

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR CAPITAL GOODS INDUSTRY

What are Occupational Standards(OS)?

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



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Introduction

Qualifications Pack: Assistant Manual Metal Arc Welding/ Shielded Metal Arc Welding Welder

SECTOR: CAPITAL GOODS

SUB-SECTOR: Machine Tools, Dies, Moulds and Press Tools,
Plastics Manufacturing Machinery, Process Plant Machinery,
Textile Manufacturing Machinery, Electrical and Power Machinery,
Light Engineering Goods

OCCUPATION: Welding and Cutting

REFERENCE ID: CSC/ Q 0202

ALIGNED TO: NCO-2004/NIL

MMAW/SMAW Welder: Perform manual metal arc welding (MMAW) welding also known as Shielded Metal Arc Welding (SMAW) for producing fillet and groove welds on carbon and low alloy steels in 1G/1F and 2G/2F welding positions as per specific instructions given.

Brief Job Description: Perform these above mentioned operations as per instructions given. The correct equipment, raw materials and consumables will be provided and the candidate must know how to use the same in a safe manner following practices that ensure safety for self, others and the work environment and assess weld quality through visual inspection.

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, manage self and work to improve efficiency and effectiveness.

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Job Details	Qualifications Pack Code	CSC/ Q 0202		
	Job Role	Assistant Manual Metal Arc Welding/Shielded Metal Arc Welder		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	CAPITAL GOODS	Drafted on	10/04/14
	Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods 	Last reviewed on	18/03/15
	Occupation	WELDING AND CUTTING	Next review date	30/08/16
	NSQC Clearance on	22/04/2015		

Job Role	Assistant MMAW/SMAW Welder
Role Description	Perform manual metal arc welding (MMAW) also known as shielded metal arc welding (SMAW) for producing groove/ fillet joints on carbon and low alloy steels in simple welding positions as per detailed instructions received.
NSQF level	2
Minimum Educational Qualifications	5 th standard
Maximum Educational Qualifications	N.A.
Training (Suggested but not mandatory)	No Previous Training Required
Minimum Job Entry Age	18 Years Old
Experience	No Previous Experience Required
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> CSC/ N 0202 (Manually weld carbon and low alloy steels in simple welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding) CSC/ N 0201 (Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas) CSC/ N 1335 (Use basic health and safety practices at the workplace) CSC/ N 1336 (Work effectively with others) <p>Optional: 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
MMAW	Manual Metal Arc Welding
SMAW	Shielded Metal Arc Welding
WPS	Welding Procedure Speciation
IS	Indian Standards
EN	European Standards
ASME	American Society of Mechanical Engineers
AC / DC	Alternating Current / Direct Current
VT	Visual Testing
NDT	Non-Destructive Testing
DT	Destructive Testing
RT	Radiographic Testing
UT	Ultrasonic Testing
DPT	Dye Penetrant Testing
MPT	Magnetic Particle Testing
FPT	Fluorescent Penetrant Testing
DP	Dye Penetration Test
CO2	Carbon dioxide
CPR	Cardiac Pulmonary Resuscitation
IS	Indian Standards
EN	European Standards
ASME	American Society of Mechanical Engineers
ISO	International Organization for Standardization
PQR	Process Qualification Record

CSC/ N 0202: Manually weld carbon and low alloy steels in simple welding positions using Manual Metal Arc Welding /Shielded Metal Arc Welding

National Occupational Standard	Unit Code	CSC / N 0202
	Unit Title (Task)	Manually weld carbon and low alloy steels in simple welding positions using Manual Metal Arc Welding /Shielded Metal Arc Welding
	Description	This OS unit is about performing manual metal arc welding (MMAW) welding also known as Shielded Metal Arc Welding (SMAW) for producing various types of joints on carbon and low alloy steels in 1G/1F and 2G/2F welding positions as per specific instructions given and under close supervision. The correct equipment, raw materials and consumables will be provided and the candidate must know how to use the same in a safe manner and also assess weld quality through visual inspection.
	Scope	This unit/task covers the following: <ul style="list-style-type: none"> Working Safely Preparing for welding operations Carrying out welding operations Testing for quality
Performance Criteria(PC) w.r.t. the Scope		
Element	Performance Criteria	
Working Safely	<p>The user/individual on the job should be able to:</p> <p>PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines</p> <p>PC2. adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations</p> <p>Safety precautions: general workshop safety; fire prevention; general hazards; manual lifting; overhead lifting; shopfloor housekeeping including surface conditions; waste disposal; stability of surrounding structures, furniture, etc.</p> <p>PC3. check the condition of, welding leads, earthing arrangements and electrode holder</p> <p>PC4. report any faults or potential hazards to appropriate authority</p> <p>PC5. follow fume extraction safety procedures</p>	
Preparing for welding operations	<p>The user/individual on the job should be able to:</p> <p>PC6. read and interpret routine information on written job instructions and drawings</p> <p>PC7. identify welding machines eg. transformers, rectifiers, inverters and generators, according to the task</p> <p>PC8. prepare the work area for the welding activities</p> <p>PC9. perform measurements for joint preparation and routine MMAW</p> <p>Raw materials: carbon steels, low alloy steels</p> <p>PC10. prepare the raw materials joint in readiness for welding</p> <p>Form: plate(>1.5 mm, <24 mm), sheet (1.5mm)</p> <p>Preparation: made rust free; cleaned – free from scaling, paint, oil/grease; made dry and free from moisture; edges to be welded prepared as per job</p>	

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	<p>requirement - such as flat, square or bevelled; use various machines and techniques for the above (eg. chamfering machine, grinding and stripping, gas or plasma cutting, etc.); correctly positioned; positioning: devices and techniques; jigs and fixtures; setting up the joint in the correct position and alignment</p> <p>PC11. verify set up by running test weld specimen (scrap plate)</p> <p>PC12. tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding</p> <p>PC13. use manual metal-arc welding and related equipment to include a. alternating current (AC) equipment b. direct current (DC) equipment MMAW equipment: transformers; rectifiers; generators; invertors; consumables – electrodes, dyes; welding accessories - holders, cables and accessories; ancillary equipment - (power saw, angle, pedestal and straight grinders, tong tester, etc.)</p> <p>PC14. receive the set up equipment and connect to power source</p> <p>PC15. report any faults or problem to appropriate authority</p>
<p>Carrying out welding operations</p>	<p>The user/individual on the job should be able to:</p> <p>PC16. strike and maintain a stable arc</p> <p>PC17. stop and properly re-start arc to avoid welding defects (scratch start, tapping techniques)</p> <p>PC18. maintain constant puddle by using appropriate travel speed</p> <p>PC19. maintain proper bead sequence with respect to groove/fillet configurations and positions</p> <p>PC20. remove slag in an appropriate manner (eg. wire brush, hammer, etc.)</p> <p>PC21. produce fillet and groove joints in simple welding positions as per specific instructions given using single or multi-run welds(as instructed) Positions: flat (PA) IG/1F, horizontal vertical (PB) 2F, horizontal (PC) 2G</p> <p>PC22. produce joints on carbon and low alloy steel materials using various methods Methods: drag, weave, whip</p> <p>PC23. weld the joint to the specified quality standards, dimensions and profile for sheets and plates from 1.5 mm – 24 mm Standards: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joints at stop/start positions merge smoothly; weld surface is: free from cracks; substantially free from porosity; free from any pronounced hump or crater; substantially free from shrinkage cavities; substantially free from trapped slag; substantially free from arcing or chipping marks; fillet welds are: equal in leg length, slightly convex in profile (where applicable, size of the fillet equivalent to the thickness of the material welded: weld contour is: of linear and of uniform profile; smooth and free from excessive undulations; regular and has an even ripple formation; welds are adequately fused, and there is minimal undercut, overlap and surface inclusions; tack welds are blended in to form part of the finished weld,</p>

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	<p>without excessive hump; corner joints have minimal burn through to the underside of the joint or, where appropriate</p> <p>PC24. ensure full penetration groove welds are back clipped prior to back welding</p> <p>PC25. 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>PC26. ensure welding is done according to welding parameter specified in WPS</p> <p>PC27. shut down and make safe the welding equipment on completion of the welding activities</p>
<p>Testing for quality</p>	<p>The user/individual on the job should be able to:</p> <p>PC28. measure and check that all dimensional and geometrical aspects of the weld are as per instructions</p> <p>PC29. identify various weld defects using visual inspection Weld defects: lack of continuity of the weld ; uneven and irregular ripple formation; excessive spatter; incorrect weld size or profile; burn through; undercutting; overlap; inclusions; distortion; porosity; internal cracks; surface cracks; lack of fusion or incomplete fusion; lack of penetration; excessive penetration; gouges; stray arc strikes; sharp edges; excessive convexity Visual inspections: e.g. use of visual techniques, distance from workpiece, angle of observation, adequate lighting, low powered magnification, fillet weld gauges, etc.</p> <p>PC30. detect and report surface imperfections to appropriate authority</p> <p>PC31. deal with defects in welding as per instructions given</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. relevant legislation, standards, policies, and procedures followed in the company</p> <p>KA2. department structure and hierarchy protocols</p> <p>KA3. work flow and own role in the workflow</p> <p>KA4. dependencies and interdependencies in the workflow</p> <p>KA5. support functions and types of support available for incumbents in this role</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. health and safety hazards associated with MMAW/SMAW welding Safety precautions: protection from live and other electrical components, including insulation, proper earthing, etc.; proper handling and placement of hot metal; taking account of spatter and related safe distance; adequate lighting; appropriate personal protective equipment (suitable aprons, welding gloves, respirators, safety boots, correctly fitting overalls, suitable eye shields/goggles, hard hat/helmet); protection of self and others from the effects of the welding arc; fume extraction/control measures; safety measures for elevated and trench workings (eg. harness, etc.)</p> <p>KB2. effects of exposure to the electric arc</p> <p>KB3. types of fire extinguishers and their suitable uses</p> <p>KB4. effects of exposure to welding fume</p>

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	<p>KB5. methods of managing welding fume hazards</p> <p>KB6. personal protective equipment (PPE) and clothing to be worn during MMAW/SMAW welding</p> <p>KB7. various welding methods and specific equipment requirements for MMAW/SMAW welding MMAW equipment: transformers; rectifiers; generators; invertors; consumables – electrodes, dyes; welding accessories - holders, cables and accessories; ancillary equipment - (power saw, angle, pedestal and straight grinders, tong tester, etc.) Methods: drag, weave, whip</p> <p>KB8. main components and controls of welding equipment</p> <p>KB9. type of current used and implication</p> <p>KB10. types of consumables used for MMAW/SMAW welding</p> <p>KB11. various defects associated with the MMAW/SMAW welding process Weld defects: lack of continuity of the weld ; uneven and irregular ripple formation; excessive spatter; incorrect weld size or profile; burn through; undercutting; overlap; inclusions; distortion; porosity; internal cracks; surface cracks; lack of fusion or incomplete fusion; lack of penetration; excessive penetration; gouges; stray arc strikes; sharp edges; excessive convexity</p> <p>KB12. magnetic arc blow or arc deflection, causes and methods to avoid or compensate</p> <p>KB13. types of joint configurations Joints: groove and fillet</p> <p>KB14. factors that determine weld bead shape Factors: electrode angles and welding technique (push, perpendicular, drag); arc length; thickness of base metal; travel speed (slow, normal, fast)</p> <p>KB15. types of beads, their characteristics and uses (stringer, weave, weave patterns) Bead characteristics: spatter deposits, roughness , evenness, fill, crater, overlap</p> <p>KB16. factors that affect weld quality</p> <p>KB17. weld positions such as flat, horizontal, vertical and overhead Positions: flat (PA) IG/1F, horizontal vertical (PB) 2F, horizontal (PC) 2G</p> <p>KB18. types of equipment components such as electrode holders, work leads cables and ground clamps</p> <p>KB20. welding process specification sheet, process qualification record (PQR) and related essential variables</p> <p>KB21. travel speed and heat inputs</p> <p>KB22. importance and implications of various diameters of electrodes</p> <p>KB23. purpose and importance of pre-heating requirements for base metals</p> <p>KB24. purpose and importance of post-heating in welding</p> <p>KB25. types of visual inspection indicators and methods Visual inspections: e.g. use of visual techniques, distance from workpiece, angle of observation, adequate lighting, low powered magnification, fillet weld gauges, etc.</p>
Skills (S) [Optional]	

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A. Core Skills/ Generic Skills	Communication
	The user/ individual on the job needs to know and understand how to: SA1. read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English or local language SA2. convey and share technical information clearly using appropriate language SA3. check and clarify task-related information SA4. liaise with appropriate authorities using correct protocol SA5. communicate with people in respectful form and manner in line with organizational protocol
	Numerical and computational skills
	The user/individual on the job needs to know and understand how to: SA6. undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) SA7. use appropriate measuring techniques SA8. apply appropriate degree of accuracy to express numbers Units and number systems representing degree of accuracy: decimals places, fractions as a decimal quantity 
	Learning
	The user/individual on the job needs to know and understand how to: SA9. participate in on-the-job and other learning, training and development interventions and assessments SA10. clarify task related information with appropriate personnel or technical adviser SA11. seek to improve and modify own work practices SA12. 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: SB1. identify problems with work planning, procedures, output and behavior and their implications SB2. prioritize and plan for problem solving SB3. communicate problems appropriately to others SB4. identify sources of information and support for problem solving SB5. seek assistance and support from other sources to solve problems SB6. identify effective resolution techniques SB7. select and apply resolution techniques SB8. seek evidence for problem resolution
	Plan and Organize

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

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NOS Version Control

NOS Code	CSC / N 0202		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods 	Last reviewed on	18/03/15
Occupation	Welding and Cutting	Next review date	30/08/16

CSC/ N 0201: Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas

National Occupational Standard	Unit Code	CSC / N 0201
	Unit Title (Task)	Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas
	Description	<p>This unit is about competencies required for simple manual cutting operations on carbon steels using oxy-fuel gas such as oxy-acetylene. The person would be able to carry out simple oxy-fuel cutting operations on carbon steels as per specific instructions given.</p> <p>The candidate will be expected to work under constant supervision, taking no responsibility.</p>
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Working safely • Preparing for cutting operations • Carrying out cutting operations • Testing for accuracy • Dealing with contingencies
Performance Criteria(PC) w.r.t. the Scope		
Element	Performance Criteria	
Working safely	<p>The user/individual on the job should be able to:</p> <p>PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines Safety precautions: general workshop safety, fire prevention, general hazards, manual lifting, overhead lifting, surface conditions, stability of surrounding structures, furniture, etc.</p> <p>PC2. take necessary safety precautions for gas cutting operations including equipment, processes and checks</p>	
Preparing for cutting operations	<p>The user/individual on the job should be able to:</p> <p>PC3. interpret cutting procedure data sheets specifications PC4. check regulators, hoses and check that valves are securely connected and free from leaks and damage PC5. check equipment is calibrated and approved for use PC6. check the correct size gas nozzle to the torch PC7. ensure preheat and oxygen holes on the tips are clean PC8. check that a flashback arrestor is fitted PC9. set appropriate gas pressures PC10. use the correct procedure for lighting, adjusting and extinguishing the flame Lighting and cutting procedures: lighting the cutting torch; adjusting gas controls to produce a neutral flame; methods of starting the cut and controlling the cutting speed; direction and angle of cut; procedure for extinguishing the flame</p> <p>PC11. adjust torch valve for type of flame such as neutral, carburizing and oxidizing PC12. follow sequence of operations such as pre-heating material and initiating cut</p>	

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	<p>PC13. check if the locations for cutting have been marked out by authorised persons</p> <p>PC14. use appropriate and safe procedures for handling and storing of gas cylinders</p> <p>PC15. prepare the work area for the cutting activities</p> <p>PC16. obtain the appropriate tools and equipment for the oxy-fuel gas cutting operations, and check that they are in a safe and usable condition</p> <p>Equipment: hand-held oxy-fuel gas cutting equipment, simple, portable, track-driven cutting equipment (electrical or mechanical), fixed bench gas cutting equipment</p> <p>PC17. check that the oxy-fuel gas cutting equipment is set up for the operations to be performed</p> <p>PC18. adjust cylinder valves and adjust regulator for operating pressure to achieve specifications for required operations</p> <p>PC19. seek clarification where marking out is not done or is not clear from authorised person</p> <p>PC20. perform trial cut to check for cut defects</p>
<p>Carrying out cutting operations</p>	<p>The user/individual on the job should be able to:</p> <p>PC21. operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles as per instructions given</p> <p>PC22. use various oxy-fuel gas lighting and cutting procedures</p> <p>PC23. perform various cutting operations correctly</p> <p>Cutting operations: down-hand straight cuts (freehand), making straight cuts (track guided), cutting regular shapes, making angled cuts, bevelled edge – weld preparations</p> <p>PC24. produce thermal cuts in carbon steel (1.5mm to 10mm thickness)</p> <p>PC25. produce cut profiles for various type of materials and forms</p> <p>Materials: carbon steels</p> <p>Forms: plate; sheet; pipe/tube; bars and rods</p> <p>PC26. produce thermally-cut components which meet specified quality criteria</p> <p>Quality criteria: dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 2mm; angled/radial cuts are within specification requirements; cuts are clean and smooth and free from flutes; no drags</p> <p>PC27. recognize and correct burnback and flashback</p> <p>PC28. detect and correct defects in cut</p> <p>PC29. ensure the work area is left in a safe and tidy condition on completion of the cutting activities</p>
<p>Testing for accuracy</p>	<p>The user/individual on the job should be able to:</p> <p>PC30. check that the finished components meet the standard required</p> <p>PC31. use appropriate methods and equipment to check the quality, and that all dimensional and geometrical aspects of the cut material are to the specification</p> <p>PC32. identify various cutting defects and follow organisation recommended procedures to address them</p> <p>Defects: distortion; grooved, fluted or ragged cuts; poor draglines; rounded</p>

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	edges; tightly adhering slag
Dealing with contingencies	<p>The user/individual on the job should be able to:</p> <p>PC33. report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions</p> <p>PC34. detect equipment malfunctions and deal with them appropriately</p> <p>PC35. 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>PC36. shut down and make safe the cutting equipment on completion of the cutting activities</p> <p>PC37. in case of emergencies follow standard emergency procedures</p> <p>Emergencies (safety procedures): sustained backfire in a blowpipe; close the oxygen valve of the blowpipe, followed by the fuel valve and then close both cylinder valves; investigate the cause and rectify the fault; re-light the blowpipe only after it is completely cooled down; flashback into the hose and equipment, or a hose fire or explosion, or a fire at the gas regulator connections; isolate the fuel gas and oxygen supplies by closing the cylinder valves only when this can be done safely; may attempt to control the fire by fire-fighting equipment only when there is no undue risk of personal injury; activate the fire alarm and call for the Fire Services Department as per organizational procedures; fires involving acetylene cylinders: always best dealt with by firemen from the Fire Services Department. However, the following initial response may be appropriate: cool the cylinder by spraying with water only if it is safe to do so; close the cylinder valve to control the fire only if it is safe to do so; evacuate the building by activating the fire alarm or by any other means; to avoid explosion never move an acetylene cylinder involved in a fire or which has been affected by heat from a nearby fire even if it seems cooled down.</p>
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. job relevant legislation, standards, policies, and procedures followed in the company</p> <p>KA2. key purpose of the organization</p> <p>KA3. department structure and hierarchy protocols</p> <p>KA4. work flow and own role in the workflow</p> <p>KA5. dependencies and interdependencies in the workflow</p> <p>KA6. support functions and types of support available for incumbents in this role</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. types of fire extinguishers and their suitable uses in case of gas cutting related fires</p> <p>KB2. specific safety precautions to be taken when working with oxy-fuel gas cutting equipment in a fabrication environment</p>

CSC/ N 0201: Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas

	<p>Safety precautions: safety from trailing hoses; safety from naked flames; appropriate fume and gases extraction/control measures; safety from explosive gas mixtures and oxygen enrichment; safety from spatter and hot metal (distance, PPE, proper handling and placement); protection from live and other electrical components, including insulation, proper earthing, proper loading, etc.; adequate lighting protection of self and others from the effects of the flame; safety measures for elevated and trench working; gas cylinder safety: right color coded; correctly labelled; no leakage; away from heat or ignition source; never use hose other than that designed for the specified gas; use ferrules or clamps designed for the hose (not ordinary wire or other substitute) to connect hoses to fittings; upright position (fuel gas); physical care to avoid damage and falls, throws and bumps; move on trolleys, cap closed and without regulators; valves closed on empty cylinders</p> <p>KB3. personal protective clothing and equipment (PPE) to be worn when working with gas cutting equipment</p> <p>Personal protective equipment: suitable aprons; gloves ; safety boots; correctly fitting overalls; suitable eye shields/goggles; respirators</p> <p>KB4. hazards associated with carrying out gas cutting activities and how they can be minimized</p> <p>KB5. safe working practices and procedures for using thermal equipment</p> <p>KB6. principles of oxy-fuel gas cutting</p> <p>KB7. procedure for obtaining job instructions and other related specifications</p> <p>KB8. various types of gas cutting equipment available</p> <p>Equipment: hand-held oxy-fuel gas cutting equipment, simple, portable, track-driven cutting equipment (electrical or mechanical), fixed bench gas cutting equipment</p> <p>KB9. various components of the gas cutting equipment</p> <p>Components: color coded cylinder oxygen, color coded cylinder acetylene, cylinder valve, flashback arrestor, set of nozzles, gas lighter nozzle, cutting tips, pressure regulator, pressure gauge, non-return valves, color coded flexible hose, trolleys, torches (rose-bud heating, cutting, others)</p> <p>KB10. construction of the heating and cutting torch</p> <p>KB11. types of oxy-fuel gases such as acetylene, natural gas and propane</p> <p>KB12. accessories that can be used with handheld gas cutting equipment to aid cutting operations (such as cutting guides, trammels, templates)</p> <p>Cutting operations: down-hand straight cuts (freehand), making straight cuts (track guided), cutting regular shapes, making angled cuts, beveled edge – weld preparations</p> <p>KB13. types of regulators such as low- and high-pressure, and single- and two-stage</p> <p>KB14. how to identify the gases used in the cutting process, and the color coding of gas cylinders</p> <p>KB15. type and thickness of base metals related to nozzle type</p> <p>KB16. preparations prior to cutting (including checking connections for leaks, setting gas pressures, setting up the material/workpiece, and checking the cleanliness of materials used)</p> <p>KB17. holding methods that are used to aid thermal cutting, and the equipment that can be used</p>
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CSC/ N 0201: Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas

	<p>KB18. correct procedure for lighting, cutting and extinguishing the flame</p> <p>KB19. types of flames and their implication for cutting</p> <p>KB20. importance of following the correct procedure for lighting, cutting and extinguishing a flame</p> <p>Lighting and cutting procedures: lighting the cutting torch; adjusting gas controls to produce a neutral flame; methods of starting the cut and controlling the cutting speed; direction and angle of cut; procedure for extinguishing the flame</p> <p>KB21. problems that can occur with thermal cutting, and how they can be avoided (including causes of distortion during thermal cutting and methods of controlling distortion)</p> <p>KB22. effects of oil, grease, scale or dirt on the cutting process</p> <p>KB23. gas mixture ratio required to get various flames</p> <p>KB24. quality parameters for gas cut materials</p> <p>Quality parameters: shape and length of the dragline, smoothness of the sides, sharpness of the top edges, amount of slag adhering to the metal</p> <p>KB25. causes of cutting defects, how to recognize them, and methods of correction and prevention</p> <p>KB26. importance of leaving the work area in a safe and clean condition on completion of activities</p> <p>KB27. correct handling and storage of gas cylinders</p> <p>KB28. emergency procedures for backfires, flashback and other fires</p> <p>Emergencies (safety procedures): sustained backfire in a blowpipe; close the oxygen valve of the blowpipe, followed by the fuel valve and then close both cylinder valves; investigate the cause and rectify the fault; re-light the blowpipe only after it is completely cooled down; flashback into the hose and equipment, or a hose fire or explosion, or a fire at the gas regulator connections; isolate the fuel gas and oxygen supplies by closing the cylinder valves only when this can be done safely; may attempt to control the fire by fire-fighting equipment only when there is no undue risk of personal injury; activate the fire alarm and call for the Fire Services Department as per organizational procedures; fires involving acetylene cylinders: always best dealt with by firemen from the Fire Services Department. However, the following initial response may be appropriate: cool the cylinder by spraying with water only if it is safe to do so; close the cylinder valve to control the fire only if it is safe to do so; evacuate the building by activating the fire alarm or by any other means; to avoid explosion never move an acetylene cylinder involved in a fire or which has been affected by heat from a nearby fire even if it seems cooled down.</p> <p>KB29. how to close down the cutting equipment safely and correctly</p> <p>KB30. purging tools and their function</p>
Skills (S) [Optional]	
A. Core Skills/	Communication

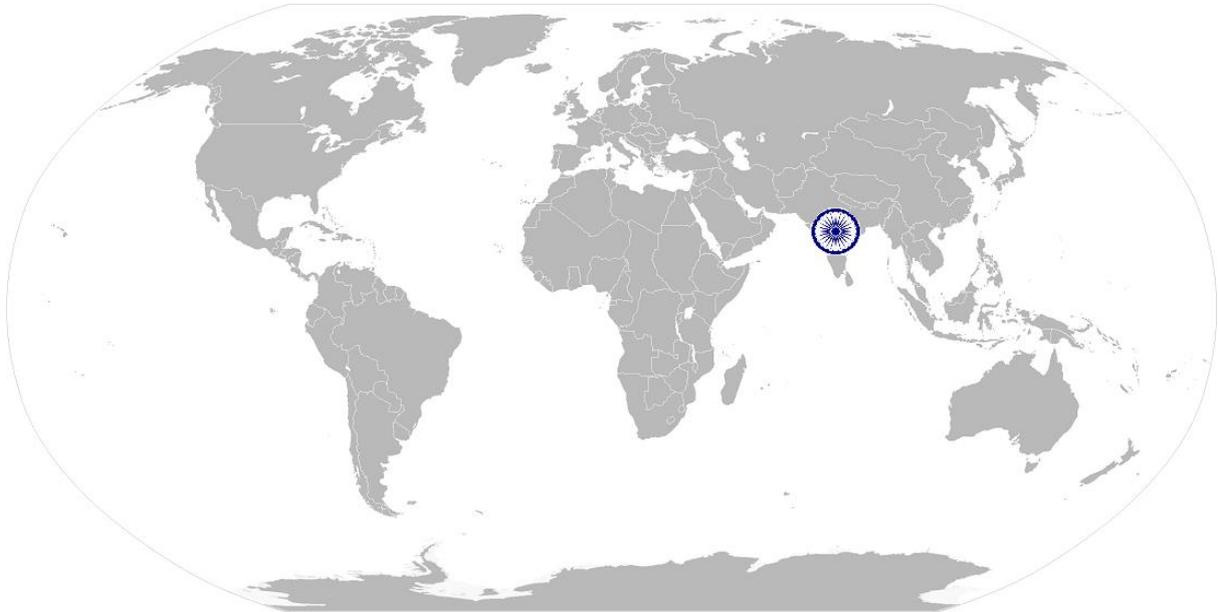
CSC/ N 0201: Perform simple manual cutting operations on low carbon and low alloy steels using oxy-fuel gas

NOS Version Control

NOS Code	CSC / N 0201		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods 	Last reviewed on	18/03/15
Occupation	Welding and Cutting	Next review date	30/08/16

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

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	Unit Code	CSC / N 1335
	Unit Title (Task)	Use basic health and safety practices at the workplace
	Description	<p>This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace. It covers responsibilities towards self, others, assets and the environment.</p> <p>It includes understanding of risks and hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies, etc.</p> <p>It covers knowledge of fire safety, common first aid applications, safe practices and emergency procedures.</p>
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Health and safety • Fire safety • Emergencies, rescue and first-aid procedures
Performance Criteria(PC) w.r.t. the Scope		
Element	Performance Criteria	
Health and safety	<p>The user/individual on the job should be able to:</p> <p>PC1. use protective clothing/equipment for specific tasks and work conditions</p> <p>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</p> <p>Equipment: 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>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.)</p>	

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

	<p>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)</p> <p>PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others</p> <p>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.</p> <p>PC6. state methods of accident prevention in the work environment of the job role</p> <p>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</p> <p>PC7. state location of general health and safety equipment in the workplace</p> <p>General health and safety equipment: 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>Ladder faults: corrosion of metal components, deterioration, splits and cracks timber components, imbalance, loose rungs, missing/unfixed nuts or bolts, etc.</p> <p>Ladders set up: 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>Good housekeeping practices: clean/tidy work areas, removal/disposal of waste products, protect surfaces</p> <p>PC12. identify common hazard signs displayed in various areas</p> <p>Various areas: 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>Documents: fire notices, accident reports, safety instructions for equipment and procedures, company notices and documents, legal documents (eg government notices)</p>
<p>Fire safety</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>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)</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>Emergencies, rescue and first-aid procedures</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>Emergency procedures: 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>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</p> <p>PC27. demonstrate correct method to move injured people and others during an emergency</p>
<p>Knowledge and Understanding (K)</p>	

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

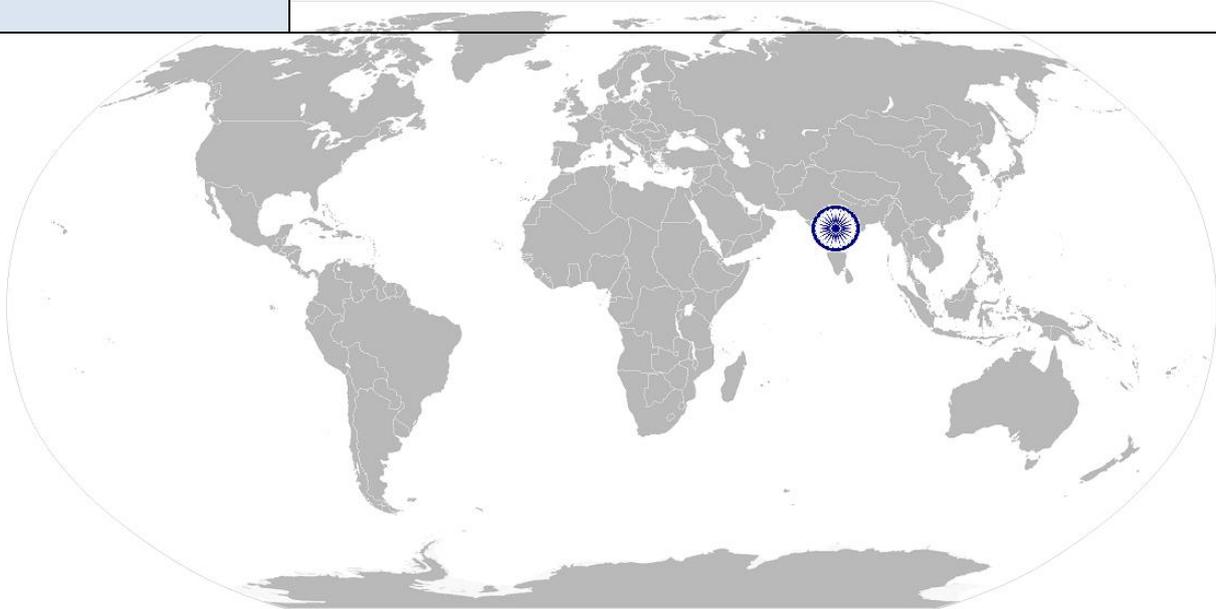
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.</p> <p>KA2. names and location of documents that refer to health and safety in the workplace.</p>
<p>B. Technical Knowledge</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 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)</p> <p>KB5. methods of accident prevention 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</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 Exposure: ingested, contact with skin, inhaled Preventative action: ventilation, masks, protective clothing/ equipment); Remedial action: immediate first aid, report to supervisor Toxic materials: 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 Causes of fires: 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 Materials: sand, water, foam, CO₂, 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>
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:
	SA1. read and comprehend basic content to read labels, charts, signages
	SA2. read and comprehend basic English to read manuals of operations
	SA3. read and write an accident/incident report in local language or English
	Oral Communication (Listening and Speaking skills)
The user/individual on the job needs to know and understand how to:	
SA4. question coworkers appropriately in order to clarify instructions and other issues	
SA5. give clear instructions to coworkers, subordinates others	
Decision Making	
The user/individual on the job needs to know and understand how to:	
SA6. make appropriate decisions pertaining to the concerned area of work with respect to intended work objective, span of authority, responsibility, laid down procedure and guidelines	
B. Professional Skills	Plan and Organize
	The user/individual on the job needs to know and understand how to:
	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:	
SB2. remain congenial while discussing and debating issues with co-workers	
SB3. follow appropriate protocols for communication based on situation, hierarchy, organizational culture and practice	
SB4. ask for, provide and receive required assistance where possible to ensure achievement of work related objectives	
SB5. thank coworkers for any assistance received	
SB6. offer appropriate respect based on mutuality and respect for fellow workmanship and authority	

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: 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
	Analytical Thinking
	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

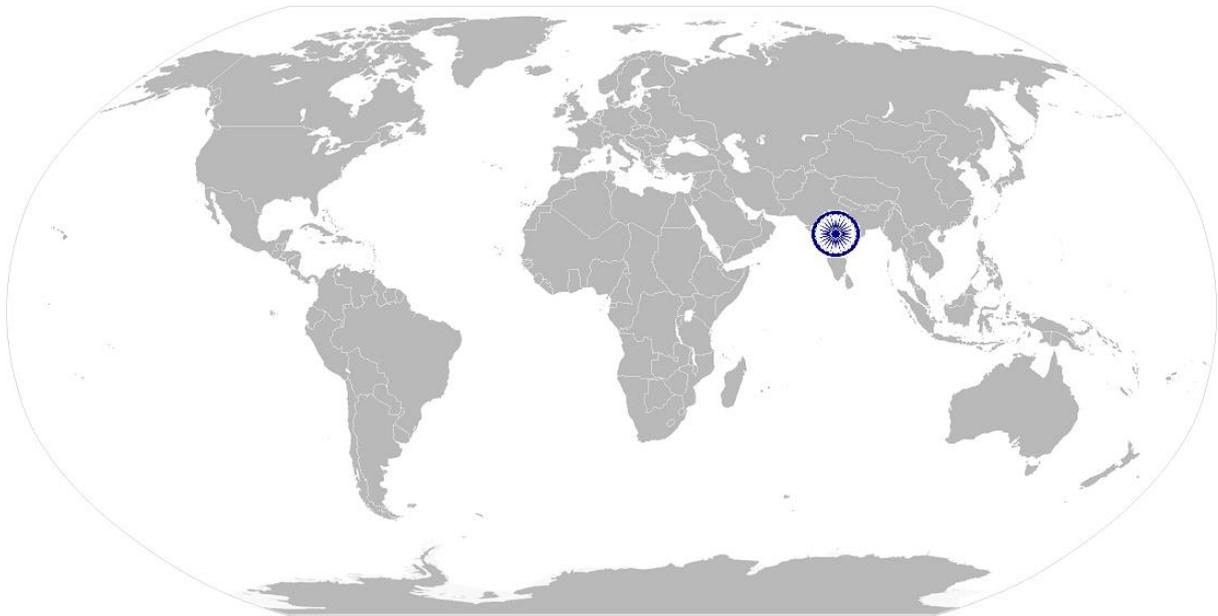
NOS Version Control

NOS Code	CSC / N 1335		
Credits (NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds And Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Generation Machinery 7. Light Engineering Goods 	Last reviewed on	18/03/15
Occupation	Welding and Cutting	Next review date	30/08/16

CSC/ N 1336:

Work effectively with others

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. 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

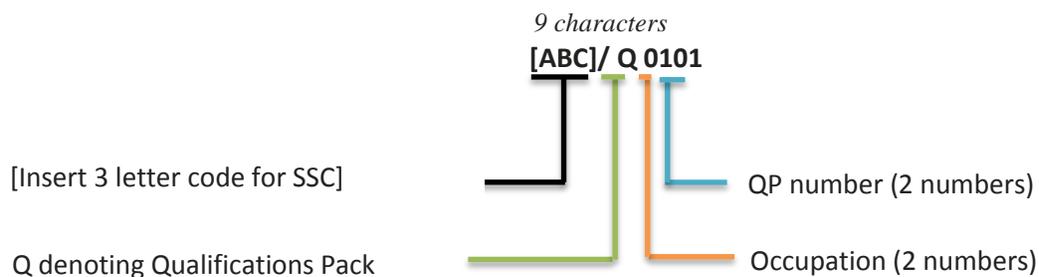
NOS Version Control

NOS Code	CSC / N 1336		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds And Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods 	Last reviewed on	18/03/15
Occupation	Welding and Cutting	Next review date	30/08/16

Annexure

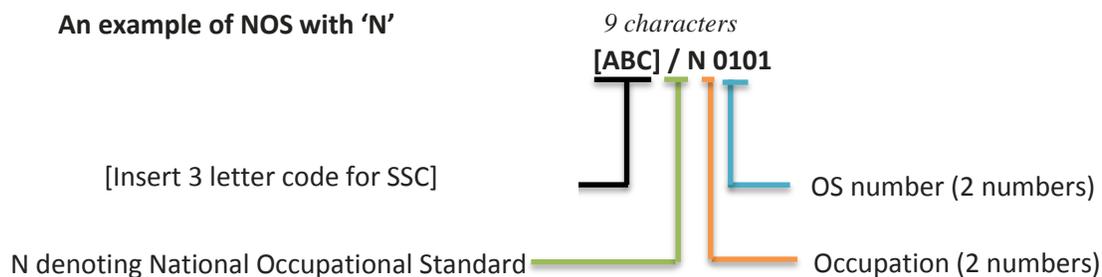
Nomenclature for QP and NOS

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 QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role MMAW/SMAW Welder Level 2
Qualification Pack CSC/ Q 0202
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 Mark	Out of	Theory	Practical Skill
CSC/ N 0202: Manually weld carbon and low alloy steels in simple welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
	PC2. adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations		4	1	3
	PC3. check the condition of, welding leads, earthing arrangements and electrode holder		2	0	2
	PC4. report any faults or potential hazards to appropriate authority		2	0	2
	PC5. follow fume extraction safety procedures		3	1	2
	PC6. read and interpret routine information on written job instructions and drawings		2	0	2
	PC7. identify welding machines eg. transformers, rectifiers, inverters and generators, according to the task		3	1	2
	PC8. prepare the work area for the welding activities		2	0	2
	PC9. perform measurements for joint preparation and routine MMAW		3	0	3

PC10. prepare the raw materials joint in readiness for welding	4	1	3
PC11. verify set up by running test weld specimen (scrap plate)	3	0	3
PC12. tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding	3	0	3
PC13. use manual metal-arc welding and related equipment to include a. alternating current (AC) equipment b. direct current (DC) equipment	2	0	2
PC14. receive the set up equipment and connect to power source	3	0	3
PC15. report any faults or problem to appropriate authority	3	0	3
PC16. strike and maintain a stable arc	3	0	3
PC17. stop and properly re-start arc to avoid welding defects (scratch start, tapping techniques)	2	0	2
PC18. maintain constant puddle by using appropriate travel speed	3	0	3
PC19. maintain proper bead sequence with respect to groove/fillet configurations and positions	3	0	3
PC20. remove slag in an appropriate manner (eg. wire brush, hammer, etc.)	4	0	4
PC21. produce fillet and groove joints in simple welding positions as per specific instructions given using single or multi-run welds(as instructed)	4	1	3
PC22. produce joints on carbon and low alloy steel materials using various methods	6	2	4
PC23. weld the joint to the specified quality standards, dimensions and profile for sheets and plates from 1.5 mm – 24 mm	4	0	4
PC24. ensure full penetration groove welds are back clipped prior to back welding	5	1	4
PC25. 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	2	0	2

	PC26. ensure welding is done according to welding parameter specified in WPS		4	1	3
	PC27. shut down and make safe the welding equipment on completion of the welding activities		3	1	2
	PC28. measure and check that all dimensional and geometrical aspects of the weld are as per instructions		4	1	3
	PC29. identify various weld defects using visual inspection		5	1	4
	PC30. detect and report surface imperfections to appropriate authority		3	0	3
	PC31. deal with defects in welding as per instructions given		3	1	2
			100	14	86
2. 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

3. 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	