

# Tool Room Operator

QP Code: ASC/Q4101

NSQF Level: 4

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## Qualification Pack

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## Qualification Pack

### ASC/Q4101: Tool Room Operator

#### Brief Job Description

Tool room operator covers operations of different machine tools performed both manually and through automatic/ CNC machines/ robots. This role primarily involves all kinds of machining and in-line inspection activities for quality verification, ad hoc repair work, change of worn out parts, gauging and de-burring activities. The operator also looks after the various tool assembly processes.

#### Personal Attributes

The individual should be detailed oriented, observant; should have the ability of operation monitoring i.e., observing gauges , dials etc., good level of hand eye coordination, maintaining arm steadiness, ability to quickly move hand to grasp and assemble objects (Dexterity), high precision working ,reading, writing and communication skills, eye for detail and sensitivity towards safety for self and equipment. The role holder should also be able to visualize the final product output from the 2D drawing supplied to him by the design team.

#### 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/N4101: Understand the machining and assembling processes and equipment requirements to complete the task](#)
4. [ASC/N4102: Prepare the machine, auxiliary apparatus and metal work pieces for manufacturing and assembly of Tools and Dies](#)
5. [ASC/N4103: Performing the Tool and Die manufacturing operations](#)
6. [ASC/N4104: Performing the Tool and Die assembly operations](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Tool Room Operator
<b>Country</b>	India

### Qualification Pack

<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7223.0200
<b>Minimum Educational Qualification &amp; Experience</b>	I.T.I (Mechanical) with 2-3 years of experience in Tool Room/Machinist OR I.T.I (Mechanical) OR I.T.I (Mechanical)
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	Basic tool manufacturing and assembly Usage of assembly tools 5S and Safety Problem solving Quality Management
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	06/11/2013
<b>Next Review Date</b>	31/03/2020
<b>NSQC Approval Date</b>	20/07/2015
<b>Version</b>	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>	<b>8</b>	<b>23</b>	-	-
<b>PC1..</b> Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	3	6	-	-
<b>PC2.</b> Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc	2	6	-	-
<b>PC3.</b> Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations	2	6	-	-
<b>PC4.</b> 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>	<b>17</b>	<b>52</b>	-	-
<b>PC5..</b> Follow the instructions given on the equipment manual describing the operating process of the equipments	3	7	-	-
<b>PC6..</b> Follow the Safety, Health and Environment related practices developed by the organization	3	8	-	-
<b>PC7.</b> Operate the machine using the recommended Personal Protective Equipments (PPE)	3	8	-	-
<b>PC8. .</b> 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	-	-
<b>PC9.</b> Maintain high standards of personal hygiene at the work place	2	7	-	-
<b>PC10.</b> 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
<b>PC11.</b> 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	-	-
<b>NOS Total</b>	<b>25</b>	<b>75</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

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

## Qualification Pack

### ASC/N0021: Maintain 5S at the work premises

#### Description

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

#### Elements and Performance Criteria

##### *Ensure sorting*

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

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

##### *Ensure proper documentation and storage ( organizing , streamlining)*

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

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

##### *Ensure cleaning of self and the work place*

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

- PC14.** check whether safety glasses are clean and in good condition
- PC15.** keep all outside surfaces of recycling containers are clean
- PC16..** ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards

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- PC17..** check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up
- PC18..** ensure workbenches and work surfaces are clean and in good condition
- PC19.** follow the cleaning schedule for the lighting system to ensure proper illumination
- PC20.** store the cleaning material and equipment in the correct location and in good condition
- PC21.** ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene

### *Ensure sustenance*

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

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

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

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

## Generic Skills (GS)

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

- GS1.** write basic level notes and observations

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

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure sorting</i>	<b>10</b>	<b>30</b>	-	-
<b>PC1..</b> 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	-	-
<b>PC2..</b> ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions	1	3	-	-
<b>PC3..</b> follow the technique of waste disposal and waste storage in the proper bins as per sop	1	3	-	-
<b>PC4..</b> segregate the items which are labelled as red tag items for the process area and keep them in the correct places	1	3	-	-
<b>PC5.</b> 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	-	-
<b>PC6. .</b> ensure that areas of material storage areas are not overflowing	1	3	-	-
<b>PC7.</b> 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	-	-
<b>PC8.</b> 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	-	-
<b>PC9.</b> follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards	1	3	-	-
<b>PC10.</b> 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>	<b>3</b>	<b>9</b>	-	-
<b>PC11.</b> check that the items in the respective areas have been identified as broken or damaged	1	3	-	-
<b>PC12.</b> 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	-	-
<b>PC13.</b> 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>	<b>8</b>	<b>24</b>	-	-
<b>PC14.</b> check whether safety glasses are clean and in good condition	1	3	-	-
<b>PC15.</b> keep all outside surfaces of recycling containers are clean	1	3	-	-
<b>PC16..</b> 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	-	-
<b>PC17..</b> check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up	1	3	-	-
<b>PC18..</b> ensure workbenches and work surfaces are clean and in good condition	1	3	-	-
<b>PC19.</b> follow the cleaning schedule for the lighting system to ensure proper illumination	1	3	-	-
<b>PC20.</b> store the cleaning material and equipment in the correct location and in good condition	1	3	-	-
<b>PC21.</b> ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene	1	3	-	-
<i>Ensure sustenance</i>	<b>4</b>	<b>12</b>	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC22.</b> follow the daily cleaning standards and schedules to create a clean working environment	1	3	-	-
<b>PC23.</b> attend all training programs for employees on 5 s	0.5	2	-	-
<b>PC24.</b> support the team during the audit of 5 s	1	3	-	-
<b>PC25.</b> participate actively in employee work groups on 5s and encourage team members for active participation	0.5	2	-	-
<b>PC26.</b> 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	-	-
<b>NOS Total</b>	<b>25</b>	<b>75</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

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

## Qualification Pack

# ASC/N4101: Understand the machining and assembling processes and equipment requirements to complete the task

## Description

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

## Scope

The tool room operator will be responsible for understanding the process and equipment requirements escalations of any queries regarding the job The job holder will cover tool & die manufacturing methods like machining, grinding and assembly processes like fitting, bolting, tightening for manufacturing of tools and dies. The role holder will interact with the tool designer, maintenance team and material management team

- understanding the process and equipment requirements
- escalations of any queries regarding the job

## Elements and Performance Criteria

*Understand the machining & assembling requirements, equipment and parameters to be set for the process*

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

- PC1.** . ensure that all the drawings, sketches and models are understood at the beginning of the process to finalize the operations to be performed by the operator
- PC2.** . ensure accurate understanding of the geometric dimensions and tolerance before initiating the tool and die making process
- PC3.** . understand the right machining & assembling methodology and process to be adopted for completing the work order through discussions with the supervisor/ master technician and reading the process manuals/ work instructions/standard operating procedures
- PC4.** . understand the various machining processes (manual as well as on cnc) like grinding, tapering , milling , boring , cutting etc. which will be required during the tool making and die making process
- PC5.** . understand the material required and the equipment availability for executing the activity
- PC6.** . understand the various assembling process parameters like cycle time, fitting tolerances, torque application, bolting and fastening before starting the assembling process, as mentioned in the work instructions/ sop manual
- PC7.** . understand 5 s related to the work station and line area
- PC8.** . clearly understanding the do's and don'ts of the manufacturing process as defined in sops/ work instructions or defined by supervisors

*Escalations of queries on the given job*

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

- PC9.** . in case while understanding the drawings and sketches some problems are observed, ensure that they are highlighted to the design team

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- PC10.** . refer the queries to a competent internal specialist if they cannot be resolved by the operator on own
- PC11..** obtain help or advice from specialist if the problem is outside his/her area of competence or experience
- PC12.** . confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** 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.** how to read engineering drawings, sketches, work orders
- KU5.** Geometric Dimension and Tolerance limits
- KU6.** different types of machining tools like Electric Discharge Machine based Machining operations, Vertical Machining Centre, rub machining and wire cutting etc.
- KU7.** different types of processes like drilling, fitting, grinding boring, cutting
- KU8.** different types of assembling processes like bolting, torqueing and tightening and associated equipment
- KU9.** the method of reading and interpreting the various measurement gauges
- KU10.** how to visualize the final product output and conduct quality verification tests.
- KU11.** the impact of various physical parameters like machining, torqueing and tightening on the properties of final output product
- KU12.** hazards and safety aspects involved in assembling activities and usage of relevant PPEs

## Generic Skills (GS)

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

- GS1.** document the available information
- GS2.** note down observations (if any) in the given format
- 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 technical specifications of the specimen
- GS5.** read equipment manuals and process documents to understand the equipments and processes better
- GS6.** read internal information documents sent by internal teams
- GS7.** read and interpret technical customer drawings
- GS8.** read engineering drawings and symbols used in drawings and sketches
- GS9.** discuss task lists, schedules and activities with the supervisor

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- GS10.** effectively communicate with the team members
- GS11.** question the shop supervisor in order to understand the nature of the problem and to clarify queries
- GS12.** attentively listen with full attention and comprehend the information given by the speaker
- GS13.** plan and organize the work order and jobs received from the Operator
- GS14.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS15.** support the supervisor in scheduling tasks for tool room helper
- GS16.** use common sense and make judgments during day to day basis
- GS17.** use reasoning skills to identify and resolve basic problems use intuition and keen observation skills to detect any potential problems which could arise during operations
- GS18.** follow instructions and work on areas of improvement identified
- GS19.** complete the assigned tasks with minimum supervision
- GS20.** complete the job defined by the supervisor within timelines and quality norms
- GS21.** detect problems in day to day tasks
- GS22.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS23.** discuss possible solution with the supervisor for problem solving
- GS24.** make decisions in emergency conditions in case the supervisor is not available( as per the authority matrix defined by the organization)

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Understand the machining &amp; assembling requirements, equipment and parameters to be set for the process</i>	<b>20</b>	<b>50</b>	-	-
<b>PC1.</b> . ensure that all the drawings, sketches and models are understood at the beginning of the process to finalize the operations to be performed by the operator	3	6	-	-
<b>PC2.</b> . ensure accurate understanding of the geometric dimensions and tolerance before initiating the tool and die making process	3	6	-	-
<b>PC3.</b> . understand the right machining & assembling methodology and process to be adopted for completing the work order through discussions with the supervisor/ master technician and reading the process manuals/ work instructions/standard operating procedures	3	7	-	-
<b>PC4.</b> . understand the various machining processes (manual as well as on cnc) like grinding, tapering , milling , boring , cutting etc. which will be required during the tool making and die making process	2	7	-	-
<b>PC5.</b> . understand the material required and the equipment availability for executing the activity	2	5	-	-
<b>PC6..</b> understand the various assembling process parameters like cycle time, fitting tolerances, torque application, bolting and fastening before starting the assembling process, as mentioned in the work instructions/ sop manual	2	6	-	-
<b>PC7.</b> . understand 5 s related to the work station and line area	3	7	-	-
<b>PC8.</b> . clearly understanding the do's and don'ts of the manufacturing process as defined in sops/ work instructions or defined by supervisors	2	6	-	-
<i>Escalations of queries on the given job</i>	<b>8</b>	<b>22</b>	-	-
<b>PC9..</b> in case while understanding the drawings and sketches some problems are observed, ensure that they are highlighted to the design team	2	6	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> . refer the queries to a competent internal specialist if they cannot be resolved by the operator on own	2	6	-	-
<b>PC11.</b> .. obtain help or advice from specialist if the problem is outside his/her area of competence or experience	2	5	-	-
<b>PC12.</b> . confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution	2	5	-	-
<b>NOS Total</b>	<b>28</b>	<b>72</b>	-	-

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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N4101
<b>NOS Name</b>	Understand the machining and assembling processes and equipment requirements to complete the task
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Tool Room Supervisor
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	06/11/2013
<b>Next Review Date</b>	06/11/2013
<b>NSQC Clearance Date</b>	

## Qualification Pack

# ASC/N4102: Prepare the machine, auxiliary apparatus and metal work pieces for manufacturing and assembly of Tools and Dies

## Description

This NOS unit is about preparing the surface of the metal parts by removing dust, moistures etc., cleaning the manufacturing and assembling apparatus and installing the metal parts on the manufacturing and assembling machine

## Scope

The tool room operator will be responsible for arranging for equipment and material required for the tool/ die design cleaning the equipment and setting the same for the process escalations of any queries The job holder will cover tool & die manufacturing methods like machining, grinding and assembly processes like fitting, bolting, tightening for manufacturing of tools and dies. The role holder will interact with the tool designer, maintenance team and material management team

- arranging for equipment and material required for the tool/ die design
- cleaning the equipment and setting the same for the process
- escalations of any queries

## Elements and Performance Criteria

### *Arrange for working equipment and material*

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

- PC1.** . understand the material required and the equipment availability for executing the activity
- PC2..** ensure that the related engineering drawings and sketches are available before starting the tool & die manufacturing process
- PC3.** . ensure that the required material is procured from the store before starting the machining process
- PC4.** . ensure that the helper/ assistant technician brings the required material and tools before the start of the assembling operations
- PC5.** . ensure that the machines like grinders, lather machines, CNC operator wire cut and EDM machines and tools like bolting guns, rivet guns, nuts, bolts, screw drivers, wrenches, hacksaws, hammers etc. required for tool & die manufacturing and assembly are available for operations
- PC6.** . ensure that the correct machine specifications are set in the machine before the start of operation

### *Clean the machining/assembling equipment before executing the operations and setup the equipment*

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

- PC7.** . ensure that the helper/ assistant operator cleans the surface of the machines ( wire cutting/ EDM/ assembly tools) to remove dust and any other impurities like grease, oil, paint etc.
- PC8.** . ensure that the assembly apparatus is setup as per the selected assembling process and the internal sops/ work instructions and the setting standards for the machine
- PC9.** . ensure that the calibration of the manufacturing tools and measuring tools is accurate

## Qualification Pack

### *Escalations of queries for the given job*

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

- PC10..** immediately refer the queries to the supervisor to avoid any delay in the actual process
- PC11..** confirm self-understanding to the supervisor/ master technician during the discussions so that all doubts & queries can be resolved before the actual process execution

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** 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 machining processes like grinding , broaching , tapering, wire cutting , honing etc.
- KU5.** how to read and interpret engineering drawings, sketches and models provided the tool and die design team
- KU6.** how to use manual as well as CNC operated machines and tools
- KU7.** how to use wire cutting and EDM machines
- KU8.** different types of joining/ assembling processes like welding, brazing, tightening, riveting, bolting and equipment associated with these processes
- KU9.** the impact of various physical parameters like torqueing and tightening on the properties of final output product like durability, surface finish, part movement, aesthetics
- KU10.** the method of reading and interpreting the various measurement gauges
- KU11.** Basics of algebra and trigonometry
- KU12.** how to visualize the final product output
- KU13.** hazards and safety aspects involved in assembling activities and usage of relevant PPEs

## Generic Skills (GS)

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

- GS1.** document information
- GS2.** note down observations (if any) related to the process
- 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 technical specifications of the assemble specimen
- GS5.** read equipment manuals and process documents to understand the equipments and processes better
- GS6.** read internal information documents sent by internal teams
- GS7.** read and interpret engineering drawings
- GS8.** discuss task lists, schedules and activities with the supervisor

## Qualification Pack

- GS9.** effectively communicate with the team members
- GS10.** question the supervisor in order to understand the nature of the problem and to clarify queries
- GS11.** attentively listen with full attention and comprehend the information given by the speaker
- GS12.** plan and organize the work order and jobs received from the Operator
- GS13.** organize all process/ equipment manuals so that sorting/ accessing information is easy
- GS14.** visualize the final job product after understanding the given drawing/ sketches
- GS15.** co relate the type of job output required with the machining/assembling methodology to be used
- GS16.** identify the strengths and weakness of various assembling process
- GS17.** use common sense and make judgments during day to day basis
- GS18.** use reasoning skills to identify and resolve basic problems
- GS19.** follow instructions and work on areas of improvement identified and complete the assigned tasks with minimum supervision
- GS20.** complete the job defined by the supervisor within the timelines and quality norms
- GS21.** 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>Arrange for working equipment and material</i>	<b>17</b>	<b>38</b>	-	-
<b>PC1.</b> . understand the material required and the equipment availability for executing the activity	2	6	-	-
<b>PC2..</b> ensure that the related engineering drawings and sketches are available before starting the tool & die manufacturing process	3	6	-	-
<b>PC3.</b> . ensure that the required material is procured from the store before starting the machining process	3	6	-	-
<b>PC4.</b> . ensure that the helper/ assistant technician brings the required material and tools before the start of the assembling operations	3	6	-	-
<b>PC5.</b> . ensure that the machines like grinders, lather machines, CNC operator wire cut and EDM machines and tools like bolting guns, rivet guns, nuts, bolts, screw drivers, wrenches, hacksaws, hammers etc. required for tool & die manufacturing and assembly are available for operations	3	7	-	-
<b>PC6.</b> . ensure that the correct machine specifications are set in the machine before the start of operation	3	7	-	-
<i>Clean the machining/assembling equipment before executing the operations and setup the equipment</i>	<b>9</b>	<b>20</b>	-	-
<b>PC7.</b> . ensure that the helper/ assistant operator cleans the surface of the machines ( wire cutting/ EDM/ assembly tools) to remove dust and any other impurities like grease, oil, paint etc.	3	6	-	-
<b>PC8.</b> . ensure that the assembly apparatus is setup as per the selected assembling process and the internal sops/ work instructions and the setting standards for the machine	3	7	-	-
<b>PC9.</b> . ensure that the calibration of the manufacturing tools and measuring tools is accurate	3	7	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Escalations of queries for the given job</i>	4	12	-	-
<b>PC10..</b> immediately refer the queries to the supervisor to avoid any delay in the actual process	2	6	-	-
<b>PC11..</b> confirm self-understanding to the supervisor/ master technician during the discussions so that all doubts & queries can be resolved before the actual process execution	2	6	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N4102
<b>NOS Name</b>	Prepare the machine, auxiliary apparatus and metal work pieces for manufacturing and assembly of Tools and Dies
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Tool Room Supervisor
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	06/11/2013
<b>Next Review Date</b>	06/11/2013
<b>NSQC Clearance Date</b>	

## Qualification Pack

### ASC/N4103: Performing the Tool and Die manufacturing operations

#### Description

This NOS is about manufacturing the tool/ die using various machining techniques, conducting quality inspections and fitting the tool/ die at the customer end

#### Scope

The tool room operator will be responsible for using special purpose/ CNC operated machines for manufacturing tools and dies maintaining data of production and rejection escalations of any queries The job holder will cover tool & die manufacturing methods like machining, grinding and assembly processes like fitting, bolting, tightening for manufacturing of tools and dies. The role holder will interact with the tool designer, maintenance team and material management team

- using special purpose/ CNC operated machines for manufacturing tools and dies
- maintaining data of production and rejection
- escalations of any queries

#### Elements and Performance Criteria

*Carry out tool and die manufacturing activities using Special Purpose Machines, manual machining tools, and wire cutting machines*

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

- PC1.** . ensure that the operator receives the 2D drawing from the design team
- PC2.** . study the drawings/ sketches to understand the operations to be performed by the operator/ machinist and plan sequences of operations for fabricating tools, dies or assemblies
- PC3..** select metals to be used based on properties like hardness and tolerance for forming the tool
- PC4.** . measure and mark the metal to lay out machining using instruments such as protractors or micrometres
- PC5.** . lift the work pieces/ metal blocks on the working platform using appropriate lifting tools like hoists, cranes, chain pulley, angle plates
- PC6..** ensure that the work pieces are sized as per the requirement using power operated/ manual/ automatic cutting tools like hacksaws, sawing blades
- PC7.** . conduct rough machining for initial block sizing. ensure that the block is properly bolted on the machining block and machining activities are carried out as per the product requirement
- PC8..** operate cnc machines like lathes, milling machines, boring machines and grinders to cut , bore , grind the material to achieve the prescribed shape and dimension
- PC9..** ensure that the right program is selected for operating the CNC machine tools
- PC10.** . in case of manual tools, ensure correct setting of drill presses, boring tools, hacksaws, grinders as per the process requirement mentioned in the work instructions/ sop manuals
- PC11.** . cut , shape and trim blanks to specified lengths or shapes using the CNC machines

## Qualification Pack

- PC12.** . use wire cutting and vertical machining centre technique to cut the blocks into separate pieces
- PC13.**.. ensure that the metal block is properly loaded on the VMC machine to mill the block as per requirement
- PC14.** . ensure that the machine operations are regularly monitored to detect any malfunctions in machine operations or any out of tolerance machining
- PC15.** . verify the conformance of the output product to the specifications mentioned in the work instructions/ sops using precision measurement tools
- PC16.**.. ensure that routine maintenance activities are carried out by the operator as per the checklist provided by the maintenance team
- PC17.** . ensure that any impurities like grease, oil, dust, rust etc. is periodically cleaned from the machining equipment

### *Creation of through holes using Electric Discharge Machining (EDM)*

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

- PC18.**.. use electric discharge machining to hole out blind spots and also to create hole in the die formation plate/ metal work plate
- PC19.** . setup the electrodes of the edm machine and measure the distance between the electrodes as mentioned in the work instructions/ sops
- PC20.**.. ensure that the correct current and voltage are selected for the edm process
- PC21.** . ensure that the work piece/ metal piece is carefully loaded on the edm machine surface tables/ work platform using manual/ automatic tools
- PC22.** . ensure that there is uniform flow of dielectric liquid i.e. flushing of the dielectric liquid to remove any debris which would have collected during the edm process
- PC23.**.. ensure that the machine operations are regularly monitored to detect any malfunctions in machine operations or any out of tolerance machining
- PC24.** . ensure that the electrode properties like surface, dimensions, metallurgical properties are periodically checked as per the checklist provided
- PC25.** . ensure that the electrodes are changed in case there is a deviation from the specifications

### *Documentation and record keeping*

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

- PC26.** . ensure all records related to production of tools and die is maintained in the format used by the organization/ process mentioned in the work instructions
- PC27.**.. ensure that proper data related to rejections and bad quality is separately maintained as per the internal processes
- PC28.** . report any issues observed during record keeping to the supervisor in a timely manner

## 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.** quality management practices of the organization
- KU4.** basic preparation process of machine and machine settings

## Qualification Pack

- KU5.** operations for various machining related tools
- KU6.** the method of reading and interpreting the various drawings ( 2D, 3D and line sketches)
- KU7.** knowledge of punch setting, operating presses and stoning operations
- KU8.** types of jigs, fixtures and dies used in the tooling process
- KU9.** usage of tri squares, geometry squares to check for perpendicularism in two joining parts
- KU10.** manufacturing processes like milling , grinding , boring, turning etc through manual/ CNC operated machines
- KU11.** process related to welding and assembly of tools, fixtures and dies
- KU12.** how to operate wire cut machines and EDM machines used for die making
- KU13.** metallurgical properties of various metals/ alloys used for die and tool preparation
- KU14.** how to use lifting tools like hoists, cranes, clamps etc.
- KU15.** how to use various measuring gauges like vernier calipers, micrometers, thickness gauges, dial indicators
- KU16.** Basic algebra and trigonometric rules
- KU17.** how to visualize the final product output and conduct quality verification tests
- KU18.** manufacturing defects associated with the machining and related processes and impact of the defects on the final product output

## Generic Skills (GS)

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

- GS1.** document information
- GS2.** note down observations (if any) related to the design aspect
- 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 technical 2D drawings
- GS5.** read and understand the various tolerances and specifications for the product
- GS6.** read internal information documents sent by internal teams
- GS7.** discuss task lists, schedules and activities with the supervisor
- GS8.** effectively communicate with the team members
- GS9.** question the customer in order to understand the nature of the problem and to clarify queries
- GS10.** attentively listen with full attention and comprehend the information given by the speaker
- GS11.** plan and organize the work order and jobs received
- GS12.** plan and organize the design/ process/quality documents received from internal customers
- GS13.** organize all manuals so that sorting out information is fast
- GS14.** carefully analyse the 2D drawing for various customer specifications
- GS15.** carefully do the manufacturing and assembly operations with relevant actions as listed in SOP/WI
- GS16.** detect problems in day to day tasks

## Qualification Pack

- GS17.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS18.** discuss possible solution with the supervisor for problem solving
- GS19.** make decisions in emergency conditions in case the supervisor is not available( as per the authority matrix defined by the organization)
- GS20.** identify defective parts in the manufacturing line by comparing manufactured pieces with the work standard
- GS21.** link the defect observed with the overall impact on the performance of the component

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out tool and die manufacturing activities using Special Purpose Machines, manual machining tools, and wire cutting machines</i>	19	44	-	-
<b>PC1.</b> . ensure that the operator receives the 2D drawing from the design team	1	2	-	-
<b>PC2.</b> . study the drawings/ sketches to understand the operations to be performed by the operator/ machinist and plan sequences of operations for fabricating tools, dies or assemblies	1	3	-	-
<b>PC3..</b> select metals to be used based on properties like hardness and tolerance for forming the tool	1	2	-	-
<b>PC4.</b> . measure and mark the metal to lay out machining using instruments such as protractors or micrometres	2	3	-	-
<b>PC5.</b> . lift the work pieces/ metal blocks on the working platform using appropriate lifting tools like hoists, cranes, chain pulley, angle plates	1	3	-	-
<b>PC6..</b> ensure that the work pieces are sized as per the requirement using power operated/ manual/ automatic cutting tools like hacksaws, sawing blades	1	2	-	-
<b>PC7.</b> . conduct rough machining for initial block sizing. ensure that the block is properly bolted on the machining block and machining activities are carried out as per the product requirement	1	4	-	-
<b>PC8..</b> operate cnc machines like lathes, milling machines, boring machines and grinders to cut , bore , grind the material to achieve the prescribed shape and dimension	2	4	-	-
<b>PC9..</b> ensure that the right program is selected for operating the CNC machine tools	1	2	-	-
<b>PC10.</b> . in case of manual tools, ensure correct setting of drill presses, boring tools, hacksaws, grinders as per the process requirement mentioned in the work instructions/ sop manuals	1	2	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11.</b> . cut , shape and trim blanks to specified lengths or shapes using the CNC machines	1	3	-	-
<b>PC12.</b> . use wire cutting and vertical machining centre technique to cut the blocks into separate pieces	1	3	-	-
<b>PC13..</b> ensure that the metal block is properly loaded on the VMC machine to mill the block as per requirement	1	2	-	-
<b>PC14.</b> . ensure that the machine operations are regularly monitored to detect any malfunctions in machine operations or any out of tolerance machining	1	2	-	-
<b>PC15.</b> . verify the conformance of the output product to the specifications mentioned in the work instructions/ sops using precision measurement tools	1	3	-	-
<b>PC16..</b> ensure that routine maintenance activities are carried out by the operator as per the checklist provided by the maintenance team	1	2	-	-
<b>PC17.</b> . ensure that any impurities like grease, oil, dust, rust etc. is periodically cleaned from the machining equipment	1	2	-	-
<i>Creation of through holes using Electric Discharge Machining (EDM)</i>	<b>8</b>	<b>20</b>	-	-
<b>PC18..</b> use electric discharge machining to hole out blind spots and also to create hole in the die formation plate/ metal work plate	1	3	-	-
<b>PC19.</b> . setup the electrodes of the edm machine and measure the distance between the electrodes as mentioned in the work instructions/ sops	1	3	-	-
<b>PC20..</b> ensure that the correct current and voltage are selected for the edm process	1	2	-	-
<b>PC21.</b> . ensure that the work piece/ metal piece is carefully loaded on the edm machine surface tables/ work platform using manual/ automatic tools	1	3	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC22.</b> . ensure that there is uniform flow of dielectric liquid i.e. flushing of the dielectric liquid to remove any debris which would have collected during the edm process	1	2	-	-
<b>PC23.</b> .. ensure that the machine operations are regularly monitored to detect any malfunctions in machine operations or any out of tolerance machining	1	2	-	-
<b>PC24.</b> . ensure that the electrode properties like surface, dimensions, metallurgical properties are periodically checked as per the checklist provided	1	2	-	-
<b>PC25.</b> . ensure that the electrodes are changed in case there is a deviation from the specifications	1	3	-	-
<i>Documentation and record keeping</i>	<b>3</b>	<b>6</b>	-	-
<b>PC26.</b> . ensure all records related to production of tools and die is maintained in the format used by the organization/ process mentioned in the work instructions	1	2	-	-
<b>PC27.</b> .. ensure that proper data related to rejections and bad quality is separately maintained as per the internal processes	1	2	-	-
<b>PC28.</b> . report any issues observed during record keeping to the supervisor in a timely manner	1	2	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N4103
<b>NOS Name</b>	Performing the Tool and Die manufacturing operations
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Tool Room Supervisor
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	06/11/2013
<b>Next Review Date</b>	06/11/2013
<b>NSQC Clearance Date</b>	

## Qualification Pack

### ASC/N4104: Performing the Tool and Die assembly operations

#### Description

This NOS is about assembling the tool/ die using various fitting and joining techniques , conducting quality inspections and fitting the tool/ die at the customer end

#### Scope

The tool room operator will be responsible for using methods like bolting, riveting, fastening etc. to assemble the dies and the tools. maintaining data of production and rejection escalations of any queries The job holder will cover tool & die manufacturing methods like machining, grinding and assembly processes like fitting, bolting, tightening for manufacturing of tools and dies. The role holder will interact with the tool designer, maintenance team and material management team

- using methods like bolting, riveting, fastening etc. to assemble the dies and the tools.
- maintaining data of production and rejection
- escalations of any queries

#### Elements and Performance Criteria

##### *Tool and Die Assembly*

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

- PC1..** understand the assembly operations from the assembly drawing/ blue print, work instructions/ sops supplied on the assembly line
- PC2. .** understand the right tools required for assembly and fabrication of the tool & die manufactured
- PC3. .** ensure availability of joining parts like clamps, braces, nuts, bolts, fasteners collars etc. at the assembly platform
- PC4. .** understand the correct method of the assembly operation such as angle for holding the bolting gun/ riveting gun, direction of applying torque, position of technician hand/ body to complete the assembly operation keeping in mind safe working procedures
- PC5..** read the specifications manuals and plan assembly or building operations
- PC6..** design and manufacture the jigs and fixtures for use to aid in assembly of parts
- PC7..** lift , position and secure machined parts on surface plates or worktables for assembly using appropriate equipment like hoists, chain pulleys, cranes etc
- PC8. .** fit and assemble parts to make , repair or modify tools using machine tools
- PC9. .** carefully insert the right bolts, screw, rivet in the required place in the part of be assembled
- PC10..** perform tightening of nuts and bolts using bolting guns/ riveting guns as per the required specifications for fitment of each part
- PC11..** ensure right amount of torque application for tightening the bolted components
- PC12..** join components using welding and brazing processes as per the design and specifications available with the assembly team
- PC13..** ensure any extra material on the tool & die is removed using cutting tools like hacksaws, power blades, cutting torches etc.

## Qualification Pack

- PC14..** file, shim, grind and polish flat and contoured surface of assembled tools and dies using manual files, abrasive grinding surfaces, polishing tools ( for rough polishing, fine polishing, diamond polishing and surface smoothening)
- PC15..** ensure verification of dimensions, clearances and alignment of parts and components as specified in the work instructions/ sop, using standard measurement gauges like micrometres, vernier calipers, thickness gauges and dial indicators
- PC16..** seal any potential areas of leakage and seepage which may damage the tool or die
- PC17..** conduct regular maintenance and cleaning of assembly tools and lifting tools as per the processes mentioned in the checklist
- PC18..** ensure that any type of impurities like grease, oil, dust, rust etc. should be removed from the assembly and fabrication tools

### *Tool and Die Inspection*

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

- PC19..** conduct quality inspection of the tool for various tolerances
- PC20..** ensure that the finished dies are checked for smoothness, contour conformity and defects. check the tools and dies in a green room in case facility is available with the operator
- PC21..** ensure squareness checking to measure various angles in case of joining parts
- PC22..** conduct a spotting press operation including punch setting, hard pressing, and component spotting to perform real time tests on the developed tools
- PC23..** perform the nitriding operation to harden the manufacturing tool and die
- PC24..** conduct test runs as specified in the work instructions/ sop manuals on assembled tools and dies to ensure conformance to the standards
- PC25..** support the team in conducting test trials of the tool at the customer end. key customer end tests includes checking the mounting of the dies, fitment of the die in the machine slot, production of the product sample, adherence to the product dimensions as per the specifications provided by the customer
- PC26..** in case of any deviations/ required changes, make changes in the tool/ die and conduct re-trial of the tool at the shop floor for durability and reliability
- PC27..** send the completed tool and die for packaging and despatch to the customer

### *Documentation and record keeping*

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

- PC28..** ensure all records related to production and final assembly of tools and die is maintained in the format used by the organization/ process mentioned in the work instructions
- PC29..** ensure that proper data related to rejections and bad quality is separately maintained as per the internal processes
- PC30..** report any issues observed during record keeping to the supervisor in a timely manner

## 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.** quality management practices of the organization

## Qualification Pack

- KU4.** basic preparation process of machine and machine settings
- KU5.** operations for various machining related tools
- KU6.** the method of reading and interpreting the various drawings ( 2D, 3D and line sketches)
- KU7.** knowledge of punch setting, operating presses and stoning operations
- KU8.** types of jigs, fixtures and dies used in the tooling process
- KU9.** usage of tri squares, geometry squares to check for perpendicularism in two joining parts
- KU10.** manufacturing processes like milling , grinding , boring, turning etc.
- KU11.** assembly processes like bolting, tightening, bending, jointing, sealing
- KU12.** process related to welding and assembly of tools, fixtures and dies
- KU13.** how to operate wire cut machines and EDM machines used for die making
- KU14.** metallurgical properties of various metals/ alloys used for die and tool preparation
- KU15.** how to use lifting tools like hoists, cranes, clamps etc.
- KU16.** how to use various measuring gauges like vernier calipers, micrometers, thickness gauges, dial indicators
- KU17.** how to visualize the final product output and conduct quality verification tests.

## Generic Skills (GS)

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

- GS1.** document information
- GS2.** note down observations (if any) related to the design aspect
- 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 technical 2D drawings SA5. read and understand the various tolerances and specifications for the product
- GS5.** read internal information documents sent by internal teams
- GS6.** discuss task lists, schedules and activities with the supervisor
- GS7.** effectively communicate with the team members
- GS8.** question the customer in order to understand the nature of the problem and to clarify queries
- GS9.** attentively listen with full attention and comprehend the information given by the speaker
- GS10.** plan and organize the work order and jobs received
- GS11.** plan and organize the design/ process/quality documents received from internal customers
- GS12.** organize all manuals so that sorting out information is fast
- GS13.** carefully analyse the 2D drawing for various customer specifications
- GS14.** carefully do the manufacturing and assembly operations with relevant actions as listed in SOP/WI
- GS15.** detect problems in day to day tasks
- GS16.** support supervisor in using specific problem solving techniques and detailing out the problems
- GS17.** discuss possible solution with the supervisor for problem solving

## Qualification Pack

- GS18.** make decisions in emergency conditions in case the supervisor is not available( as per the authority matrix defined by the organization)
- GS19.** identify defective parts in the manufacturing line by comparing manufactured pieces with the work standard
- GS20.** link the defect observed with the overall impact on the performance of the component

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Tool and Die Assembly</i>	<b>18</b>	<b>44</b>	-	-
<b>PC1..</b> understand the assembly operations from the assembly drawing/ blue print, work instructions/ sops supplied on the assembly line	1	2	-	-
<b>PC2. .</b> understand the right tools required for assembly and fabrication of the tool & die manufactured	1	2	-	-
<b>PC3. .</b> ensure availability of joining parts like clamps, braces, nuts, bolts, fasteners collars etc. at the assembly platform	1	2	-	-
<b>PC4. .</b> understand the correct method of the assembly operation such as angle for holding the bolting gun/ riveting gun, direction of applying torque, position of technician hand/ body to complete the assembly operation keeping in mind safe working procedures	1	2	-	-
<b>PC5..</b> read the specifications manuals and plan assembly or building operations	1	3	-	-
<b>PC6..</b> design and manufacture the jigs and fixtures for use to aid in assembly of parts	1	3	-	-
<b>PC7..</b> lift , position and secure machined parts on surface plates or worktables for assembly using appropriate equipment like hoists, chain pulleys, cranes etc	1	3	-	-
<b>PC8. .</b> fit and assemble parts to make , repair or modify tools using machine tools	1	3	-	-
<b>PC9. .</b> carefully insert the right bolts, screw, rivet in the required place in the part of be assembled	1	3	-	-
<b>PC10..</b> perform tightening of nuts and bolts using bolting guns/ riveting guns as per the required specifications for fitment of each part	1	3	-	-
<b>PC11..</b> ensure right amount of torque application for tightening the bolted components	1	2	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12..</b> join components using welding and brazing processes as per the design and specifications available with the assembly team	1	3	-	-
<b>PC13..</b> ensure any extra material on the tool & die is removed using cutting tools like hacksaws, power blades, cutting torches etc.	1	2	-	-
<b>PC14..</b> file, shim, grind and polish flat and contoured surface of assembled tools and dies using manual files, abrasive grinding surfaces, polishing tools ( for rough polishing, fine polishing, diamond polishing and surface smoothening)	1	3	-	-
<b>PC15..</b> ensure verification of dimensions, clearances and alignment of parts and components as specified in the work instructions/ sop, using standard measurement gauges like micrometres, vernier calipers, thickness gauges and dial indicators	1	2	-	-
<b>PC16..</b> seal any potential areas of leakage and seepage which may damage the tool or die	1	2	-	-
<b>PC17..</b> conduct regular maintenance and cleaning of assembly tools and lifting tools as per the processes mentioned in the checklist	1	2	-	-
<b>PC18..</b> ensure that any type of impurities like grease, oil, dust, rust etc. should be removed from the assembly and fabrication tools	1	2	-	-
<i>Tool and Die Inspection</i>	<b>9</b>	<b>21</b>	-	-
<b>PC19..</b> conduct quality inspection of the tool for various tolerances	1	2	-	-
<b>PC20..</b> ensure that the finished dies are checked for smoothness, contour conformity and defects. check the tools and dies in a green room in case facility is available with the operator	1	2	-	-
<b>PC21..</b> ensure squareness checking to measure various angles in case of joining parts	1	2	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC22..</b> conduct a spotting press operation including punch setting, hard pressing, and component spotting to perform real time tests on the developed tools	1	3	-	-
<b>PC23..</b> perform the nitriding operation to harden the manufacturing tool and die	1	3	-	-
<b>PC24..</b> conduct test runs as specified in the work instructions/ sop manuals on assembled tools and dies to ensure conformance to the standards	1	3	-	-
<b>PC25..</b> support the team in conducting test trials of the tool at the customer end. key customer end tests includes checking the mounting of the dies, fitment of the die in the machine slot, production of the product sample, adherence to the product dimensions as per the specifications provided by the customer	1	2	-	-
<b>PC26..</b> in case of any deviations/ required changes, make changes in the tool/ die and conduct retrial of the tool at the shop floor for durability and reliability	1	2	-	-
<b>PC27..</b> send the completed tool and die for packaging and despatch to the customer	1	2	-	-
<i>Documentation and record keeping</i>	<b>3</b>	<b>5</b>	-	-
<b>PC28..</b> ensure all records related to production and final assembly of tools and die is maintained in the format used by the organization/ process mentioned in the work instructions	1	2	-	-
<b>PC29..</b> ensure that proper data related to rejections and bad quality is separately maintained as per the internal processes	1	2	-	-
<b>PC30..</b> report any issues observed during record keeping to the supervisor in a timely manner	1	1	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N4104
<b>NOS Name</b>	Performing the Tool and Die assembly operations
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Tool Room Supervisor
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	06/11/2013
<b>Next Review Date</b>	06/11/2013
<b>NSQC Clearance Date</b>	

## Qualification Pack

### Assessment Guidelines and Assessment Weightage

#### Assessment Guidelines

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

**Recommended Pass % aggregate for QP : 70**

#### Assessment Weightage

##### Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	15
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	10
ASC/N4101.Understand the machining and assembling processes and equipment requirements to complete the task	28	72	-	-	100	20

### Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N4102.Prepare the machine, auxiliary apparatus and metal work pieces for manufacturing and assembly of Tools and Dies	30	70	-	-	100	10
ASC/N4103.Performing the Tool and Die manufacturing operations	30	70	-	-	100	25
ASC/N4104.Performing the Tool and Die assembly operations	30	70	-	-	100	20
<b>Total</b>	<b>168</b>	<b>432</b>	<b>-</b>	<b>-</b>	<b>600</b>	<b>100</b>

## Qualification Pack

### Acronyms

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

## Qualification Pack

### Glossary

<b>Sector</b>	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.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	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.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	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.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	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.
<b>Scope</b>	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

<b>Knowledge and Understanding (KU)</b>	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.
<b>Organisational Context</b>	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.
<b>Technical Knowledge</b>	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
<b>Core Skills/ Generic Skills (GS)</b>	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.
<b>Electives</b>	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.
<b>Options</b>	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.