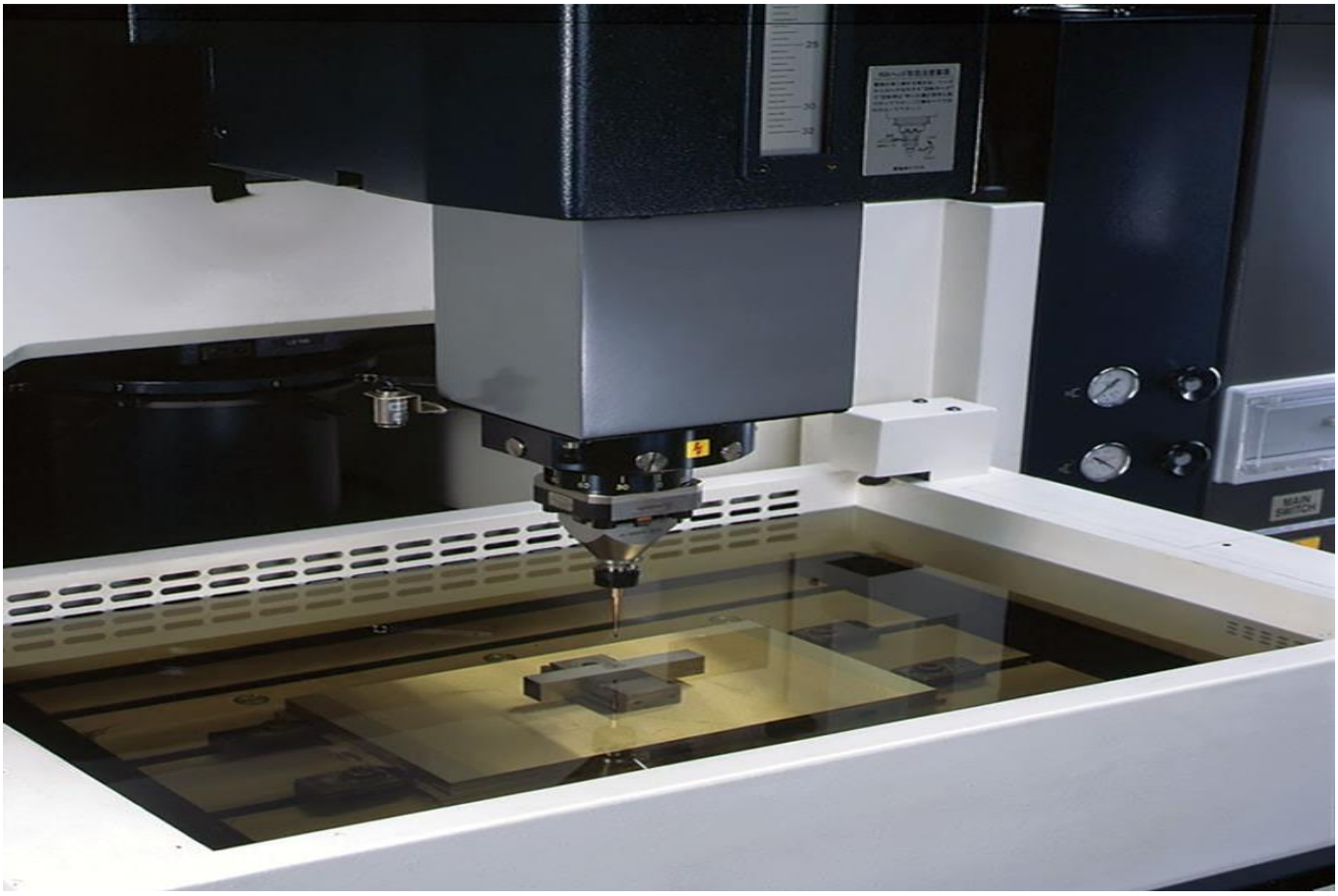
सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack



CNC Setter and Operator - Electro Discharge Machine (Spark Erosion)

QP Code: CSC/Q0121

Version: 2.0

NSQF Level: 4

Capital Goods Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place
New Delhi - 110001

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Qualification Pack

CSC/Q0121: CNC Setter and Operator - Electro Discharge Machine (Spark Erosion)

Brief Job Description

A CNC Setter and Operator – Electro Discharge Machine (Spark Erosion) is responsible for setting up the Computer Numerically Controlled (CNC) Electro Discharge Machine (EDM) for use and operating it as per the standard procedure to machine a variety of ferrous and non-ferrous metal components.

Personal Attributes

The individual must be physically fit to work for long durations. The person must have attention to detail and problem-solving skills along with numerical and computational abilities. The individual must be able to communicate well verbally and in writing.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. CSC/N1335: Follow the health and safety practices at work
2. CSC/N1336: Coordinate with co-workers to achieve work efficiency
3. CSC/N0121: Set up the CNC EDM for machining components
4. CSC/N0118: Operate the CNC EDM to machine components

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery
Occupation	Machining
Country	India
NSQF Level	4

Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification & Experience	8th Class Pass + ITI (2years) with 2 years of experience in the relevant field OR 10th Class Pass with 2 years of experience in the relevant field OR 10th Class Pass + ITI (1 year after Class 10th) with 1 year of experience in the relevant field OR 10th Class Pass + ITI (2 years after Class 10th) OR 12th Class Pass with 6 months of experience in the relevant field OR Certified in NSQF-L3 Operator - Non-Conventional Electro Discharge Machine (Spark Erosion) with 2 years of experience in the relevant field
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	2015/CCM/GCSC/00254
NQR Version	1.0

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
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
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
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

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	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

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)
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)

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

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	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

CSC/N0121: Set up the CNC EDM for machining components

Description

This OS unit is about setting up a CNC Electro-Discharge Machine (Spark Erosion) for machining a variety of ferrous and non-ferrous metal components to achieve the required specifications.

Scope

This unit/task covers the following:

- Prepare for setting up the CNC EDM
- Set up the CNC EDM for use

Elements and Performance Criteria

Prepare for setting up the CNC EDM

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

PC1. determine the job specifications such as limits, tolerances, surface texture and finish requirements by referring to the valid and approved documents, such as job instruction sheet, component drawings, approved sketches/illustrations, etc.
PC2. coordinate with the supervisor or other relevant personnel for the rectification of any incorrect and inconsistent information in the job specification documents
PC3. check the availability of the required raw materials or components in the appropriate quality, quantity and type
PC4. select the appropriate tools and equipment to be used for machining the components
PC5. check the tools and equipment to ensure they are in working condition and carry out their regular repair and maintenance as per the manufacturer's instructions
PC6. prepare the work area for setting up the CNC EDM, ensuring there are no hazards in the area
PC7. use the relevant Personal Protective Equipment while setting up the CNC EDM, as required
PC8. carry out routine cleaning of the CNC EDM
PC9. check the position and alignment of the CNC EDM machine, and make appropriate adjustments as per the requirement
PC10. use the appropriate measuring tools as per the job requirement, ensuring the tools are calibrated and approved for use
PC11. check that the correct electrode is in place, and is in usable condition
PC12. apply the recommended grade of grease on the relevant machine parts
PC13. check the dielectric fluid, coolant and lubricant have the recommended levels, and replenish them, if required
PC14. check the machine sub-systems to ensure they are working as expected
PC15. prepare CNC Spark Erosion tooling for use

Set up the CNC EDM for use

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

PC16. pre-set electrodes in tooling holders manually or by using setting jigs/fixtures, as appropriate
PC17. position electrode holders in the correct position on the machine head or magazine
PC18. check the electrode holders have the recommended tool number or technology setting with respect to the operating program
PC19. program the relevant tooling data such as holder position and offsets in the operating program
PC20. set the electrode datum point and save changes to the program

PC21. mount and set the required work holding devices appropriately
PC22. position and secure workpieces to machine table/ pneumatic or magnetic table using the appropriate accessories such as angle plate, v-block, clamp, chuck, etc.
PC23. select, load and set the appropriate tool holding device appropriate to different types of electrodes, such as plain, profile, and hollow electrodes
PC24. set the recommended machine tool operating parameters to achieve the required component specifications
PC25. set up the machine with the appropriate specifications such as current density, spark frequency, linear feeds and speeds, dielectric flow rates, as per the requirement for machining various ferrous and non-ferrous metal components
PC26. ensure to set up the CNC EDM to produce required features on the machined components such as angular, flat, square, parallel face; threads, concave, convex, internal and external profiles, etc.
PC27. conduct trial runs and adjust machine parameters and positioning until the required accuracy parameters are achieved
PC28. follow the manufacturer's instructions to resolve any issues encountered while setting up the CNC EDM, tooling, work holding devices and proving the program
PC29. ensure there is no damage to the tool/fixture while performing the prove-out
PC30. carry out appropriate documentation with respect to the setting up of CNC EDM, recording various machine parameters along with any issues encountered and steps taken to resolve them

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the relevant documentation requirements in the job ole
KU2. applicable environmental regulations to be observed
KU3. the terminology associated with CNC machining
KU4. the relevant documentation to be referred to for determining the job specifications, such as job instruction sheet, planning and quality control documents, component drawing, approved sketches/illustrations, reference tables and charts, etc.
KU5. the use of relevant PPE while carrying machining activities on a CNC EDM
KU6. the importance of adhering to the applicable health and safety guidelines
KU7. the importance of checking the machine guards are in place before operating the CNC EDM
KU8. the process of checking the cutting tools and securing components on the CNC EDM without distortion
KU9. the importance of leaving the work area and machine in a safe and appropriate condition on completion of the activities
KU10. the imperial and metric systems of measurement
KU11. use of the relevant measuring equipment such as micrometre, Vernier scale; slip, bore/hole, thread, plug, radius/profile gauges; Dial Test Indicator (DTI)
KU12. how to read and interpret first and third angle component drawings
KU13. how to extract information from engineering drawings or data and related specifications
KU14. the features and various parts of a CNC EDM machine, and the relevant accessories
KU15. the importance of following the recommended machining sequences and procedures
KU16. the importance of ensuring the suitability of workpieces/materials and consumables for the specified job and related procedures
KU17. the importance and process of checking the tools and equipment to ensure they are in a safe and usable condition
KU18. various work holding methods and devices used with a CNC EDM
KU19. how to set up work holding devices and electrodes on CNC EDM

KU20. the importance of ensuring the machine is isolated from the power supply before mounting electrodes and work holding devices
KU21. the basic principles of operation of the various CNC EDM, and various operations that they can perform
KU22. how to handle and store electrodes, electrode holders, verified tapes and programs safely
KU23. the importance of setting the work holding device in relation to the machine datum and reference points
KU24. various eroded features produced on a CNC EDM
KU25. different types of electrodes such as plain, profile, and hollow electrodes
KU26. the conditions determining the use of electrodes
KU27. the process of selecting the correct grade and type of electrode for the materials and profiles being machined
KU28. the importance of checking the electrodes are in a good and serviceable condition
KU29. use of various electrode tool holding devices
KU30. the process of loading, securing and setting the electrodes appropriately in the electrode holder or feed mechanism
KU31. use of tooling magazines or technology settings
KU32. how to position and identify the tools in relation to the operating program
KU33. how to place CNC EDM in the correct operating mode
KU34. how to access the program edit facility to enter the tooling data
KU35. how to conduct trial runs using single block run, dry run and feed/speed override controls
KU36. appropriate check to be conducted before operating the machine in full program run mode
KU37. how various types of materials affect the feeds and voltage to be used
KU38. different types and applications of dielectric fluids concerning a range of different materials
KU39. how to carry out regular repair and maintenance of a CNC EDM and rectify faults encountered during machining
KU40. how to resolve the common problems encountered while setting-up electrodes in cartridges/holders/feed mechanisms and with using work holding devices

Generic Skills (GS)

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

GS1. maintain work-related notes and records
GS2. read the relevant literature to get the latest updates about the field of work
GS3. listen attentively to understand the information or instructions being shared
GS4. communicate politely and professionally
GS5. perform work-related calculations
GS6. coordinate with co-workers to achieve the work objectives
GS7. plan and schedule tasks to ensure timely completion
GS8. identify possible disruptions to work and take appropriate preventive measures
GS9. take quick decisions to deal with workplace emergencies and accidents
GS10. evaluate all possible solutions to a problem to select the best one

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0121
NOS Name	Set up the CNC EDM for machining components
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery
Occupation	Machining
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

CSC/N0118: Operate the CNC EDM to machine components

Description

This OS unit is about machining a variety of components using the CNC EDM and achieving the given quality and accuracy standards as per the given specifications. It also covers resource optimisation.

Scope

This unit/task covers the following:

- Carry out machining using CNC EDM
- Use resources optimally

Elements and Performance Criteria

Carry out machining using CNC EDM

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

PC1. check that the operating program is at the correct start point
PC2. ensure that the workpiece is clear of tooling and secure to prevent distortion, before starting the machine
PC3. follow the manufacturer's instructions for starting and running the operating system and CNC EDM
PC4. carry out machining on the component as per the applicable organisational procedures to achieve the required specifications
PC5. identify various mechanical faults, and error messages displayed on the CNC EDM and take appropriate action as per the manufacturer's instructions to deal with them promptly
PC6. coordinate with the supervisor or the relevant expert to resolve any complex issues encountered with the CNC EDM
PC7. monitor the machining process and adjust the machine settings as per the requirement to maintain the required accuracy
PC8. use the appropriate gauges and instruments for carrying out the necessary quality and accuracy checks during and after the machining process
PC9. check the machined components to ensure they meet the applicable quality standards and have the required accuracy and specifications, such as flatness and squareness, surface texture, tolerance, dimensions, etc.
PC10. segregate the components that don't meet the applicable quality and accuracy standards, and carry out further processing or dispose them as per the organisational policy
PC11. ensure the daily production targets are met
PC12. isolate the CNC EDM appropriately after closing the operating programs
PC13. carry out regular maintenance of the CNC EDM as per the manufacturer's instructions
PC14. follow the recommended steps to deal with spilt cutting fluids
PC15. collect and dispose the industrial waste appropriately in compliance with the applicable regulations and organisational procedures
PC16. ensure adherence to the applicable national, international and organisational standards

Use resources optimally

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

PC17. optimise the usage of electricity and other resources in various tasks and processes

PC18. connect the electrical tools and equipment safely, and turn them off when not in use

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance of identifying relevant risks in the work area and dealing with them before operating the CNC EDM
KU2. hazards associated with the use of a CNC EDM and how to minimise them, such as revolving/moving parts of machinery; electrical components; airborne hot metal particles; sharp cutting tools; burrs and sharp edges on the components; use of power-operated chucks; handling dielectrics; fumes, etc.
KU3. relevant safety precautions to be taken while operating a CNC EDM, such as the use of relevant PPE and ensuring the safety of co-workers
KU4. how to use the various safety mechanisms available on CNC EDM, such as the emergency stop button/ brake
KU5. how to interpret component drawings, eroding data, and component machining specifications
KU6. how to extract and use information from engineering drawings and related specifications
KU7. symbols and conventions appropriate to BS, ISO or BSEN, DIN standards
KU8. various types of information found in component drawing, such as dimensioning and labelling information; first and third angle orthographic projections; isometric view; reference points, etc.
KU9. various errors and faults experienced with a CNC EDM and how to deal with them
KU10. the importance of operating a CNC EDM according to the manufacturer's instructions
KU11. how to find the correct restart point in the program when the machine has been stopped before completion of the program
KU12. the workpiece reference points and system of tolerances
KU13. the manual and automatic modes of machine control such as control buttons; keyboard and touchpad
KU14. how to operate the CNC EDM using single block run, full program run and feed/speed override controls
KU15. the importance of accounting for electrode wear and how to make adjustments to the program operating parameters to take account of it
KU16. the importance of maintaining spark gap during EDM machining process to prevent voltage surges from damaging equipment
KU17. how to deal with sparking and arcing during EDM machining
KU18. the importance of flushing during EDM machining
KU19. the benefit of using dielectric fluid or EDM oil
KU20. the importance of using the recommended polarity
KU21. how to set and secure the workpiece to the machine table/work holding device correctly
KU22. the effects of clamping the workpiece and how material removal can cause warping/distortion of the finished workpiece
KU23. various types of materials used for electrodes, such as copper, tungsten copper, graphite, etc.
KU24. use of various types of electrodes
KU25. how electrodes are located and secured to the machine head, tool cartridge and tool magazine
KU26. safe handling and storage of tooling, and dielectric and ionized fluids
KU27. the importance of checking the condition of the electrode before using it
KU28. the effects worn tooling has on the workpiece surface finish and tolerances
KU29. the importance and process of dressing and reshaping electrodes, and the use of relevant

equipment

KU30. various problems encountered with electrical discharge activities and to overcome them
KU31. the use of dielectric and ionized fluids with respect to the machining of various materials
KU32. the relevant quality checks to be carried out after machining of components

Generic Skills (GS)

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

GS1. maintain work-related notes and records
GS2. read the relevant literature to learn about the latest developments in the field of work
GS3. listen attentively to understand the information or instructions being shared
GS4. undertake work-related numerical computations
GS5. use the appropriate units of measurement and measuring techniques
GS6. communicate politely and professionally
GS7. organise and analyse work-related information
GS8. plan and prioritise tasks to ensure timely completion
GS9. take prompt decisions to deal with workplace emergencies and accidents
GS10. identify possible disruptions to work and take appropriate preventive measures
GS11. evaluate all possible solutions to a problem to select the best one
GS12. coordinate with co-workers to achieve the work objectives

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0118
NOS Name	Operate the CNC EDM to machine components
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery
Occupation	Machining
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	
Next Review Date	
Deactivation Date	
NSQC Clearance Date	

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 their importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.
3. The assessment for the theory part will/may be based on a knowledge bank of questions approved by 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 a 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

Total						

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
CNC	Computer Numerically Controlled
CAD	Computer Aided Design
2D	2 Dimensional
3D	3 Dimensional
CO2	Carbon Dioxide
CPR	Cardiac Pulmonary Resuscitation
ISO	International Organization For Standardization
PPE	Personal Protective Equipment
CD	Compact Disc
DVD	Digital Video Disc Or Digital Versatile Disc

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 that 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 summary of the unit content. This would behelpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

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