

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR CAPITAL GOODS INDUSTRY

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### 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

### Introduction

## Qualifications Pack: CNC Setter cum Operator - Turning

**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 Goods        |
| 4. Textile Manufacturing Machinery  |                                   |

**OCCUPATION:** Machining

**REFERENCE ID:** CSC/ Q 0120

**Aligned to:** NCO-2004/7223.40

**CNC Setter cum Operator - Turning:** Setting of Computer Numerically Controlled (CNC) lathe machine, in order to perform turning operations on metal components, as per specifications provided.

**Brief Job Description:** It involves setting up the CNC turning machine, its work holding devices, tooling, loading the machine operating programmes, conducting trial runs and correcting faults, in order to ensure that the work output is produced as per specification.

**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

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Job Details	<b>Qualifications Pack Code</b>	<b>CSC/ Q 0120</b>		
	<b>Job Role</b>	<b>CNC Setter cum Operator - Turning</b>		
	<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
	<b>Sector</b>	<b>CAPITAL GOODS</b>	<b>Drafted on</b>	<b>14/04/14</b>
	<b>Sub-sector</b>	<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 Goods</li> </ol>	<b>Last reviewed on</b>	
	<b>Occupation</b>	<b>MACHINING</b>	<b>Next review date</b>	<b>30/08/16</b>

Job Role	CNC Setter cum Operator - Turning
Role Description	Setting of Computer Numerical Control (CNC) machines, such as CNC lathe machine, in order to perform turning operations on metal components, as per specifications provided.
NSQF level	4
Minimum Educational Qualifications	10 <sup>th</sup> Standard
Maximum Educational Qualifications	N.A.
Training (Suggested but not mandatory)	Basic CNC programming training
Experience	Minimum 1 year as an CNC Turning Machine Operator
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li>1. <a href="#">CSC/ N 0120 (Set computer numerically controlled (CNC) machines for turning operations on metal components)</a></li> <li>2. <a href="#">CSC/ N 0115 (Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines)</a></li> <li>3. <a href="#">CSC/ N 1335 (Use basic health and safety practices at the workplace)</a></li> <li>4. <a href="#">CSC/ N 1336 (Work effectively with others)</a></li> </ol> <p><b>Optional:</b> N.A.</p>
Performance Criteria	As described in the relevant OS units

Definitions

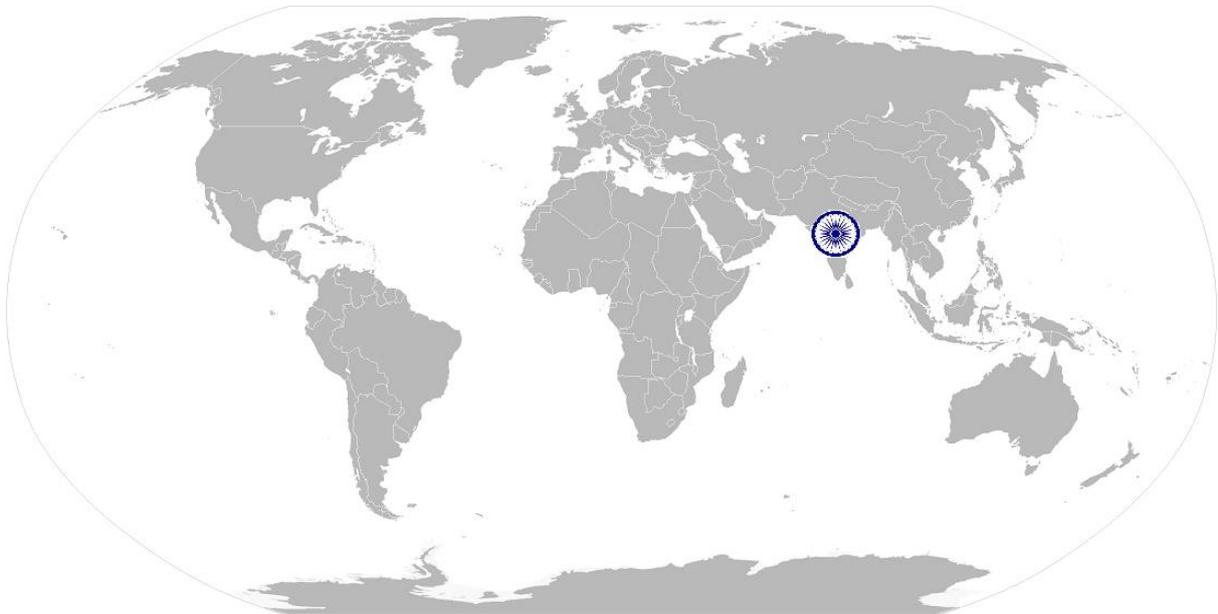
Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable 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
	OD	Outside Diameter
	ID	Inside Diameter
	DTI	Dial Test Indicators
	CO2	Carbon dioxide
	CPR	Cardiac Pulmonary Resuscitation
	PPE	Personal Protective Equipment

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

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# National Occupational Standard



## Overview

This unit covers setting of Computer Numerical Control (CNC) lathe machine, in order to perform turning operations on metal and plastic components, as per specifications provided. It does not include programming or operating of the machine.

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

<b>Unit Code</b>	<b>CSC / N 0120</b>
<b>Unit Title (Task)</b>	<b>Set computer numerically controlled (CNC) machines for turning operations on metal and plastic components</b>
<b>Description</b>	This unit covers setting of computer numerically controlled (CNC) lathe machines, in order to perform turning operations on metal and plastic components, as per specifications provided. It does not include programming or operating of the machine. The candidate will be expected to perform independently as per instructions given, taking personal responsibility for one's own actions and for the quality and accuracy of the work produced.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Working safely</li> <li>• Preparing for setting CNC turning machine for production</li> <li>• Carrying out setting for CNC turning operations using CNC machine</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Working safely</b>	The user/individual on the job should be able to: <ul style="list-style-type: none"> <li>PC1. work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines</li> <li>PC2. check that all safety mechanisms are in place and that the equipment is set correctly for the required operations</li> <li>PC3. adhere to procedures or systems in place for health and safety, personal protective equipment and other relevant safety regulations and procedures to realize a safe system of work</li> <li>PC4. keep the work area clean and tidy</li> <li>PC5. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition</li> <li>PC6. ensure that the components used are free from foreign objects, dirt or other contamination</li> </ul>
<b>Preparing for setting CNC turning machine for production</b>	The user/individual on the job should be able to: <ul style="list-style-type: none"> <li>PC7. 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; instructions from supervisor <b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national and organisational standards; reference tables and charts</li> <li>PC8. 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; operations required (list, sequence and procedures where applicable); work-holding devices; instruments and tools to be used; interdependencies; form tolerances; cycle</li> </ul>

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p>time</p> <p>PC9. follow job instructions, assembly drawings and laid down procedures at all times</p> <p>PC10. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures</p> <p>PC11. prepare the work area for the turning operations as per procedure or operational specification</p> <p><b>Turning operations:</b> turning (OD and ID), facing, contour turning with roughing, finish turning using stock removal cycles (OD and ID), grooving (face, OD and ID), thread cutting (OD and ID), drilling, boring, rigid tapping and tapping with attachment</p> <p>PC12. conduct a preliminary check of the readiness of the CNC turning machine</p> <p><b>CNC machines:</b> 2-axis CNC lathe machine</p> <p>PC13. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements</p> <p><b>Cutting tools:</b> turning tool (OD and ID), grooving tool (OD and ID), parting tool, threading tool, form tools, centre drills, twist/insert drills, reamers</p> <p><b>Hand tools:</b> hammer (ball peen, mallet), magnifying glass, allen keys, spanner, wrenches, deburring tools</p> <p>PC14. ensure that all measuring equipment is calibrated and approved for usage</p> <p><b>Measuring equipments:</b> steel 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), height master</p> <p>PC15. determine what operational objectives and targets need to be achieved and how best the machine will be set to achieve this</p> <p>PC16. extract and use information from engineering drawings and relate specifications in relation to work undertaken</p> <p>PC17. identify tool requirements from tooling layout and assess their suitability</p> <p>PC18. identify suitable work-holding or fixturing device as per the job requirement</p> <p><b>Work-holding devices:</b> chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, faceplates, magnetic/pneumatic devices, other work-holding devices</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>PC21. pre-set the tooling appropriately using setting jigs/fixtures</p> <p>PC22. seek any necessary instruction/training on the operation of the machine where required</p>
<p><b>Carrying out setting for CNC turning operations using CNC machine</b></p>	<p>The user/individual on the job should be able to:</p> <p>PC23. mount tools in the correct position in the tool posts, turrets, magazine or carousel</p> <p>PC24. check that the tools have a specific tool number in relation to the operating program</p> <p>PC25. produce machined components that combine different turning operations and</p>

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p>have a range of features</p> <p><b>Features of machined components produced:</b> diameters (parallel, stepped, tapered), faces, undercuts (internal and external), profiles (internal and external), holes (reamed, tapped, drilled, bored), parting-off, threads (internal, external), chamfers and radii, grooves</p> <p>PC26. enter all relevant tool data to the operating program</p> <p><b>Tool data:</b> e.g. tool types, tool lengths, tool offsets, radius compensation, etc.</p> <p>PC27. set tool datums, positions, lengths, offsets and radius compensation</p> <p>PC28. mount the work-holding device/fixture onto the machine</p> <p>PC29. set the work-holding device/fixture in relationship to the machine datum's and reference points</p> <p>PC30. set the machine tool operating parameters (eg. hydraulic pressure, clamping) as per the component requirements</p> <p>PC31. place the machine into the correct operating mode, and access the program edit facility in order to enter tooling data,</p> <p><b>Mode of machine control:</b> machine / Operator Control Panel. CNC - MDI Panel</p> <p>PC32. conduct trial runs using single block run, dry run and feed and speed override controls</p> <p>PC33. measure the critical parameters of the machined component on the machine</p> <p><b>Critical parameters:</b> linear dimensions (such as lengths, depths), slots (position, width, depth), flatness, squareness, parallelism, hole size/fit, angles, recesses, thread fit (suit to gauges / masters), runout, concentricity, contour/profile</p> <p>PC34. prove the program tool by tool in single block mode</p> <p>PC35. 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 component on the machine and correct tool offsets 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; ensure that all dimensions are within specifications; correct if required; repeat this till parts come within specifications without any correction requirement</p> <p>PC36. hand-over the machine after set-up to the machine operator along with relevant instructions and documentation</p> <p>PC37. complete relevant documentation as per organizational procedure</p> <p>PC38. handle the typical problems that can occur with the setting up of the tooling, work-holding devices and proving the program</p> <p>PC39. switch the CNC turning/lathe machine on and off in normal and emergency situations</p> <p>PC40. return the old cutting tools, workholding device/fixtures/instruments/drawings back to store and verified tapes and programs, safely and correctly</p> <p>PC41. ensure that there is no damage to the tool/fixture while doing the prove-out</p> <p>PC42. complete documentation during and post operations as per organizational procedures</p>
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**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p>PC43. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve</p> <p>PC44. shut down the equipment to a safe condition on conclusion of the activities</p> <p>PC45. leave the work area in a safe and tidy condition on completion of the fitting activities</p> <p>PC46. return all tools and equipment to the correct location on completion of the turning activities</p>
<b>Knowledge and Understanding (K)</b>	
<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. 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>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. specific safe working practices, CNC turning procedures and environmental regulations that must be observed <b>Safe working practices and procedures:</b> ensure that the machine is not accidentally operated by others during setting; fitting and adjusting machine guards; machine must be operated in closed door condition; ensuring that the work-piece is secure and that tooling is free from work-piece before starting the machine; the personal protective equipment (PPE) to be worn for the CNC milling activities; as correctly fitting overalls and safety glasses; ensuring that long hair, it is tied back or netted; removing any jewellery or other items that can become entangled in the machinery</p> <p>KB2. hazards associated with carrying out the machining operations on a CNC machine and how can they be minimized <b>CNC machines:</b> 2-axis CNC lathe machine <b>Hazards:</b> automatic machine operations; revolving/moving parts of machinery; sharp cutting tools; lifting and handling work-holding devices; burrs and sharp edges on component; use of power operated chucks; moving machinery; hot and airborne metal and particles and fluid</p> <p>KB3. personal protective equipment to be used during the machining activities on a CNC machine and where can it be obtained</p> <p>KB4. types and sources of appropriate job specifications <b>Valid sources:</b> job instruction sheet/job card; work drawings and instructions;</p>

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p>planning documentation; quality control documents; operation sheets; instructions from supervisor</p> <p><b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national and organisational standards; reference tables and charts</p> <p>KB5. uses and applications of CNC Turning machines</p> <p>KB6. common terminology used in CNC turning</p> <p>KB7. how to read and interpret first and third angle component drawings</p> <p>KB8. how to extract information from engineering drawings or data and related specifications</p> <p>KB9. main features and working parts of the CNC machine, and the accessories that can be used</p> <p>KB10. importance of following specified machining sequences and procedures</p> <p>KB11. importance of ensuring suitability of work-pieces/materials and consumables for the specified job and related procedures</p> <p>KB12. importance and procedures to ensure that tools and equipment are in a safe and usable condition</p> <p>KB13. various CNC turning operations that can be performed, and the methods and equipment used</p> <p><b>Turning operations:</b> turning (OD and ID), facing, contour turning with roughing, finish turning using stock removal cycles (OD and ID), grooving (face, OD and ID), thread cutting (OD and ID), drilling, boring, rigid tapping and tapping with attachment</p> <p>KB14. range of work-holding methods and devices that are used on CNC lathes</p> <p><b>Work-holding devices:</b> chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, faceplates, magnetic/pneumatic devices, other work-holding devices</p> <p>KB15. methods of setting the work-holding devices, and the tools and equipment that can be used</p> <p>KB16. factors determining selection and use of Tungsten carbide, Ceramic and Diamond indexable tips</p> <p><b>Factors:</b> hardness of the material to be cut, the cutting characteristics of the material, tolerances to be achieved, component surface finish, component specifications, machine specifications like power, RPM, Torque, cutting speed</p> <p>KB17. range of cutting tools that are used on CNC lathes, and typical applications</p> <p><b>Cutting tools:</b> turning tool (OD and ID), grooving tool (OD and ID), parting tool, threading tool, form tools, centre drills, twist/insert drills, reamers</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. explain the advantages of using pre-set tooling, and how to set the tooling using setting jigs/fixtures</p> <p>KB20. understand the use of tool posts, magazines and carousels, and how to position and identify the tools in relationship to the operating program</p> <p>KB21. function of error messages, and appropriate subsequent action</p> <p>KB22. importance of proving the program and how to do it</p> <p>KB23. quality control procedures that are used, inspection checks to be carried out, and the equipment that will need to be used</p>
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**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

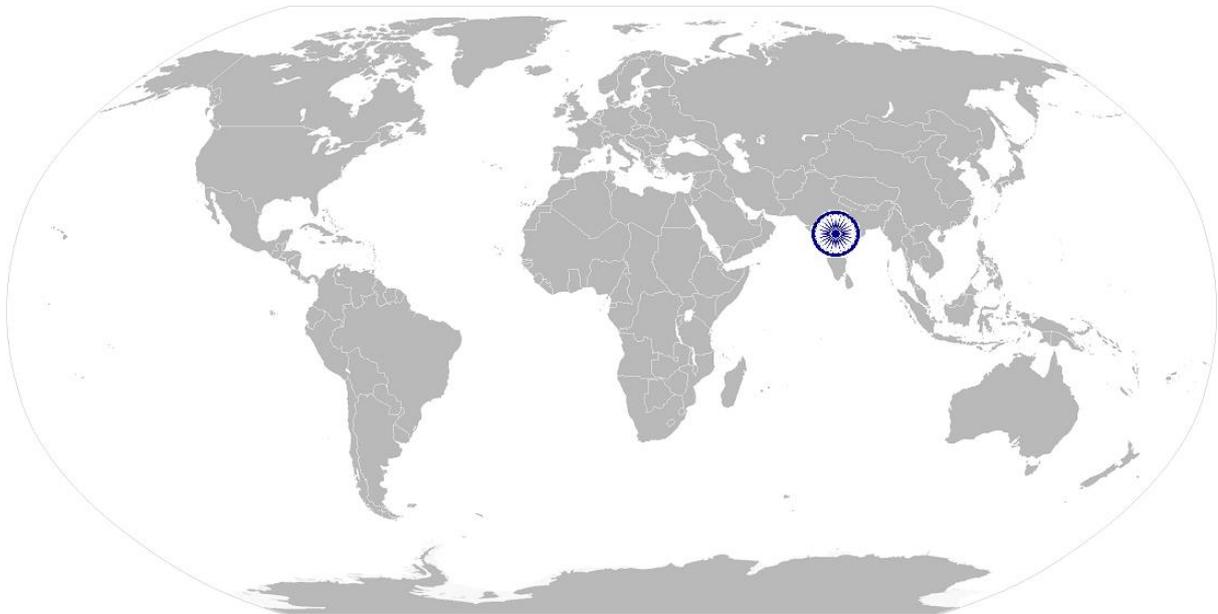
	<p>KB24. importance to report problems in a timely manner</p> <p>KB25. methods of checking quality of the shaped components against the required quality standards <b>Produce components standards:</b> components to be free from false tool cuts, burrs and sharp edges; general dimensional tolerance +/- 0.02mm; surface finish of Ra 1.6µm; reamed holes within H8(or as per basic machine alignment); screw thread fit better than 6G/6H; angles/tapers within +/- 15sec; flatness and squareness 0.025mm</p> <p>KB26. range of materials used in common engineering applications <b>Range of Materials:</b> ferrous metals: eg . carbon steels, stainless steels, cast iron, tool steel, hard metals; ; non-ferrous metals: eg. aluminium, aluminium alloys, copper and copper alloys; non-metals: eg. plastics</p> <p>KB27. the forms of supply of materials <b>Raw material form 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>KB28. how to identify materials by their physical properties</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</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 basic numerical operations, and calculations/ formulae <b>Numerical computations:</b> addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages</p> <p>SA8. identify various basic, compound and solid shapes as per dimensions given <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</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 <b>Angles in a triangle:</b> right-angled, isosceles, equilateral</p>

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p><b>Learning</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SA12. participate in on-the-job and other learning, training and development interventions and assessments</li> <li>SA13. clarify task related information with appropriate personnel or technical adviser</li> <li>SA14. seek to improve and modify own work practices</li> <li>SA15. maintain current knowledge of application standards, legislation, codes of practice and product/process developments</li> </ul>
<p><b>B. Professional Skills</b></p>	<p><b>Problem Solving</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB1. identify problems with work planning, procedures, output and behavior and their implications</li> <li>SB2. prioritize and plan for problem solving</li> <li>SB3. communicate problems appropriately to others</li> <li>SB4. identify sources of information and support for problem solving</li> <li>SB5. seek assistance and support from other sources to solve problems</li> <li>SB6. identify effective resolution techniques</li> <li>SB7. select and apply resolution techniques</li> <li>SB8. seek evidence for problem resolution</li> </ul>
	<p><b>Plan and Organize</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB9. plan, prioritize and sequence work operations as per job requirements</li> <li>SB10. organize and analyze information relevant to work</li> <li>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time</li> </ul>
	<p><b>Initiative and Enterprise</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB12. undertake and express new ideas and initiatives to others</li> <li>SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</li> <li>SB14. participate in improvement procedures including process, quality and internal/external customer/supplier relationships</li> <li>SB15. one's competencies in new and different situations and contexts to achieve more</li> </ul>
	<p><b>Self-Management</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB16. exercise restraint while expressing dissent and during conflict situations</li> <li>SB17. avoid and manage distractions to be disciplined at work</li> <li>SB18. manage own time for achieving better results</li> </ul>
	<p><b>Teamwork</b></p>

**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"><li>SB19. work in a team in order to achieve better results</li><li>SB20. identify and clarify work roles within a team</li><li>SB21. communicate and cooperate with others in the team for better results</li><li>SB22. seek assistance from fellow team members</li></ul>
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**CSC/ N 0120: Set computer numerically controlled (CNC) machines for turning operations on metal components**

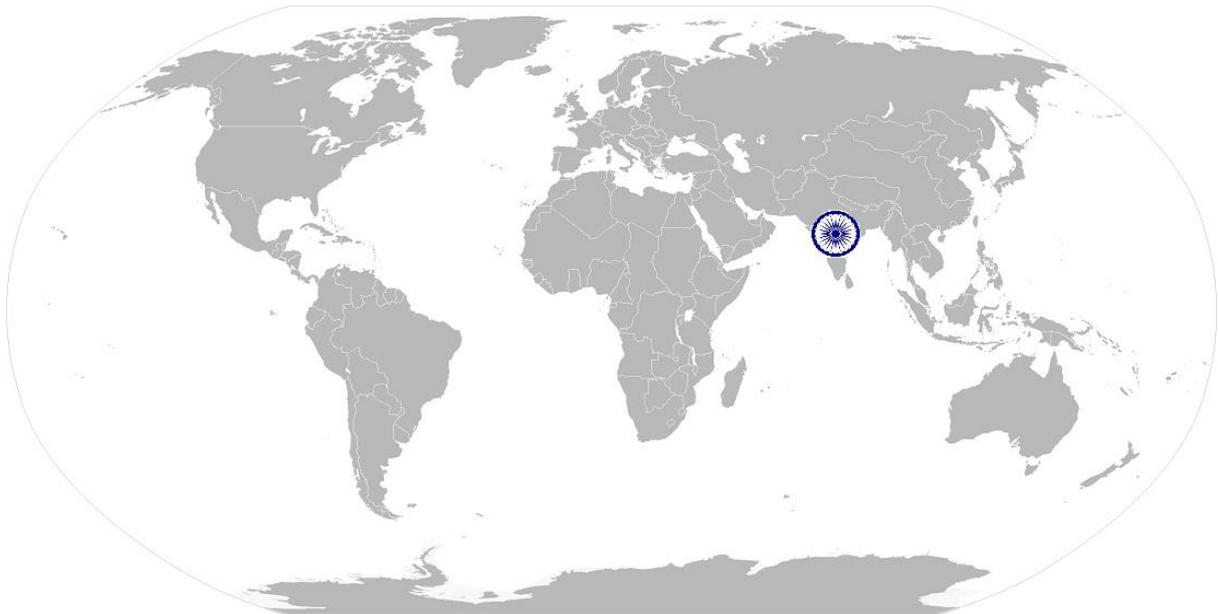
**NOS Version Control**

NOS Code	CSC / N 0120		
Credits(NSQF)	TBD	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 Goods</li> </ol>	Last reviewed on	
		Next review date	30/08/16

**CSC/ N 0115: Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines**

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# National Occupational Standard



## Overview

This unit covers the operation of Computer Numerically Controlled (CNC) machines, such as CNC lathe machine, in order to perform turning operations on metal or plastic components, as per specifications provided. It does not include machine setting or programming.

**CSC/ N 0115: Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines**

<b>Unit Code</b>	<b>CSC / N 0115</b>
<b>Unit Title (Task)</b>	<b>Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines</b>
<b>Description</b>	<p>This unit covers the operation of Computer Numerically Controlled (CNC) lathe machines in order to perform turning operations on metal and plastic components, as per specifications provided. It does not include machine setting or programming. This involves removal of material from a rotating cylindrical work-piece.</p> <p>The candidate will be expected to perform under supervision and as per instructions given, taking personal responsibility for some actions and for the quality and accuracy of the work produced.</p>
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Working Safely</li> <li>• Preparing for performing turning operations using CNC machine</li> <li>• Carrying out turning operations using CNC 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>The user/individual on the job should be able to:</p> <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 CNC turning operations</p> <p><b>Turning operations:</b> Turning (OD, ID), facing, grooving (OD and ID), face grooving, thread cutting (OD and ID), drilling, boring and tapping</p> <p><b>Personal protective equipment:</b> correctly fitting overalls; safety glasses; long hair is tied back or netted; removing any jewelry or other items that can become entangled in the machinery; covered shoes; face mask</p> <p>PC3. read and understand safety instructions, warning signs on the CNC machines used</p> <p><b>CNC machines used:</b> 2-axis CNC lathe machine</p> <p>PC4. work following laid down procedures and instructions</p> <p>PC5. ensure work area is clean and safe from hazards</p> <p><b>Hazards associated with the use of CNC machines:</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 chucks; moving machinery; hot and airborne metal and particles and fluid</p> <p>PC6. ensure that all tools and equipment are in a safe and usable condition</p>
<b>Prepare for performing turning operations using CNC machine</b>	<p>The user/individual on the job should be able to:</p> <p>PC7. obtain job specification from a valid source</p> <p><b>Valid sources:</b> job instruction sheet/job card; work drawings and instructions; planning documentation; quality control documents; operation sheets;</p>

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	<p>process specifications; instructions from supervisor</p> <p>PC8. read and establish job requirements from the job specification document accurately</p> <p><b>Job specification documents:</b> detailed component drawings; approved sketches/illustrations; national, international and organizational standards; process drawing</p> <p><b>Job requirements:</b> raw materials or components required (type, quality, quantity); dimensions; limits and tolerances; surface finish requirements; operations required (list, sequence and procedures where applicable); shape or profiles to be generated; instruments and tools to be used; form tolerances (flatness, concentricity, etc.); cycle time, production rate</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 turning operations as per procedure or operational specification</p> <p><b>Turning operations:</b> Turning (OD, ID), facing, grooving (OD and ID), face grooving, thread cutting (OD and ID), drilling, boring and tapping</p> <p>PC11. perform daily maintenance of machine according to defined checklist, at the beginning of day's shifts.</p> <p><b>Basic maintenance activities:</b> replenish coolant; ensure all parts are clean; perform housekeeping tasks on the machine; remove and dispose swarf</p> <p>PC12. ensure that the components used are free from foreign objects, dirt or other contamination</p> <p>PC13. conduct a preliminary check of the readiness of the CNC turning machine used</p> <p><b>Preliminary check ensuring readiness:</b> e.g. machine is clean, 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, received necessary instruction/training on specific operation of the machine, etc.</p> <p><b>CNC machines used:</b> 2-axis CNC lathe machine</p> <p>PC14. obtain correct work-pieces/raw materials and consumables as per job requirements</p> <p>PC15. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements</p> <p><b>Hand tools:</b> hammer (ball peen, mallet), magnifying glass, allen keys, spanner, wrenches and deburring tools</p> <p><b>Cutting tools:</b> turning tool (OD and ID), grooving tool (OD and ID), parting tool, threading tool, form tools, centre drills, twist/insert drills and reamers</p> <p><b>Measuring equipments:</b> steel 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) and height master</p> <p>PC16. ensure that all measuring equipment is calibrated and approved for usage</p> <p>PC17. set work pieces as per job requirements using appropriate positioning and/or</p>
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	<p>holding devices and support mechanisms</p> <p>PC18. seek necessary instruction/training on the operation of the machine where required from appropriate sources</p> <p>PC19. check that the operating program is at the correct start point and the tool is at a safe position clear of the part</p> <p>PC20. perform basic daily maintenance activities as per the checklist given</p>
<p><b>Carry out turning operations using CNC machine</b></p>	<p>The user/individual on the job should be able to:</p> <p>PC21. obtain the component drawings, specifications and/or job instructions required for the components to be machined</p> <p>PC22. use and extract information from engineering drawings, dimensioning and labeling data</p> <p><b>Drawings, dimensioning and labeling:</b> projections (orthographic [first angle, third angle]; isometric [including exploded], sectional view); reference points, lines, edges and surfaces</p> <p>PC23. use and extract information from reference charts, tables, graphs and standards</p> <p><b>Information pertaining to:</b> e.g. thread sizes; feeds and speeds; machining symbols and tolerances; surface finish symbols; etc.</p> <p>PC24. interpret the visual display and the various messages displayed correctly</p> <p>PC25. find the correct restart point in the program when the machine has been stopped before completion of the program</p> <p>PC26. load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions</p> <p><b>Work-holding devices to position and secure work-pieces:</b> chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, faceplates, magnetic/pneumatic devices and other work-holding devices</p> <p>PC27. check correctness of program through dry run and single block check</p> <p>PC28. do first part cutting trial by setting tool offsets to get oversize part</p> <p>PC29. measure the critical parameters of the machined component on the machine (without removing from the machine ), after the trial run</p> <p><b>Critical parameters:</b> linear dimensions (such as lengths, depths), slots (position, width, depth), flatness, surface finish, squareness, parallelism, hole size/fit, angles, recesses, thread fit, runout and roundness</p> <p>PC30. correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data</p> <p><b>Tooling data:</b> offsets compensation, radius compensation</p> <p>PC31. measure the component after unloading to check for accuracy in the critical parameters as per job specifications</p> <p>PC32. produce machined components that combine different turning operations and have a range of features</p> <p><b>Features of machined components produced:</b> diameters (parallel, stepped, tapered), faces, undercuts (internal and external), profiles (internal and external), holes (reamed, tapped, drilled, bored), parting-off and threads (internal, external)</p> <p><b>Turning operations:</b> Turning (OD, ID), facing, grooving (OD and ID), face</p>

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	<p>grooving, thread cutting (OD and ID), drilling, boring and tapping</p> <p>PC33. follow the specified machining sequence and procedure as per job specifications</p> <p>PC34. interpret in-built machine alarms and respond to the same as per operating manual/organizational guidelines</p> <p>PC35. inspect as per frequency of inspection mentioned in the inspection plan (part of the job specifications)</p> <p>PC36. record the measured values as per organizational procedure</p> <p>PC37. observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly</p> <p>PC38. ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy</p> <p>PC39. identify when tools need replacing</p> <p>PC40. replace worn tool with new tool</p> <p>PC41. cut a trial part and adjust tool offsets after each tool change</p> <p>PC42. store finished components as well as raw material as per organizational procedure</p> <p>PC43. produce components as per standards applicable to the process</p> <p><b>Produce components standards:</b> components to be free from false tool cuts, burrs and sharp edges; general dimensional tolerance +/- 0.02mm; specific dimensional tolerances within +/- 0.1mm; surface finish within 1.6µm; reamed holes within H8; screw threads 6G/6H; angles/tapers within +/- 15 sec; flatness and squareness 0.025mm</p> <p>PC44. report problems and seek appropriate assistance in a timely manner</p> <p>PC45. deal with finished components as per organizational guidelines</p> <p>PC46. complete documentation during and post operations as per organizational procedures</p> <p>PC47. return the machine and all tools and equipment to the correct location on completion of activities</p> <p>PC48. leave the work area in a safe and tidy condition on completion of job activities</p> <p><b>Safe conditions:</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>Knowledge and Understanding (K)</b>	
<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. 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>

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	<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>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. specific safe working practices, CNC turning procedures and environmental regulations that must be observed  <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; the personal protective equipment (PPE) to be worn for the CNC turning activities; as correctly fitting overalls and safety glasses; ensuring that, if they have long hair, it is tied back or netted; removing any jewelry or other items that can become entangled in the machinery</p> <p>KB2. hazards associated with carrying out the machining operations on a CNC machine and how can they be minimized  <b>Hazards associated with the use of CNC machines:</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 chucks; moving machinery; hot and airborne metal and particles and fluid</p> <p>KB3. safety mechanism on the machine and how to check if they are functioning properly  <b>Safety mechanisms on the CNC machine:</b> emergency stop buttons, emergency brakes</p> <p>KB4. personal protective equipment to be used during the machining activities on a CNC machine and where can it be obtained  <b>Personal protective equipment:</b> correctly fitting overalls; safety glasses; long hair is tied back or netted; removing any jewelry or other items that can become entangled in the machinery; covered shoes; face mask</p> <p>KB5. types and sources of appropriate job specifications  <b>Valid sources for job specifications:</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 CNC turning</p> <p>KB7. how to read and interpret first and third angle component drawings</p> <p>KB8. 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], sectional view); reference points, lines, edges and surfaces</p> <p>KB9. symbols and conventions to appropriate ISO standards in relation to work undertaken</p> <p>KB10. main features and working parts of the CNC machine, and the accessories that can be used</p>

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	<p>KB11. importance of following specified machining sequences and procedures</p> <p>KB12. importance of ensuring suitability of work-pieces/materials and consumables for the specified job and related procedures</p> <p>KB13. tools and equipment used for machining operations on a CNC machines</p> <p>KB14. importance and procedures to ensure that tools and equipment are in a safe and usable condition</p> <p>KB15. various CNC turning operations that can be performed, and the methods and equipment used</p> <p><b>Turning operations:</b> Turning (OD and ID), facing, grooving (OD and ID), face grooving, thread cutting (OD and ID), drilling, boring and tapping</p> <p>KB16. correct techniques and procedures to carry out specific turning operations on a CNC lathe</p> <p>KB17. importance of using correct procedures as per raw material form of supply/shapes</p> <p><b>Raw material form 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>KB18. understanding error messages on machine and taking appropriate corrective action</p> <p>KB19. importance of securing the work-piece/raw material correctly using appropriate devices and mechanisms</p> <p>KB20. importance of setting the work-holding device in relationship to the machine axis and reference points</p> <p>KB21. common problems that can occur in CNC turning operations and their implications</p> <p>KB22. correct procedures to address problems commonly encountered during CNC turning operations</p> <p>KB23. importance of reporting problems immediately and accurately</p> <p>KB24. meaning and importance of quality in relation to final and intermediate job output</p> <p>KB25. how to check the quality of machined components against the specified quality standards</p> <p><b>Produce components standards:</b> components to be free from false tool cuts, burrs and sharp edges; general dimensional tolerance +/- 0.02mm; specific dimensional tolerances within +/- 0.1mm; surface finish within 1.6µm; reamed holes within H8; screw threads 6G/6H; angles/tapers within +/- 15 sec; flatness and squareness 0.025mm</p> <p>KB26. range of materials used in relevant CNC turning applications and their machinability characteristics</p> <p><b>Range of Materials:</b> ferrous metals: eg. steel, stainless steel, cast iron; non-ferrous metals: eg. aluminium, aluminium alloys, copper and copper alloys; non-metals: eg. plastics</p> <p>KB27. problems peculiar to machining of each raw material</p> <p>KB28. metric systems of measurement</p> <p>KB29. absolute and incremental systems of tool positioning and offsetting</p>
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	<p>KB30. machine zero, work piece zero, work offsets, tool offsets</p> <p>KB31. tool nose radius compensation- its necessity and effects of not using it</p> <p>KB32. use of HSS, Tungsten carbide, Ceramic and Diamond indexable tips, and factors which determine their selection and use  <b>Factors to determine selection and use of tungsten carbide, ceramic and diamond indexable tips:</b> hardness of the material, the cutting characteristics of the material, tolerances to be achieved, component surface finish, component specifications</p> <p>KB33. use of various work holding devices – chuck, tailstock, steady rest  <b>Work-holding devices to position and secure work-pieces:</b> chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, faceplates, magnetic/pneumatic devices and other work-holding devices</p> <p>KB34. 1st and 2nd setup operation, use of hard and soft jaws</p> <p>KB35. deciding holding length, Jaw pressure setting</p> <p>KB36. importance of conducting cutting trial, methods of trial – dry run, single block checks, cutting with offset adjustment to get oversize part</p> <p>KB37. parameters to be checked before operating in auto mode – dimensions, surface finishes</p> <p>KB38. importance of periodic maintenance checks for the machine and what are the common maintenance checks  <b>Basic maintenance activities:</b> replenish coolant; ensure all parts are clean; perform housekeeping tasks on the machine; remove and dispose swarf</p> <p>KB39. production cost, machine hour rate, raw material cost, tool cost, coolant cost, overheads, cycle time, idle time, cost of machine idling, part rejection cost</p> <p>KB40. selection of cutting tools, tool materials, chip breaker geometry, selecting cutting parameters from tool catalogues, selecting coolant  <b>Cutting tools:</b> turning tool (OD and ID), grooving tool (OD and ID), parting tool, threading tool, form tools, centre drills, twist/insert drills and reamers</p> <p>KB41. relationship between surface finish, tool nose radius and feed rate</p> <p>KB42. factors that affect feed and speed  <b>Factors:</b> type and condition of material, work-holding method, tooling used, tolerance to be achieved, finish to be achieved</p> <p>KB43. impact of depth of cut on chatter, surface finish</p> <p>KB44. extent of their own authority and to whom they should report if they have problems that they cannot resolve</p> <p>KB45. importance of leaving the work area and machine in a safe condition on completion of the activities  <b>Safe conditions:</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>	
<b>A. Core Skills/ Generic Skills</b>	<b>Communication</b>
	<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>

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	<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  <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)</p> <p>SA8. identify various basic, compound and solid shapes as per dimensions given  <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</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  <b>Units and number systems representing degree of accuracy:</b> decimals places, significant figures, fractions as a decimal quantity</p> <p>SA11. use metric systems of measurement  <b>Angles in a triangle:</b> right-angled, isosceles, equilateral</p>
	<p><b>Computer skills</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA12. use basic office applications like spread sheet, word processor, presentations</p> <p>SA13. use ERP software and other organizational software specific to quality function</p> <p>SA14. use email to communicate within the organization as per organization guidelines</p>
	<p><b>Learning</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA15. participate in on-the-job and other learning, training and development interventions and assessments</p> <p>SA16. clarify task related information with appropriate personnel or technical adviser</p> <p>SA17. seek to improve and modify own work practices</p> <p>SA18. maintain current knowledge of application standards, legislation, codes of practice and product/process developments</p>
<b>B. Professional Skills</b>	<b>Problem Solving</b>

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	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB1. identify problems with work planning, procedures, output and behavior and their implications</li> <li>SB2. prioritize and plan for problem solving</li> <li>SB3. communicate problems appropriately to others</li> <li>SB4. identify sources of information and support for problem solving</li> <li>SB5. seek assistance and support from other sources to solve problems</li> <li>SB6. identify effective resolution techniques</li> <li>SB7. select and apply resolution techniques</li> <li>SB8. seek evidence for problem resolution</li> </ul>
	<p><b>Plan and Organize</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB9. plan, prioritize and sequence work operations as per job requirements</li> <li>SB10. organize and analyze information relevant to work</li> <li>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time</li> </ul>
	<p><b>Initiative and Enterprise</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB12. undertake and express new ideas and initiatives to others</li> <li>SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</li> <li>SB14. participate in improvement procedures including process, quality and internal/external customer/supplier relationships</li> <li>SB15. one's competencies in new and different situations and contexts to achieve more</li> </ul>
	<p><b>Self-Management</b></p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB16. exercise restraint while expressing dissent and during conflict situations</li> <li>SB17. avoid and manage distractions to be disciplined at work</li> <li>SB18. manage own time for achieving better results</li> </ul>
	<p><b>Teamwork</b></p>
<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SB19. work in a team in order to achieve better results</li> <li>SB20. identify and clarify work roles within a team</li> <li>SB21. communicate and cooperate with others in the team for better results</li> <li>SB22. seek assistance from fellow team members</li> </ul>	

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**NOS Version Control**

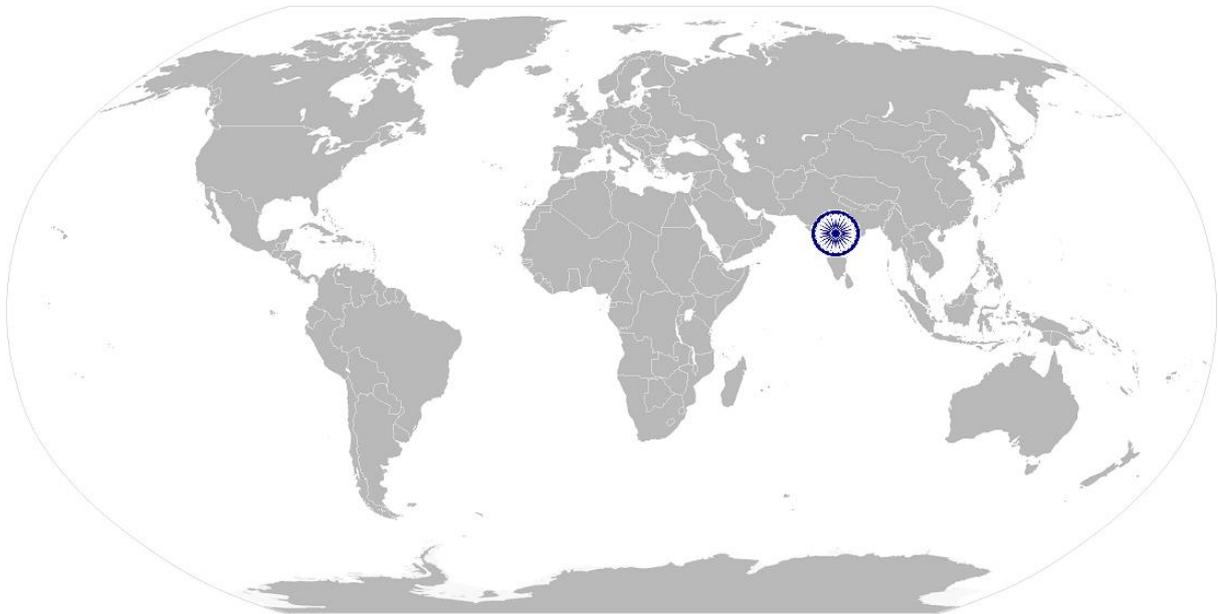
NOS Code	CSC / N 0115		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	14/04/14
Industry Sub-sector	<ol style="list-style-type: none"> <li>1. Machine Tools</li> <li>2. Dies, Moulds And Press Tools</li> <li>3. Plastics Manufacturing Machinery</li> <li>4. Textile Manufacturing Machinery</li> <li>5. Process Plant Machinery</li> <li>6. Electrical and Power Machinery</li> <li>7. Light Engineering Goods</li> </ol>	Last reviewed on	
		Next review date	30/08/16



CSC/ N 1335: 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 1335: Use basic health and safety practices at the workplace**

National Occupational Standard

<b>Unit Code</b>	<b>CSC / N 1335</b>
<b>Unit Title (Task)</b>	<b>Use basic health and safety practices at the workplace</b>
<b>Description</b>	<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>
<b>Scope</b>	<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>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Health and safety</b>	<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>

**CSC/ N 1335: Use basic health and safety practices at the workplace**

	<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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**CSC/ N 1335: Use basic health and safety practices at the workplace**

	<p><b>Documents:</b> fire notices, accident reports, safety instructions for equipment and procedures, company notices and documents, legal documents (eg government notices)</p>
<p><b>Fire safety</b></p>	<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>
<p><b>Emergencies, rescue and first-aid procedures</b></p>	<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>

**Knowledge and Understanding (K)**

**CSC/ N 1335: Use basic health and safety practices at the workplace**

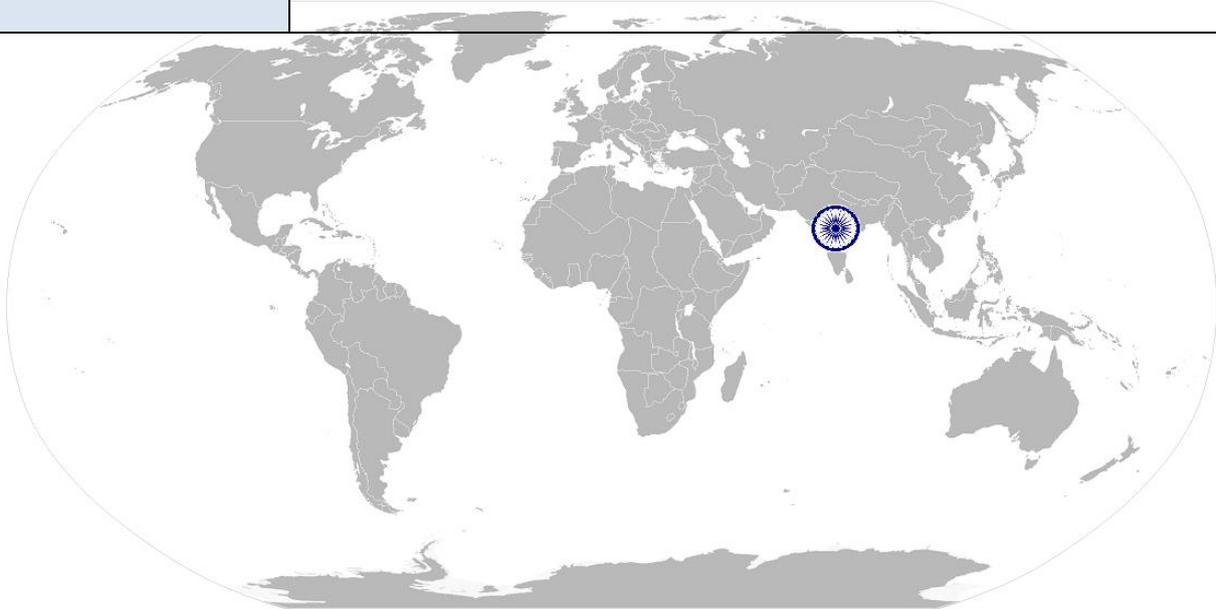
<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.</p> <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 1335: 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>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA1. read and comprehend basic content to read labels, charts, signages</p> <p>SA2. read and comprehend basic English to read manuals of operations</p> <p>SA3. read and write an accident/incident report in local language or English</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA4. question coworkers appropriately in order to clarify instructions and other issues</p> <p>SA5. give clear instructions to coworkers, subordinates others</p>
	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>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</p>
<b>B. Professional Skills</b>	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. plan and organize their own work schedule, work area, tools, equipment and materials to maintain decorum and for improved productivity</p>
	<b>Working with others</b>
<p>The user/individual on the job needs to know and understand how to:</p> <p>SB2. remain congenial while discussing and debating issues with co-workers</p> <p>SB3. follow appropriate protocols for communication based on situation, hierarchy, organizational culture and practice</p> <p>SB4. ask for, provide and receive required assistance where possible to ensure achievement of work related objectives</p> <p>SB5. thank coworkers for any assistance received</p> <p>SB6. offer appropriate respect based on mutuality and respect for fellow workmanship and authority</p>	

**CSC/ N 1335: Use basic health and safety practices at the workplace**

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

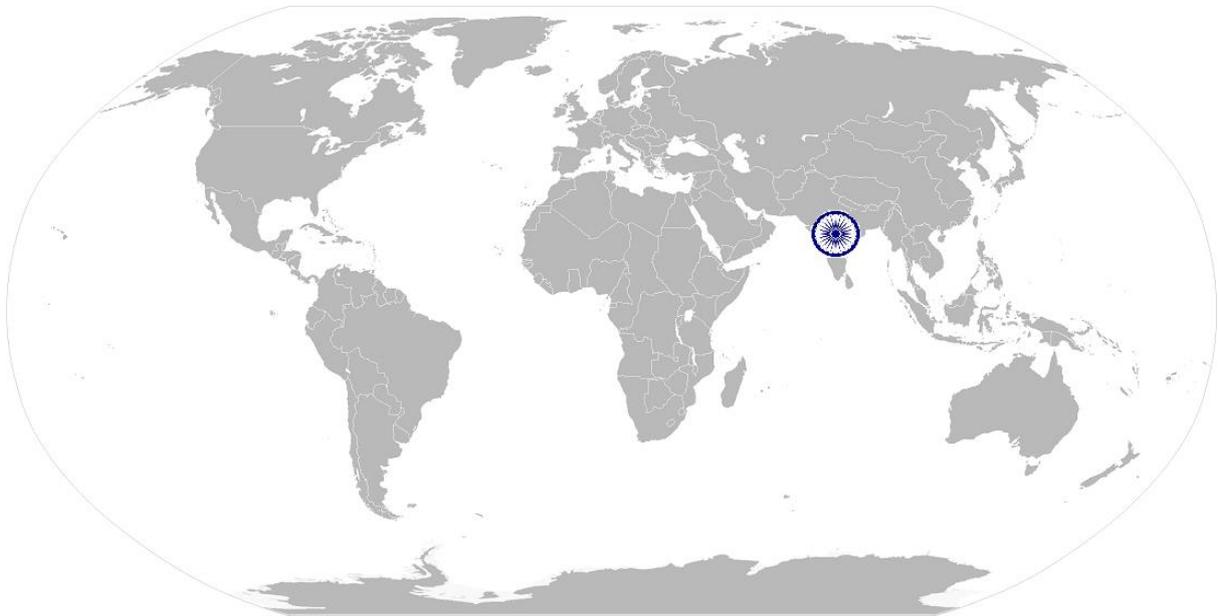


**CSC/ N 1335: Use basic health and safety practices at the workplace**

## NOS Version Control

<b>NOS Code</b>	<b>CSC / N 1335</b>		
<b>Credits (NSQF)</b>	<b>TBD</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. 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 Generation Machinery</li> <li>7. Light Engineering Goods</li> </ol>	<b>Last reviewed on</b>	
		<b>Next review date</b>	<b>30/08/16</b>

# National Occupational Standard



## Overview

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

**CSC/ N 1336: Work effectively with others**

<b>Unit Code</b>	<b>CSC / N 1336</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><b>Disciplined behaviors:</b> 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 1336: 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 1336: Work effectively with others

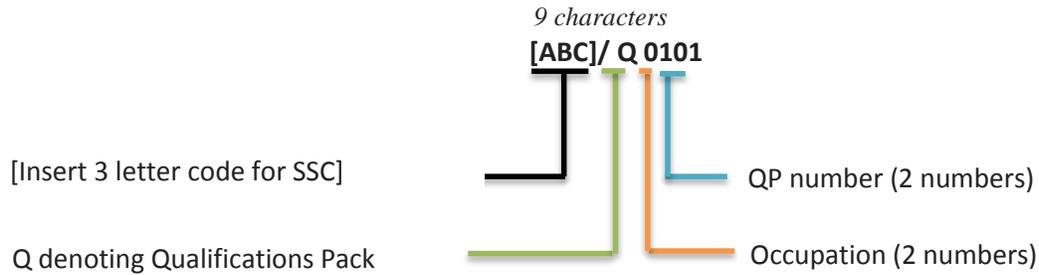
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<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
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<b>Industry Sub-sector</b>	<ol style="list-style-type: none"> <li>1. Machine Tools</li> <li>2. Dies, Moulds And Press Tools</li> <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 Goods</li> </ol>	<b>Last reviewed on</b>	
		<b>Next review date</b>	<b>30/08/16</b>

## Annexure

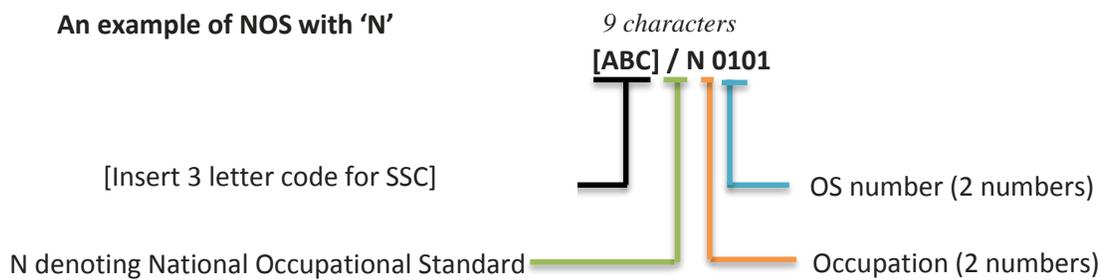
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

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



The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Machine Tools	01-13
Dies, Moulds and Press Tools	01-13
Plastics Manufacturing Machinery	01-13
Textile Manufacturing Machinery	01-13
Process Plant Machinery	01-13
Electrical and Power Machinery	01-13
Light Engineering Goods	01-13

Sequence	Description	Example
Three letters	Capital Goods	CSC
Slash	/	/
Next letter	Whether <b>QP</b> or <b>NOS</b>	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

**PERFORMANCE CRITERIA**

**Job Role: CNC Setter cum Operator - Turning**

**Qualification Pack: CSC/ Q 0120**

**Sector Skill Council: Capital Goods Sector Skills Council**

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/training center.
4. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessment Strategy Marks Allocation		
NOS CODE	NOS TITLE	Weightage
CSC/ N 0120	Set computer numerically controlled (CNC) machines for turning operations on metal components	35
CSC/ N 0115	Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines	35
CSC/ N 1335	Use basic health and safety practices at the workplace	20
CSC/ N 1336	Work effectively with others	10
		100

CSC/ N 0120	Set computer numerically controlled (CNC) machines for turning operations on metal components		
Elements	Performance criteria	Theory	Practical
Work safely	PC1. work safely at all times, complying with health and safety, environmental and other relevant regulations and guidelines	1	1
	PC2. check that all safety mechanisms are in place and that the equipment is set correctly for the required operations	0	2
	PC3. adhere to procedures or systems in place for health and safety, personal protective equipment and other relevant safety regulations and procedures to realize a safe system of work	1	2
	PC4. keep the work area clean and tidy	0	1
	PC5. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition	0	1

	PC6. ensure that the components used are free from foreign objects, dirt or other contamination	0	1
		<b>2</b>	<b>8</b>
<b>Prepare for setting CNC turning machine for production</b>	PC8. obtain job specification from a valid and approved source	0	1
	PC9. read and establish job requirements from the job specification document accurately	1	1
	PC10. follow job instructions, assembly drawings and laid down procedures at all times	1	1
	PC11. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	0	2
	PC12. prepare the work area for the turning operations as per procedure or operational specification	1	1
	PC13. conduct a preliminary check of the readiness of the CNC turning machine	0	1
	PC14. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements	1	1
	PC15. ensure that all measuring equipment is calibrated and approved for usage	0	1
	PC16. determine what operational objectives and targets need to be achieved and how best the machine will be set to achieve this	1	1
	PC17. extract and use information from engineering drawings and relate specifications in relation to work undertaken	1	2
	PC18. identify tool requirements from tooling layout and assess their suitability	1	2
	PC19. identify suitable work-holding or fixturing device as per the job requirement	1	1
	PC20. ensure that the tools and fixtures are in usable condition (free from breakage, damage, calibration, etc.)	0	1
	PC21. ensure the correct and latest part-program is uploaded onto the CNC system	1	2
PC22. pre-set the tooling appropriately using setting jigs/fixtures	1	2	
PC23. seek any necessary instruction/training on the operation of the machine where required	0	1	
		<b>10</b>	<b>21</b>
<b>Carry out setting for CNC turning</b>	PC24. mount tools in the correct position in the tool posts, turrets, magazine or carousel	1	2

operations using CNC machine	PC25. check that the tools have a specific tool number in relation to the operating program	0	2
	PC26. produce machined components that combine different turning operations and have a range of features	2	3
	PC27. enter all relevant tool data to the operating program	1	2
	PC28. set tool datums, positions, lengths, offsets and radius compensation	1	2
	PC29. mount the work-holding device/fixture onto the machine	1	2
	PC30. set the work-holding device/fixture in relationship to the machine datum's and reference points	1	2
	PC31. set the machine tool operating parameters (eg. hydraulic pressure, clamping) as per the component requirements	1	2
	PC32. place the machine into the correct operating mode, and access the program edit facility in order to enter tooling data,	1	2
	PC33. conduct trial runs using single block run, dry run and feed and speed override controls	1	1
	PC34. measure the critical parameters of the machined component on the machine	0	3
	PC35. prove the program tool by tool in single block mode	2	3
	PC36. perform the necessary checks before allowing the machine to operate in full program run mode	1	2
	PC37. hand-over the machine after set-up to the machine operator along with relevant instructions and documentation	2	2
	PC38. complete relevant documentation as per organizational procedure	1	1
	PC39. handle the typical problems that can occur with the setting up of the tooling, work-holding devices and proving the program	1	1
	PC40. switch the CNC turning/lathe machine on and off in normal and emergency situations	0	1
	PC41. return the old cutting tools, workholding device/fixtures/instruments/drawings back to store and verified tapes and programs, safely and correctly	0	1
	PC42. ensure that there is no damage to the tool/fixture while doing the prove-out	0	1
	PC43. complete documentation during and post operations as per organizational procedures	1	1

	PC44. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve	0	2
	PC45. shut down the equipment to a safe condition on conclusion of the activities	0	1
	PC46. leave the work area in a safe and tidy condition on completion of the fitting activities	0	1
	PC47. return all tools and equipment to the correct location on completion of the turning activities	0	1
		<b>18</b>	<b>41</b>
		<b>30</b>	<b>70</b>
		<b>100</b>	

<b>CSC/ N 0115</b>	<b>Perform turning operations on metal components using Computer Numerically Controlled (CNC) machines</b>		
Elements	Performance criteria	Theory	Practical
<b>Work 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 CNC turning operations	1	2
	PC3. read and understand safety instructions, warning signs on the machine	0	2
	PC4. work following laid down procedures and instructions	1	1
	PC5. ensure work area is clean and safe from hazards	0	1
	PC6. ensure that all tools and equipment are in a safe and usable condition	0	1
		<b>3</b>	<b>8</b>

<b>Prepare for performing turning operations using CNC machine</b>	PC7. obtain job specification from a valid and approved source	0	1
	PC8. read and establish job requirements from the job specification document accurately	1	1
	PC9. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	1	2
	PC10. prepare the work area for the turning operations as per procedure or operational specification	1	1
	PC11. perform daily maintenance of machine according to defined checklist, at the beginning of day's shifts.	1	2
	PC12. ensure that the components used are free from foreign objects, dirt or other contamination	0	1
	PC13. conduct a preliminary check of the readiness of the CNC turning machine	0	2
	PC14. obtain correct work-pieces/raw materials and consumables as per job requirements	1	1
	PC15. obtain appropriate cutting tools and hand tools and measuring tools as per job requirements	1	1
	PC16. ensure that all measuring equipment is calibrated and approved for usage	0	2
	PC17. set work pieces as per job requirements using appropriate positioning and/or holding devices and support mechanisms	1	2

	PC18. seek necessary instruction/training on the operation of the machine where required from appropriate sources	0	2
	PC19. check that the operating program is at the correct start point and the tool is at a safe position clear of the part	0	2
	PC20. perform basic daily maintenance activities as per the checklist given	1	1
		<b>8</b>	<b>21</b>

<b>Carry out turning operations using CNC machine</b>	PC21. obtain the component drawings, specifications and/or job instructions required for the components to be machined	0	1
	PC22. use and extract information from engineering drawings, dimensioning and labeling data	0	2
	PC23. use and extract information from reference charts, tables, graphs and standards	0	2
	PC24. interpret the visual display and the various messages displayed correctly	0	2
	PC25. find the correct restart point in the program when the machine has been stopped before completion of the program	0	2
	PC26. load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions	1	2
	PC27. check correctness of program through dry run and single block check	0	2
	PC28. do first part cutting trial by setting tool offsets to get oversize part	0	3
	PC29. measure the critical parameters of the machined component on the machine (without removing from the machine ), after the trial run	0	3
	PC30. correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data	0	3
	PC31. measure the component after unloading to check for accuracy in the critical parameters as per job specifications	1	3
	PC32. produce machined components that combine different turning operations and have a range of features	1	3
	PC33. follow the specified machining sequence and procedure as per job specifications	1	1
	PC34. interpret in-built machine alarms and respond to the same as per operating manual/organizational	1	1

	guidelines		
	PC35. inspect as per frequency of inspection mentioned in the inspection plan (part of the job specifications)	1	1
	PC36. record the measured values as per organizational procedure	0	1
	PC37. observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly	1	2
	PC38. ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy	0	2
	PC39. identify when tools need replacing	0	2
	PC40. replace worn tool with new tool	0	1
	PC41. cut a trial part and adjust tool offsets after each tool change	0	1
	PC42. store finished components as well as raw material as per organizational procedure	1	1
	PC43. produce components as per standards applicable to the process	1	2
	PC44. report problems and seek appropriate assistance in a timely manner	0	2
	PC45. deal with finished components as per organizational guidelines	1	1
	PC46. complete documentation during and post operations as per organizational procedures	1	1
	PC47. return the machine and all tools and equipment to the correct location on completion of activities	0	1
	PC48. leave the work area in a safe and tidy condition on completion of job activities	0	1
		<b>11</b>	<b>49</b>
		<b>22</b>	<b>78</b>
		<b>100</b>	

CSC/ N 1335		Use basic health and safety practices at the workplace	
Elements	Performance criteria	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>21</b>	<b>29</b>
<b>Fire safety</b>	PC13. use the various appropriate fire extinguishers on different types of fires correctly	1	3
	PC14. demonstrate rescue techniques applied during fire hazard	1	3
	PC15. demonstrate good housekeeping in order to prevent fire hazards	1	2
	PC16. demonstrate the correct use of a fire extinguisher	1	3
		<b>4</b>	<b>11</b>
<b>Emergencies, rescue and first-aid</b>	PC17. demonstrate how to free a person from electrocution	1	3

procedures	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	1	3
	PC21. perform and organize loss minimization or rescue activity during an accident in real or simulated environments	1	2
	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>11</b>	<b>24</b>	
	<b>36</b>	<b>64</b>	
	<b>100</b>		

CSC/ N 1336	Work effectively with others		
Elements	Performance criteria	Theory	Practical
<b>Work effectively with others</b>	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>	