सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack

Transforming the skill landscape

Process Design Engineer Level 6

QP Code: ASC/Q6404

Version: 1.0

NSQF Level: 6

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

Contents

ASC/Q6404: Process Design Engineer Level 6

Brief Job Description

Individuals at this job need to design, develop andevaluate integrated systems for achieving QCD of the production process.

Personal Attributes

This job requires the individual to work independently and be comfortable in making decisions pertaining to his/her area of work. The individual should be result oriented. The individual should also be able to demonstrate skills for CFT-teamwork information ordering, oral expression, mathematical and deductive reasoning and comprehension.

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/N6410: Design the Process Flow & Operations ; Selection of equipment
4. ASC/N6411: Process Review Plan, Conduct , Document

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Process Engineering
Country	India
NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2144.0101
Minimum Educational Qualification & Experience	B.E./B.Tech (Industrial/Production/Mechanical Engineering) with 5-10 Years of experience Manufacturing department OR Certificate (ASDC Process /Tool Designer L5) with 3-5 Years of experience

Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Basic statistics fundamentals training courses
Minimum Job Entry Age	18 Years
Last Reviewed On	23/09/2013
Next Review Date	30/06/2020
Deactivation Date	30/06/2020
NSQC Approval Date	28/09/2015
Version	1.0

ASC/N0006: Maintain a safe and healthy working environment

Description

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

Scope

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

Elements and Performance Criteria

Identify and report the risks identified

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

PC1.. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise

PC2. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc

PC3. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations

PC4. Create awareness amongst other by sharing information on the identified risks

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

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

PC5.. Follow the instructions given on the equipment manual describing the operating process of the equipments

PC6.. Follow the Safety, Health and Environment related practices developed by the organization

PC7. Operate the machine using the recommended Personal Protective Equipments (PPE)

PC8. . Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc

PC9. Maintain high standards of personal hygiene at the work place

PC10. Ensure that the waste disposal is done in the designated area and manner as per organization SOP.

PC11. Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

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

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 risksassociated with the tools/ equipment

KU6. knowledge of personal hygiene and how an individual an 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. informemployees 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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify and report the risks identified	**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	-	-
Create and sustain a Safe, clean and environment friendly work place	**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	-	-

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**	**-**	**-**

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

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:

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 goodcondition 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
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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensure sorting	**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	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Ensure proper documentation and storage (organizing , streamlining)	**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	-	-
Ensure cleaning of self and the work place	**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 goodcondition 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	-	-
Ensure sustenance	**4**	**12**	**-**	**-**

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**	**-**	**-**

National Occupational Standards (NOS) Parameters

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

ASC/N6410: Design the Process Flow & Operations ; Selection of equipment

Description

This OS unit is about the process design engineer applying his process knowledge to design the process flow steps / operations & selection of the Equipment to conduct the manufacturing process to achieve the product characteristics, in pre-determined cycle time and cost

Scope

The unit/ task covers the following:

- studying drawings and tolerances for the new product
- analyzing and evaluating the existing manufacturing process of the product
- analyzing the drawings for new tools/equipments
- analyzing the equipment available & selection to meet planned QCT
- breaking down total process in operations at each work station and arrive at the Process Flow Integrate the base equipment with auxiliary equipment & controls/ automation

Elements and Performance Criteria

Study of drawings and tolerances

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

PC1. collect all the CAD software engineering drawings for the new product and study them thoroughly

PC2. study the dimensional tolerances of the new product using GD&T and 3D modeling techniques

PC3. based on that determine the dimensional interrelationships between the new product and existing process

PC4. based on the above steps , decide the future references for new manufacturing process

Analysis of the existing manufacturing process

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

PC5. receive the DFMEA and prototype control plan from R&D department and study them thoroughly

PC6. study the existing manufacturing process for the product

PC7. based on the documents and process study , identify the limitations and capabilities of the existing process operation wise

PC8. record the observations for further analysis

Analyze the drawings for tools and equipments

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

PC9. study the existing tools and equipments layout and incorporate all the data in Process modeling software

PC10. simulate the software and prepare the FTG drawings for the equipments

PC11. record the results of the simulation for further analysis

PC12. based on the simulation results , redesign/introduce tool or equipment with help of the CAD software

PC13. re-run the simulation in the 3D modeling with the new tool/equipment and observe the results

PC14. repeat the above two processes until the simulation shows no discrepancies

PC15. prepare the FTG drawings for the new equipments

PC16. apart from equipments if required, use Mechatronics, Robotics technology and prepare the cost benefit analysis

PC17. Seek the approval from the senior management for introduction of these technologies after determining the cost effectiveness

Analyzing equipment & selection

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

PC18. based on the simulation results , redesign/introduce tool or equipment with help of the CAD software

PC19. re-run the simulation in the 3D modeling with the new tool/equipment and observe the results

PC20. repeat the above two processes until the simulation shows no discrepancies

PC21. prepare the FTG drawings for the new equipments

PC22. apart from equipments if required, use Mechatronics, Robotics technology and prepare the cost benefit analysis

PC23. Seek the approval from the senior management for introduction of these technologies after determining the cost effectiveness

Design Process Flow

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

PC24. design the process flow with each operation/ step vis- a-vis the concept for the Equipment /Workstation, Fixtures, tools on which the tool design engineer will be able to work for detailing

Establishment of auxiliary equipment & controls

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

PC25. verify the concept for all equipment : main & auxiliary in 3 D with the tool design simultaneously working with Product design for available space vis- a vis product & fixture profile adequacy of rating, load capacity etc requirement of automation, poka yoke for operation & or parameter check process parameters cost and cycle time

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company manufacturing processes

KU2. sequence of operations for each shop floor activity

KU3. in-house and third parties involved in process design for the company

KU4. complete knowledge of the new product usage and application

KU5. product conformance requirements

KU6. product engineering drawings and dimensional tolerances

KU7. knowledge of CAD software and 3D modeling techniques
KU8. complete layout for the process in consideration
KU9. material and information flow of the process
KU10. knowledge of documents required for new process approval like PPAP etc.
KU11. equipments available in local/ global market ; technological upgrades
KU12. all the economic factors involved in the activity
KU13. previous similar design & achieved data for QCT
KU14. elements of Control systems : Pneumatic, Hydraulic, Electrical/ electronic
KU15. elements of Automation

Generic Skills (GS)

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

GS1. read the equipment literature & understand its features.
GS2. compile all the data related to main & auxiliary equipment required in the processes
GS3. communicate with NPD-CFT for design features
GS4. assist CFT members in doing their job as per the standards
GS5. share operation knowledge with co-workers
GS6. plan the execution of entire design activity ; long term and short term activities so that he can finish the task activity wise in the stipulated time
GS7. analyze the way in which job is being performed and think of some other suitable method in order to optimize the QCT while performing the work

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Study of drawings and tolerances	**8**	**12**	**-**	**-**
PC1. collect all the CAD software engineering drawings for the new product and study them thoroughly	2	2	-	-
PC2. study the dimensional tolerances of the new product using GD&T and 3D modeling techniques	2	2	-	-
PC3. based on that determine the dimensional interrelationships between the new product and existing process	2	4	-	-
PC4. based on the above steps , decide the future references for new manufacturing process	2	4	-	-
Analysis of the existing manufacturing process	**5**	**11**	**-**	**-**
PC5. receive the DFMEA and prototype control plan from R&D department and study them thoroughly	2	3	-	-
PC6. study the existing manufacturing process for the product	1	3	-	-
PC7. based on the documents and process study , identify the limitations and capabilities of the existing process operation wise	1	3	-	-
PC8. record the observations for further analysis	1	2	-	-
Analyze the drawings for tools and equipments	**9**	**25**	**-**	**-**
PC9. study the existing tools and equipments layout and incorporate all the data in Process modeling software	1	2	-	-
PC10. simulate the software and prepare the FTG drawings for the equipments	1	3	-	-
PC11. record the results of the simulation for further analysis	1	3	-	-
PC12. based on the simulation results , redesign/introduce tool or equipment with help of the CAD software	1	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. re-run the simulation in the 3D modeling with the new tool/equipment and observe the results	1	2	-	-
PC14. repeat the above two processes until the simulation shows no discrepancies	1	2	-	-
PC15. prepare the FTG drawings for the new equipments	1	4	-	-
PC16. apart from equipments if required, use Mechatronics, Robotics technology and prepare the cost benefit analysis	1	3	-	-
PC17. Seek the approval from the senior management for introduction of these technologies after determining the cost effectiveness	1	2	-	-
Analyzing equipment & selection	**6**	**15**	**-**	**-**
PC18. based on the simulation results , redesign/introduce tool or equipment with help of the CAD software	1	3	-	-
PC19. re-run the simulation in the 3D modeling with the new tool/equipment and observe the results	1	2	-	-
PC20. repeat the above two processes until the simulation shows no discrepancies	1	2	-	-
PC21. prepare the FTG drawings for the new equipments	1	3	-	-
PC22. apart from equipments if required, use Mechatronics, Robotics technology and prepare the cost benefit analysis	1	3	-	-
PC23. Seek the approval from the senior management for introduction of these technologies after determining the cost effectiveness	1	2	-	-
Design Process Flow	**1**	**4**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. design the process flow with each operation/ step vis- a-vis the concept for the Equipment /Workstation, Fixtures, tools on which the tool design engineer will be able to work for detailing	1	4	-	-
Establishment of auxiliary equipment & controls	**1**	**3**	**-**	**-**
PC25. verify the concept for all equipment : main & auxiliary in 3 D with the tool design simultaneously working with Product design for available space vis- a vis product & fixture profile adequacy of rating, load capacity etc requirement of automation, poka yoke for operation & or parameter check process parameters cost and cycle time	1	3	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6410
NOS Name	Design the Process Flow & Operations ; Selection of equipment
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Process Design Engineer
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	23/09/2013
Next Review Date	30/09/2015
NSQC Clearance Date	

ASC/N6411: Process Review Plan, Conduct , Document

Description

This OS unit is about the process engineer planning & conducting the Process review at Phase III stage of APQP in a CFT for the new product development

Scope

The unit/ task covers the following:

- simultaneously conducting the phase III of Process design with Product design
- conduct discussions in CFT & finalize the PF , PFMEA, CP Documentation ,
- release & dynamically update at the instance of ECN/ PCN , Problem Solving

Elements and Performance Criteria

Phase III Process Design

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

PC1. simultaneous to the Product design the concept of the process is decided for the tool designer to detail

Conduct Process Review

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

PC2. based on the Process Flow steps and the main / auxiliary equipment selected the process design engineer should competently lead the NPD-CFT and finalize the process characteristics for each operation factors introducing variation severity , Failure modes & their occurrence and detection ratings, etc for the FMEA based on SOD/ RPN numbers finalize actions for pokeyoke, DOE, and control actions to be taken

PC3. similarly finalize the CP with special control actions

Documentation ,Release, Updation

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

PC4. decide the process of releasing the documentation viz. numbering, revision control, tamper-proof mechanism for soft/ physical copy versions etc.

PC5. review and update whenever ECN / PCN is released necessitating revision of all or some of PF/ FMEA/ CP PFMEA / CP is necessary to be revised as an associated step in Internal/ external problem solving

PC6. release as details of process design some or all of the following Workstation Design Fixture drawings/ Part lists Mechanism , auxiliary process parts

Compliance to standards

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

PC7. ensure that the entire activity is in accordance with the requirements of APQP, FMEA ,CP, PPAP & TS /ISO 16949

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company manufacturing processes
KU2. sequence of operations for each shop floor activity
KU3. norms established for Time study
KU4. the final product and the manufacturing process followed
KU5. application of the final product
KU6. APQP, FMEA, CP, PPAP

Generic Skills (GS)

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

GS1. understand and prepare the PFMEA , CP and all the required process documentation
GS2. communicate with the shop floor for understanding the problems faced during the process and accordingly incorporate in the process documentation
GS3. discuss in team and prepare the documentation for process design in a timely and effective manner
GS4. plan the execution the design so that he can finish task activity wise in the stipulated time
GS5. analyze the way in which job is being performed and think of some other suitable method in order to minimize the ineffective time taken in each activity

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Phase III Process Design	**6**	**12**	**-**	**-**
PC1. simultaneous to the Product design the concept of the process is decided for the tool designer to detail	6	12	-	-
Conduct Process Review	**10**	**23**	**-**	**-**
PC2. based on the Process Flow steps and the main / auxiliary equipment selected the process design engineer should competently lead the NPD-CFT and finalize the process characteristics for each operation factors introducing variation severity , Failure modes & their occurrence and detection ratings, etc for the FMEA based on SOD/ RPN numbers finalize actions for pokeyoke, DOE, and control actions to be taken	6	12	-	-
PC3. similarly finalize the CP with special control actions	4	11	-	-
Documentation ,Release, Updation	**11**	**27**	**-**	**-**
PC4. decide the process of releasing the documentation viz. numbering, revision control, tamper-proof mechanism for soft/ physical copy versions etc.	4	11	-	-
PC5. review and update whenever ECN / PCN is released necessitating revision of all or some of PF/ FMEA/ CP PFMEA / CP is necessary to be revised as an associated step in Internal/ external problem solving	4	8	-	-
PC6. release as details of process design some or all of the following Workstation Design Fixture drawings/ Part lists Mechanism , auxiliary process parts	3	8	-	-
Compliance to standards	**3**	**8**	**-**	**-**
PC7. ensure that the entire activity is in accordance with the requirements of APQP, FMEA ,CP, PPAP & TS /ISO 16949	3	8	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6411
NOS Name	Process Review Plan, Conduct , Document
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Process Design Engineer
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	23/09/2013
Next Review Date	30/09/2015
NSQC Clearance Date	

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 % : 75

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	15
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	15
ASC/N6410.Design the Process Flow & Operations ; Selection of equipment	30	70	-	-	100	30
ASC/N6411.Process Review Plan, Conduct , Document	30	70	-	-	100	40

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
Total	**110**	**290**	**-**	**-**	**400**	**100**

Acronyms

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

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.

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.