

Qualification Pack



Fitter - Mechanical Assembly

QP Code: CSC/Q0304

Version: 2.0

NSQF Level: 3

Capital Goods Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place
New Delhi - 110001 || email:coo@cgsc.in



Qualification Pack

Contents

CSC/Q0304: Fitter Mechanical Assembly	3
<i>Brief Job Description</i>	3
Applicable National Occupational Standards (NOS)	3
<i>Compulsory NOS</i>	3
<i>Qualification Pack (QP) Parameters</i>	3
CSC/N1335: Follow the health and safety practices at the workplace	5
CSC/N1336: Coordinate with co-workers to achieve work efficiency	12
CSC/N0304: Perform fitting and assembly operations on metal components	18
Assessment Guidelines and Weightage	25
<i>Assessment Guidelines</i>	25
<i>Assessment Weightage</i>	25
Acronyms	26
Glossary	27

Qualification Pack

CSC/Q0304: Fitter Mechanical Assembly

Brief Job Description

The incumbent in the job is responsible for performing machining, fitting and assembly activities to produce machinery or machine components of required features and specifications.

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 workplace](#)
2. [CSC/N1336: Coordinate with co-workers to achieve work efficiency](#)
3. [CSC/N0304: Perform fitting and assembly operations on metal components](#)

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods
Occupation	Fitting and Assembly
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8211.1202

Qualification Pack

Minimum Educational Qualification & Experience	<p>Ability to Read and Write with 5 years experience in the relevant field</p> <p>Or</p> <p>5th Class Pass with 3 years experience in the relevant field</p> <p>Or</p> <p>8th Class Pass with 1year experience in the relevant field</p> <p>Or</p> <p>8th Class Pass + ITI (1year)</p> <p>Or</p> <p>Assistant Manual Metal Welder NSQF - Level 2 with 1year experience in the relevant field</p>
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	
Next Review Date	
Deactivation Date	
NSQC Approval Date	
Version	2.0
Reference code on NQR	
NQR Version	2.0

Qualification Pack

CSC/N1335: Follow the health and safety practices at 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

This unit/task 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

Qualification Pack

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

Qualification Pack

and work conditions

- 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



Qualification Pack

- KU33. how to free a person from electrocution safely
- KU34. how to administer appropriate first aid to an injured person
- 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

Assessment Criteria

Qualification Pack

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	-	-
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	-	-

Qualification Pack

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	-	-
<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	-	-

Qualification Pack

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	Generic
Occupation	Generic
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

Qualification Pack

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

This unit/task 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)

Qualification Pack

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 tone and pitch in effective communication
- KU7. importance of avoiding casual expletives and unpleasant terms while communicating professional circles
- KU8. the importance of maintaining discipline and ethical behaviour at work
- KU9. the common reasons for interpersonal conflict and how to resolve them
- KU10. the importance of developing effective working relationships for professional success
- KU11. how expressing and addressing grievances appropriately and effectively
- KU12. the importance and process of planning daily tasks to ensure their timely completion and efficient use of time
- KU13. the importance of adhering to the limits of authority at work
- KU14. the importance of following the applicable quality standards and timescales at work
- KU15. the importance of coordinating with the co-workers to achieve the work objectives efficiently
- KU16. the relevant documentation requirements
- KU17. the importance of providing appropriate information clearly and systematically in work documents
- KU18. the escalation matrix to be followed to deal with out of authority tasks and concerns
- KU19. the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities
- KU20. how to identify possible disruptions to work prevent them
- KU21. how to use various resources efficiently to ensure maximum utilisation and minimum wastage
- KU22. the recommended practices to be followed at work to avoid and resolve conflicts at work
- KU23. the importance and process of efficient and timely dissemination of information to the authorised personnel
- KU24. how to communicate clearly and politely to ensure effective communication
- KU25. the importance of following the recommended practices to ensure an inclusive environment for PwD and all genders at work

Generic Skills (GS)



Qualification Pack

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

- GS1. maintain work-related notes and records
- 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

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Work effectively with co-workers</i>	20	24	-	-
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	-	-
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	-	-



Qualification Pack

PC15. empathise with Persons with Disabilities (PwD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	30	70	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1336
NOS Name	Coordinate with co-workers to achieve work efficiency
Sector	Capital Goods
Sub-Sector	Generic
Occupation	Generic
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

Qualification Pack

CSC/N0304: Perform fitting and assembly operations on metal components

Description

This unit is about basic fitting and assembly activities to produce machinery of required features and specifications.

Scope

This unit/task covers the following:

- Prepare for work
- Perform marking on the components
- Perform fitting operations
- Perform assembling operations
- Perform post-assembly activities

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 assembly operations need to perform on the basis of drawing information
- PC3. identify and arrange the tools, measuring instruments, equipment, parts and subassemblies required for the job
- PC4. check the tools and equipment for any defects before use
- PC5. check that all measuring equipment are within calibration date
- PC6. use appropriate Personal Protective Equipment (PPE) for safe working in workshop

Perform marking on the components

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

- PC7. prepare suitable datum on the component from which mark out has to be start (e.g. choosing a machine face or filing a flat face as a datum)
- PC8. apply a marking medium to enhance clarity of the marking out
- PC9. use a range of marking out equipment and mark the dimensions on the component by applying an appropriate method of marking out
- PC10. mark out a range of features (Features: datum lines; cutting guidelines; square and rectangular profiles; circular and radial profiles; angles; holes linearly positioned, boxed and on pitch circles) on the component

Perform fitting operations

Qualification Pack

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

- PC11. plan the fitting activities before starting
- PC12. cut and shape the materials to the required specification by using appropriate cutting operations and techniques
- PC13. use a range of fitting methods and perform fitting operations on the component as per SOP
- PC14. use a range of manually operated machines for performing machining operations on the component as per SOP

Perform assembling operations

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

- PC15. assemble and secure the components and sub-assemblies in their correct positions by using appropriate assembly methods and techniques
- PC16. perform drilling, tapping and reaming operation to create holes in the components as per the requirement
- PC17. fasten components permanently by using engineered fasteners, applying adhesives, soldering and brazing
- PC18. produce mechanical assemblies by combining the components as per job specifications
- PC19. dismantle mechanical assemblies without damage to components and/or subassemblies
- PC20. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve
- PC21. report to the supervisor about any problems faced or anticipated during the complete process

Perform post-assembly activities

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

- PC22. perform necessary quality checks or tests for correct assembly, dimensional accuracy and required quality standards
- PC23. use the appropriate measuring equipment for checking activities
- PC24. prepare inspection and work completion reports for the higher authorities
- PC25. clean and store all the tools, machine and equipment after completion of work
- PC26. 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. various job requirements such as raw materials or components required (type, quality, quantity); dimensions; limits and tolerances; operations required (list, sequence and procedures where applicable); shape or profiles to be fabricated; cutting, bending for fabricated forms; instruments and tools to be used; interdependencies; timelines etc. for fitting and assembly work
- KU3. how to interpret engineering drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing (Geometric Dimensioning and Tolerancing -- GD&T)

Qualification Pack

- KU4. how to prepare the component for the marking out activities
Preparation of components: visually checking for defects, cleaning the materials, removing burrs and sharp edges, etc.
- KU5. how to select and establish a suitable datum
- KU6. possible effects of working from an incorrect datum
- KU7. importance of ensuring that marking out is undertaken from the selected datum
- KU8. SOP recommended by manufacturer for using various marking tools i.e. rules/tapes, dividers/trammels, scribes, punches, scribing blocks, squares, protractor, permanent markers
- KU9. various marking out methods e.g. direct marking using tapes and markers, set-outs of pipework using templates, producing set wires, set-outs of pipework onto floor
- KU10. SOP recommended by manufacturer for using various tools and equipment required during cutting and preparation of components
- KU11. various cutting techniques i.e. cutting out the rough profile using saws (e.g. hacksaw, chop saw, power saw), or oxy-fuel gas cutting torch, de-burring reamers, rubbing with abrasive cloth, drilling holes etc.
- KU12. various manually operated machine tools i.e. manual grinding machines (Ag4, wolf grinding machine, etc.), drills (power drills, pedestal drills), punching machines, threading machines
- KU13. various fitting activities i.e. file flat, square and curved surfaces and achieve a smooth surface finish; select saw blades for different materials, and how to set the saw blades for different operations; produce screw threads on workpieces using hand dies; tighten torque with torque wrenches; determine the drill size for tapped holes, and the importance of using the taps in the correct sequence
- KU14. methods of holding the workpiece for the hand fitting, drilling threading and taping activities
- KU15. various assembly methods i.e. assembling components having interference fits (e.g. by pressure, expansion or contraction); securing components using threaded fasteners (e.g. nuts, bolts, machine screws, cap screws); securing components using spring clips (e.g. external circlips, internal circlips, special clips); using locking and retaining devices (e.g. tab washers, locking nuts, wire locks, special purpose types); securing components using rivets (e.g. countersunk, roundhead, blind, special purpose types); applying sealing compounds or adhesives; electrical bonding of components; setting and adjusting components to give correct working parameters (e.g. shimming and packing); torque setting of nuts and bolts
- KU16. how the components are to be aligned, adjusted and positioned prior to securing them, and the tools and equipment
Alignment: slideways: flat, vee, dovetail, cylindrical, comparison of their capabilities, main features, accuracy of movement, means of adjustment, lubrication, protection
Typical checks: coaxial alignment between main spindle axis, coaxial alignment between two spindles, alignment of spindle to guideway, squareness of slideways movement, concentricity and end float of spindle, squareness of planes to spindle, setting of guards, stops and automatic safety cut-outs; bearings: plain bush (radial, radial and axial) ball (radial, axial, radial and axial) roller (radial, axial, radial and axial);
Methods of alignment: standard tests, straight edge, precision level, autocollimator and reflector, roundness measuring machine
- KU17. methods to dismantle fittings i.e. procedure for isolation and locking off a device/system;

Qualification Pack

sequence of operations used to dismantle a device/system; proof marking, correct storage procedures for removed parts; release of pressure/force; extraction

- KU18. various adhesives and sealing compounds that are used on non-metallic pipework
- KU19. precautions to be taken when using the adhesives, cements and sealing compounds (such as adequate ventilation, fume extraction, away from naked flames, avoiding skin contact) and gas torches to form the joint
- KU20. mechanical fastenings and joining techniques i.e. non-permanent - nuts, bolts, studs, permanent - welded, soldered, brazed, riveted
- KU21. methods of mounting, positioning, aligning and securing the workpiece
- KU22. techniques of taking trial cuts and checking dimensional accuracy
- KU23. application of cutting fluids and compounds with regard to a range of different materials
Range of Materials: Ferrous metals: e.g. carbon steels, stainless steels, cast iron, tool steel, hard metals; Non-ferrous metals: e.g. bronze, aluminium, copper and copper alloys
- KU24. 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, form testers
- KU25. how to measure internal and external dimensions

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
- 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. apply domain information to set and define operation parameters that ensures economy and quality of the product
- GS11. analyse the complexity of work to determine if it can be successfully carried out or needs to be referred to a superior/specialist
- GS12. recognise a workplace problem and take suitable action to resolve it

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for work</i>	8	9	-	7
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 machining, fitting and assembly operations need to perform on the basis of drawing information	2	2	-	3
PC3. identify the tools, measuring instruments, equipment, parts and subassemblies required for the job	3	2	-	2
PC4. check the tools and equipment for any defects before use	1	2	-	1
PC5. check that all measuring equipment are within calibration date	1	1	-	-
PC6. use appropriate Personal Protective Equipment (PPE) for safe working in workshop	-	1	-	-
<i>Perform marking on the components</i>	5	7	-	3
PC7. prepare suitable datum on the component from which mark out has to be start (e.g. choosing a machine face or filing a flat face as a datum)	1	1	-	1
PC8. apply a marking medium to enhance clarity of the marking out	1	1	-	-
PC9. use a range of marking out equipment and mark the dimensions on the component by applying an appropriate method of marking out	2	3	-	-
PC10. mark out a range of features (datum lines; cutting guidelines; square and rectangular profiles; circular and radial profiles; angles; holes linearly positioned, boxed and on pitch circles) on the component	1	2	-	2
<i>Perform fitting operations</i>	7	11	-	3
PC11. plan the fitting activities before starting	1	2	-	-
PC12. cut and shape the materials to the required specification by using appropriate cutting operations and techniques	2	3	-	1

Qualification Pack

PC13. use a range of hand fitting methods and perform fitting operations on the component as per SOP	2	3	-	1
PC14. use a range of manually operated machines for performing machining operations on the component as per SOP	2	3	-	1
<i>Perform assembling operations</i>	6	14	-	5
PC15. assemble and secure the components and sub-assemblies in their correct positions by using appropriate assembly methods and techniques	2	4	-	2
PC16. perform drilling, tapping and reaming operation to create holes in the components as per the requirement	2	3	-	1
PC17. fasten components permanently by using engineered fasteners, applying adhesives and performing soldering and brazing	1	2	-	1
PC18. produce mechanical assemblies by combining the components as per job specifications	-	2	-	-
PC19. dismantle mechanical assemblies without damage to components and/or subassemblies	1	2	-	1
PC20. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
<i>Perform post-assembly activities</i>	4	9	-	2
PC21. perform necessary quality checks or tests for correct assembly, dimensional accuracy and required quality standards	2	3	-	1
PC22. use the appropriate measuring equipment for checking activities	-	1	-	-
PC23. prepare inspection and work completion reports for the higher authorities	1	2	-	1
PC24. clean and store all the tools, machine and equipment after completion of work	1	2	-	-
PC25. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations	-	1	-	-
NOS Total	30	50	-	20

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0304
NOS Name	Perform fitting and assembly operations on metal components
Sector	Capital Goods
Sub-Sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods
Occupation	Fitting and Assembly
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	
Next Review Date	
NSQC Clearance Date	

Qualification Pack

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.

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. Use basic health and safety practices at the workplace	30	70	-	-	100	15
CSC/N1336. Coordinate with co-workers to achieve work efficiency	30	70	-	-	100	15
CSC/N0304. Perform fitting and assembly operations on metal components	30	50	-	20	100	70
Total	90	190	-	20	300	100

Qualification Pack

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
GD&T	Geometric Dimensioning And Tolerancing
DTI	Dial Test Indicators
CMM	Coordinate Measuring Machine
ECM	Electrochemical Machining
BODMAS	Brackets/ Of/ Division/ Multiplication/ Addition/ Subtraction
CO ₂	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.

Qualification Pack

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.