# QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR CAPITAL GOODS INDUSTRY

## Contents



## What are Occupational Standards(OS)?

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


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## Introduction

## Qualifications Pack: CNC Programmer

**SECTOR:** CAPITAL GOODS

**SUB-SECTOR:**

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

**OCCUPATION:** Design

**REFERENCE ID:** CSC/ Q 0401

**ALIGNED TO:** NCO-2004/ NIL

**CNC Programmer**: Develops, loads and proves the machine tool programs for computer numerically controlled (CNC) machines using appropriate software, as per approved procedures.

**Brief Job Description:** Produce the component program using manual data input or by use of a remote computer, saving the prepared program on the machine controller from the computer. This involves understanding the CNC machine tools used in the process, their application and programming, editing and proving process, in adequate depth to provide a sound basis for carrying out the activities.

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

Job Details

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| **Qualifications Pack Code** | **CSC/ Q 0401** | | |
| **Job Role** | **CNC Programmer** | | |
| **Credits (NSQF)** | **TBD** | **Version number** | **1.0** |
| **Sector** | **CAPITAL GOODS** | **Drafted on** | **10/04/14** |
| **Sub-sector** | 1. Machine Tools<br>2. Dies, Moulds And Press Tools<br>3. Plastics Manufacturing Machinery<br>4. Textile Manufacturing Machinery<br>5. Process Plant Machinery<br>6. Electrical and Power Machinery<br>7. Light Engineering Goods | **Last reviewed on** | **18/03/15** |
| **Occupation** | **DESIGN** | **Next review date** | **30/08/16** |
| **NSQC Clearance on** | **19/05/2015** | | |

| Job Role | CNC Programmer |
|---|---|
| **Role Description** | Develops, loads and proves the machine tool programs for computer numerically controlled (CNC) machines using appropriate software, as per approved procedures. |
| **NSQF level** | 4 |
| **Minimum Educational Qualifications** | Diploma in Mechanical Engineering |
| **Maximum Educational Qualifications** | N.A. |
| **Training** (Suggested but not mandatory) | CAM(Computer Aided Manufacture) Training |
| **Minimum Job Entry Age** | 18 Years Old |
| **Experience** | Minimum 1 year working with CNC machine/ |
| **Applicable National Occupational Standards (NOS)** | **Compulsory:**<br>1. CSC/ N 0401 (Program computer numerically controlled (CNC) machines)<br>2. CSC/ N 1335 (Use basic health and safety practices at the workplace)<br>3. CSC/ N 1336 (Work effectively with others)<br><br>**Optional:**<br>N.A. |
| **Performance Criteria** | As described in the relevant OS units |

## Acronyms

| 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. |

| Keywords /Terms | Description |
|---|---|
| CNC | Computer Numerically Controlled |
| NC | Numerically Controlled |
| VMC | Vertical Machining Center |
| HMC | Horizonal Machining Center |
| CAD | Computer Aided Design |
| 2D | 2 Dimensional |
| 3D | 3 Dimensional |
| CO2 | Carbon dioxide |
| CPR | Cardiac Pulmonary Resuscitation |
| ISO | International Organization for Standardization |
| PPE | Personal Protective Equipment |

**CSC/ N 0401: Program computer numerically controlled (CNC) machines**

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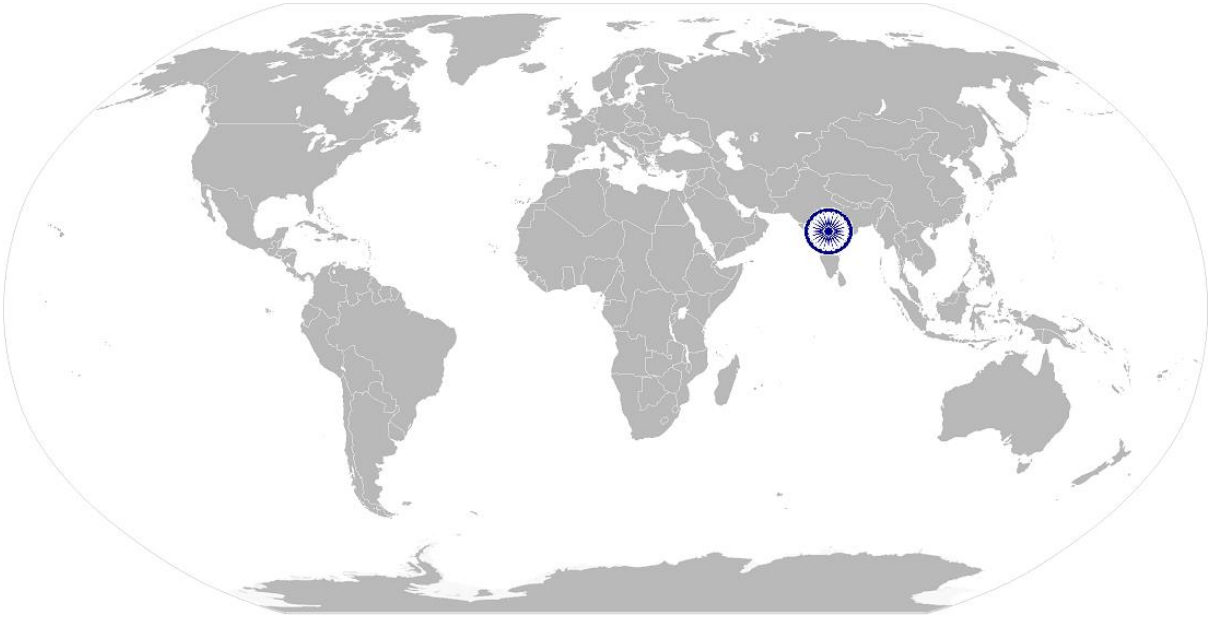
# National Occupational Standard



## Overview

**This unit covers how to produce, load and prove the machine tool programs for computer numerically controlled (CNC) machines using appropriate software, as per approved procedures.**

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

National Occupational Standard

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| **Unit Code** | **CSC / N 0401** |
| **Unit Title (Task)** | **Programming computer numerically controlled (CNC) machines** |
| **Description** | This unit covers making programs for and proving out of parts on Computer Numerically Controlled (CNC) lathes and machining centers. Programming can be done manually or using CAM software. The program is transferred to the machine's controller by entering it at the console, transmitting it through a wired link, or copying it through a data storage device like a flash card.<br><br>The candidate will be expected to perform safe operations with a minimum of supervision, taking personal responsibility for one's own actions and for the quality and accuracy of the work produced. |
| **Scope** | This unit/ task covers the following:<br>• Working safely<br>• Preparing for programming CNC machine for production<br>• Carrying out programming for CNC machine<br>• Test and prove the program on the CNC Machine |

| **Performance Criteria(PC) w.r.t. the Scope** | |
|---|---|
| **Element** | **Performance Criteria** |
| **Working safely** | The user/individual on the job should be able to:<br>PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work<br>PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while programming CNC machines<br>PC3. work following laid down procedures and instructions<br>PC4. ensure that machine guards are in place and are correctly adjusted<br>PC5. read and understand safety instructions, warning signs on the machine<br>PC6. ensure work area is clean and safe from hazards<br>PC7. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition |
| **Preparing for programming CNC machine for production** | The user/individual on the job should be able to:<br>PC8. obtain job specification from a valid and approved source<br>**Valid sources**: job instruction sheet/job card; work drawings and instructions; planning documentation; quality control documents; operation sheets; process specifications; instructions from supervisor<br>PC9. read and establish job requirements from the job specification document accurately<br>**Job specification documents**: detailed component drawings; approved sketches/illustrations; national, international and organisational standards; reference tables and charts; fabrication/casting drawings; operational diagrams; contractual specifications<br>**Job requirements**: 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 |

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| | profiles to be generated; instruments and tools to be used; form tolerances (flatness, concentricity, etc.); cycle time, production rate; projections orthographic (first angle, third angle), isometric (including exploded, oblique); reference points, lines, edges and surfaces; dimensions (baseline, continuous); workholding devices<br>PC10. follow job instructions, assembly drawings and laid down procedures at all times<br>PC11. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures<br>PC12. use and extract information from reference charts, tables, graphs and standards<br>**Information pertaining to**: tapping sizes and threads; cutting parameters – feeds, speed, depth of cut; machining symbols and tolerances<br>PC13. prepare the work area as per procedure or operational specification<br>PC14. conduct a preliminary check of the readiness of the program so that the CNC machine operates correctly<br>**CNC machines**: 2-axis CNC machine, 3-axis machining centers (VMC, HMC), > 3 axes machining centers(3.5/4/5 axes)<br>**Checks**: ensure that all tool tool length / wear / radius offsets are correctly entered; for finishing operations, adjust offsets to get slightly oversize/undersize dimensions to ensure that the part does not get rejected; run the program in dry run mode to ensure that there are no collisions between the tool and workpiece / work holding devices; check tool change positions are safe and clear of the workpiece and work holding devices; ensure that correct tools are selected at the appropriate points in the program; check if the tool paths are executed safely and correctly; ensure that the auxiliary functions operate at the correct point in the program(spindle start/stop, coolant flow, program optional stop); run the program, in single block mode wherever necessary; measure the dimensions of the component on the machine and make necessary corrections in tool offsets; inspect the component for all dimensions and record findings in specified formats; make necessary changes in tool length / wear / radius offsets to correct dimension errors; run the next component; ensure that all dimensions are within specifications; if dimensions are not within specifications, correct using appropriate actions; repeat this till parts come within specifications without any correction requirement<br>PC15. determine what operational objectives and targets need to be achieved and how best the machine needs to be programmed to achieve this<br>**CNC programming operations**: preparing, loading, storing in appropriate format, proving the part program, trial runs<br>PC16. extract and use information from engineering drawings and related specifications in relation to work undertaken<br>PC17. identify tool requirements from tooling layout and assess their suitability<br>PC18. identify suitable workholding or fixturing device as per the job requirement<br>PC19. ensure the correct and latest part-program is uploaded onto the CNC system |

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

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| **Carrying out programming for CNC machine** | The user/individual on the job should be able to:<br>PC20. make the CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, in syntax corresponding to the machine and control system on which the component will be machined.<br>PC21. various ways to make CNC program are by writing it on paper or in a computer's text editor, or using CAM software or controllers on machine<br>**Ways**: written, directly entered into the machine controller, using computer software- CAM software<br>PC22. ensure that the part program is efficient and results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions<br>PC23. use subprograms and canned cycles, to reduce program size and input time and avoid memory overflow on the machine<br>PC24. transfer the program to the machine by entering it at the console or transmitting it through a wired link or through a data transfer device<br>PC25. follow the correct procedures for calling up the program and dealing with any error messages or faults<br>PC26. handle the typical problems that can occur with the programming, loading and editing activities effectively using approved procedures<br>PC27. save the proven program in the appropriate storage medium – paper, computer hard disk, etc. - and location<br>PC28. complete relevant documentation as per organizational procedure<br>PC29. leave the work area in a safe and tidy condition on completion of the activities |
| **Test and prove the program on the CNC Machine** | The user/individual on the job should be able to:<br>PC30. obtain appropriate equipment or tools needed as per job requirements<br>PC31. ensure that all measuring equipment is calibrated and approved for usage<br>PC32. ensure that the tools and fixtures are in usable condition(eg. free from breakage, damage, calibration, etc.)<br>PC33. pre-set the tooling appropriately using setting jigs/fixtures<br>PC34. seek any necessary instruction/training on the operation of the machine where required<br>PC35. mount tools in the correct positions in the tool turret or magazine<br>PC36. check that the tools have been mounted in positions corresponding to tool numbers in the part program<br>PC37. measure tool and work offset data - X and Z offsets for lathes; work offsets, length offsets and tool radius for machining centers.<br>PC38. ensure that the component is free of burrs, chips or other material adhering to its butting surfaces<br>PC39. mount the part on machine firmly in the specified work holding devices, with the appropriate clamping forces.<br>PC40. enter work offset and tool data on the machine – X and Z offsets, tool orientation and nose radius for lathes; length offsets and tool radius for machining centers.<br>PC41. ensure that tool data has been entered in offset number corresponding to the tool offset numbers in the part program<br>**Tool data**: tool length and radius/diameter offsets for milling tools; X, Z tool offsets for turning tools; tool nose radius for turning tools<br>PC42. deal with error messages and faults on the program or equipment<br>PC43. cut a trial part using single block run, dry run and feed and speed override |

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| | controls<br>PC44. edit the program and adjust tool and wear offsets to correct any dimensional errors on the part<br>PC45. ensure that the trial part conforms to drawing specifications in terms of dimensions, surface finishes and geometrical parameters like concentricity, parallelism, runout, etc.<br>PC46. hand-over the machine to the machine operator for machining the batch of parts, along with relevant instructions and documentation on periodic inspection of components, change of worn out tools<br>PC47. correct the tool wear offsets whenever required, based on the results of the period inspection<br>PC48. change worn out tools and indexable inserts whenever required<br>PC49. after every change of a worn out tool or insert, cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets<br>PC50. return worn out cutting tools, workholding device / fixtures / instruments / drawings to store<br>PC51. ensure that there is no damage to the tool/fixture while doing the prove-out<br>PC52. shut down the equipment to a safe condition on conclusion of the activities<br>PC53. deal promptly and effectively with problems within span of responsibility and control and report those that cannot be solved |
| **Knowledge and Understanding (K)** | |
| **A. Organizational Context** (Knowledge of the company / organization and its processes) | The user/individual on the job needs to know and understand:<br>KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions<br>KA2. relevant health and safety requirements applicable in the work place<br>KA3. importance of working in clean and safe environment<br>KA4. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities<br>KA5. reporting structure, inter-dependent functions, lines and procedures in the work area<br>KA6. relevant people and their responsibilities within the work area<br>KA7. escalation matrix and procedures for reporting work and employment related issues<br>KA8. documentation and related procedures applicable in the context of employment and work<br>KA9. importance and purpose of documentation in context of employment and work |
| **B. Technical Knowledge** | The user/individual on the job needs to know and understand:<br>KB1. specific safe working practices, CNC programming procedures and environmental regulations that must be observed<br>**Safe working practices and procedures**: use the appropriate reference manuals and programming codes to suit the machine controller; use the correct and updated version of the program; ensure that tool and work offsets are entered correctly; ensure that the program does not result in tool collision with the workpiece or work holding devices; ensure that the workpiece and tools are clamped firmly; use the correct control program and ensure it is correctly loaded into the machine controller; wear personal protective equipment (PPE); use correctly fitting overalls, boots and safety glasses; ensure that long hair tied back or netted; remove any jewellery or other items that can become |

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

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| | entangled in the machinery<br>KB2. hazards associated with carrying out the machining operations on a CNC machine and how can they be minimized<br>**Hazards**: automatic, high speed machine movements; revolving/moving parts of machinery; airborne and hot metal particles and fluids; sharp cutting tools; parts dropping from material handling devices; burrs and sharp edges on component; use of power operated chucks; moving machinery in aisles<br>KB3. personal protective equipment to be used during the machining activities on a CNC machine and where can it be obtained<br>KB4. safety mechanism on the machine and how to check if they are functioning properly<br>**Safety mechanism on the machine**: emergency stop button; feed hold button<br>KB5. types and sources of appropriate job specifications<br>KB6. common terminology used in CNC programming<br>features of produced CNC program<br>**Features**: program number; program documentation in comments - part number, part name, programmer, date of program, tool names, operation names; motion commands; tool change positioning and command; tool numbers and offset numbers; subprograms and canned cycles; tool nose radius compensation commands; spindle, feed rate and coolant commands<br>KB7. selection of strategies based on material and fixturing, holding and clamping force<br>KB8. the factors which will determine selection and use of tungsten carbide and tips<br>**Factors**: hardness of the component material; machinability characteristics of the material; tolerances to be achieved; surface finish to be achieved; geometrical accuracies like ovality, straightness and flatness to be achieved; rigidity of work holding<br>KB9. importance of tool selection based on material, finish required and tolerances achieved<br>KB10. importance of cutter engagement and exit<br>KB11. factors affecting tool life<br>KB12. importance and effect of the depth of cut, RPM and feed<br>KB13. how to read and interpret first and third angle component drawings<br>KB14. how to extract information from engineering drawings or data and related specifications<br>KB15. how to use the function keys and user interface of the machine control system<br>KB16. determination and entry of work and tool offsets, tool wear data<br>KB17. main features and working parts of the CNC machine, and the accessories that can be used<br>**CNC machines**: 2-axis CNC machine, 3-axis machining centers (VMC, HMC), > 3 axes machining centers(3.5/4/5 axes)<br>KB18. importance of following specified machining sequences and procedures<br>KB19. importance of ensuring suitability of workpieces/materials and consumables for the specified job and related procedures<br>KB20. importance and procedures to ensure that tools and equipment are in a safe and usable condition<br>KB21. various CNC operations that can be performed, and the methods and equipment used |

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

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| | KB22. methods of setting the work-holding devices, and the tools and equipment that can be used<br>KB23. various tool holding devices that are used, and the methods of correctly mounting and securing the cutting tools to the tool holders<br>KB24. how to set the machine controller in the program and editing mode, and enter or download the prepared program<br>**Mode of machine control**: program operating and control buttons<br>KB25. automatic tool changers, pallet changers, rotary tables and part auto loaders used<br>KB26. how to position and identify the tools in relationship to the operating program<br>KB27. function of error messages, and appropriate subsequent action<br>KB28. importance of proving the program, how to do it and selecting the correct proving tools<br>**Tools**: single block mode, jog, dry run, graphical tool path simulation, search facilities, program save/store facilities, edit facilities, spindle speed and feed rate override controls, program input facilities – insert, delete, modify, tool data input facilities – tool offset, nose radius<br>KB29. need for storing program tapes and disks safely and correctly, away from contaminants and electromagnetic sources<br>KB30. quality control procedures that are used, inspection checks to be carried out, and the equipment that will need to be used<br>KB31. importance to report problems in a timely manner<br>KB32. importance of writing programs that are easily editable or correctable by the next person<br>KB33. methods of checking quality of the shaped components against the required quality standards<br>KB34. production cost, machine hour rate, raw material cost, tool cost, coolant cost, overheads, cycle time, idle time, cost of machine idling, part rejection cost<br>KB35. selection of cutting tools, tool materials, chip breaker geometry, selecting cutting parameters from tool catalogues, selecting coolant<br>KB36. relationship between surface finish, tool nose radius and feed rate<br>KB37. impact of depth of cut on chatter, surface finish<br>KB38. range of materials used in common engineering applications<br>KB39. how to identify materials by their physical properties |
| **Skills (S) [Optional]** | |
| **A. Core Skills/ Generic Skills** | **Communication**<br>The user/ individual on the job needs to know and understand how to:<br>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<br>SA2. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language<br>SA3. convey and share technical information clearly using appropriate language<br>SA4. check and clarify task-related information<br>SA5. liaise with appropriate authorities using correct protocol<br>SA6. communicate with people in respectful form and manner in line with organizational protocol |

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

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| | **Numerical and computational skills** |
| | The user/individual on the job needs to know and understand how to:<br>SA7. undertake numerical computations and calculation<br>**Numerical computations:** addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages, basic algebra and trigonometry<br>SA8. identify and draw various basic, compound and solid shapes as per dimensions given<br>**Basic shapes:** square, rectangle, triangle, circle, quadrilaterals<br>**Compound shapes:** involving squares, rectangles, triangles, circles, semi-circles, quadrants of a circle<br>**Solid shapes:** cube, rectangular prism, cylinder<br>SA9. use appropriate measuring techniques and units of measurement<br>SA10. use appropriate units and number systems to express degree of accuracy<br>**Units and number systems representing degree of accuracy**: decimals places, significant figures, fractions as a decimal quantity<br>SA11. interpret and express tolerance in terms of limits on dimensions<br>SA12. calculation of the value of angles in a triangle<br>**Angles in a triangle:** right-angled, isosceles, equilateral, scalene |
| | **Learning** |
| | The user/individual on the job needs to know and understand how to:<br>SA13. participate in on-the-job and other learning, training and development interventions and assessments<br>SA14. clarify task related information with appropriate personnel or technical adviser<br>SA15. seek to improve and modify own work practices<br>SA16. maintain current knowledge of application standards, legislation, codes of practice and product/process developments |
| **B. Professional Skills** | **Problem Solving** |
| | The user/individual on the job needs to know and understand how to:<br>SB1. identify problems with work planning, procedures, output and behavior and their implications<br>SB2. prioritize and plan for problem solving<br>SB3. communicate problems appropriately to others<br>SB4. identify sources of information and support for problem solving<br>SB5. seek assistance and support from other sources to solve problems<br>SB6. identify effective resolution techniques<br>SB7. select and apply resolution techniques<br>SB8. seek evidence for problem resolution |
| | **Plan and Organize** |
| | The user/individual on the job needs to know and understand how to:<br>SB9. plan, prioritize and sequence work operations as per job requirements<br>SB10. organize and analyze information relevant to work<br>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time |

## CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines

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| | **Initiative and Enterprise** |
| | The user/individual on the job needs to know and understand how to:<br>SB12. undertake and express new ideas and initiatives to others<br>SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses<br>SB14. participate in improvement procedures including process, quality and internal/external customer/supplier relationships<br>SB15. one's competencies in new and different situations and contexts to achieve more |
| | **Self-Management** |
| | The user/individual on the job needs to know and understand how to:<br>SB16. exercise restraint while expressing dissent and during conflict situations<br>SB17. avoid and manage distractions to be disciplined at work<br>SB18. manage own time for achieving better results |
| | **Teamwork** |
| | The user/individual on the job needs to know and understand how to:<br>SB19. work in a team in order to achieve better results<br>SB20. identify and clarify work roles within a team<br>SB21. communicate and cooperate with others in the team for better results<br>SB22. seek assistance from fellow team members |

**CSC/ N 0401: Program Computer Numerically Controlled (CNC) machines**

## NOS Version Control

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| **NOS Code** | **CSC / N 0401** | | |
| **Credits(NSQF)** | **TBD** | **Version number** | **1.0** |
| **Industry** | **Capital Goods** | **Drafted on** | **10/04/14** |
| **Industry Sub-sector** | 1. Machine Tools<br>2. Dies, Moulds And Press Tools<br>3. Plastics Manufacturing Machinery<br>4. Textile Manufacturing Machinery<br>5. Process Plant Machinery<br>6. Electrical and Power Machinery<br>7. Light Engineering Goods | **Last reviewed on** | **18/03/15** |
| **Occupation** | **Design** | **Next review date** | **30/08/16** |

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

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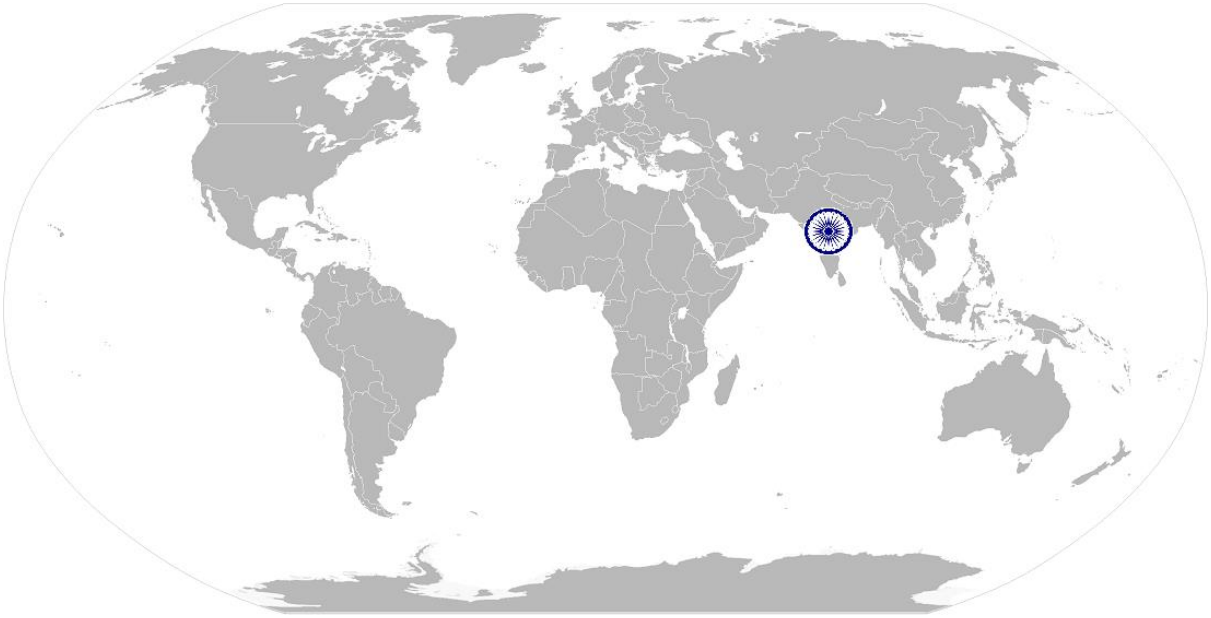
# National Occupational Standard



## 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

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| **Unit Code** | **CSC / N 1335** |
| **Unit Title (Task)** | **Use basic health and safety practices at the workplace** |
| **Description** | 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.<br><br>It includes understanding of risks and hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies, etc.<br><br>It covers knowledge of fire safety, common first aid applications, safe practices and emergency procedures. |
| **Scope** | This unit/task covers the following:<br><br>• Health and safety<br>• Fire safety<br>• Emergencies, rescue and first-aid procedures |

| **Performance Criteria(PC) w.r.t. the Scope** | |
|---|---|
| **Element** | **Performance Criteria** |
| **Health and safety** | The user/individual on the job should be able to:<br>PC1. use protective clothing/equipment for specific tasks and work conditions<br>**Protective clothing**: 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<br>**Equipment**: hand shields, machine guards, residual current devices, shields, dust sheets, respirator<br>PC2. state the name and location of people responsible for health and safety in the workplace<br>PC3. state the names and location of documents that refer to health and safety in the workplace<br>PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace<br>**Hazards**: 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.) |

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

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| | **Possible causes of risk and accident**: physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)<br>PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others<br>**Safe working practices**: 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.<br>PC6. state methods of accident prevention in the work environment of the job role<br>**Methods of accident prevention**: 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<br>PC7. state location of general health and safety equipment in the workplace<br>**General health and safety equipment**: fire extinguishers; first aid equipment; safety instruments and clothing; safety installations(eg fire exits, exhaust fans)<br>PC8. inspect for faults, set up and safely use steps and ladders in general use<br>**Ladder faults**: corrosion of metal components, deterioration, splits and cracks timber components, imbalance, loose rungs, missing/ unfixed nuts or bolts, etc.<br>**Ladders set up**: firm/level base, clip/lash down, leaning at the correct angle, etc.<br>PC9. work safely in and around trenches, elevated places and confined areas<br>PC10. lift heavy objects safely using correct procedures<br>PC11. apply good housekeeping practices at all times<br>**Good housekeeping practices**: clean/tidy work areas, removal/disposal of waste products, protect surfaces<br>PC12. identify common hazard signs displayed in various areas<br>**Various areas**: on chemical containers; equipment; packages; inside buildings; in open areas and public spaces, etc.<br>PC13. retrieve and/or point out documents that refer to health and safety in the workplace |

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

| | |
|---|---|
| | **Documents**: fire notices, accident reports, safety instructions for equipment and procedures, company notices and documents, legal documents (eg government notices) |
| **Fire safety** | The user/individual on the job should be able to:<br>PC14. use the various appropriate fire extinguishers on different types of fires correctly<br>**Types of fires**: 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)<br>PC15. demonstrate rescue techniques applied during fire hazard<br>PC16. demonstrate good housekeeping in order to prevent fire hazards<br>PC17. demonstrate the correct use of a fire extinguisher |
| **Emergencies, rescue and first-aid procedures** | The user/individual on the job should be able to:<br>PC18. demonstrate how to free a person from electrocution<br>PC19. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.<br>PC20. demonstrate basic techniques of bandaging<br>PC21. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments<br>PC22. perform and organize loss minimization or rescue activity during an accident in real or simulated environments<br>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<br>PC24. demonstrate the artificial respiration and the CPR Process<br>PC25. participate in emergency procedures<br>**Emergency procedures**: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work<br>PC26. complete a written accident/incident report or dictate a report to another person, and send report to person responsible<br>**Incident Report includes details of**: 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<br>PC27. demonstrate correct method to move injured people and others during an emergency |
| **Knowledge and Understanding (K)** | |

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

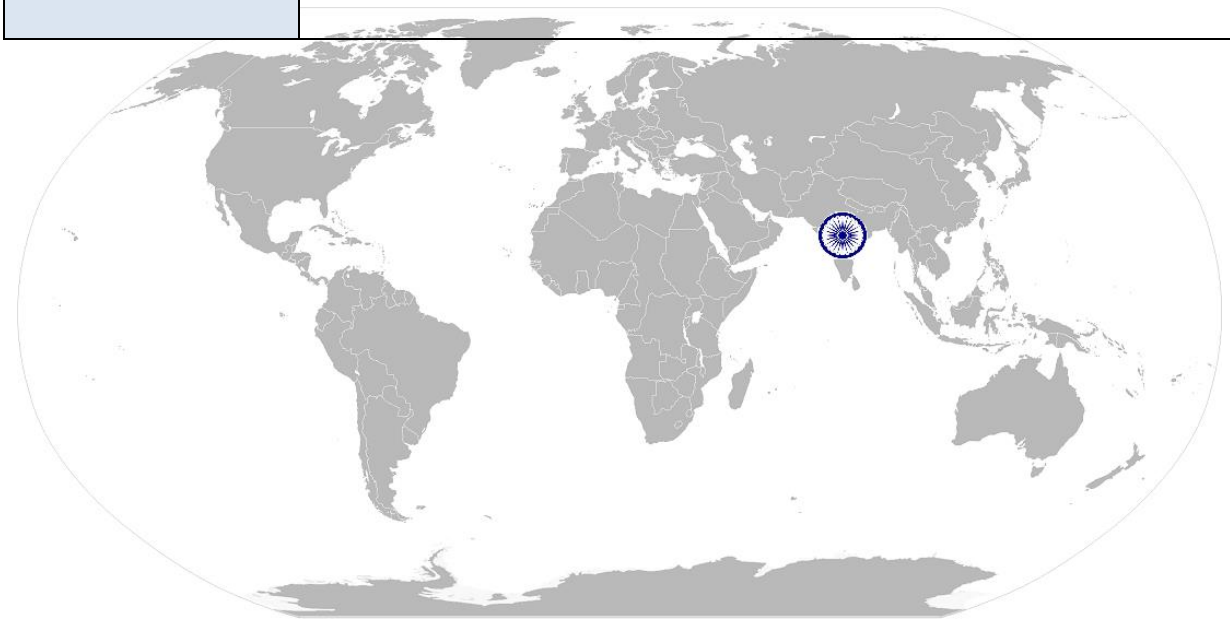
| | |
|---|---|
| **A. Organizational Context** (Knowledge of the company / organization and its processes) | The user/individual on the job needs to know and understand:<br>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.<br>KA2. names and location of documents that refer to health and safety in the workplace. |
| **B. Technical Knowledge** | The user/individual on the job needs to know and understand:<br>KB1. meaning of "hazards" and "risks"<br>KB2. health and safety hazards commonly present in the work environment and related precautions<br>KB3. possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible<br>KB4. possible causes of risk and accident<br>**Possible causes of risk and accident**: physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)<br>KB5. methods of accident prevention<br>**Methods of accident prevention**: 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<br>KB6. safe working practices when working with tools and machines<br>KB7. safe working practices while working at various hazardous sites<br>KB8. where to find all the general health and safety equipment in the workplace<br>KB9. various dangers associated with the use of electrical equipment<br>KB10. preventative and remedial actions to be taken in the case of exposure to toxic materials<br>**Exposure:** ingested, contact with skin, inhaled<br>**Preventative action**: ventilation, masks, protective clothing/ equipment);<br>**Remedial action:** immediate first aid, report to supervisor<br>**Toxic materials:** solvents, flux, lead<br>KB11. importance of using protective clothing/equipment while working<br>KB12. precautionary activities to prevent the fire accident<br>KB13. various causes of fire<br>**Causes of fires**: heating of metal; spontaneous ignition; sparking; electrical heating; loose fires (smoking, welding, etc.); chemical fires; etc.<br>KB14. techniques of using the different fire extinguishers<br>KB15. different methods of extinguishing fire<br>KB16. different materials used for extinguishing fire<br>**Materials**: sand, water, foam, CO2, dry powder<br>KB17. rescue techniques applied during a fire hazard<br>KB18. various types of safety signs and what they mean |

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

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

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

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

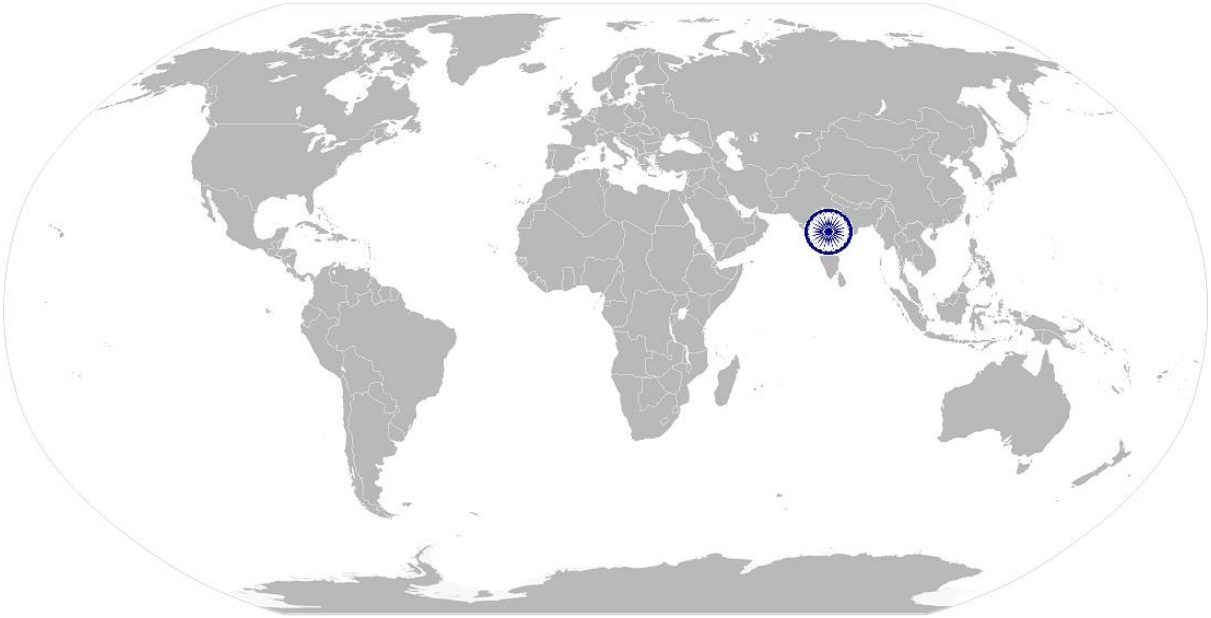


**CSC/ N 1335: Use basic health and safety practices at the workplace**

## NOS Version Control

| NOS Code | CSC / N 1335 | | |
|---|---|---|---|
| Credits (NSQF) | TBD | Version number | 1.0 |
| Industry | Capital Goods | Drafted on | 10/04/14 |
| Industry Sub-sector | 1. Machine Tools<br>2. Dies, Moulds And Press Tools<br>3. Plastics Manufacturing Machinery<br>4. Textile Manufacturing Machinery<br>5. Process Plant Machinery<br>6. Electrical and Power Generation Machinery<br>7. Light Engineering Goods | Last reviewed on | 18/03/15 |
| Occupation | Design | Next review date | 30/08/16 |

# National Occupational Standard



## Overview

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

National Occupational Standard

## CSC/ N 1336: Work effectively with others

| | |
|---|---|
| **Unit Code** | **CSC / N 1336** |
| **Unit Title (Task)** | **Work effectively with others** |
| **Description** | 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.<br><br>These cover areas such as communication etiquette, discipline, listening, handling conflict and grievances. |
| **Scope** | This unit/task covers the following:<br><br>• Working with others |

**Performance Criteria (PC) w.r.t. the Scope**

| Element | Performance Criteria |
|---|---|
| **Working with others** | The user/individual on the job should be able to:<br>PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required<br>PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt<br>PC3. give information to others clearly, at a pace and in a manner that helps them to understand<br>PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible<br>PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks<br>PC6. display appropriate communication etiquette while working<br>**Communication etiquette:** do not use abusive language; use appropriate titles and terms of respect; do not eat or chew while talking (vice versa)etc.<br>PC7. display active listening skills while interacting with others at work<br>PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism<br>PC9. demonstrate responsible and disciplined behaviors at the workplace<br>**Disciplined behaviors:** e.g. punctuality; completing tasks as per given time and standards; not gossiping and idling time; eliminating waste, honesty, etc.<br>PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict |

**Knowledge and Understanding (K)**

| | |
|---|---|
| **A. Organizational Context** (Knowledge of the company / organization and its processes) | The user/individual on the job needs to know and understand:<br>KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions<br>KA2. reporting structure, inter-dependent functions, lines and procedures in the work area<br>KA3. relevant people and their responsibilities within the work area<br>KA4. escalation matrix and procedures for reporting work and employment related issues |

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

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

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

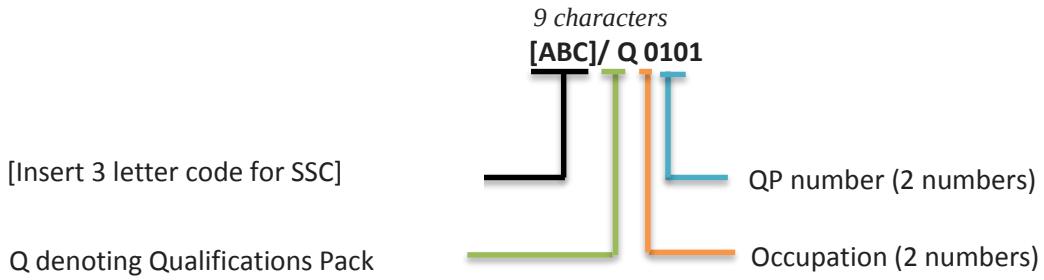
## NOS Version Control

| | | | |
|---|---|---|---|
| **NOS Code** | **CSC / N 1336** | | |
| **Credits(NSQF)** | **TBD** | **Version number** | **1.0** |
| **Industry** | **Capital Goods** | **Drafted on** | **10/04/14** |
| **Industry Sub-sector** | 1. Machine Tools<br>2. Dies, Moulds And Press Tools<br>3. Plastics Manufacturing Machinery<br>4. Textile Manufacturing Machinery<br>5. Process Plant Machinery<br>6. Electrical and Power Machinery<br>7. Light Engineering Goods | **Last reviewed on** | **18/03/15** |
| **Occupation** | **Design** | **Next review date** | **30/08/16** |

# Annexure

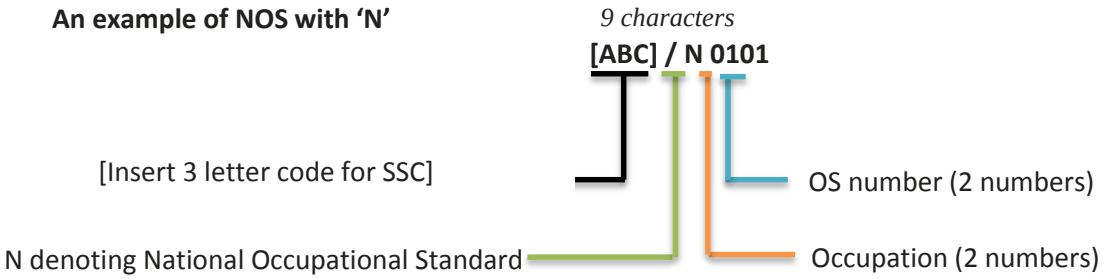
## Nomenclature for QP and NOS

### 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 |
| **Plastic 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 **Q**P or **N**OS | N |
| **Next two numbers** | Occupation code | 01 |
| **Next two numbers** | OS number | 01 |

**CRITERIA FOR ASSESSMENT OF TRAINEES**

**Job Role : CNC Programmer**

**Qualification Pack : CSC/ Q 0401**

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

**Guidelines for Assessment:**

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 part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack , every trainee should score a minimum of 70% in every NOS
6. 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.

| Assessable Outcomes | Assessment Criteria | Total Marks (300) | Out of | Theory | Skills Practical |
|---|---|---|---|---|---|
| **CSC/ N 0401 : Program computer numerically controlled(CNC) machines** | PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work | **100** | 3 | 1 | 2 |
| | PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while programming CNC machines | | 3 | 1 | 2 |
| | PC3. work following laid down procedures and instructions | | 1 | 0 | 1 |
| | PC4. ensure that machine guards are in place and are correctly adjusted | | 1 | 0 | 1 |
| | PC5. read and understand safety instructions, warning signs on the machine | | 1 | 0 | 1 |
| | PC6. ensure work area is clean and safe from hazards | | 1 | 0 | 1 |
| | PC7. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition | | 1 | 0 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| | PC8. obtain job specification from a valid and approved source | | 1 | 0 | 1 |
| | PC9. read and establish job requirements from the job specification document accurately | | 2 | 1 | 1 |
| | PC10.follow job instructions, assembly drawings and laid down procedures at all times | | 2 | 1 | 1 |
| | PC11.report and rectify incorrect and inconsistent information in job specification documents as per organization procedures | | 2 | 1 | 1 |
| | PC12.use and extract information from reference charts, tables, graphs and standards | | 1 | 0 | 1 |
| | PC13.prepare the work area as per procedure or operational specification | | 2 | 1 | 1 |
| | PC14.conduct a preliminary check of the readiness of the program so that the CNC machine operates correctly | | 2 | 0 | 2 |
| | PC15.determine what operational objectives and targets need to be achieved and how best the machine needs to be programmed to achieve this | | 2 | 1 | 1 |
| | PC16.extract and use information from engineering drawings and related specifications in relation to work undertaken | | 3 | 1 | 2 |
| | PC17. identify tool requirements from tooling layout and assess their suitability | | 3 | 1 | 2 |
| | PC18. identify suitable work holding or fixturing device as per the job requirement | | 2 | 0 | 2 |
| | PC19. ensure the correct and latest part-program is uploaded onto the CNC system | | 2 | 0 | 2 |
| | PC20. make the CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, in syntax corresponding to the machine and control system on which the component will be machined. | | 3 | 1 | 2 |
| | PC21. various ways to make CNC program are by writing it on paper or in a computer's text editor, or using CAM software or controllers on machine | | 3 | 1 | 2 |
| | P22. ensure that the part program is efficient and results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions | | 2 | 0 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | PC23. use subprograms and canned cycles, to reduce program size and input time and avoid memory overflow on the machine | | 2 | 0 | 2 |
| | PC24.transfer the program to the machine by entering it at the console or transmitting it through a wired link or through a data transfer device | | 2 | 0 | 2 |
| | PC25.follow the correct procedures for calling up the program and dealing with any error messages or faults | | 1 | 0 | 1 |
| | PC26.handle the typical problems that can occur with the programming, loading and editing activities effectively using approved procedures | | 1 | 0 | 1 |
| | PC27.save the proven program in the appropriate storage medium – paper, computer hard disk, etc. - and location | | 1 | 0 | 1 |
| | PC28.complete relevant documentation as per organizational procedure | | 1 | 0 | 1 |
| | PC29. leave the work area in a safe and tidy condition on completion of the activities | | 1 | 0 | 1 |
| | PC30. obtain appropriate equipment or tools needed as per job requirements | | 3 | 1 | 2 |
| | PC31. ensure that all measuring equipment is calibrated and approved for usage | | 1 | 0 | 1 |
| | PC32. ensure that the tools and fixtures are in usable condition(eg. free from breakage, damage, calibration, etc.) | | 1 | 0 | 1 |
| | PC33. pre-set the tooling appropriately using setting jigs/fixtures | | 3 | 1 | 2 |
| | PC34. seek any necessary instruction/training on the operation of the machine where required | | 1 | 0 | 1 |
| | PC35. mount tools in the correct positions in the tool turret or magazine | | 3 | 1 | 2 |
| | PC36. check that the tools have been mounted in positions corresponding to tool numbers in the part program | | 2 | 1 | 1 |
| | PC37. measure tool and work offset data - X and Z offsets for lathes; work offsets, length offsets and tool radius for machining centers. | | 3 | 1 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | PC38. ensure that the component is free of burrs, chips or other material adhering to its butting surfaces | | 1 | 0 | 1 |
| | PC39. mount the part on machine firmly in the specified work holding devices, with the appropriate clamping forces. | | 2 | 0 | 2 |
| | PC40. enter work offset and tool data on the machine – X and Z offsets, tool orientation and nose radius for lathes; length offsets and tool radius for machining centers. | | 3 | 1 | 2 |
| | PC41. ensure that tool data has been entered in offset number corresponding to the tool offset numbers in the part program | | 2 | 1 | 1 |
| | PC42. deal with error messages and faults on the program or equipment | | 2 | 1 | 1 |
| | PC43. cut a trial part using single block run, dry run and feed and speed override controls | | 2 | 1 | 1 |
| | PC44. edit the program and adjust tool and wear offsets to correct any dimensional errors on the part | | 2 | 1 | 1 |
| | PC45. ensure that the trial part conforms to drawing specifications in terms of dimensions, surface finishes and geometrical parameters like concentricity, parallelism, runout, etc. | | 2 | 1 | 1 |
| | PC46. hand-over the machine to the machine operator for machining the batch of parts, along with relevant instructions and documentation on periodic inspection of components, change of worn out tools | | 2 | 1 | 1 |
| | PC47. correct the tool wear offsets whenever required, based on the results of the period inspection | | 2 | 1 | 1 |
| | PC48. change worn out tools and indexable inserts whenever required | | 2 | 1 | 1 |
| | PC49. after every change of a worn out tool or insert, cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets | | 1 | 0 | 1 |
| | PC50. return worn out cutting tools, workholding device / fixtures / instruments / drawings to store | | 2 | 0 | 2 |
| | PC51. ensure that there is no damage to the tool/fixture while doing the prove-out | | 2 | 0 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | PC52. shut down the equipment to a safe condition on conclusion of the activities | | 2 | 0 | 2 |
| | PC53. deal promptly and effectively with problems within span of responsibility and control and report those that cannot be solved | | 2 | 0 | 2 |
| | | **Total** | **100** | **25** | **75** |
| **CSC/ N 1335: Use basic health and safety practices at the workplace** | PC1. use protective clothing/equipment for specific tasks and work conditions | **100** | 5 | 2 | 3 |
| | PC2. state the name and location of people responsible for health and safety in the workplace | | 3 | 1 | 2 |
| | PC3. state the names and location of documents that refer to health and safety in the workplace | | 3 | 1 | 2 |
| | PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace | | 5 | 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 | | 4 | 2 | 2 |
| | PC6. state location of general health and safety equipment in the workplace | | 3 | 2 | 1 |
| | PC7. inspect for faults, set up and safely use steps and ladders in general use | | 5 | 2 | 3 |
| | PC8. work safely in and around trenches, elevated places and confined areas | | 5 | 2 | 3 |
| | PC9. lift heavy objects safely using correct procedures | | 5 | 2 | 3 |
| | PC10. apply good housekeeping practices at all times | | 4 | 2 | 2 |
| | PC11. identify common hazard signs displayed in various areas | | 5 | 2 | 3 |
| | PC12. retrieve and/or point out documents that refer to health and safety in the workplace | | 3 | 1 | 2 |
| | PC13. use the various appropriate fire extinguishers on different types of fires correctly | | 4 | 1 | 3 |
| | PC14. demonstrate rescue techniques applied during fire hazard | | 4 | 1 | 3 |
| | PC15. demonstrate good housekeeping in order to prevent fire hazards | | 3 | 1 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | PC16. demonstrate the correct use of a fire extinguisher | | 4 | 1 | 3 |
| | PC17. demonstrate how to free a person from electrocution | | 4 | 1 | 3 |
| | PC18. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc. | | 4 | 1 | 3 |
| | PC19. demonstrate basic techniques of bandaging | | 3 | 1 | 2 |
| | PC20. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments | | 4 | 1 | 3 |
| | PC21. perform and organize loss minimization or rescue activity during an accident in real or simulated environments | | 3 | 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 | | 3 | 1 | 2 |
| | PC23. demonstrate the artificial respiration and the CPR Process | | 3 | 1 | 2 |
| | PC24. participate in emergency procedures | | 3 | 2 | 1 |
| | PC25. complete a written accident/incident report or dictate a report to another person, and send report to person responsible | | 4 | 1 | 3 |
| | PC26. demonstrate correct method to move injured people and others during an emergency | | 4 | 1 | 3 |
| | | **Total** | **100** | **36** | **64** |
| **CSC/ N 1336: Work effectively with others** | PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required | **100** | 10 | 3 | 7 |
| | PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt | | 10 | 3 | 7 |
| | PC3. give information to others clearly, at a pace and in a manner that helps them to understand | | 10 | 3 | 7 |
| | PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible | | 10 | 3 | 7 |

| | | | | | |
|---|---|---|---|---|---|
| | PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks | | 10 | 3 | 7 |
| | PC6. display appropriate communication etiquette while working | | 10 | 3 | 7 |
| | PC7. display active listening skills while interacting with others at work | | 10 | 3 | 7 |
| | PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism | | 10 | 3 | 7 |
| | PC9. demonstrate responsible and disciplined behaviors at the workplace | | 10 | 3 | 7 |
| | PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict | | 10 | 3 | 7 |
| | | **Total** | **100** | **30** | **70** |