

Qualification Pack



Fitter - Fabrication

QP Code: CSC/Q0303

Version: 3.0

NSQF Level: 3

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CSC/Q0303: Fitter - Fabrication

Brief Job Description

The incumbent on the job roles carrying out fitting and fabrication operations like measuring, marking out, sawing, grinding, drilling, chiseling, threading, tapping, scraping, manual lapping and inspecting of components in order to fit a component as per specifications. It also involves basic oxy-fuel gas cutting and basic manual arc welding as per given instructions and under supervision.

Personal Attributes

The job holder must have an eye for detail as well as the patience and discipline required to carry out detailed and repetitive tasks. The candidate should be able to read and understand technical manuals, instructions and warnings.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

- [1. CSC/N1335: Follow the health and safety practices at the work](#)
- [2. CSC/N1336: Coordinate with co-workers to achieve work efficiency](#)
- [3. CSC/N0201: Manually cut metal and metal alloys using oxy-fuel gas](#)
- [4. CSC/N0204: Manually weld carbon and low alloy steels by using Metal Arc Welding \(MMAW\)/Shielded Metal Arc Welding \(SMAW\)](#)
- [5. CSC/N0303: Perform fitting operations on metal components](#)
- [6. DGT/VSQ/N0101: Employability Skills \(30 Hours\)](#)

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Fitting and Assembly
Country	India



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NSQF Level	3
Credits	15
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7224.0102
Minimum Educational Qualification & Experience	Ability to read and write (with 5 years experience in the relevant field) with 5 Years of experience OR 5th Class (with 3 years experience in the relevant field) with 3 Years of experience OR 8th Class (with 1year experience in the relevant field) with 1 Year of experience OR 8th Class (Pass + NTC (1year)) with NA of experience OR Certificate-NSQF (Assistant Manual Metal Welder NSQF – Level 2 with 1year experience in the relevant field) with 1 Year of experience
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	31/03/2025
NSQF Approval Date	31/03/2022
Version	3.0
Reference code on NQR	2022/CCM/CGSC/06611
NQR Version	1



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CSC/N1335: Follow the health and safety practices at the work

Description

This OS unit is about following the appropriate health and safety practices at work. It covers responsibilities towards self and others to ensure a safe work environment.

Scope

The scope covers the following :

- Maintain personal health and safety
- Assist in hazard management
- Check the first aid box, firefighting and safety equipment
- Assist in waste management
- Follow the fire safety guidelines
- Follow the emergency and first-aid procedures
- Carry out relevant documentation and review

Elements and Performance Criteria

Maintain personal health and safety

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

- PC1.** follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask
- PC2.** check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them
- PC3.** select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions
- PC4.** follow the recommended techniques while lifting and moving heavy objects to avoid injury
- PC5.** follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment

Assist in hazard management

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

- PC6.** identify existing and potential hazards at work
- PC7.** assess the potential risks and injuries associated with the identified hazards
- PC8.** coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards
- PC9.** handle hazardous materials safely and store them in the designated storage

Check the first aid box, firefighting and safety equipment

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

- PC10.** check the first aid box to ensure it is updated with the relevant first aid supplies
- PC11.** check and test the firefighting and various safety equipment to ensure they are in usable condition



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PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment

Assist in waste management

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

PC13. segregate waste into appropriate categories

PC14. recycle the recyclable waste appropriately

PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations

Follow the fire safety guidelines

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

PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely

PC17. follow the recommended practices for a safe rescue during a fire emergency

PC18. coordinate with the fire department to request assistance to extinguish a serious fire

Follow the emergency and first-aid procedures

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

PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety

PC20. follow the recommended practices to minimise loss to organisational property during an emergency

PC21. follow the recommended procedure to free a person from electrocution

PC22. administer appropriate first aid to the injured personnel

PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest

PC24. coordinate with the emergency services to request medical assistance for seriously injured/ill personnel requiring professional medical attention or hospitalisation

Carry out relevant documentation and review

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

PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information

PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident

PC27. assist in implementing appropriate changes to improve the health and safety conditions at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask

KU2. the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them

KU3. the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions



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- KU4.** the recommended techniques to be followed while lifting and moving heavy objects to avoid injury
- KU5.** the importance of following the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment
- KU6.** the importance and process of identifying existing and potential hazards at work
- KU7.** the process of assessing the potential risks and injuries associated with the various hazards
- KU8.** how to prevent or minimise different types of hazards
- KU9.** how to handle and store hazardous materials safely
- KU10.** the importance of ensuring the first aid box is updated with the relevant first aid supplies
- KU11.** the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable condition
- KU12.** the criteria for segregating waste into appropriate categories
- KU13.** the appropriate methods for recycling the recyclable waste
- KU14.** the process of disposing of the non-recyclable waste safely and the applicable regulations
- KU15.** Use of different types of fire extinguishers to extinguish different types of fires
- KU16.** the recommended practices to be followed for a safe rescue during a fire emergency
- KU17.** how to request assistance from the fire department to extinguish a serious fire
- KU18.** the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property
- KU19.** common health and safety hazards present in a work environment, associated risks, and how to mitigate them
- KU20.** safe working practices to be followed while working at various hazardous sites and using electrical equipment
- KU21.** the importance of ensuring easy access to firefighting and safety equipment
- KU22.** the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases
- KU23.** various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents
- KU24.** different methods of extinguishing fire
- KU25.** different materials used for extinguishing fire, such as sand, water, foam, CO₂, dry powder, etc.
- KU26.** the applicable rescue techniques to be followed during a fire emergency
- KU27.** the importance of placing safety signs and instructions at strategic locations in a workplace and following them
- KU28.** different types of first aid treatment to be provided for different types of injuries
- KU29.** potential injuries associated with incorrect manual handling
- KU30.** how to move an injured person safely
- KU31.** various hazards associated with the use of various machinery, tools, implements, equipment and materials
- KU32.** the importance of ensuring no obstruction and free access to fire exits
- KU33.** how to free a person from electrocution safely
- KU34.** how to administer appropriate first aid to an injured person



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- KU35.** how to perform Cardiopulmonary Resuscitation (CPR)
- KU36.** the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation
- KU37.** the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included
- KU38.** the importance and process of reviewing the health and safety conditions at work regularly or following an incident
- KU39.** the importance and process of implementing appropriate changes to improve the health and safety conditions at work

Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** communicate clearly and politely with co-workers and clients
- GS3.** read the relevant literature to get the latest updates about the field of work
- GS4.** listen attentively to understand the information being shared
- GS5.** plan and prioritise tasks to ensure timely completion
- GS6.** take quick decisions to deal with workplace emergencies and accidents
- GS7.** identify possible disruptions to work and take appropriate preventive measures
- GS8.** coordinate with the co-workers to achieve the work objectives
- GS9.** evaluate all possible solutions to a problem to select the best one

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain personal health and safety</i>	7	12	-	-
PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask	2	3	-	-
PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them	1	2	-	-
PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions	1	2	-	-
PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury	1	3	-	-
PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment	2	2	-	-
<i>Assist in hazard management</i>	4	10	-	-
PC6. identify existing and potential hazards at work	1	1	-	-
PC7. assess the potential risks and injuries associated with the identified hazards	1	3	-	-
PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards	1	3	-	-
PC9. handle hazardous materials safely and store them in the designated storage	1	3	-	-
<i>Check the first aid box, firefighting and safety equipment</i>	3	7	-	-
PC10. check the first aid box to ensure it is updated with the relevant first aid supplies	1	2	-	-
PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition	1	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment	1	2	-	-
<i>Assist in waste management</i>	3	8	-	-
PC13. segregate waste into appropriate categories	1	3	-	-
PC14. recycle the recyclable waste appropriately	1	3	-	-
PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations	1	2	-	-
<i>Follow the fire safety guidelines</i>	3	12	-	-
PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely	1	4	-	-
PC17. follow the recommended practices for a safe rescue during a fire emergency	1	4	-	-
PC18. coordinate with the fire department to request assistance to extinguish a serious fire	1	4	-	-
<i>Follow the emergency and first-aid procedures</i>	7	12	-	-
PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety	1	2	-	-
PC20. follow the recommended practices to minimise loss to organisational property during an emergency	1	3	-	-
PC21. follow the recommended procedure to free a person from electrocution	1	2	-	-
PC22. administer appropriate first aid to the injured personnel	1	2	-	-
PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest	1	2	-	-
PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation	2	1	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out relevant documentation and review</i>	3	9	-	-
PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information	1	3	-	-
PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident	1	3	-	-
PC27. assist in implementing appropriate changes to improve the health and safety conditions at work	1	3	-	-
NOS Total	30	70	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1335
NOS Name	Follow the health and safety practices at the work
Sector	Capital Goods
Sub-Sector	Machine Tools, Process Plant Machinery, Dies, Moulds and Press Tools, Electrical and Power Machinery, Plastics Manufacturing Machinery, Light Engineering Goods, Textile Manufacturing Machinery
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	26/05/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022



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CSC/N1336: Coordinate with co-workers to achieve work efficiency

Description

This OS unit is about working in coordination with co-workers to achieve the work objectives efficiently. It also covers practising inclusion at work.

Scope

The scope covers the following :

- Work effectively with co-workers
- Communicate effectively with co-workers
- Practice inclusion at work

Elements and Performance Criteria

Work effectively with co-workers

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

- PC1.** plan daily tasks at work to ensure their timely completion and efficient use of time
- PC2.** carry out work responsibilities adhering to the limits of authority
- PC3.** follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales
- PC4.** coordinate with the co-workers to achieve the work objectives efficiently
- PC5.** prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically
- PC6.** coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns
- PC7.** mentor and assist subordinates in the execution of their work responsibilities
- PC8.** identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures
- PC9.** use various resources efficiently to ensure maximum utilisation and minimum wastage
- PC10.** follow the recommended practices to avoid and resolve conflicts at work
- PC11.** follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work

Communicate effectively with co-workers

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

- PC12.** follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel
- PC13.** communicate clearly and politely to ensure effective communication with co-workers
- PC14.** follow the appropriate techniques for active listening during interactions

Practice inclusion at work

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

- PC15.** empathise with Persons with Disabilities (PwD)



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PC16. adopt gender-neutral behaviour at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the importance and process of effective communication in the workplace
- KU2.** the barriers to effective communication and how to overcome them
- KU3.** the importance of teamwork in an organisation's and individual's success
- KU4.** the importance of active listening in the work environment
- KU5.** the appropriate techniques to be followed for active listening
- KU6.** importance of avoiding casual expletives and unpleasant terms while communicating professional circles
- KU7.** the importance of maintaining discipline and ethical behaviour at work
- KU8.** the common reasons for interpersonal conflict and how to resolve them
- KU9.** the importance of developing effective work relationships for professional success
- KU10.** how expressing and addressing grievances appropriately and effectively
- KU11.** the importance and process of planning daily tasks to ensure their timely completion and efficient use of time
- KU12.** the importance of adhering to the limits of authority at work
- KU13.** the importance of following the applicable quality standards and timescales at work
- KU14.** the importance of coordinating with the co-workers to achieve the work objectives efficiently
- KU15.** the relevant documentation requirements
- KU16.** the importance of providing appropriate information clearly and systematically in work documents
- KU17.** the escalation matrix to be followed to deal with out of authority tasks and concerns
- KU18.** the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities
- KU19.** how to identify possible disruptions to work prevent them
- KU20.** how to use various resources efficiently to ensure maximum utilisation and minimum wastage
- KU21.** the recommended practices to be followed at work to avoid and resolve conflicts at work
- KU22.** the importance and process of efficient and timely dissemination of information to the authorised personnel
- KU23.** how to communicate clearly and politely to ensure effective communication
- KU24.** the importance of following the recommended practices to ensure an inclusive environment for PwD and all genders at work

Generic Skills (GS)

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

- GS1.** maintain work-related notes and records



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- GS2.** read work-related and other relevant literature
- GS3.** communicate politely and -professionally
- GS4.** listen attentively to understand the information or instructions being shared
- GS5.** plan and prioritise tasks to ensure timely completion
- GS6.** take prompt decisions to deal with workplace emergencies and accidents
- GS7.** evaluate all possible solutions to a problem to select the best one

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Work effectively with co-workers</i>	20	43	-	-
PC1. plan daily tasks at work to ensure their timely completion and efficient use of time	2	4	-	-
PC2. carry out work responsibilities adhering to the limits of authority	2	4	-	-
PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales	2	4	-	-
PC4. coordinate with the co-workers to achieve the work objectives efficiently	2	4	-	-
PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically	2	4	-	-
PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns	2	4	-	-
PC7. mentor and assist subordinates in the execution of their work responsibilities	2	4	-	-
PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures	2	4	-	-
PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage	2	4	-	-
PC10. follow the recommended practices to avoid and resolve conflicts at work	1	4	-	-
PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work	1	3	-	-
<i>Communicate effectively with co-workers</i>	6	15	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel	2	5	-	-
PC13. communicate clearly and politely to ensure effective communication with co-workers	2	5	-	-
PC14. follow the appropriate techniques for active listening during interactions	2	5	-	-
<i>Practice inclusion at work</i>	4	12	-	-
PC15. empathise with Persons with Disabilities (PwD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	30	70	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1336
NOS Name	Coordinate with co-workers to achieve work efficiency
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	26/05/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022



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CSC/N0201: Manually cut metal and metal alloys using oxy-fuel gas

Description

This unit is about performing gas cutting and post-cutting operations as per the given work order and the standards specified by the organization.

Scope

The scope covers the following :

- Prepare for cutting operations
- Perform oxy-gas cutting operations
- Perform post-cutting operations

Elements and Performance Criteria

Prepare for cutting operations

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

- PC1.** identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders
- PC2.** identify the tools, cutting torch, machine, measuring instruments, accessories, consumables and input materials (mild carbon steel, high tensile and special steels, other materials) as per the requirements mentioned in WPS or drawing
- PC3.** select and arrange the right material, equipment, fixtures, accessories such as regulators, hoses and valve and consumables such as shielding gas etc. as per the SOP and job requirements
- PC4.** select the correct type of nozzle, consumables, gases and oxy-gas cutting equipment required for the job by following WPS and drawing
- PC5.** check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards
- PC6.** prepare the work area for cutting activities
- PC7.** set the oxy-gas cutting apparatus and its parameters as per the WPS and SOP
- PC8.** ensure that a flashback arrestor is fitted with the apparatus
- PC9.** use correct technique for lighting, adjusting and extinguishing the arc
- PC10.** adjust torch valve for the type of flame such as neutral, carburizing and oxidizing
- PC11.** mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS

Perform oxy-gas cutting operations

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

- PC12.** follow safety precautions during cutting work as per SOP and organizational guidelines
- PC13.** start the gas cutting machine for cutting operations
- PC14.** adjust cylinder valves and regulator for operating pressure to achieve required specifications
- PC15.** perform oxy-gas cutting process as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing

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- PC16.** perform various cutting operations correctly and produce thermal cuts in various forms of material (metal of 3mm and above) which meet specified quality criteria i.e. dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 2mm; angled/radial cuts are within specification requirements; cuts are clean and smooth and free from flutes; no drags
- PC17.** recognize and correct burn-back and flashback
- PC18.** measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing
- PC19.** shut down the cutting equipment and remove the workpiece after completion of cutting activities

Perform post-cutting operations

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

- PC20.** check the work pieces as per the work instructions for product quality
- PC21.** identify defects in the completed workpiece by using appropriate methods and equipment
- PC22.** separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair
- PC23.** clean and store all the tools, machine and equipment after completion of work
- PC24.** check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction
- PC25.** dispose scrap or waste material in accordance with the company policies and environmental regulations
- PC26.** report to the supervisor about any problems faced or anticipated during the complete process

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant legislation, standards, policies, and procedures followed in the organization
- KU2.** the basic principle of oxy-gas process and its process flow
- KU3.** SOP recommended by the manufacturer for using tools, measuring instruments, accessories, gas cutting apparatus etc. during the cutting process
- KU4.** various materials such as mild steel, high tensile/special steel and other appropriate metal and their properties used for gas cutting
- KU5.** various forms of material used for cutting are plate, rolled section, pipe/tube, solid bars etc.
- KU6.** different cutting gases used in oxy-gas cutting and their selection criteria
- KU7.** various cutting operations i.e. Downhand straight cuts (freehand), Making straight cuts (track guided), Cutting regular shapes, Cutting irregular shapes, Making angled cuts, Cutting chamfers, Making radial cuts, Gouging, flushing, Bevelled edge - weld preparations and cutting out holes
- KU8.** ISO colour codes for cutting apparatus such as gas cylinder, hoses, electric cables, etc.
- KU9.** impact of various cutting parameters on the quality and quantity of output
- KU10.** holding methods that are used to aid thermal cutting
- KU11.** types of flames and their implication for cutting



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- KU12.** various quality check parameters i.e. shape and length of the draglines, smoothness of the sides, sharpness of the top edges and amount of slag adhering to the metal
- KU13.** effects of oil, grease, scale or dirt on the cutting process
- KU14.** various types of cutting defects such as distortion, grooved, fluted or ragged cuts, poor draglines, rounded edges, tightly adhering slag, etc. and their remedies
- KU15.** effects of oil, grease, scale or dirt on the cutting process
- KU16.** emergency procedures for backfires, flashback and other fires
- KU17.** safety requirements during the cutting work

Generic Skills (GS)

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

- GS1.** read and interpret drawings, work instructions, equipment manuals and process documents
- GS2.** communicate the welding process requirements to the supervisor and co-workers
- GS3.** attentively listen and comprehend the information given by the supervisor/team members
- GS4.** write any work related information in English/regional language
- GS5.** recognise a workplace problem and take suitable action
- GS6.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS7.** plan and organize tools, machines and consumables for carrying out welding job
- GS8.** complete the assigned tasks with minimum supervision
- GS9.** report to the supervisor or deal with a colleague individually, depending on the type of concern

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for cutting operations</i>	15	21	-	9
PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, cutting torch, machine, measuring instruments, accessories, consumables and input materials (mild carbon steel, high tensile and special steels, other materials) as per the requirements mentioned in WPS or drawing	3	2	-	2
PC3. select and arrange the right material, equipment, fixtures, accessories such as regulators, hoses and valve and consumables such as shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. select the correct type of nozzle, consumables, gases and oxy-gas cutting equipment required for the job by following WPS and drawing	1	2	-	1
PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards	2	2	-	1
PC6. prepare the work area for cutting activities	1	2	-	-
PC7. set the oxy-gas cutting apparatus and its parameters as per the WPS and SOP	1	2	-	1
PC8. ensure that a flashback arrestor is fitted with the apparatus	1	-	-	1
PC9. use correct technique for lighting, adjusting and extinguishing the arc	1	2	-	1
PC10. adjust torch valve for the type of flame such as neutral, carburizing and oxidizing	1	2	-	-
PC11. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS	1	2	-	-
<i>Perform oxy-gas cutting operations</i>	9	17	-	6

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow safety precautions during cutting work as per SOP and organizational guidelines	-	1	-	-
PC13. start the gas cutting machine for cutting operations	1	2	-	1
PC14. adjust cylinder valves and regulator for operating pressure to achieve required specifications	1	2	-	1
PC15. perform oxy-gas cutting process as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing	2	4	-	1
PC16. perform various cutting operations correctly and produce thermal cuts in various forms of material (metal of 3mm and above) which meet specified quality criteria i.e. dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 2mm; angled/radial cuts are within specification requirements; cuts are clean and smooth and free from flutes; no drags	2	4	-	2
PC17. recognize and correct burn-back and flashback	1	1	-	1
PC18. measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing	1	2	-	-
PC19. shut down the cutting equipment and remove the workpiece after completion of cutting activities	1	1	-	-
<i>Perform post-cutting operations</i>	6	12	-	5
PC20. check the work pieces as per the work instructions for product quality	1	2	-	1
PC21. identify defects in the completed workpiece by using appropriate methods and equipment	2	3	-	1
PC22. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC23. clean and store all the tools, machine and equipment after completion of work	1	2	-	1



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2	-	1
PC25. dispose scrap or waste material in accordance with the company policies and environmental regulations	-	1	-	-
PC26. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
NOS Total	30	50	-	20



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0201
NOS Name	Manually cut metal and metal alloys using oxy-fuel gas
Sector	Capital Goods
Sub-Sector	Machine Tools, Process Plant Machinery, Dies, Moulds and Press Tools, Electrical and Power Machinery, Plastics Manufacturing Machinery, Light Engineering Goods, Textile Manufacturing Machinery
Occupation	Welding and Cutting
NSQF Level	2
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022



Qualification Pack

CSC/N0204: Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)

Description

This unit is about performing manual metal arc welding (MMAW) for producing various types of joints on carbon and low alloy steels as per the given specifications and standards specified by the organisation.

Scope

The scope covers the following :

- Prepare for welding operations
- Perform MMAW/SMAW operations
- Perform post-welding operations

Elements and Performance Criteria

Prepare for welding operations

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

- PC1.** identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders
- PC2.** identify the tools, welding machines, measuring instruments, accessories, consumables and input materials (i.e. carbon, low alloy steel etc.) as per the requirements mentioned in WPS or drawing
- PC3.** select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements
- PC4.** check the input material, tools and equipment for any defects and that they are as per the required quality standards
- PC5.** prepare the work area for the welding activities
- PC6.** prepare the materials (i.e. plate(1.5 - 24mm)/ sheet (1.5mm)) and joint for welding process
- PC7.** set the MMAW machine and its parameters as per the WPS and SOP
- PC8.** re-dry electrodes as per electrode classification requirement
- PC9.** install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements
- PC10.** verify set up by running test weld specimen (scrap plate)

Perform MMAW/SMAW operations

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

- PC11.** follow safety precautions during welding work as per SOP and organizational guidelines
- PC12.** start the MMAW machine for welding operations
- PC13.** strike and maintain a stable arc by applying correct technique (i.e. scratch start, tapping techniques) and to avoid welding defects
- PC14.** perform MMAW welding process as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile

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- PC15.** produce fillet and groove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as specified in WPS by using single or multi-run welds
- PC16.** ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation
- PC17.** maintain proper bead sequence with respect to groove/fillet configurations and positions
- PC18.** monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards
- PC19.** measure the final welded piece and compare with the dimensional and geometrical aspects of the weld as prescribed in the WPS and engineering drawing
- PC20.** remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece
- PC21.** hammer the work piece to get the desired shape, if there are any welding bulges/distortions
- PC22.** shut down the welding equipment and remove the workpiece after completion of welding activities

Perform post-welding operations

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

- PC23.** check the work pieces as per the work instructions for product quality
- PC24.** identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces
- PC25.** separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair
- PC26.** clean and store all the tools, machine and equipment after completion of work
- PC27.** dispose scrap or waste material in accordance with the company policies and environmental regulations
- PC28.** report to the supervisor about any problems faced or anticipated during the complete process

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant legislation, standards, policies, and procedures followed in the organization
- KU2.** the basic principle of welding process
- KU3.** MMAW welding and its process flow
- KU4.** various types of welding joints (i.e. fillet lap joints, tee fillet joints, corner joints, butt joints (square, single, vee, double vee)) and welding positions (i.e. flat (PA) 1F, horizontal vertical (PB) 2F, horizontal (PC) 2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F)
- KU5.** how to read and interpret WPS, welding drawings and symbols
- KU6.**
 - welding specific equipment requirements for MMAW/SMAW welding
 - MMAW equipment: transformers, rectifiers, generators, invertors;
 - Consumables - electrodes, dyes;
 - Welding accessories - holders, cables, welding torch and accessories;
 - Ancillary equipment - power saw, angle, pedestal and straight grinders, tong tester; etc.



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- KU7.** SOP recommended by the manufacturer for using tools, measuring instruments, accessories, MMAW welding machine etc. during the welding process
- KU8.** main components and controls of welding equipment
- KU9.** type of current used and implication
- KU10.** ISO colour codes for welding apparatus such as gas cylinder, hoses, electric cables, etc.
- KU11.** joint preparation process: made rust free; cleaned – free from scaling, paint, oil/grease; made dry and free from moisture; edges to be welded prepared as per job requirement - such as flat, square or bevelled; use various machines and techniques for the above (e.g. chamfering machine, grinding and stripping, gas or plasma cutting, etc.); correctly positioned (positioning: devices and techniques; jigs and fixtures; setting up joint in correct position & alignment)
- KU12.** Impact of various welding parameters like voltage, current, gas flow rate, speed, pressure, torch angle, cycle time, electrode distance etc. on the quality and quantity of welding
- KU13.** welding techniques i.e. drag, weave, whip
- KU14.** various materials used for MMAW welding and their properties
- KU15.** SOP recommended by the organisation for operating MMAW welding machine and its accessories
- KU16.** purpose and importance of pre-heating requirements for base metals
- KU17.** • factors that determine weld bead shape
• Factors: electrode angles and welding technique (push, perpendicular, drag); arc length; thickness of base metal; travel speed (slow, normal, fast)
- KU18.** • types of beads, characteristics and uses (stringer, weave, weave patterns)
• Bead characteristics: spatter deposits, roughness, evenness, fill, crater, overlap
- KU19.** SOP recommended by the organisation for checking irregularities in the product/work piece
- KU20.** • factors that affect weld quality standards
• Quality standards: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joints at stop/start positions merge smoothly; weld surface is (free from cracks; substantially free from porosity; free from any pronounced hump or crater; substantially free from shrinkage cavities; substantially free from trapped slag; substantially free from arcing or chipping marks); fillet welds are (equal in leg length, slightly convex in profile (where applicable), size of the fillet equivalent to the thickness of the material welded); weld contour is (of linear and of uniform profile; smooth and free from excessive undulations; regular and has an even ripple formations); welds are adequately fused, and there is minimal undercut, overlap and surface inclusions etc.
- KU21.** • various defects associated with the MMAW/SMAW welding process
• Weld defects: lack of continuity of the weld; uneven and irregular ripple formation; excessive spatter; incorrect weld size or profile; burn through; undercutting; overlap; inclusions; distortion; porosity; internal cracks; surface cracks; lack of fusion or incomplete fusion; lack of penetration; excessive penetration; gouges; stray arc strikes; sharp edges; excessive convexity
- KU22.** how to control distortion (such as welding sequence; deposition technique)
- KU23.** magnetic arc blow or arc deflection, causes and methods to avoid or compensate
- KU24.** Various testing techniques like visual, destructive and non-destructive
- KU25.** common welder testing codes i.e. ASME section IX, EN 287, ISO 9606, IS 7310 and their purpose
- KU26.** safety requirements during the welding work



Qualification Pack

Generic Skills (GS)

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

- GS1.** read and interpret drawings, work instructions, equipment manuals and process documents
- GS2.** communicate the welding process requirements to the supervisor and co-workers
- GS3.** attentively listen and comprehend the information given by the supervisor/team members
- GS4.** write any work related information in English/regional language
- GS5.** recognise a workplace problem and take suitable action
- GS6.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS7.** plan and organize tools, machines and consumables for carrying out welding job
- GS8.** complete the assigned tasks with minimum supervision
- GS9.** report to the supervisor or deal with a colleague individually, depending on the type of concern

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for welding operations</i>	13	19	-	7
PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, welding machines, measuring instruments, accessories, consumables and input materials (i.e. carbon, low alloy steel etc.) as per the requirements mentioned in WPS or drawing	3	2	-	2
PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards	2	4	-	1
PC5. prepare the work area for the welding activities	1	1	-	-
PC6. prepare the materials (i.e. plate(1.5 - 24mm)/ sheet (1.5mm)) and joint for welding process	1	1	-	1
PC7. set the MMAW machine and its parameters as per the WPS and SOP	1	2	-	1
PC8. re-dry electrodes as per electrode classification requirement	1	1	-	-
PC9. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements	1	2	-	-
PC10. verify set up by running test weld specimen (scrap plate)	-	1	-	-
<i>Perform MMAW/SMAW operations</i>	11	20	-	8
PC11. follow safety precautions during welding work as per SOP and organizational guidelines	-	1	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. start the MMAW machine for welding operations	1	2	-	-
PC13. strike and maintain a stable arc by applying correct technique (i.e. scratch start, tapping techniques) and to avoid welding defects	1	2	-	1
PC14. perform MMAW welding process as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile	2	4	-	2
PC15. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as specified in WPS by using single or multi-run welds	2	4	-	2
PC16. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation	1	1	-	1
PC17. maintain proper bead sequence with respect to groove/fillet configurations and positions	-	1	-	-
PC18. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards	1	1	-	1
PC19. measure the final welded piece and compare with the dimensional and geometrical aspects of the weld as prescribed in the WPS and engineering drawing	1	1	-	1
PC20. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece	1	1	-	-
PC21. hammer the work piece to get the desired shape, if there are any welding bulges/distortions	1	1	-	-
PC22. shut down the welding equipment and remove the workpiece after completion of welding activities	-	1	-	-
<i>Perform post-welding operations</i>	6	11	-	5



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. check the work pieces as per the work instructions for product quality	1	2	-	1
PC24. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces	2	4	-	2
PC25. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC26. clean and store all the tools, machine and equipment after completion of work	1	2	-	1
PC27. dispose scrap or waste material in accordance with the company policies and environmental regulations	1	1	-	-
PC28. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
NOS Total	30	50	-	20



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0204
NOS Name	Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery
Occupation	Welding and Cutting
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2025
NSQF Clearance Date	31/03/2022



Qualification Pack

CSC/N0303: Perform fitting operations on metal components

Description

This unit is about fabrication and fitting of metal products to modify the shape of a component or manufacturing a machine component from raw material, as per given instructions.

Scope

The scope covers the following :

- Prepare for work
- Perform marking on the workpieces
- Perform fabrication and fitting operations

Elements and Performance Criteria

Prepare for work

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

- PC1.** identify work requirements by interpreting engineering drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications etc. and instructions received from supervisor
- PC2.** select the appropriate fitting and fabrication operations need to perform on the basis of drawing information
- PC3.** prepare the work area for the fabrication and fitting operations as per SOP and work instructions
- PC4.** identify and arrange the material, tools, measuring instruments, equipment, parts and subassemblies required for the job
- PC5.** check the tools and equipment for any defects before use
- PC6.** check that all measuring equipment are within calibration date
- PC7.** set work pieces as per job requirements by using appropriate positioning and/or holding devices and support mechanisms
- PC8.** use appropriate Personal Protective Equipment (PPE) for safe working in workshop

Perform marking on the workpieces

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

- PC9.** use a range of marking out equipment and mark the dimensions on the workpiece by applying an appropriate method of marking out
- PC10.** mark out a range of features (Features: datum/centre lines, lines (perpendicular, parallel), circles, profiles (square/rectangular, radial, angles/angular), hole positions (radial, linear), allowances for bending, simple pattern development) on the workpiece
- PC11.** mark out templates for tracing/transferring the specified features on the workpieces as per job specification
- PC12.** trace/transfer the specified features from the templates onto the workpieces as per job specification

Perform fabrication and fitting operations

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

- PC13.** plan the fabrication and fitting activities before starting the work
- PC14.** use appropriate methods and perform fabrication and fitting operations to produce machine components by following organizational specified sequence and procedure as per job specifications
- PC15.** produce components with various features as per standards applicable to the process (Features of components produced: flat; square; parallel and angular faces; perpendicular plates; radii and curved profiles; drilled holes; internal and external threads; sliding or mating parts; counter bore, countersink or spot face; vessels; simple structures)
- PC16.** check the fabricated and fitted products to ensure completeness of work

Perform post-fitting operations

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

- PC17.** perform necessary quality checks or tests for correct fitting, dimensional accuracy and required quality standards
- PC18.** use the appropriate measuring equipment for checking activities
- PC19.** prepare job card, progress records, incident reports etc. for the higher authorities as per organizational procedures
- PC20.** clean and store all the tools, machine and equipment after completion of work
- PC21.** dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant legislation, standards, policies, and procedures followed in the organization
- KU2.** common terminology used in fabrication and fitting
- KU3.** how to read and interpret information from engineering drawings or data and related specifications
- KU4.**
 - range of materials used in relevant fitting and fabrication applications
 - Ferrous metals: e.g. carbon steels, stainless steels, cast iron, tool steel, hard metals;
 - Non-ferrous metals: e.g. bronze, bronze alloys, copper and copper alloys
- KU5.**
 - mechanical properties of materials and implications for job
 - Mechanical properties: tensile strength, toughness, hardness, elasticity, ductility, malleability
- KU6.**
 - importance of using correct procedures as per type and form of materials and metal components
 - Forms of metal components: square/rectangular (e.g. bar stock, sheet material, machined components), circular/cylindrical (e.g. bar stock, tubes, turned components, flat discs), sections (e.g. angles, channel, tee section, joists, extrusions), irregular shapes/profile (e.g. castings, forgings, odd shaped components)
- KU7.** how to identify materials by their color, appearance, density
- KU8.** marking methods i.e. direct marking using instruments, use of templates, tracing/transfer methods
- KU9.** methods of marking out cutting guidelines for square and rectangular profiles, circular and radial profiles, angles and hole positions

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- KU10.** marking out features i.e. datum/centre lines; square/rectangular profiles; circles; radial profiles; cutting and bending detail (including allowances); hole centering and outlining (such as circular or linear)
- KU11.**
- ways of laying out the marking-out shapes or patterns to optimize use of materials
 - Marking out tools: rules/tapes; straight edge; dividers/trammels; scribes; punches; squares; protractor; chalk, bluing or paint
- KU12.** SOP recommended by manufacturer for using various measuring instruments, marking, fabrication and fitting tools and equipment required during work
- KU13.** importance of following specified fabrication and fitting sequences and procedures
- KU14.** suitability of workpieces/materials and consumables: e.g. correct type and code, correct form, correct dimensions, damage free, correctly issued, etc.
- KU15.**
- correct techniques and procedures to carry out specific fabrication and fitting operations by hand tools and manually operated machines
 - Hand tools: hacksaws; hammers; punches; screwdrivers; sockets; wrenches; spanners; scrapers; chisels; gouges; files; taps; vices and clamps
 - Manually operated machine tools: drills (power drills, pedestal drills), grinders (hand held power grinders, pedestal grinders), saws (jigsaws, cutting saws), shears (hand shear, mechanized shears), nibblers, press V-shape, punching machines, bending machines, threading machines
- KU16.**
- how to secure and position the workpiece/raw material correctly using appropriate holding devices and mechanisms
 - Positioning and holding devices: belts; braces; clamps; jigs and fixtures; bolt straps; blocks and tables; manual lifts; ropes; jacks
- KU17.** common problems that can occur in the fabrication and fitting operations and their implications
- KU18.** ways to address problems commonly encountered during fitting and fabrication operations
- KU19.** importance of reporting problems immediately and accurately
- KU20.**
- how to check the quality of the shaped components against the specified quality standards
 - Components quality standards: components to be free from damage, false tool cuts, burrs, scratches and non-specified sharp edges; general dimensional tolerance +/- 0.10mm; flatness and squareness 0.05mm; angles within +/- 1 degree; screw threads to fit as per standard; reamed and bored holes within interference: - 0.05mm (hole) + 0.05mm (shaft), transition: -0.1mm (hole) + 0.1 (shaft), clearance: 50microns; radius: 0.5 r; ovality restriction
- KU21.**
- how to check the workpiece and the measuring equipment that is used
 - Measuring equipment: external micrometers, vernier/digital/dial caliper, surface finish equipment (e.g. comparison plates, machines), rules, squares, protractors, depth micrometers, depth verniers, feeler gauges, bore/hole gauges, slip gauges, radius/profile gauges, thread gauges, height gauge, hardness tester, dial test indicators (DTI), surface roughness tester, coordinate measuring machine (CMM), profile projectors, for
- KU22.** how to measure internal and external dimensions
- KU23.** safety practices need to follow during fabrication and fitting activities

Generic Skills (GS)

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

- GS1.** note the information related to work and processes
- GS2.** write reports and observations related to work in English/regional language



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- GS3.** read and interpret and process flowchart for all operations
- GS4.** read manuals and operation documents to understand the Equipment used into operation
- GS5.** discuss task lists, schedules and activities with the seniors and team members
- GS6.** follow organization rule-based decision making process
- GS7.** take decisions with systematic course of actions and/or response
- GS8.** plan and organize tasks to meet deadlines
- GS9.** find ways of modifying difficult operating stages to make it operation friendly
- GS10.** recognise a workplace problem and take suitable action to resolve it
- GS11.** apply domain information to set and define operation parameters that ensures economy and quality of the product
- GS12.** analyse the complexity of work to determine if it can be successfully carried out or needs to be referred to a superior/specialist

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for work</i>	11	15	-	8
PC1. identify work requirements by interpreting engineering drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications etc. and instructions received from supervisor	1	1	-	1
PC2. select the appropriate fitting and fabrication operations need to perform on the basis of drawing information	3	2	-	2
PC3. prepare the work area for the fabrication and fitting operations as per SOP and work instructions	1	2	-	1
PC4. identify and arrange the material, tools, measuring instruments, equipment, parts and subassemblies required for the job	3	2	-	2
PC5. check the tools and equipment for any defects before use	1	3	-	1
PC6. check that all measuring equipment are within calibration date	1	2	-	-
PC7. set work pieces as per job requirements by using appropriate positioning and/or holding devices and support mechanisms	1	2	-	1
PC8. use appropriate Personal Protective Equipment (PPE) for safe working in workshop	-	1	-	-
<i>Perform marking on the workpieces</i>	6	10	-	4
PC9. use a range of marking out equipment and mark the dimensions on the workpiece by applying an appropriate method of marking out	1	2	-	1
PC10. mark out a range of features (Features: datum/centre lines, lines (perpendicular, parallel), circles, profiles (square/rectangular, radial, angles/angular), hole positions (radial, linear), allowances for bending, simple pattern development) on the workpiece	2	3	-	1

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. mark out templates for tracing/transferring the specified features on the workpieces as per job specification	2	3	-	2
PC12. trace/transfer the specified features from the templates onto the workpieces as per job specification	1	2	-	-
<i>Perform fabrication and fitting operations</i>	6	12	-	4
PC13. plan the fabrication and fitting activities before starting the work	1	2	-	1
PC14. use appropriate methods and perform fabrication and fitting operations to produce machine components by following organizational specified sequence and procedure as per job specifications	2	4	-	1
PC15. produce components with various features as per standards applicable to the process (Features of components produced: flat; square; parallel and angular faces; perpendicular plates; radii and curved profiles; drilled holes; internal and external threads; sliding or mating parts; counter bore, countersink or spot face; vessels; simple structures	2	4	-	1
PC16. check the fabricated and fitted products to ensure completeness of work	1	2	-	1
<i>Perform post-fitting operations</i>	7	13	-	4
PC17. perform necessary quality checks or tests for correct fitting, dimensional accuracy and required quality standards	2	4	-	2
PC18. use the appropriate measuring equipment for checking activities	2	4	-	1
PC19. prepare job card, progress records, incident reports etc. for the higher authorities as per organizational procedures	1	2	-	1
PC20. clean and store all the tools, machine and equipment after completion of work	1	2	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC21. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations	1	1	-	-
NOS Total	30	50	-	20



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0303
NOS Name	Perform fitting operations on metal components
Sector	Capital Goods
Sub-Sector	Machine Tools, Process Plant Machinery, Dies, Moulds and Press Tools, Electrical and Power Machinery, Plastics Manufacturing Machinery, Light Engineering Goods, Textile Manufacturing Machinery
Occupation	Fitting and Assembly
NSQF Level	3
Credits	4
Version	2.0
Last Reviewed Date	31/03/2022
Next Review Date	31/03/2025
NSQC Clearance Date	31/03/2022



Qualification Pack

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

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

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values - Citizenship

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

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

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

PC4. speak with others using some basic English phrases or sentences

Communication Skills

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

PC5. follow good manners while communicating with others

PC6. work with others in a team



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Diversity & Inclusion

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

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

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

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

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

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

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

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

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

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services



Qualification Pack

- KU10.** how to compute income and expenses
- KU11.** importance of maintaining safety and security in financial transactions
- KU12.** different legal rights and laws
- KU13.** how to operate digital devices and applications safely and securely
- KU14.** ways to identify business opportunities
- KU15.** types of customers and their needs
- KU16.** how to apply for a job and prepare for an interview
- KU17.** apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

- GS1.** communicate effectively using appropriate language
- GS2.** behave politely and appropriately with all
- GS3.** perform basic calculations
- GS4.** solve problems effectively
- GS5.** be careful and attentive at work
- GS6.** use time effectively
- GS7.** maintain hygiene and sanitisation to avoid infection

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
<i>Constitutional values - Citizenship</i>	1	1	-	-
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	1	3	-	-
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
<i>Communication Skills</i>	1	1	-	-
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	1	-	-
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
<i>Financial and Legal Literacy</i>	3	4	-	-
PC9. use various financial products and services safely and securely	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
<i>Essential Digital Skills</i>	4	6	-	-
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
<i>Entrepreneurship</i>	3	5	-	-
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
<i>Customer Service</i>	2	2	-	-
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	1	3	-	-
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	20	30	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	NA
Next Review Date	27/05/2024
NSQC Clearance Date	27/05/2021

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for the Qualification Pack will be created by CGSC.
2. Performance Criteria (PC) have been assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
3. The assessment for the theory part will/may be based on knowledge bank of questions approved CGSC.
4. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
5. Assessment Agencies will create Assessor Guides comprising of Theory and Practical Assessment Set and Guidelines for each examination/training centre (as per assessment criteria below). The same will be approved by CGSC for adequacy.
6. To successfully attain Certification on the Qualification Pack, the trainee must score a minimum of 70% in each Core NOS and minimum of 50% in all non-core NOS. In addition, a candidate needs to attain a minimum overall pass percentage of 70% for certification.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

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Minimum Aggregate Passing % at QP Level : 70

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

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N1335.Follow the health and safety practices at the work	30	70	-	-	100	15
CSC/N1336.Coordinate with co-workers to achieve work efficiency	30	70	-	-	100	10
CSC/N0201.Manually cut metal and metal alloys using oxy-fuel gas	30	50	-	20	100	20
CSC/N0204.Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)	30	50	-	20	100	25
CSC/N0303.Perform fitting operations on metal components	30	50	-	20	100	25
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	0	0	50	5
Total	170	320	0	60	550	100



Qualification Pack

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
CO2	Carbon Dioxide
CPR	Cardiac Pulmonary Resuscitation
PPE	Personal Protective Equipment

Qualification Pack

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

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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.