconsistencies identified in the properties of the output sand, send the same for further processing

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 sand making jobs

KU5. different types of sand making processes and associated equipment

KU6. effect of operators work on output quality at in house and at customers, how to improve customers satisfaction

KU7. different parameters pertinent to sand making process like quantity of additives, Sand properties GCS, Compatibility, Clay and moisture %, Squeeze pressure, metal temperature, inoculation addition, cooling time etc.

KU8. properties of sand and other additives

KU9. final output sand and hence decide on the key steps to be followed

KU10. safety precautions to be taken for all types of activities

KU11. mechanical laws and working of machines etc.

Generic Skills (GS)

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

GS1. write drawings to internal customers on the requirement of sand, additives, apparatus etc.

GS2. write log book in terms of output quantity, set up parameters, machine setting parameters and loss details etc.

GS3. note measurements, equipment panel readings for various process parameters in the required reporting formats

GS4. read equipment manuals and process documents to understand the equipment and processes better

GS5. read instructions especially safety instructions especially symbols while using the equipment in the plant area

GS6. read internal drawings send by internal customers (other functions within the organization)

GS7. discuss task lists, schedules, and work-loads with co-workers

GS8. question internal customers/ shop supervisor appropriately in order to understand the nature of the problem and make a diagnosis

GS9. plan and organize the work order and jobs received from the internal customers

GS10. organize all process/ equipment manuals so that sorting out information is fast

Qualification Pack

- GS11.** organize apparatus etc. in an orderly manner at proper designated areas
- GS12.** analyse the properties of the output sand after understanding the given specifications
- GS13.** finalize the optimum levels of physical parameters so that the output meets the prescribed standards
- GS14.** think through the problem, evaluate the possible solution and suggest the best possible solution to the problem
- GS15.** identify immediate or temporary solutions to resolve delays

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 sand making</i>	5	15	-	-
PC1. . check for operation of apparatus for sand feeding and mixing like hoppers, mixers etc. as per the instructions mentioned in the work instructions/ SOPs	3	7	-	-
PC2. . make modifications in the machine parameters if required and ensure alignment with the prescribed standards	2	8	-	-
<i>Pour the sand into mixer</i>	4	14	-	-
PC3. . instruct assistant operator to turn valves of machines to regulate speed and quantity of the sand	2	7	-	-
PC4. . ensure pouring in line with the defined standards and specifications	2	7	-	-
<i>Prepare the sand in line with the defined standards</i>	7	20	-	-
PC5. . feed the mixer with the required additives in the right quantities. the quantity of additives added in the sand should be as per the process requirements mentioned in the work instructions/ SOPs	3	8	-	-
PC6. . feed the required operation code in the mixer	2	6	-	-
PC7. . clean and lubricate the machinery to prevent any sand sticking on the mixer/ hopper surface	2	6	-	-
<i>Check measurement instruments for monitoring process parameters</i>	5	14	-	-
PC8. . monitor the sand feeding and mixing process by observing and analyzing the readings on various panels/ meters to prevent machine breakdown/ process stoppage and deviations of the cast from desired specifications	2	7	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. . observe and analyze any irregularity in the process and take preventive steps	3	7	-	-
<i>Perform the inspection of the sand</i>	4	12	-	-
PC10. . perform the quality check on output sand in terms of grain compressive strength etc	3	7	-	-
PC11. . in case there are any inconsistencies identified in the properties of the output sand, send the same for further processing	1	5	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3217
NOS Name	Perform the sand making related operations and monitor process parameters
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

Qualification Pack

ASC/N3218: Perform the core making related operations and monitor process parameters

Description

This NOS is about preparing the core as per the desired shape and ensure the output in line with the required specifications and industry standards

Scope

The operator will be responsible for

- checking the operations of the equipment
- pour the sand and additives into the die
- prepare the core into the die
- inspecting the core for the parameters The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team

Elements and Performance Criteria

Check the operations of the equipment used in preparing the core

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

- PC1.** . check for operation of core making apparatus like hoppers, pouring nozzles, mixers, pressing machines etc
- PC2.** . make modifications in the machine related parameters if required and ensure alignment with the prescribed standards

Pour the sand and additives required into die

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

- PC3.** . turn valves (like butterfly valve) of machines to regulate flow of additives and sand into the die
- PC4.** . ensure pouring in line with the defined standards and specifications

Conduct the actual core making process

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

- PC5.** . ensure that the right type of die is put in the machine.
- PC6.** . ensure escalation of any issues related to die setting to the machine setter in the plant
- PC7.** . feed the required operation code in the pressing machine for it to prepare the core
- PC8.** . adjust the temperature, pressure and other parameters as per the cores requirement
- PC9.** . monitor the process parameters and ensure that the cycle time of the process is as per the work instructions/ SOPs
- PC10.** . ensure proper hardening of the core by creating hot vapor within the core making process
- PC11.** . withdraw the output core carefully from the machine at the end of the core making cycle time
- PC12.** . turn valves to circulate high pressure air to clean the die

Qualification Pack

PC13. . blow air jet on core to remove impurities or additional material stuck in between die/ machine parts which can hamper future casting operations

Perform painting of the core

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

PC14.. instruct helper to prepare the water based paint for core

PC15. . check the viscosity and other properties of paint

PC16. . dip the core into paint tank and remove the same once coated with paint

PC17.. put the painted core into heater/ combustion zone for hardening

Remove surface imperfections using Shot Blasting technique

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

PC18. . clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material

PC19.. load the components and the shots in the chamber of the shot blasting machine

PC20. . ensure that the door of the shot blasting machine is tightly closed

PC21. . switch on the shot blasting machine and ensure that all auxiliary motors are in the ON position

PC22. . keep the machine in the moving position till the cycle time prescribed in the work instructions/ SOP manual

PC23. . 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

PC24. . keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.

PC25.. open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley

PC26. . ensure that the machine is again cleaned using an air blasting machine

Check measurement instruments for monitoring process parameters

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

PC27. . monitor the core making process (right from sand feeding till core hardening) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the output core from desired specifications

PC28. . observe and analyze any irregularity in the process and take preventive steps

Perform the visual inspection of the output to further finish the core

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

PC29. . measure the final core and compare the dimensions as prescribed in the work order engineering drawing

PC30. . in case the core is not as per the given measurements, send the same for further processing

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant standards and procedures followed in the company

Qualification Pack

- 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 core making jobs
- KU5.** different types equipment for core making
- KU6.** different parameters pertinent to core making process like Temperature, Pressure etc
- KU7.** effect of operators work on output quality at in house and at customers, how to improve customers satisfaction
- KU8.** different types of paints to be used for painting the core
- KU9.** measuring instruments like verniercalipers, micrometer
- KU10.** geometry and dimensions of the core being manufactured
- KU11.** sketches and engineering drawings
- KU12.** how to visualize the final product output and hence decide on the key steps to be followed
- KU13.** safety precautions to be taken for all types of core making activities
- KU14.** mechanical laws and working of pressing/ other machines 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 sand, additives, core making 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 equipments and processes better
- GS8.** read instructions especially safety instructions especially symbols while using the equipments 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 core 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 standard
- GS19.** think through the problem, evaluate the possible solution and suggest the best possible solution to the problem
- GS20.** identify immediate or temporary solutions to resolve delays

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 preparing the core</i>	2	4	-	-
PC1. . check for operation of core making apparatus like hoppers, pouring nozzles, mixers, pressing machines etc	1	2	-	-
PC2. . make modifications in the machine related parameters if required and ensure alignment with the prescribed standards	1	2	-	-
<i>Pour the sand and additives required into die</i>	2	4	-	-
PC3. . turn valves (like butterfly valve) of machines to regulate flow of additives and sand into the die	1	2	-	-
PC4.. ensure pouring in line with the defined standards and specifications	1	2	-	-
<i>Conduct the actual core making process</i>	9.75	27	-	-
PC5. . ensure that the right type of die is put in the machine.	1	3	-	-
PC6. . ensure escalation of any issues related to die setting to the machine setter in the plant	0.5	1	-	-
PC7. . feed the required operation code in the pressing machine for it to prepare the core	1	3	-	-
PC8. . adjust the temperature, pressure and other parameters as per the cores requirement	1.5	4	-	-
PC9. . monitor the process parameters and ensure that the cycle time of the process is as per the work instructions/ SOPs	1.5	4	-	-
PC10. . ensure proper hardening of the core by creating hot vapor within the core making process	1	4	-	-
PC11. . withdraw the output core carefully from the machine at the end of the core making cycle time	1	3	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. . turn valves to circulate high pressure air to clean the die	1	2	-	-
PC13. . blow air jet on core to remove impurities or additional material stuck in between die/ machine parts which can hamper future casting operations	1.25	3	-	-
<i>Perform painting of the core</i>	4	9	-	-
PC14.. instruct helper to prepare the water based paint for core	1	2	-	-
PC15. . check the viscosity and other properties of paint	1	3	-	-
PC16. . dip the core into paint tank and remove the same once coated with paint	1	2	-	-
PC17.. put the painted core into heater/ combustion zone for hardening	1	2	-	-
<i>Remove surface imperfections using Shot Blasting technique</i>	8	16	-	-
PC18. . clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material	1	2	-	-
PC19.. load the components and the shots in the chamber of the shot blasting machine	1	2	-	-
PC20. . ensure that the door of the shot blasting machine is tightly closed	1	2	-	-
PC21. . switch on the shot blasting machine and ensure that all auxiliary motors are in the ON position	0.5	1	-	-
PC22. . keep the machine in the moving position till the cycle time prescribed in the work instructions/ SOP manual	1	2	-	-
PC23. . 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	2	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. . keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.	1	2	-	-
PC25. .. open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley	1	2	-	-
PC26. . ensure that the machine is again cleaned using an air blasting machine	0.5	1	-	-
<i>Check measurement instruments for monitoring process parameters</i>	2.5	6	-	-
PC27. . monitor the core making process (right from sand feeding till core hardening) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the output core from desired specifications	1.25	3	-	-
PC28. . observe and analyze any irregularity in the process and take preventive steps	1.25	3	-	-
<i>Perform the visual inspection of the output to further finish the core</i>	1.75	4	-	-
PC29. . measure the final core and compare the dimensions as prescribed in the work order engineering drawing	1.25	3	-	-
PC30. . in case the core is not as per the given measurements, send the same for further processing	0.5	1	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3218
NOS Name	Perform the core making related operations and monitor process parameters
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

Qualification Pack

ASC/N3219: Perform the mould making related operations and monitor process parameters

Description

This NOS is about preparing the mould as per the desired pattern and ensure the output in line with the required specifications and industry standards

Scope

The operator will be responsible for

- checking the operations of the equipment
- pour the sand and additives into the die
- prepare the mould
- inspecting the mould for the parameters The job holder will cover all types casting methods . The role holder will interact with the maintenance team and material management team.

Elements and Performance Criteria

Check the operations of the equipment used in preparing the mould

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

PC1. . check for operation of mould making apparatus like hoppers, pouring nozzles, mixers, pressing machines etc.

PC2. . make modifications in the machine related parameters if required and ensure alignment with the prescribed standards

Pour the sand and additives required into die

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

PC3. . turn valves (like butterfly valve) of machines to regulate flow of additives and sand into the die

PC4. . ensure pouring in line with the defined standards and specifications

Conduct the actual mould making process

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

PC5.. ensure that the right type of die is put in the machine.

PC6.. ensure escalation of any issues related to die setting to the machine setter in the plant

PC7.. check the mould making machine as per the checklist provided at the working place

PC8. . adjust the temperature, pressure and other parameters as per the output mould requirement

PC9. . feed the required operation code in the pressing machine for it to prepare the mould

PC10.. withdraw the output mould carefully from the machine

PC11. . prepare the mould box (combination of core and mould with a metal jacket on it) for casting of metal

PC12. . ensure that the two halves of the mould box do not move while pouring operations of the molten metal are in process

Qualification Pack

PC13. . turn valves to circulate jet to clean the die

PC14... blow air jet on mould to remove impurities or additional material between the cavities

Check measurement instruments for monitoring process parameters

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

PC15. . monitor the mould making process (right from sand feeding till mould preparation) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the output mould pattern from desired specifications

PC16. . observe and analyze any irregularity in the process and take preventive steps

Perform the visual inspection of the output to further finish the mould

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

PC17. . measure the final mould pattern and compare the dimensions as prescribed in the work order engineering drawing

PC18. . in case the mould is not as per the given measurements, send the same for further processing

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 mould making jobs

KU5. different types equipment for mould making

KU6. different parameters pertinent to mould making process like Temperature, Pressure etc

KU7. effect of operators work on output quality at in house and at customers, how to improve customers satisfaction

KU8. measuring instruments like verniercalipers, micrometer

KU9. geometry and dimensions

KU10. sketches and engineering drawings

KU11. final product output and hence decide on the key steps to be followed

KU12. safety precautions to be taken for all types of core making activities

KU13. mechanical laws and working of pressing/ other machines 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

Qualification Pack

- GS4.** write drawings to internal customers on the requirement of sand, additives, mould making 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 equipments and processes better
- GS8.** read instructions especially safety instructions especially symbols while using the equipments 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
- GS17.** carefully measure the pattern of mould 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.** think through the problem, evaluate the possible solution and suggest the best possible solution to the problem
- GS20.** identify immediate or temporary solutions to resolve delays

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 preparing the mould</i>	2	8	-	-
PC1. . check for operation of mould making apparatus like hoppers, pouring nozzles, mixers, pressing machines etc.	1	4	-	-
PC2. . make modifications in the machine related parameters if required and ensure alignment with the prescribed standards	1	4	-	-
<i>Pour the sand and additives required into die</i>	3	9	-	-
PC3. . turn valves (like butterfly valve) of machines to regulate flow of additives and sand into the die	1	4	-	-
PC4. . ensure pouring in line with the defined standards and specifications	2	5	-	-
<i>Conduct the actual mould making process</i>	14	41	-	-
PC5. .. ensure that the right type of die is put in the machine.	2	4	-	-
PC6. .. ensure escalation of any issues related to die setting to the machine setter in the plant	1	3	-	-
PC7. .. check the mould making machine as per the checklist provided at the working place	1	4	-	-
PC8. . adjust the temperature, pressure and other parameters as per the output mould requirement	2	5	-	-
PC9. . feed the required operation code in the pressing machine for it to prepare the mould	2	5	-	-
PC10. .. withdraw the output mould carefully from the machine	1	3	-	-
PC11. . prepare the mould box (combination of core and mould with a metal jacket on it) for casting of metal	2	5	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. . ensure that the two halves of the mould box do not move while pouring operations of the molten metal are in process	1	4	-	-
PC13. . turn valves to circulate jet to clean the die	1	4	-	-
PC14.. blow air jet on mould to remove impurities or additional material between the cavities	1	4	-	-
<i>Check measurement instruments for monitoring process parameters</i>	3	10	-	-
PC15. . monitor the mould making process (right from sand feeding till mould preparation) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the output mould pattern from desired specifications	2	5	-	-
PC16. . observe and analyze any irregularity in the process and take preventive steps	1	5	-	-
<i>Perform the visual inspection of the output to further finish the mould</i>	3	7	-	-
PC17. . measure the final mould pattern and compare the dimensions as prescribed in the work order engineering drawing	2	5	-	-
PC18. . in case the mould is not as per the given measurements, send the same for further processing	1	2	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3219
NOS Name	Perform the mould making related operations and monitor process parameters
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Sand Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

Qualification Pack

ASC/N3220: Perform the sand casting related operations and monitor process parameters

Description

This NOS is about obtaining desired shape and ensure finishing of the output in line with the required specifications and industry standards

Scope

The operator will be responsible for

- checking the operations of the equipment
- pour the molten metal into the mould
- conduct the actual sand casting process
- inspecting the cast for the parameters The job holder will cover all types casting methods . The role holder will interact with the maintenance team, machining and material management team

Elements and Performance Criteria

Check the operations of the equipment used in the sandcasting process

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

- PC1..** check for operation of casting apparatus like molten metal carrying bucket, pouring nozzles, ladles etc.
- PC2. .** ensure casting parameters are as per the batch specifications laid down by the laboratory team
- PC3. .** make modifications in the casting parameters if required and ensure alignment with the prescribed standards

Pour the metal into mould

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

- PC4. .** turn valves of machines to regulate speed of the metal into moulds through runners
- PC5. .** ensure pouring in line with the defined work standards and specifications and minimization of metal spillage in the work area; record the pouring observations like parting leak, gas evolution, interrupted pouring or any abnormality
- PC6. .** maintain downsprue always full during pouring as per the process mentioned in the work instructions/ sops
- PC7. .** ensure metal stream inoculation per each mould

Conduct the actual sandcasting process

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

- PC8. .** turn valves to circulate water through cores, or spray water on filled molds to cool and solidify metal (in case of manual solidification) pc9. remove the sand moulds with metal casted in the desired shape
- PC10..** clean and lubricate metal casts and machinery as specified in the work instructions/ sops
- PC11. .** stamp the cast with the identifying information (wherever required) and send the same for further processing

Qualification Pack

Check measurement instruments for monitoring casting process parameters

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

- PC12.** . monitor the casting process (parameters like temperature etc.) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the cast from desired specifications
- PC13.** . observe and analyze any irregularity in the process and take preventive steps
- PC14.** . check the in line composition/ soundness of the casting

Perform Post casting operations

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

- PC15.** . pull out the entire mould with solidified metal from the machine
- PC16.** . hammer out the sand to obtain metal casting after a lapse of definite time
- PC17.** . use wedge cutting machines to separate the cast runner from the prepared casts
- PC18.** . perform cleaning of the metal casting through air/ water jet

Perform the visual inspection of the output to further finish the casting

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

- PC19.** . measure the final metal casting and compare the dimensions as prescribed in the work order engineering drawing
- PC20.**.. in case the parts are not as per the given measurements, send the same for further processing in terms of chipping, fettling, wedge cutting etc.

Remove surface imperfections using Shot Blasting technique

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

- PC21.**.. clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material
- PC22.** . load the components and the shots in the chamber of the shot blasting machine
- PC23.**.. ensure that the door of the shot blasting machine is tightly closed
- PC24.**.. switch on the shot blasting machine and ensure that all auxiliary motors are in the on position
- PC25.** . keep the machine in the moving position till the cycle time prescribed in the work instructions/ sop manual
- PC26.** . 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
- PC27.** . keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.
- PC28.**.. open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley
- PC29.** . ensure that the machine is again cleaned using an air blasting machine

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

Qualification Pack

- 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 casting jobs
- KU5.** different types of casting processes and associated equipment
- KU6.** different parameters pertinent to casting process like casting hardness, tensile strength, elongation and microstructure requirement etc.
- KU7.** casting defects and how they are generated, how they can be prevented, knowledge of different raw materials, ferrous alloys and consumables used in the melt shop
- KU8.** furnace operation, melting process, charging method and safety process of handling hot liquid iron, furnace lining process and control
- KU9.** measuring instruments like vernier callipers, micrometer and other measurement systems
- KU10.** metallurgical properties of the metal used in the process
- KU11.** effect of operators work on casting quality at in house and at customers, how to improve customers satisfaction
- KU12.** geometry and dimensions
- KU13.** sketches and engineering drawings
- KU14.** final product output and hence decide on the key steps to be followed
- KU15.** safety precautions to be taken for all types of casting activities
- KU16.** mechanical laws and working of machines 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 casting metal, casting 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

Qualification Pack

- 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
- GS17.** carefully measure the casting 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.** think through the problem, evaluate the possible solution and suggest the best possible solution to the problem
- GS20.** identify immediate or temporary solutions to resolve delays

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 sandcasting process</i>	4	6	-	-
PC1. check for operation of casting apparatus like molten metal carrying bucket, pouring nozzles, ladles etc.	1	2	-	-
PC2. ensure casting parameters are as per the batch specifications laid down by the laboratory team	2	2	-	-
PC3. make modifications in the casting parameters if required and ensure alignment with the prescribed standards	1	2	-	-
<i>Pour the metal into mould</i>	5	9	-	-
PC4. turn valves of machines to regulate speed of the metal into moulds through runners	1	2	-	-
PC5. ensure pouring in line with the defined work standards and specifications and minimization of metal spillage in the work area; record the pouring observations like parting leak, gas evolution, interrupted pouring or any abnormality	1	2	-	-
PC6. maintain downsprue always full during pouring as per the process mentioned in the work instructions/ sops	1	2	-	-
PC7. ensure metal stream inoculation per each mould	2	3	-	-
<i>Conduct the actual sandcasting process</i>	3	6	-	-
PC8. turn valves to circulate water through cores, or spray water on filled molds to cool and solidify metal (in case of manual solidification) pc9. remove the sand moulds with metal casted in the desired shape	1	2	-	-
PC10. clean and lubricate metal casts and machinery as specified in the work instructions/ sops	1	2	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. . stamp the cast with the identifying information (wherever required) and send the same for further processing	1	2	-	-
<i>Check measurement instruments for monitoring casting process parameters</i>	3	8	-	-
PC12. . monitor the casting process (parameters like temperature etc.) by observing and analyzing the readings on various panels/ meters to prevent machine breakdown and deviations of the cast from desired specifications	1	2	-	-
PC13. . observe and analyze any irregularity in the process and take preventive steps	1	3	-	-
PC14. . check the in line composition/ soundness of the casting	1	3	-	-
<i>Perform Post casting operations</i>	4	10	-	-
PC15. . pull out the entire mould with solidified metal from the machine	1	3	-	-
PC16. . hammer out the sand to obtain metal casting after a lapse of definite time	1	2	-	-
PC17. . use wedge cutting machines to separate the cast runner from the prepared casts	1	2	-	-
PC18. . perform cleaning of the metal casting through air/ water jet	1	3	-	-
<i>Perform the visual inspection of the output to further finish the casting</i>	2	4	-	-
PC19. . measure the final metal casting and compare the dimensions as prescribed in the work order engineering drawing	1	2	-	-
PC20. in case the parts are not as per the given measurements, send the same for further processing in terms of chipping, fettling, wedge cutting etc.	1	2	-	-
<i>Remove surface imperfections using Shot Blasting technique</i>	9	27	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21.. clean the shot blasting machine using air pressure blast to remove any dust particles and any unwanted material	1	3	-	-
PC22. . load the components and the shots in the chamber of the shot blasting machine	1	3	-	-
PC23.. ensure that the door of the shot blasting machine is tightly closed	1	3	-	-
PC24.. switch on the shot blasting machine and ensure that all auxiliary motors are in the on position	1	3	-	-
PC25. . keep the machine in the moving position till the cycle time prescribed in the work instructions/ sop manual	1	3	-	-
PC26. . 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	-	-
PC27. . keep the machine moving till the prescribed cycle time is achieved. ensure that the cycle time get completed for both the cycles.	1	3	-	-
PC28.. open the shot blasting machine and carefully remove the components from the machine and load them into the designated trolley	1	3	-	-
PC29. . ensure that the machine is again cleaned using an air blasting machine	1	3	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3220
NOS Name	Perform the sand casting related operations and monitor process parameters
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015
NSQC Clearance Date	20/07/2015

Qualification Pack

ASC/N3221: Conduct quality checks and inspection of the finished sand cast products

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 operator will be responsible for

- inspection of finished goods to detect any deviations
- record logs of defective products
- repair the pieces with minor defects The job holder will cover all types casting methods . The role holder will interact with the maintenance team, machining and material management team

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, vernier calipers, 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
- 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 excess slag, shape deformation, sharp edges, rough surfaces, grooves, holes etc. by fettling, chipping, cutting, sawing, filling, shearing, hammering etc.
- PC9. .** escalate all issues related to change in colour, surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the specified output

Perform Batch Quality Procedure

Qualification Pack

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

- PC10.** . provide first and last casting from each batch to the lab for quality check on its composition, soundness, nodularity 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.** methods used for cutting, shearing, hammering, drilling which can repair pieces with minor defects
- KU8.** various standards in india (ISO)

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

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>	6	14	-	-
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	3	7	-	-
PC2. . compare texture, color, surface properties, hardness and strength with the given product specifications	3	7	-	-
<i>Record log of defective products and discard defective pieces</i>	13	31	-	-
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	3	6	-	-
PC5. . discard the pieces which are beyond repair and repair the ones which need minor modifications/ rework	3	6	-	-
PC6. . maintain records of each category of work outputs	2	7	-	-
PC7. . establish linkage between rejection of output and the pertinent causes for the same (process/ material etc.); recommend the means for rejection control	3	6	-	-
<i>Repair the pieces with minor defects</i>	6	12	-	-
PC8. . rectify minor defects like excess slag, shape deformation, sharp edges, rough surfaces, grooves, holes etc. by fettling, chipping, cutting, sawing, filling, shearing, hammering etc.	3	6	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. . escalate all issues related to change in colour, surface properties, hardness etc. so that the manufacturing equipment can be reset to achieve the specified output	3	6	-	-
<i>Perform Batch Quality Procedure</i>	5	13	-	-
PC10. . provide first and last casting from each batch to the lab for quality check on its composition, soundness, nodularity etc.	2	7	-	-
PC11. .. obtain batch clearance from the lab	3	6	-	-
NOS Total	30	70	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N3221
NOS Name	Conduct quality checks and inspection of the finished sand cast products
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	casting
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	20/10/2013
Next Review Date	31/12/2015

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.

Minimum Aggregate Passing % at QP Level : 70

Qualification Pack

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

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	10
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	10
ASC/N3214.Understand and interpret engineering drawings and sketches related to casting	30	70	-	-	100	10
ASC/N3215.Understand Casting and sand moulding processes and equipment requirement to complete the task	30	70	-	-	100	10
ASC/N3216.Prepare the machine (apparatus) and auxiliaries	25	75	-	-	100	10
ASC/N3217.Perform the sand making related operations and monitor process parameters	25	75	-	-	100	10
ASC/N3218.Perform the core making related operations and monitor process parameters	30	70	-	-	100	10
ASC/N3219.Perform the mould making related operations and monitor process parameters	25	75	-	-	100	10

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N3220.Perform the sand casting related operations and monitor process parameters	30	70	-	-	100	10
ASC/N3221.Conduct quality checks and inspection of the finished sand cast products	30	70	-	-	100	10
Total	275	725	-	-	1000	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.