

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR CAPITAL GOODS INDUSTRY

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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### Introduction

## Qualifications Pack: CNC Setter cum Operator - Vertical Machining Centre

**SECTOR:** CAPITAL GOODS

#### SUB-SECTOR:

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1. Machine Tools                    | 5. Process Plant Machinery        |
| 2. Dies, Moulds and Press Tools     | 6. Electrical and Power Machinery |
| 3. Plastics Manufacturing Machinery | 7. Light Engineering              |
| 4. Textile Manufacturing Machinery  |                                   |

**OCCUPATION:** Machining

**REFERENCE ID:** CSC/ Q 0126

NCO-2004: NIL

**CNC Setter cum Operator - Vertical Machining Centre:** Setting of computer numerically controlled (CNC) vertical machining machines (VMC) in order to perform machining operations on metal components, as per specifications provided.

**Brief Job Description:** It involves setting up cutting tools and workholding devices for producing components that combine a number of different features, conducting trial runs, proving the program tool by tool in single block mode, performing the necessary checks before allowing the machine to operate in full program run mode and then handing over for production.

**Personal Attributes:** Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness

Job Details	Qualifications Pack Code	CSC/ Q 0126		
	Job Role	CNC Setter cum Operator - Vertical Machining Centre		
	Credits NSQF [OPTIONAL]		Version number	1.0
	Sector	CAPITAL GOODS	Drafted on	14/04/14
	Sub-sector	<ol style="list-style-type: none"> <li>1. Machine Tools</li> <li>2. Dies, Moulds And Press Tools</li> <li>3. Plastics Manufacturing Machinery</li> <li>4. Textile Manufacturing Machinery</li> <li>5. Process Plant Machinery</li> <li>6. Electrical and Power Machinery</li> <li>7. Light Engineering</li> </ol>	Last reviewed on	
	Occupation	MACHINING	Next review date	30/08/15

Job Role	CNC Setter cum Operator – Vertical Machining Centre
Role Description	Setting of computer numerically controlled (CNC) vertical machining machines (VMC) in order to perform machining operations on metal components, as per specifications provided.
NSQF level	L5
Minimum Educational Qualifications*	10 <sup>th</sup> Standard
Maximum Educational Qualifications*	
Training (Suggested but not mandatory)	No Previous Training Required
Experience	Minimum 1 year as an Vertical Machine Operator
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <p>CSC/ N 0131 Set computer numerically controlled vertical machining center to perform a range of operations on metal components</p> <p>CSC/ N 0116 Perform a range of operations on metal components using computer numerical controlled vertical machining center</p> <p>CSC/ N 0135 Use basic health and safety practices at the workplace</p> <p>CSC/ N 0136 Work effectively with others</p> <p><b>Optional:</b></p> <p>1. Nil</p>
Performance Criteria	As described in the relevant OS units

**Definitions**

Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in the Indian context
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organisational Context	Organisational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the 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 the quality of performance required.
Sector	Sector is a conglomeration of different business operations having similar businesses 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.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Unit Code	Unit Code is a unique identifier for a NOS unit, which can be denoted with an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.

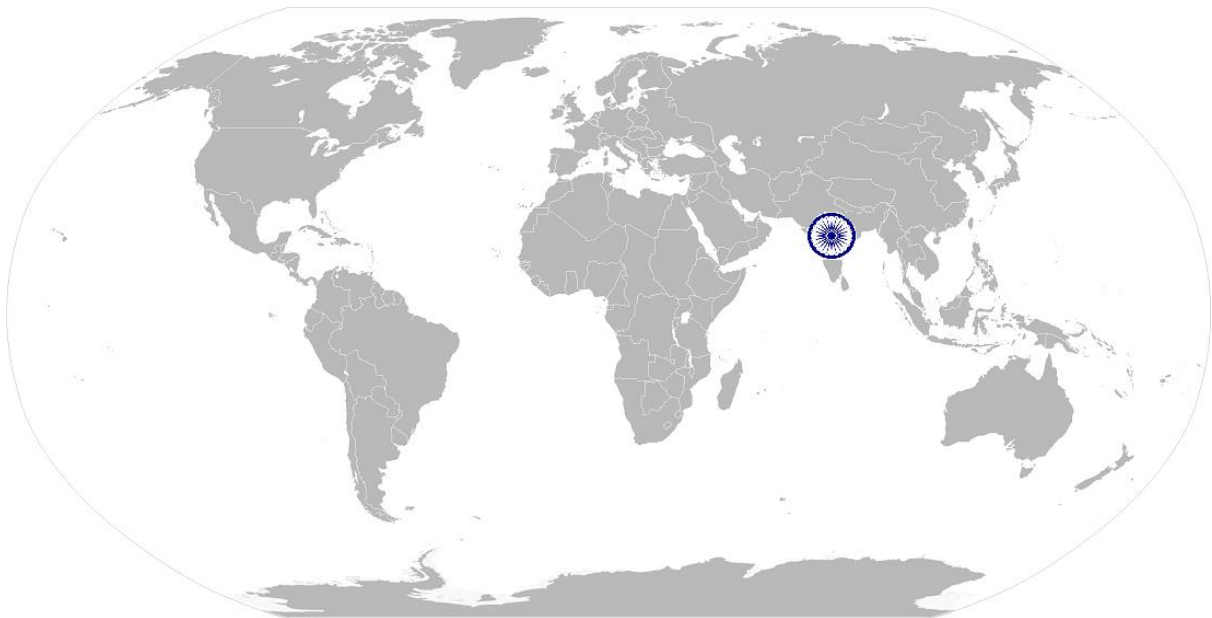
Acronyms

Keywords /Terms	Description
CNC	Computer Numerically Controlled
VMC	Vertical Machining Center
3 D	3 dimensional
CAD	Computer Aided Design
CAM	Computer Aided Manufacture
DTI	Dial test indicators
HCS	High Carbon Steel
CO2	Carbon dioxide
CPR	Cardiac pulmonary resuscitation
PPE	Personal protective equipment

**CSC/ N 0131: Set computer numerically controlled vertical machining center to perform a range of operations on metal components**

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# National Occupational Standard



## Overview

This unit covers the setting of computer numerically controlled (CNC) vertical machining machines (VMC) in order to perform machining operations on metal components, as per specifications provided.

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National Occupational Standard

<b>Unit Code</b>	<b>CSC / N 0131</b>
<b>Unit Title (Task)</b>	<b>Set computer numerically controlled vertical machining center to perform a range of operations on metal components</b>
<b>Description</b>	<p>This unit covers the setting of Computer Numerically Controlled (CNC) vertical machining center (VMC), in order to perform multiple machining operations on metal components, as per specifications provided. It does not include machine programming.</p> <p>It involves setting the machine for producing components that combine a number of different features, such as flat faces, parallel faces, faces square to each other, faces at an angle, steps/shoulders, open and enclosed slots, drilled, bored and reamed holes, internal and external threads, and special forms/profiles.</p> <p>It involves conducting trial runs, proving the program tool by tool in single block mode, performing the necessary checks before allowing the machine to operate in full program run mode and then handing over for production</p> <p>The candidate will also have to set up the cutting tools and work-holding devices for completion of the machining.</p> <p>The candidate will be expected to perform as per instructions given, taking personal responsibility for own actions and for the quality and accuracy of the work produced.</p> <p>The candidate will have knowledge and understanding of the machining operations used; their applications; the equipment, work-holding devices, tooling, materials and consumables used; the importance of quality and accuracy in their work and the safety precautions required.</p> <p>The candidate will be required to demonstrate safe working practices throughout and will understand the responsibility they owe to themselves and others in the workplace.</p>
<b>Scope</b>	<ul style="list-style-type: none"> <li>Working safely</li> <li>Prepare for setting CNC VMC machine</li> <li>Carry out setting for CNC VMC machine</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Working safely</b>	<p>PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work</p> <p>PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing VMC setting operations</p> <p>PC3. work following laid down procedures and instructions</p> <p>PC4. ensure work area is clean and safe from hazards</p> <p>PC5. ensure that all tools and equipment are in a safe and usable condition</p> <p>PC6. ensure that the components used are free from foreign objects, dirt or other contamination</p>



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<p><b>Prepare for setting CNC VMC machine</b></p>	<p>PC7. obtain job specification from a valid and approved source  <b>Valid sources:</b> Job or work instruction sheet/card; work drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications; instructions from supervisor</p> <p>PC8. read and establish job requirements from the job specification document accurately  <b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national, international and organizational standards; reference charts, tables and graphs; machining/assembly drawings  <b>Job requirements:</b> raw materials or components required (type, quality, quantity); dimensions; limits and tolerances; surface texture requirements; operations required (list, sequence and procedures where applicable); shape or profiles to be machined; projections (orthographic [first angle, third angle], isometric (including exploded, oblique); reference points, lines, edges and surfaces; continuous dimensions; baseline dimensions; work-holding devices and instruments to be used; cutting tool solutions; tool magazine setup; interdependencies; timelines</p> <p>PC9. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures</p> <p>PC10. prepare the work area for the VMC setting operations as per procedure or specification received</p> <p>PC11. conduct a preliminary check of the readiness of the VMC machine  <b>Preliminary check:</b> e.g. machine is clean, referencing-zero return, lubrication are functioning, coolant level is correct, sub-systems are working correctly, etc.</p> <p>PC12. conduct a preliminary check of the readiness of the components and cutters</p> <p>PC13. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements  <b>Hand tools:</b> allen keys, spanner, wrenches, mallet  <b>Cutting tools:</b> mills (face, end), drills (twist/core, slot), boring tools, reamers, taps, special profile cutters  <b>Cutting tools materials:</b> high carbon steel (HCS), high speed steel (HSS) tungsten carbide, carbide</p> <p>PC14. ensure that all measuring equipment is calibrated and approved for usage  <b>Measuring equipment:</b> rules, micrometers (external, internal, depth), verniers (digital, dial; length, depth; protractors), gauges (slip, bore/hole, thread, plug, radius/profile), dial test indicators (DTI), surface finish equipment (such as comparison plates, machines), templates</p> <p>PC15. extract and use information from engineering drawings and relate specifications in relation to work undertaken</p> <p>PC16. use and extract information from reference charts, tables, graphs and standards  <b>Reference charts, tables and graphs:</b> tapping sizes and threads; feeds and speeds; machining symbols and tolerances</p> <p>PC17. identify tool requirements from tooling layout and assess their suitability for</p>
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	<p>producing various features and profiles</p> <p><b>Features and profiles</b> • faces (flat, square, parallel, angular), steps/shoulders, slots (open ended, enclosed, tee), holes (drilled, bored), forms (profile -vee, concave, convex, gear forms; indexed or rotated; special), recesses, serrations</p> <p>PC18. identify suitable work-holding or fixturing device as per the job requirement</p> <p>PC19. ensure that the tools and fixtures are in usable condition (free from breakage, damage, calibration, etc)</p> <p>PC20. ensure the correct and latest part-program is uploaded onto the CNC system</p> <p><b>Part-programme for relative work/tool movement of a CNC machine tool:</b> co-ordinate positioning (absolute, incremental); use of sub routines; macros and canned cycles; CAD/CAM; CNC program; post processing; data transfer</p> <p>PC21. pre-set the tooling using setting jigs/fixtures</p> <p>PC22. where appropriate, seek any necessary instruction/training on the operation of the machine</p>
Carry out setting for CNC VMC machine	<p>PC23. mount and set the required work-holding devices, work-piece and cutting tools</p> <p><b>Set up of the machine:</b> alignment of work-holding device, position of cutters in relationship to work-piece/ tool pre-setter, VMC cutter revs per minute, machine guards/safety mechanisms, linear/table feed rate, cutting fluid flow rate, depth of cut for roughing and finishing</p> <p>PC24. check that the tools have a specific tool number in relation to the operating program</p> <p>PC25. enter all relevant tool data to the operating program on the CNC</p> <p>PC26. set tool datums, positions, lengths, offsets and radius compensation</p> <p>PC27. mount the work-holding device/fixture onto the machine</p> <p>PC28. set the work-holding device/fixture in relationship to the machine datum's and reference points</p> <p>PC29. set the machine tool operating parameters (eg hydraulic pressure, clamping) as per the component requirements</p> <p>PC30. place the machine into the correct operating mode, and access the program edit facility in order to enter tooling data,</p> <p>PC31. conduct trial runs using single block run, dry run and feed and speed override controls</p> <p>PC32. prove the program tool by tool in single block mode</p> <p>PC33. perform the necessary checks before allowing the machine to operate in full program run mode</p> <p><b>Checks:</b> after proving the program, measure the dimensions of the first component on the machine and correct accordingly; unload the component after all the dimensions are as per specifications; inspect the component for all dimensions and record findings in specified formats; make a note of the corrections to be made in the tool wear offsets and correct accordingly; run the next component</p> <p>PC34. check and hand-over the machine after set-up to the machine operator along with relevant instructions and documentation</p> <p><b>Checks:</b> check alignment and levels; check electrical power; supplies/insulation, safety switches/devices; check interlocking, security of</p>

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	<p>pipes and couplings; check oil levels; check, oil temperature, oil pressure, cooling/coolant system at light load and at full load; check if machine functions as required for production</p> <p>PC35. complete relevant documentation as per organizational procedure</p> <p>PC36. handle the typical problems that can occur with the setting up of the tooling, work-holding devices and proving the program</p> <p>PC37. switch the VMC machine on and off in normal and emergency situations</p> <p>PC38. after use, return the old cutting tools, work-holding device, fixtures, instruments, drawings and verified tapes and programs back to store, safely and correctly</p> <p>PC39. ensure that there is no damage to the tool/fixture while doing the prove-out</p> <p>PC40. complete documentation during and post operations and submit as per organizational procedures</p> <p>PC41. deal promptly and effectively with problems within the setter's control, and seek help and guidance from the relevant people, in case of problems that cannot be resolved</p> <p>PC42. shut down the equipment to a safe condition on conclusion of the activities</p> <p>PC43. leave the work area in a safe and tidy condition on completion of the setting activities</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions</p> <p>KA2. relevant health and safety requirements applicable in the work place</p> <p>KA3. importance of working in clean and safe environment</p> <p>KA4. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities</p> <p>KA5. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA6. relevant people and their responsibilities within the work area</p> <p>KA7. escalation matrix and procedures for reporting work and employment related issues</p> <p>KA8. documentation and related procedures applicable in the context of employment and work</p> <p>KA9. importance and purpose of documentation in context of employment and work</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. specific safe working practices, CNC machining procedures and environmental regulations</p> <p>KB2. hazards associated with setting and machining operations on a VMC and how can they be minimised</p> <p>KB3. personal protective equipment to be used during the setting and machining activities on a VMC and where can it be obtained</p> <p>KB4. types and sources of appropriate job specifications</p> <p><b>Valid sources:</b> Job or work instruction sheet/card; work drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications; instructions from supervisor</p>

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	<p>KB5. common terminology used in VMC</p> <p>KB6. how to read and interpret first and third angle component drawings</p> <p>KB7. how to extract information from engineering drawings or data and related specifications</p> <p>KB8. main features and working parts of the VMC machine, and the accessories that can be used</p> <p>KB9. operating principles of computer numerically controlled machine tools  <b>Operating principles:</b> open loop system; closed loop system; control systems (closed loop servo motors and associated transmission, stepper motors and associated transmission); types and function of position transducers (rotary type); digital control</p> <p>KB10. importance of following specified machining sequences and procedures</p> <p>KB11. importance of ensuring workpieces/materials and consumables are suitable for the specified job and related procedures</p> <p>KB12. characteristics considered for selection of materials for engineering applications  <b>characteristics:</b> magnetism, machine ability, application, influence of physical properties of materials on processing techniques( cutting, forming, joining)</p> <p>KB13. importance and procedures to ensure that tools and equipment are in a safe and usable condition</p> <p>KB14. various VMC machining operations that can be performed, and the methods and equipment used</p> <p>KB15. range of workholding methods and devices that are used on VMC</p> <p>KB16. the methods of setting work-holding devices, and the tools and equipment used for it  <b>Equipment used for positioning, aligning and securing:</b> clamping direct to machine table; pneumatic or magnetic table; machine vice (such as plain, swivel, universal); angle plate; vee block and clamps; fixtures; indexing head/device; rotary table; magnetic chucks</p> <p>KB17. range of cutting tools that are used on VMCs, and their applications  <b>Cutting tools:</b> mills (face, end), drills (twist/core, slot), boring tools, reamers, taps, special profile cutters  <b>Cutting tools materials:</b> high carbon steel (HCS), high speed steel (HSS) tungsten carbide, carbide</p> <p>KB18. various tool holding devices that are used, and the methods of correctly mounting and securing the cutting tools to the tool holders</p> <p>KB19. basic principles of operation of the various VMCs, and typical operations that they can perform</p> <p>KB20. how to handle and store VMC cutters safely and correctly</p> <p>KB21. how to extract and use information from engineering drawings and related specifications in relation to work undertaken</p> <p>KB22. British and metric(SI) systems of measurement</p> <p>KB23. work-piece reference points and system of tolerancing</p> <p>KB24. Factors determining selection and use of indexable tips  <b>Factors:</b> hardness of the material, the cutting characteristics of the material, tolerances to be achieved, component surface finish, component, specifications</p> <p>KB25. factors which determine speeds and feeds to be used</p>
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	<p>KB26. importance of using correct procedures as per raw materials form of supply/ shapes  <b>Raw materials forms of supply/ shapes:</b> square/rectangular (eg. bar stock, sheet material, machined components), circular/cylindrical (eg. bar stock, tubes, turned components, flat discs), irregular shapes/profile (eg. castings, forgings, odd shaped components)</p> <p>KB27. how the various types of material will affect the feeds and speeds that can be used  <b>Types of materials:</b> 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; non-metals: eg. plastics</p> <p>KB28. types of cutting fluid that are used, and precautions to be taken when handling and using them</p> <p>KB29. advantages of using pre-set tooling, and how to set the tooling using setting jigs/fixtures</p> <p>KB30. use of tool posts, magazines and carousels, and how to position and identify the tools in relationship to the operating program</p> <p>KB31. machinability as per the hardness of material.</p> <p>KB32. different kind of inserts for using higher parameters for faster machining</p> <p>KB33. need for clamping the job to avoid distortion where high degree of accuracy is required</p> <p>KB34. types of error messages on the VMC display and how to respond to each</p> <p>KB35. importance of proving the program and how to do it</p> <p>KB36. quality control procedures that are used, inspection checks to be carried out, and the equipment that will need to be used</p> <p>KB37. how to check the quality of the shaped components against the required quality standards  <b>Quality and accuracy standards:</b> components to be free from false tool cuts, burrs and sharp edges; specific dimensional tolerances within +/- 0.02mm; flatness &amp; squareness within 0.025mm; surface finish 63µin or 1.6µm; angles within +/-15sec; bored holes within H6</p> <p>KB38. basic maintenance requirements of the machine and process for repair and maintenance</p> <p>KB39. importance of reporting problems in a timely manner</p> <p>KB40. report conditions and seek appropriate assistance in a timely manner to address risk of failure to comply with necessary targets and specifications</p> <p>KB41. deal with finished components as per organizational guidelines</p> <p>KB42. complete documentation during and post operations as per organizational procedures</p> <p>KB43. Importance of returning all tools and equipment to the correct location on completion of the setting activities</p> <p>KB44. Importance of leaving the work area in a safe and tidy condition on completion of job activities</p>
<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/</b>	<b>Communication</b>

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<p><b>Generic Skills</b></p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/or local language</p> <p><b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national, international and organizational standards; reference charts, tables and graphs; machining/assembly drawings</p> <p>SA2. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language</p> <p>SA3. convey and share technical information clearly using appropriate language</p> <p>SA4. check and clarify task-related information</p> <p>SA5. liaise with appropriate authorities using correct protocol</p> <p>SA6. communicate with people in respectful form and manner in line with organizational protocol</p> <p><b>Numerical and computational skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. undertake numerical operations, and calculations/ formulae</p> <p><b>numerical computations:</b> addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages</p> <p><b>algebraic expressions:</b> represent numerical quantities using symbols, apply laws of precedence in the use of precedence (BODMAS)</p> <p><b>units and number systems representing degree of accuracy:</b> decimals places, significant figures, fractions as a decimal quantity</p> <p><b>straight line graphs:</b> determining suitable scales from given data, defining and correctly labeling axes, determine the gradient, determine the intercept, prove the law of the straight line graph is <math>y = mx + c</math></p> <p><b>basic shapes:</b> square, rectangle, triangle, circle</p> <p><b>compound shapes:</b> involving squares, rectangles, triangles, circles, semi-circles, quadrants of a circle</p> <p><b>solid shapes:</b> cube, rectangular prism, cylinder</p> <p><b>angles in a triangle:</b> right-angled, isosceles, equilateral</p> <p>speed and feed parameters</p> <p>SA8. identify and draw various basic, compound and solid shapes as per dimensions given</p> <p>SA9. use appropriate measuring techniques and units of measurement</p> <p>SA10. use appropriate units and number systems to express degree of accuracy</p> <p>SA11. interpret and express tolerance in terms of limits on dimensions</p> <p>SA12. calculation of the value of angles in a triangle</p>
	<p><b>Computer Basics</b></p>
	<p>SA13. use basic office applications like spread sheet, word processor, presentations</p> <p>SA14. use ERP software and other organizational software specific to quality function</p> <p>SA15. use email to communicate within the organization as per organization guidelines</p>
	<p><b>Learning</b></p>



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	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA16. maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments</p> <p>SA17. participate in on-the-job and other learning, training and development interventions and assessment</p> <p>SA18. clarify task related information with appropriate personnel or technical adviser</p> <p>SA19. seek to improve and modify own work practices</p>
<b>B. Professional Skills</b>	<p><b>Problem Solving</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. identify problems with work planning, procedures, output and behavior and their implications</p> <p>SB2. prioritize and plan for problem solving</p> <p>SB3. communicate problems appropriately to others</p> <p>SB4. identify sources of information and support for problem solving</p> <p>SB5. seek assistance and support from other sources to solve problems</p> <p>SB6. identify effective resolution techniques</p> <p>SB7. select and apply resolution techniques</p> <p>SB8. seek evidence for problem resolution</p> <p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. plan, prioritize and sequence work operations as per job requirements</p> <p>SB10. organize and analyze information relevant to work</p> <p>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time</p> <p><b>Initiative and Enterprise</b></p> <p>The user/individual on the job needs to know and understand:</p> <p>SB12. importance and impact of initiative and enterprise for achieving better results for self, others and organization</p> <p>SB13. how to undertake and express new ideas and initiatives to others</p> <p>SB14. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</p> <p>SB15. participate in improvement procedures including process, quality and internal/external customer/supplier relationships</p> <p>SB16. apply competencies in new and different situations and contexts to achieve more</p> <p><b>Self-Management</b></p> <p>The user/individual on the job needs to know and understand:</p> <p>SB17. importance of taking responsibility for own work outcomes</p> <p>SB18. importance of adherence to work timings, dress code and other organizational policies</p> <p>SB19. importance of following laid down rules, procedures, instructions and policies</p> <p>SB20. importance of exercising restraint while expressing dissent and during conflict situations</p>




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	SB21. how to avoid and manage distractions to be disciplined at work SB22. importance of time management for achieving better results
	<b>Team Work</b>
	The user/individual on the job needs to know and understand how to: SB23. work in a team in order to achieve better results SB24. identify and clarify work roles within a team SB25. communicate and cooperate with others in the team SB26. seek assistance from fellow team members



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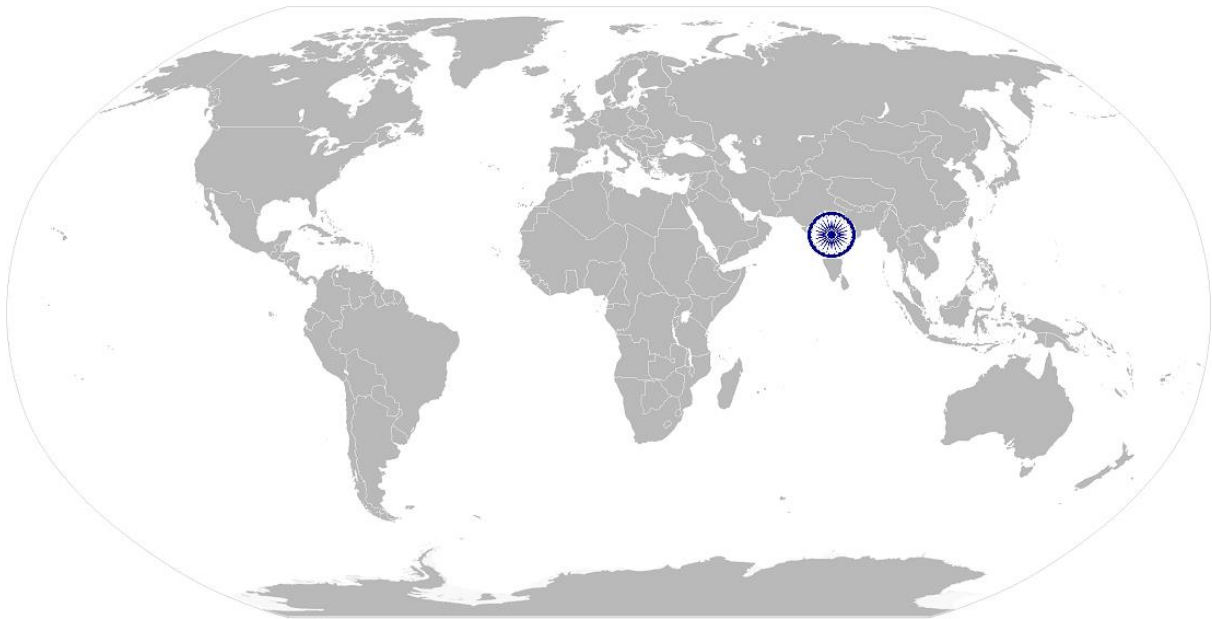
## **NOS Version Control**

<b>NOS Code</b>		<b>CSC/ N 0131</b>	
<b>Credits(NSQF) [OPTIONAL]</b>		<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Capital Goods</b>	<b>Drafted on</b>	<b>14/04/14</b>
<b>Industry Sub-sector</b>	1. Machine Tools	<b>Last reviewed on</b>	
	2. Dies, Moulds And Press Tools		
	3. Plastics Manufacturing Machinery		
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	7. Light Engineering Goods		
		<b>Next review date</b>	<b>30/08/15</b>

**CSC/ N 0116: Perform a range of operations on metal components using computer numerical controlled vertical machining center**

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# National Occupational Standard



## Overview

This unit covers the operation of Computer Numerically Controlled (CNC) vertical machining center (VMC), in order to perform machining operations on metal components, as per specifications provided. It does not include machine setting or programming.

**CSC/ N 0116: Perform a range of operations on metal components using computer numerical controlled vertical machining center**

Unit Code	CSC/ N 0116
Unit Title (Task)	Perform a range of operations on metal components using computer numerical controlled vertical machining center
Description	<p>This unit covers operation of Computer Numerically Controlled (CNC) vertical machining center (VMC) with 3-axis, in order to perform multiple machining operations on metal and plastic components, as per specifications provided. It does not include machine setting or programming. It involves producing components that combine a number of different features, such as flat faces, parallel faces, faces square to each other, faces at an angle, steps/shoulders, open and enclosed slots, drilled, bored and reamed holes, internal threads, and special forms/profiles.</p> <p>It also involves inspecting the components after machining to ensure that the completed components are as per the required specification and meet production targets.</p> <p>It also involves continuously monitoring the machining operations and, where necessary, make minor adjustments or seek the help of the setter to make the required adjustments, in order to ensure that the work output is to the required quality and accuracy.</p> <p>The candidate will also have to remove the cutting tools and work-holding devices after completion of the machining.</p> <p>The candidate will be expected to perform as per instructions given, taking personal responsibility for own actions and for the quality and accuracy of the work produced.</p> <p>The candidate will have knowledge and understanding of the machining operations used; their applications; the equipment, work-holding devices, tooling, materials and consumables used; the importance of quality and accuracy in their work and the safety precautions required.</p> <p>The candidate will be required to demonstrate safe working practices throughout and will understand the responsibility they owe to themselves and others in the workplace.</p>
Scope	<ul style="list-style-type: none"> <li>Working safely</li> <li>Preparing for machining activities on VMC</li> <li>Performing machining operations on VMC</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Working safely	<p>PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work</p> <p>PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing machining operations</p> <p>PC3. work following laid down procedures and instructions</p> <p>PC4. ensure work area is clean and safe from hazards</p> <p>PC5. ensure that all tools and equipment are in a safe and usable condition</p>

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<p><b>Preparing for machining activities on VMC</b></p>	<p>PC6. obtain job specification from a valid and approved source  <b>Valid sources:</b> job instruction sheet/job card; work drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications; instructions from supervisor</p> <p>PC7. read and establish job requirements from the job specification document accurately  <b>Job requirements:</b> raw materials or components required (type, quality, quantity); dimensions; limits and tolerances; surface texture requirements; operations required (list, sequence and procedures where applicable); shape or profiles to be machined; tools to be used; interdependencies; timelines  <b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national, international and organisational standards; reference charts, tables, graphs; machining/assembly drawings</p> <p>PC8. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures</p> <p>PC9. use and extract information from reference charts, tables, graphs and standards  <b>Information pertaining to:</b> tapping sizes and threads; feeds and speeds; component ratings; machining symbols and tolerances</p> <p>PC10. prepare the work area for the machining operations as per procedure or operational specification</p> <p>PC11. ensure that the components used are free from foreign objects, dirt or other contamination</p> <p>PC12. conduct a preliminary check of the readiness of the vertical machining center  <b>Preliminary check:</b> e.g. machine is clean, referencing-zero return, lubrication are functioning, coolant level is correct, sub-systems are working correctly, confirmation received from the machine setter that the machine is ready for production, etc.</p> <p>PC13. obtain correct workpieces/raw materials and consumables as per job requirements</p> <p>PC14. obtain appropriate cutting tools, hand tools and measuring tools as per job requirements  <b>Hand tools:</b> allen keys, spanner, wrenches, mallet, pneumatic gun  <b>Cutting tools:</b> mills (face, end), drills (twist/core, slot), boring tools, reamers, taps, special profile cutters</p> <p>PC15. ensure that all measuring equipment is calibrated and approved for usage  <b>Measuring equipment:</b> scales, micrometers (external, internal, depth), verniers (digital, dial; length, depth; protractors), gauges (slip, bore/hole, thread, plug, radius/profile), dial test indicators (DTI), surface finish equipment (such as comparison plates, machines), templates</p> <p>PC16. set work pieces as per job requirements using appropriate positioning and/or holding devices and support mechanisms</p> <p>PC17. where appropriate, seek any necessary instruction/training on the operation of the machine</p> <p>PC18. check that the operating program is at the correct start point and the work piece is clear of the machine spindle</p>
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<p><b>Performing machining operations on VMC</b></p>	<p>PC19. switch the vertical machining center on and off in normal and emergency situations</p> <p>PC20. load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions</p> <p>PC21. do trial run by taking back the tool offsets by a minimum amount keeping margin error rectification</p> <p>PC22. measure the critical parameters of the machined component on the machine (without removing from the machine ), after the trial run  <b>Critical parameters:</b> linear dimensions (such as lengths, depths), slots (position, width, depth), flatness, cylindricity, axis straightness, concentricity, squareness, parallelism, angles, recesses, thread fit, hole size/fit, surface finish</p> <p>PC23. correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data  <b>Tooling data:</b> offsets compensation, radius compensation</p> <p>PC24. ensure accuracy in the critical parameters of the machined components by performing multiple trial runs and subsequent adjustment of offsets</p> <p>PC25. measure the component after unloading to check for accuracy in the critical parameters as per job specifications</p> <p>PC26. produce machined components that combine different operations and have a range of applicable features  <b>Features of machined components produced:</b> flat; square; parallel and angular faces; steps/shoulders; slots (open ended, enclosed, recesses); holes ( drilled, bored, reamed, tapped); hole and end mill ops; profiles (external, internal, curved); special forms (such as concave, convex); grooves; undercuts; threads (internal, external); radius</p> <p>PC27. follow the specified machining sequence and procedure as per job specifications</p> <p>PC28. interpret in-built alarms and error codes of equipment and respond to the same as per operating manual/organizational guidelines</p> <p>PC29. inspect as per frequency of inspection mentioned in the inspection plan (part of the job specifications)</p> <p>PC30. record the measured values as per organizational procedure</p> <p>PC31. observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly</p> <p>PC32. ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy</p> <p>PC33. identify when tools need sharpening/replacing</p> <p>PC34. remove worn out tool and replace with a suitable tool</p> <p>PC35. perform basic maintenance checks on the machine after operations  <b>Basic maintenance activities:</b> replenish coolant; replenish lubrication oil; ensure all parts are clean; perform housekeeping tasks on the machine; remove and dispose swarf (turnings, filings or shavings); check lubrication levels</p> <p>PC36. keep finished components as well as raw material as per organizational procedure established</p> <p>PC37. produce components as per standards applicable to the process  <b>Produce components standards:</b> components to be free from false tool cuts, burrs and sharp edges; general dimensional tolerance +/- 0.02mm; surface finish</p>
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	<p>within 1.6µm; reamed holes within H7; screw threads 6G/6H; angles/tapers within +/- 15 sec; flatness and squareness 0.025mm per 25mm</p> <p>PC38. work to achieve production targets</p> <p>PC39. report conditions and seek appropriate assistance in a timely manner to address risk of failure to comply with necessary targets and specifications</p> <p>PC40. deal with finished components as per organizational guidelines</p> <p>PC41. return all tools and equipment to the correct location on completion of the machining activities</p> <p>PC42. update log book and complete necessary documentation during and post operations as per organizational procedures</p> <p>PC43. leave the work area in a safe and tidy condition on completion of job activities</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions</p> <p>KA2. relevant health and safety requirements applicable in the work place</p> <p>KA3. importance of working in clean and safe environment</p> <p>KA4. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities</p> <p>KA5. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA6. relevant people and their responsibilities within the work area</p> <p>KA7. escalation matrix and procedures for reporting work and employment related issues</p> <p>KA8. documentation and related procedures applicable in the context of employment and work</p> <p>KA9. importance and purpose of documentation in context of employment and work</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand</p> <p>KB1. specific safe working practices, VMC machining procedures and environmental regulations that must be observed</p> <p><b>Safe working practices and procedures:</b> ensuring the correct isolation of the machine before mounting work-holding devices and tooling; fitting and adjusting machine guards; ensuring that the work-piece is secure and that tooling is free from work-piece before starting the machine; ensuring personal protective equipment (PPE) to be worn for the CNC machining activities such as correctly fitting overalls and safety glasses; ensuring long hair is tied back or netted; jewellery or other items that can become entangled in the machinery are removed</p> <p>KB2. Safety mechanism on the machine and how to check if they are functioning properly</p> <p><b>Safety mechanisms on the machine:</b> emergency stop buttons, emergency brakes</p> <p>KB3. hazards associated with carrying out the machining operations on a VMC and how can they be minimised</p> <p><b>Hazards:</b> automatic machine operations; revolving/moving parts of machinery; airborne and hot metal particles; sharp cutting tools; lifting and handling work-holding devices; burrs and sharp edges on component; use of power operated</p>

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	<p>chucks; moving machinery; hot and airborne metal and particles and fluid</p> <p>KB4. personal protective equipment to be used during the machining activities on a VMC and where can it be obtained</p> <p>KB5. types and sources of appropriate job specifications  <b>Valid sources:</b> job instruction sheet/job card; work drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications; instructions from supervisor</p> <p>KB6. common terminology used in VMC machining</p> <p>KB7. how to extract information from engineering drawings, dimensioning and labeling data  <b>Drawings, dimensioning and labeling:</b> projections [orthographic (first angle, third angle), isometric (including exploded), oblique]; reference points, lines, edges and surfaces, continuous dimensions, baseline dimensions</p> <p>KB8. main features and working parts of the VMC, and the tools and accessories that can be used</p> <p>KB9. how to read and interpret first and third angle component drawings</p> <p>KB10. importance of following specified machining sequences and procedures</p> <p>KB11. importance of ensuring suitability of workpieces/materials and consumables for the specified job and related procedures</p> <p>KB12. tools and equipment used for machining operations on a VMC</p> <p>KB13. importance and procedures to ensure that tools and equipment are in a safe and usable condition</p> <p>KB14. How to use tools in different types of operations</p> <p>KB15. various CNC machining operations that can be performed, and the methods and equipment used</p> <p>KB16. correct techniques and procedures to carry out specific machining operations on a VMC</p> <p>KB17. Factors that affect feed and speed  <b>Factors:</b> type and condition of material; work-holding devices and method; tooling used; tolerance to be achieved; finish to be achieved; machine working condition (performance)</p> <p>KB18. importance of using correct procedures as per raw materials form of supply/ shapes  <b>Raw materials forms of supply/ shapes:</b> square/rectangular (eg. bar stock, sheet material, machined components), circular/cylindrical (eg. bar stock, tubes, turned components, flat discs), irregular shapes/profile (eg. castings, forgings, odd shaped components)</p> <p>KB19. the function of error messages, and what to do when an error message is displayed</p> <p>KB20. importance of securing the work-piece/raw material correctly using appropriate devices and mechanisms</p> <p>KB21. importance of setting the work-holding device in relationship to the machine axis and reference points</p> <p>KB22. common problems that can occur in VMC machining operations and their implications</p> <p>KB23. correct procedures to address problems commonly encountered during VMC machining operations</p>
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	<p>KB24. importance of reporting problems immediately and accurately</p> <p>KB25. meaning and importance of quality in relation to final and intermediate job output</p> <p>KB26. how to do self-inspection of the shaped components against the specified quality standards</p> <p>KB27. range of materials used in relevant VMC machining applications  <b>Range of materials:</b> ferrous metals: e.g. carbon steels, stainless steels, cast iron, tool steel, hard metals; non-ferrous metals: e.g. bronze, aluminium, copper, copper alloys; non-metals: eg. plastic</p> <p>KB28. the relevant mechanical properties of materials and implications for job</p> <p>KB29. the British and metric(SI) systems of measurement</p> <p>KB30. absolute and incremental systems of tool positioning and offsetting</p> <p>KB31. work-piece zero/reference points and system of tolerances</p> <p>KB32. the use of tungsten carbide, ceramic and diamond indexable tips, and the factors which will determine their selection and use  <b>Factors:</b> hardness of the material, the cutting characteristics of the material, tolerances to be achieved, component surface finish, component specifications</p> <p>KB33. the use of tool magazines and carousels</p> <p>KB34. importance of conducting trial runs</p> <p>KB35. the items that they need to check before allowing the machine to operate in full program run mode</p> <p>KB36. Importance of periodic maintenance checks for the machine and what are the common maintenance checks  <b>Basic maintenance activities:</b> replenish coolant; replenish lubrication oil; ensure all parts are clean; perform housekeeping tasks on the machine; remove and dispose swarf (turnings, filings or shavings); check lubrication levels</p> <p>KB37. span and scope of authority when dealing with problems and avenues of support and escalation</p> <p>KB38. importance of passing on information after completion shifts in an effective and efficient manner</p> <p>KB39. importance of leaving the work area and machine in a safe condition on completion of the activities  <b>Safe condition:</b> correctly isolated; operating programs closed or removed; cleaning the machine; ensuring that any spilt cutting fluids are correctly dealt with; disposing of waste</p>
<b>Skills (S) [Optional]</b>	
<p><b>A. Core Skills/ Generic Skills</b></p>	<p><b>Communication</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/or local language  <b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national, international and organisational standards; reference charts, tables, graphs; machining/assembly drawings</p> <p>SA2. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language</p>

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	<p>SA3. convey and share technical information clearly using appropriate language</p> <p>SA4. check and clarify task-related information</p> <p>SA5. liaise with appropriate authorities using correct protocol</p> <p>SA6. communicate with people in respectful form and manner in line with organizational protocol</p>
	<b>Numerical and computational skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. undertake basic numerical operations, and calculations/ formulae  <b>numerical computations:</b> addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages  <b>algebraic expressions:</b> represent numerical quantities using symbols, apply laws of precedence in the use of precedence (BODMAS)  <b>units and number systems representing degree of accuracy:</b> decimals places, significant figures, fractions as a decimal quantity  <b>basic shapes:</b> square, rectangle, triangle, circle  <b>compound shapes:</b> involving squares, rectangles, triangles, circles, semi-circles, quadrants of a circle  <b>solid shapes:</b> cube, rectangular prism, cylinder  <b>angles in a triangle:</b> right-angled, isosceles, equilateral</p> <p>SA8. identify various basic, compound and solid shapes as per dimensions given</p> <p>SA9. use appropriate measuring techniques and units of measurement</p> <p>SA10. use appropriate units and number systems to express degree of accuracy</p> <p>SA11. use metric systems of measurement</p>
<b>B. Professional Skills</b>	<b>Learning</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA12. participate in on-the-job and other learning, training and development interventions and assessment</p> <p>SA13. clarify task related information with appropriate personnel or technical adviser</p> <p>SA14. seek to improve and modify own work practices</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. identify problems with work, procedures, output and behavior and their implications</p> <p>SB2. communicate problems appropriately to others</p> <p>SB3. identify sources of information and support for problem solving</p> <p>SB4. seek assistance and support from other sources to solve problems</p> <p>SB5. identify effective resolution techniques</p> <p>SB6. select and apply resolution techniques</p> <p>SB7. seek evidence for problem resolution</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB8. plan, prioritize and sequence work operations as per job requirements  <b>Job requirements:</b> raw materials or components required (type, quality,</p>

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	quantity); dimensions; limits and tolerances; surface texture requirements; operations required (list, sequence and procedures where applicable); shape or profiles to be machined; tools to be used; interdependencies; timelines SB9. use basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time
	<b>Initiative and Enterprise</b>
	The user/individual on the job needs to know and understand: SB10. one's competencies can and should be applied in new and different situations and contexts to achieve more SB11. how to express new ideas and initiatives to others SB12. participate in improvement procedures including process, quality and internal/external customer/supplier relationships
	<b>Self-Management</b>
	The user/individual on the job needs to know and understand: SB13. importance of taking responsibility for own work outcomes SB14. importance of adherence to work timings, dress code and other organizational policies SB15. importance of following laid down rules, procedures, instructions and policies SB16. importance of exercising restraint while expressing dissent and during conflict situations SB17. how to avoid and manage distractions to be disciplined at work SB18. importance of time management for achieving better results
	<b>Teamwork</b>
	The user/individual on the job needs to know and understand how to: SB19. work in a team in order to achieve better results SB20. identify and clarify work roles within a team SB21. communicate and cooperate with others in the team SB22. seek assistance from fellow team members

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## **NOS Version Control**

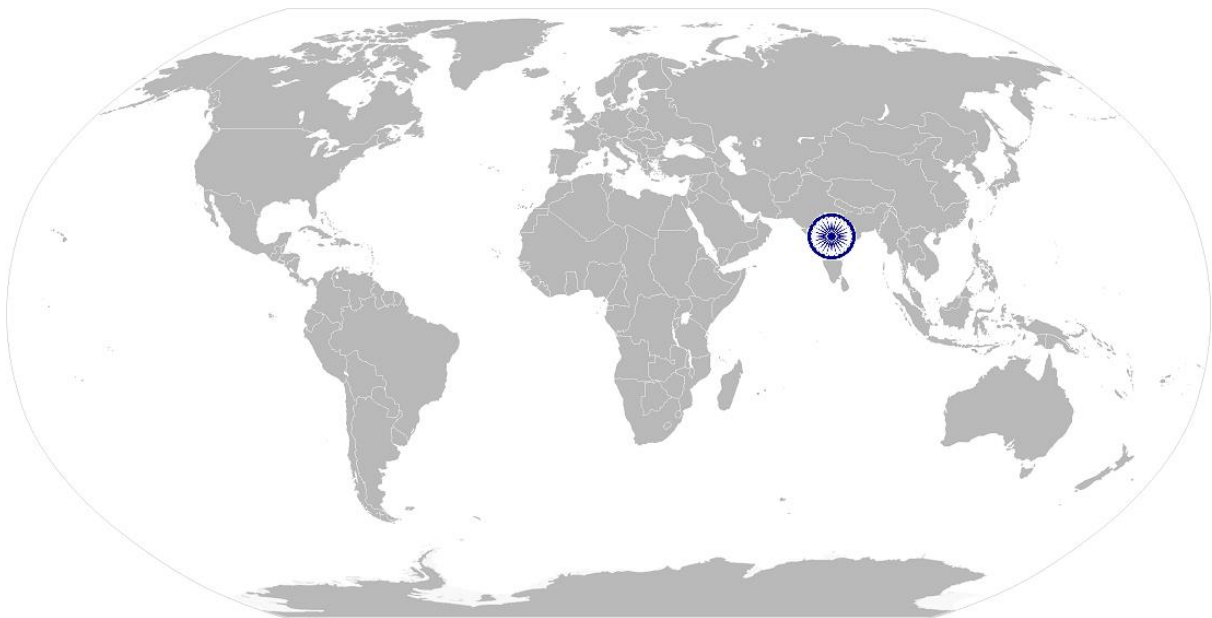
NOS Code	CSC/ N 0116		
Credits(NSQF) [OPTIONAL]		Version number	1.0
Industry	Capital Goods	Drafted on	14/04/14
Industry Sub-sector	<ol style="list-style-type: none"> <li>1. Machine Tools</li> <li>2. Dies Moulds And Press Tools</li> <li>3. Plastics Manufacturing Machinery</li> <li>4. Textile Manufacturing Machinery</li> <li>5. Process Plant Machinery</li> <li>6. Electrical and Power Machinery</li> <li>7. Light Engineering</li> </ol>	Last reviewed on	
		Next review date	30/08/15



**CSC/ N 0135: Use basic health and safety practices at the workplace**

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# National Occupational Standard



## Overview

This unit covers health, safety and security at the workplace. This includes procedures and practices that candidates need to follow to help maintain a healthy, safe and secure work environment.

**CSC/ N 0135: Use basic health and safety practices at the workplace**

Unit Code	CSC / N 0135
Unit Title (Task)	Use basic health and safety practices at the workplace
Description	<p>This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace. It covers responsibilities towards self, others, assets and the environment.</p> <p>It includes understanding of risks and hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies, etc.</p> <p>It covers knowledge of fire safety, common first aid applications, safe practices and emergency procedures.</p>
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Health and safety</li> <li>• Fire safety</li> <li>• Emergencies, rescue and first-aid procedures</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Health and safety	<p>The user/individual on the job should be able to:</p> <p>PC1. use protective clothing/equipment for specific tasks and work conditions</p> <p><b>Protective clothing:</b> leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuffless (without folds), trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors</p> <p><b>Equipment:</b> hand shields, machine guards, residual current devices, shields, dust sheets, respirator</p> <p>PC2. state the name and location of people responsible for health and safety in the workplace</p> <p>PC3. state the names and location of documents that refer to health and safety in the workplace</p> <p>PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace</p> <p><b>Hazards:</b> sharp edged and heavy tools; heated metals; oxyfuel and gas cylinders; welding radiation; hazardous surfaces(sharp, slippery, uneven, chipped, broken, etc.); hazardous substances(chemicals, gas, oxy-fuel, fumes, dust, etc.); physical hazards(working at heights, large and heavy objects and machines, sharp and piercing objects, tolls and machines, intense light, load noise, obstructions in corridors, by doors, blind turns, noise, over stacked shelves and packages, etc.) electrical hazards (power supply and points, loose and naked cables and wires, electrical machines and appliances, etc.)</p>

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	<p><b>Possible causes of risk and accident:</b> physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)</p> <p>PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others</p> <p><b>Safe working practices:</b> using protective clothing and equipment; putting up and reading safety signs; handle tools in the correct manner and store and maintain them properly; keep work area clear of clutter, spillage and unsafe object lying casually; while working with electricity take all electrical precautions like insulated clothing, adequate equipment insulation, use of control equipment, dry work area, switch off the power supply when not required, etc.; safe lifting and carrying practices; use equipment that is working properly and is well maintained; take due measures for safety while working in confined places, trenches or at heights, etc. including safety harness, fall arrestors, etc.</p> <p>PC6. state methods of accident prevention in the work environment of the job role</p> <p><b>Methods of accident prevention:</b> training in health and safety procedures; using health and safety procedures; use of equipment and working practices (such as safe carrying procedures); safety notices, advice; instruction from colleagues and supervisors</p> <p>PC7. state location of general health and safety equipment in the workplace</p> <p><b>General health and safety equipment:</b> fire extinguishers; first aid equipment; safety instruments and clothing; safety installations(eg fire exits, exhaust fans)</p> <p>PC8. inspect for faults, set up and safely use steps and ladders in general use</p> <p><b>Ladder faults:</b> corrosion of metal components, deterioration, splits and cracks timber components, imbalance, loose rungs, missing/unfixed nuts or bolts, etc.</p> <p><b>Ladders set up:</b> firm/level base, clip/lash down, leaning at the correct angle, etc.</p> <p>PC9. work safely in and around trenches, elevated places and confined areas</p> <p>PC10. lift heavy objects safely using correct procedures</p> <p>PC11. apply good housekeeping practices at all times</p> <p><b>Good housekeeping practices:</b> clean/tidy work areas, removal/disposal of waste products, protect surfaces</p> <p>PC12. identify common hazard signs displayed in various areas</p> <p><b>Various areas:</b> on chemical containers; equipment; packages; inside buildings; in open areas and public spaces, etc.</p> <p>PC13. retrieve and/or point out documents that refer to health and safety in the workplace</p>
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	<p><b>Documents:</b> fire notices, accident reports, safety instructions for equipment and procedures, company notices and documents, legal documents (eg government notices)</p>
<b>Fire safety</b>	<p>The user/individual on the job should be able to:</p> <p>PC14. use the various appropriate fire extinguishers on different types of fires correctly</p> <p><b>Types of fires:</b> Class A: eg. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: eg. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no longer receiving electricity); Class D: combustible metals such as magnesium, titanium, and sodium (These fires burn at extremely high temperatures and require special suppression agents)</p> <p>PC15. demonstrate rescue techniques applied during fire hazard</p> <p>PC16. demonstrate good housekeeping in order to prevent fire hazards</p> <p>PC17. demonstrate the correct use of a fire extinguisher</p>
<b>Emergencies, rescue and first-aid procedures</b>	<p>The user/individual on the job should be able to:</p> <p>PC18. demonstrate how to free a person from electrocution</p> <p>PC19. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.</p> <p>PC20. demonstrate basic techniques of bandaging</p> <p>PC21. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments</p> <p>PC22. perform and organize loss minimization or rescue activity during an accident in real or simulated environments</p> <p>PC23. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases</p> <p>PC24. demonstrate the artificial respiration and the CPR Process</p> <p>PC25. participate in emergency procedures</p> <p><b>Emergency procedures:</b> raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work</p> <p>PC26. complete a written accident/incident report or dictate a report to another person, and send report to person responsible</p> <p><b>Incident Report includes details of:</b> name, date/time of incident, date/time of report, location, environment conditions, persons involved, sequence of events, injuries sustained, damage sustained, actions taken, witnesses, supervisor/manager notified</p> <p>PC27. demonstrate correct method to move injured people and others during an emergency</p>
<b>Knowledge and Understanding (K)</b>	

**CSC/ N 0135: Use basic health and safety practices at the workplace**

<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.</p> <p>KA2. names and location of documents that refer to health and safety in the workplace.</p>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. meaning of “hazards” and “risks”</p> <p>KB2. health and safety hazards commonly present in the work environment and related precautions</p> <p>KB3. possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible</p> <p>KB4. possible causes of risk and accident <b>Possible causes of risk and accident:</b> physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)</p> <p>KB5. methods of accident prevention <b>Methods of accident prevention:</b> training in health and safety procedures; using health and safety procedures; use of equipment and working practices (such as safe carrying procedures); safety notices, advice; instruction from colleagues and supervisors</p> <p>KB6. safe working practices when working with tools and machines</p> <p>KB7. safe working practices while working at various hazardous sites</p> <p>KB8. where to find all the general health and safety equipment in the workplace</p> <p>KB9. various dangers associated with the use of electrical equipment</p> <p>KB10. preventative and remedial actions to be taken in the case of exposure to toxic materials <b>exposure:</b> ingested, contact with skin, inhaled <b>preventative action:</b> ventilation, masks, protective clothing/ equipment); <b>remedial action:</b> immediate first aid, report to supervisor <b>toxic materials:</b> solvents, flux, lead</p> <p>KB11. importance of using protective clothing/equipment while working</p> <p>KB12. precautionary activities to prevent the fire accident</p> <p>KB13. various causes of fire <b>Causes of fires:</b> heating of metal; spontaneous ignition; sparking; electrical heating; loose fires (smoking, welding, etc.); chemical fires; etc.</p> <p>KB14. techniques of using the different fire extinguishers</p> <p>KB15. different methods of extinguishing fire</p> <p>KB16. different materials used for extinguishing fire <b>Materials:</b> sand, water, foam, CO<sub>2</sub>, dry powder</p> <p>KB17. rescue techniques applied during a fire hazard</p> <p>KB18. various types of safety signs and what they mean</p>



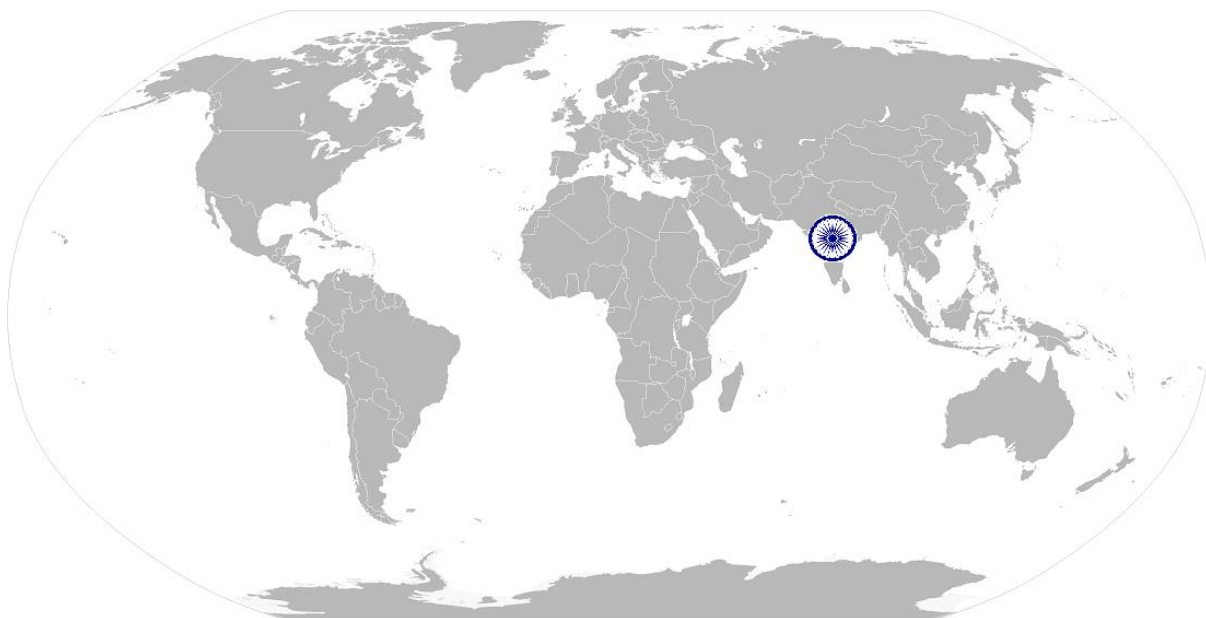
**CSC/ N 0135: Use basic health and safety practices at the workplace**

	<p>KB19. appropriate basic first aid treatment relevant to the condition eg. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries</p> <p>KB20. content of written accident report</p> <p>KB21. potential injuries and ill health associated with incorrect manual handling</p> <p>KB22. safe lifting and carrying practices</p> <p>KB23. personal safety, health and dignity issues relating to the movement of a person by others</p> <p>KB24. potential impact to a person who is moved incorrectly</p>
<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Reading and Writing Skills</b>
	The user/individual on the job needs to know and understand how to:
	SA1. read and comprehend basic content to read labels, charts, signages
	SA2. read and comprehend basic English to read manuals of operations
	SA3. read and write an accident/incident report in local language or English
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to:
	SA4. question coworkers appropriately in order to clarify instructions and other issues
	SA5. give clear instructions to coworkers, subordinates others
	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to:
	SA6. make appropriate decisions pertaining to the concerned area of work with respect to intended work objective, span of authority, responsibility, laid down procedure and guidelines
<b>B. Professional Skills</b>	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand:
	SB1. plan and organize their own work schedule, work area, tools, equipment and materials to maintain decorum and for improved productivity
	<b>Working with others</b>
	The user/individual on the job needs to know and understand how to:
	SB2. remain congenial while discussing and debating issues with co-workers
	SB3. follow appropriate protocols for communication based on situation, hierarchy, organizational culture and practice
	SB4. ask for, provide and receive required assistance where possible to ensure achievement of work related objectives
	SB5. thank coworkers for any assistance received
	SB6. offer appropriate respect based on mutuality and respect for fellow workmanship and authority
	<b>Problem Solving</b>



**CSC/ N 0135: Use basic health and safety practices at the workplace**

	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. identify immediate or temporary solutions to resolve delays</p> <p>SB9. identify sources of support that can be availed of for problem solving for various kind of problems</p> <p>SB10. seek appropriate assistance from other sources to resolve problems</p> <p>SB11. report problems that you cannot resolve to appropriate authority</p>
	<p><b>Analytical Thinking</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. identify cause and effect relations in their area of work</p> <p>SB13. use cause and effect relations to anticipate potential problems and their solution</p>



**CSC/ N 0135: Use basic health and safety practices at the workplace**

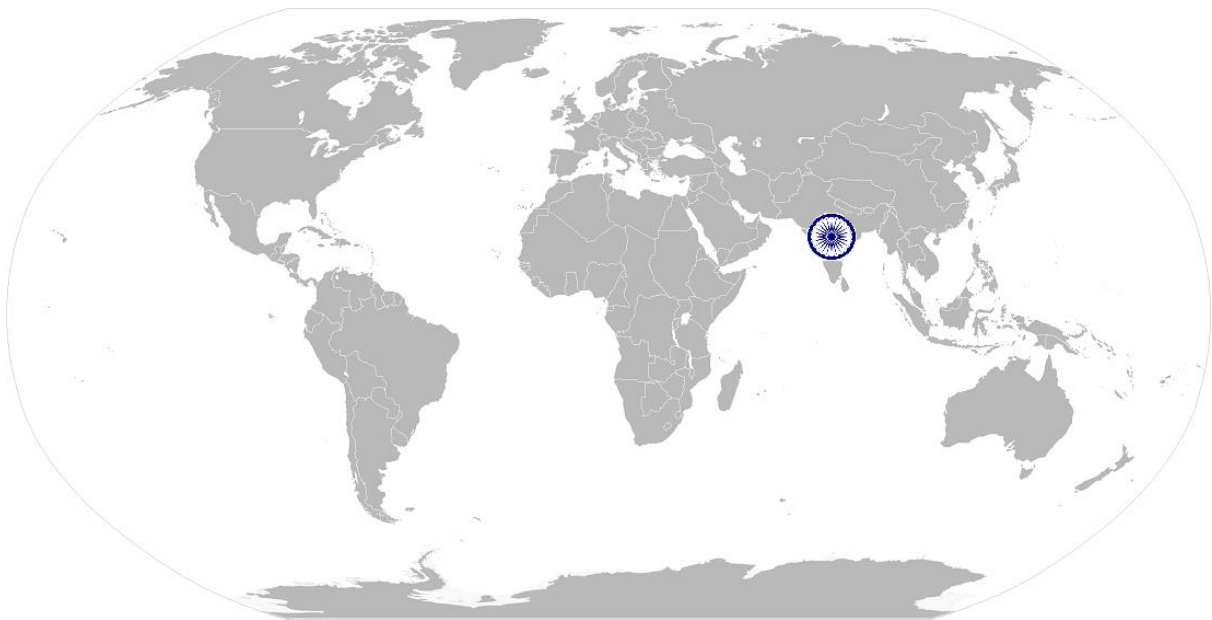
## **NOS Version Control**

<b>NOS Code</b>		<b>CSC / N 0135</b>	
<b>Credits(NSQF)</b> <b>[OPTIONAL]</b>		<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Capital Goods</b>	<b>Drafted on</b>	<b>10/04/14</b>
<b>Industry Sub-sector</b>	<ol style="list-style-type: none"> <li>1. Machine Tools</li> <li>2. Tools Dies And Press Tools</li> <li>3. Plastics Manufacturing Machinery</li> <li>4. Textile Manufacturing Machinery</li> <li>5. Process Plant Machinery</li> <li>6. Electrical and Power Generation Machinery</li> <li>7. Light Engineering Goods</li> </ol>	<b>Last reviewed on</b>	
		<b>Next review date</b>	<b>30/08/15</b>

CSC/ N 0136: Work effectively with others

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# National Occupational Standard



## Overview

This unit covers basic practices that improve effectiveness of working with others in an organizational set-up.

## CSC/ N 0136: Work effectively with others

<b>Unit Code</b>	<b>CSC / N 0136</b>
<b>Unit Title (Task)</b>	<b>Work effectively with others</b>
<b>Description</b>	<p>This unit covers basic etiquette and competencies that a candidate is required to possess and demonstrate in their behavior and interactions with others at the workplace.</p> <p>These cover areas such as communication etiquette, discipline, listening, handling conflict and grievances.</p>
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>Working with others</li> </ul>
<b>Performance Criteria (PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Working with others</b>	<p>The user/individual on the job should be able to:</p> <p>PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required</p> <p>PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt</p> <p>PC3. give information to others clearly, at a pace and in a manner that helps them to understand</p> <p>PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible</p> <p>PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks</p> <p>PC6. display appropriate communication etiquette while working</p> <p><b>Communication etiquette:</b> do not use abusive language; use appropriate titles and terms of respect; do not eat or chew while talking (vice versa)etc.</p> <p>PC7. display active listening skills while interacting with others at work</p> <p>PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism</p> <p>PC9. demonstrate responsible and disciplined behaviors at the workplace</p> <p>Disciplined behaviors: e.g. punctuality; completing tasks as per given time and standards; not gossiping and idling time; eliminating waste, honesty, etc.</p> <p>PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions</p> <p>KA2. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA3. relevant people and their responsibilities within the work area</p> <p>KA4. escalation matrix and procedures for reporting work and employment related issues</p>

**CSC/ N 0136: Work effectively with others**

**B. Technical  
Knowledge**

The user/individual on the job needs to know and understand:

- KB1. various categories of people that one is required to communicate and co-ordinate with in the organization
- KB2. importance of effective communication in the workplace
- KB3. importance of teamwork in organizational and individual success
- KB4. various components of effective communication
- KB5. key elements of active listening
- KB6. value and importance of active listening and assertive communication
- KB7. barriers to effective communication
- KB8. importance of tone and pitch in effective communication
- KB9. importance of avoiding casual expletives and unpleasant terms while communicating professional circles
- KB10. how poor communication practices can disturb people, environment and cause problems for the employee, the employer and the customer
- KB11. importance of ethics for professional success
- KB12. importance of discipline for professional success
- KB13. what constitutes disciplined behavior for a working professional
- KB14. common reasons for interpersonal conflict
- KB15. importance of developing effective working relationships for professional success
- KB16. expressing and addressing grievances appropriately and effectively
- KB17. importance and ways of managing interpersonal conflict effectively

**Skills (S) [Optional]**



**CSC/ N 0136: Work effectively with others**

## **NOS Version Control**

<b>NOS Code</b>		<b>CSC / N 0136</b>	
<b>Credits(NSQF) [OPTIONAL]</b>		<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Capital Goods</b>	<b>Drafted on</b>	<b>10/04/14</b>
<b>Industry Sub-sector</b>	1. Machine Tools 2. Tools Dies And Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods	<b>Last reviewed on</b>	
		<b>Next review date</b>	<b>30/08/15</b>

## Annexure

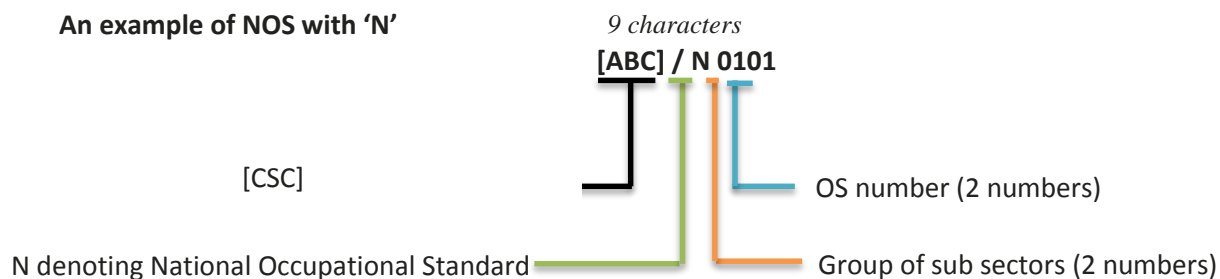
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

##### An example of NOS with 'N'



Sequence	Description	Example
Three letters	Capital Goods Sector Skills Council	CSC
Slash	/	/
Next letter	Whether QP or NOS	Q or N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

## ASSESSMENT CRITERIA

### Weightage

CSC/ N 0131	Set computer numerically controlled vertical machining center to perform a range of operations on metal components	40
CSC/ N 0116	Perform a range of operations on metal components using computer numerical controlled vertical machining center	30
CSC/ N 0135	Use basic health and safety practices at the workplace	20
CSC/ N 0136	Work effectively with others	10
		<b>100</b>

		Marks Allocation	
		Theory	Practical
CSC/ N 0131	Set computer numerically controlled vertical machining center to perform a range of operations on metal components		
<b>Working safely</b>	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	1	1
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing VMC setting operations	1	2
	PC3. work following laid down procedures and instructions	1	1
	PC4. ensure work area is clean and safe from hazards	0	2
	PC5. ensure that all tools and equipment are in a safe and usable condition	0	2
	PC6. ensure that the components used are free from foreign objects, dirt or other contamination	0	2
		<b>3</b>	<b>10</b>
<b>Prepare for setting CNC VMC machine</b>	PC7. obtain job specification from a valid and approved source	1	1
	PC8. read and establish job requirements from the job specification document accurately	1	2
	PC9. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	1	0
	PC10. prepare the work area for the VMC setting operations as per procedure or specification received	0	2
	PC11. conduct a preliminary check of the readiness of the VMC machine	1	2
	PC12. conduct a preliminary check of the readiness of the components and cutters	1	1
	PC13. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements	0	3
	PC14. ensure that all measuring equipment is calibrated and approved for usage	0	3

	PC15. extract and use information from engineering drawings and relate specifications in relation to work undertaken	1	2
	PC16. identify tool requirements from tooling layout and assess their suitability	0	3
	PC17. identify suitable work-holding or fixturing device as per the job requirement	0	3
	PC18. ensure that the tools and fixtures are in usable condition(free from breakage, damage, calibration, etc)	0	2
	PC19. ensure the correct and latest part-program is uploaded onto the CNC system	0	2
	PC20. pre-set the tooling using setting jigs/fixtures	1	2
	PC21. where appropriate, seek any necessary instruction/training on the operation of the machine	1	0
		8	28

Carry out setting for CNC VMC machine	PC22. mount and set the required work-holding devices, work-piece and cutting tools	0	3
	PC23. check that the tools have a specific tool number in relation to the operating program	0	2
	PC24. enter all relevant tool data to the operating program on the CNC	1	2
	PC25. set tool datums, positions, lengths, offsets and radius compensation	1	2
	PC26. mount the work-holding device/fixture onto the machine	0	3
	PC27. set the work-holding device/fixture in relationship to the machine datum's and reference points	1	2
	PC28. set the machine tool operating parameters(eg hydraulic pressure, clamping) as per the component requirements	1	2
	PC29. place the machine into the correct operating mode, and access the program edit facility in order to enter tooling data,	0	3
	PC30. conduct trial runs using single block run, dry run and feed and speed override controls	1	2
	PC31. prove the program tool by tool in single block mode	1	2
	PC32. perform the necessary checks before allowing the machine to operate in full program run mode	1	2
	PC33. hand-over the machine after set-up to the machine operator along with relevant instructions and documentation	1	0
	PC34. complete relevant documentation as per organizational procedure	1	1
	PC35. handle the typical problems that can occur with the setting up of the tooling, work-holding devices and proving the program	1	1

	PC36. switch the VMC machine on and off in normal and emergency situations	1	1
	PC37. after use, return the old cutting tools, work-holding device, fixtures, instruments, drawings and verified tapes and programs back to store, safely and correctly	0	2
	PC38. ensure that there is no damage to the tool/fixture while doing the prove-out	1	1
	PC39. complete documentation during and post operations and submit as per organizational procedures	1	1
	PC40. deal promptly and effectively with problems within the setter's control, and seek help and guidance from the relevant people, in case of problems that cannot beresolved	1	1
	PC41. shut down the equipment to a safe condition on conclusion of the activities	0	2
	PC42. leave the work area in a safe and tidy condition on completion of the setting activities	0	2
		14	37
Total		25	75
		100	



CSC/ N 0116	Perform a range of operations on metal components using computer numerical controlled vertical machining center	Marks Allocation	
		Theory	Practical
Working safely	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	1	1
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing machining operations	1	1
	PC3. work following laid down procedures and instructions	1	1
	PC4. ensure work area is clean and safe from hazards	0	2
	PC5. ensure that all tools and equipment are in a safe and usable condition	0	2
		<b>3</b>	<b>7</b>

Preparing for machining activities on VMC	PC6. obtain job specification from a valid and approved source	1	1
	PC7. read and establish job requirements from the job specification document accurately	1	2
	PC8. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	1	1
	PC9. prepare the work area for the machining operations as per procedure or operational specification	0	2
	PC10. ensure that the components used are free from foreign objects, dirt or other contamination	0	2
	PC11. conduct a preliminary check of the readiness of the vertical machining center	1	2
	PC12. obtain correct workpieces/raw materials and consumables as per job requirements	1	2
	PC13. obtain appropriate cutting tools, hand tools and measuring tools as per job requirements	0	2
	PC14. ensure that all measuring equipment is calibrated and approved for usage	0	2
	PC15. set work pieces as per job requirements using appropriate positioning and/or holding devices and support mechanisms	1	2
	PC16. where appropriate, seek any necessary instruction/training on the operation of the machine	2	0
	PC17. check that the operating program is at the correct start point and the work piece is clear of the machine spindle	0	2
		<b>8</b>	<b>20</b>

	PC18. switch the vertical machining center on and off in normal and emergency situations	1	2
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**Performing  
machining operations  
on VMC**

PC19. load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions	0	3
PC20. do trial run by taking back the tool offsets by a minimum amount keeping margin error rectification	1	3
PC21. measure the critical parameters of the machined component on the machine (without removing from the machine ), after the trial run	1	3
PC22. correct the offsets based on the measurements	0	3
PC23. ensure accuracy in the critical parameters of the machined components by performing multiple trial runs and subsequent adjustment of offsets	1	3
PC24. measure the component after unloading to check for accuracy in the critical parameters as per job specifications	0	3
PC25. produce machined components that combine different operations and have a range of applicable features	1	1
PC26. follow the specified machining sequence and procedure as per job specifications	1	1
PC27. interpret in-built alarms and error codes of equipment and respond to the same as per operating manual/organizational guidelines	1	1
PC28. inspect as per frequency of inspection mentioned in the inspection plan (part of the job specifications)	0	2
PC29. record the measured values as per organizational procedure	0	2
PC30. observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly	1	1
PC31. ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy	1	1
PC32. identify when tools need sharpening/replacing	1	1
PC33. remove worn out tool and replace with a suitable tool	1	1
PC34. perform basic maintenance checks on the machine after operations	1	1
PC35. keep finished components as well as raw material as per organizational procedure established	0	2
PC36. produce components as per standards applicable to the process	0	2
PC37. work to achieve production targets	0	2
PC38. report conditions and seek appropriate assistance in a timely manner to address risk of failure to comply with necessary targets and specifications	1	1
PC39. deal with finished components as per organizational guidelines	0	2

	PC40. complete documentation during and post operations as per organizational procedures	1	1
	PC41. return all tools and equipment to the correct location on completion of the machining activities	0	2
	PC42. update log book and complete necessary documentation	1	1
	PC43. leave the work area in a safe and tidy condition on completion of job activities	0	2
		<b>15</b>	<b>47</b>
		<b>26</b>	<b>74</b>
		<b>100</b>	

CSC/ N 0135 Use basic health and safety practices at the workplace		Marks Allocation	
		Theory	Practical
<b>Health and safety</b>	PC1. use protective clothing/equipment for specific tasks and work conditions	2	3
	PC2. state the name and location of people responsible for health and safety in the workplace	1	2
	PC3. state the names and location of documents that refer to health and safety in the workplace	1	2
	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace	2	3
	PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role	2	2
	PC6. state location of general health and safety equipment in the workplace	2	1
	PC7. inspect for faults, set up and safely use steps and ladders in general use	2	3
	PC8. work safely in and around trenches, elevated places and confined areas	2	3
	PC9. lift heavy objects safely using correct procedures	2	3
	PC10. apply good housekeeping practices at all times	2	2
	PC11. identify common hazard signs displayed in various areas	2	3
	PC12. retrieve and/or point out documents that refer to health and safety in the workplace	1	2
<b>Fire safety</b>	PC13. use the various appropriate fire extinguishers on different types of fires correctly	2	2
	PC14. demonstrate rescue techniques applied during fire hazard	2	2
	PC15. demonstrate good housekeeping in order to prevent fire hazards	2	1
	PC16. demonstrate the correct use of a fire extinguisher	2	2
<b>Emergencies, rescue and first-aid procedures</b>	PC17. demonstrate how to free a person from electrocution	1	3
	PC18. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.	1	3
	PC19. demonstrate basic techniques of bandaging	1	2
	PC20. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments	2	2
	PC21. perform and organize loss minimization or rescue activity during an accident in real or simulated environments	2	1
	PC22. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases	1	2

	PC23. demonstrate the artificial respiration and the CPR Process	1	2
	PC24. participate in emergency procedures	2	1
	PC25. complete a written accident/incident report or dictate a report to another person, and send report to person responsible	1	3
	PC26. demonstrate correct method to move injured people and others during an emergency	1	3
		<b>42</b>	<b>58</b>
		<b>100</b>	

CSC/ N 0136

Work effectively with others

Work effectively with others	PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	3	7
	PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt	3	7
	PC3. give information to others clearly, at a pace and in a manner that helps them to understand	3	7
	PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible	3	7
	PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks	3	7
	PC6. display appropriate communication etiquette while working	3	7
	PC7. display active listening skills while interacting with others at work	3	7
	PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	3	7
	PC9. demonstrate responsible and disciplined behaviors at the workplace	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict	3	7
		<b>30</b>	<b>70</b>
		<b>100</b>	