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: Manual Metal Arc Welding/Shielded Metal Arc Welding

SECTOR: CAPITAL GOODS

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

OCCUPATION: Welding and Cutting

REFERENCE ID: CSC/ Q 0204

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 various types of joints on carbon steels and low alloy steels in a range of welding positions as per specific instructions given.

Brief Job Description: Perform these above mentioned operations as per WPS(Welding Procedure specification). and can set-up and prepare for operations interpreting the right information from the WPS, obtaining the right consumables and raw materials, etc. 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 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.

Job Details

Qualifications Pack Code	**CSC/ Q 0204**		
Job Role	**Manual Metal Arc Welding/Shielded Metal Arc Welding**		
Credits (NSQF)	**TBD**	**Version number**	**1.0**
Sector	**CAPITAL GOODS**	**Drafted on**	**10/04/14**
Sub-sector	1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastic 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	MMAW/SMAW Welder
Role Description	Perform manual metal arc welding (MMAW) also known as shielded metal arc welding (SMAW) for producing a fillet and groove joints on carbon and low alloy steels in a range of welding positions as per detailed instructions received.
NSQF level	3
Minimum Educational Qualifications	8th 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)	**Compulsory:** 1. CSC/ N 0204 (Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding) 2. CSC/ N 0201 (Perform Simple manual cutting operations on Carbon steels using oxy fuel gas) 3. CSC/ N 1335 (Use basic health and safety practices at the workplace) 4. CSC/ N 1336 (Work effectively with others) **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

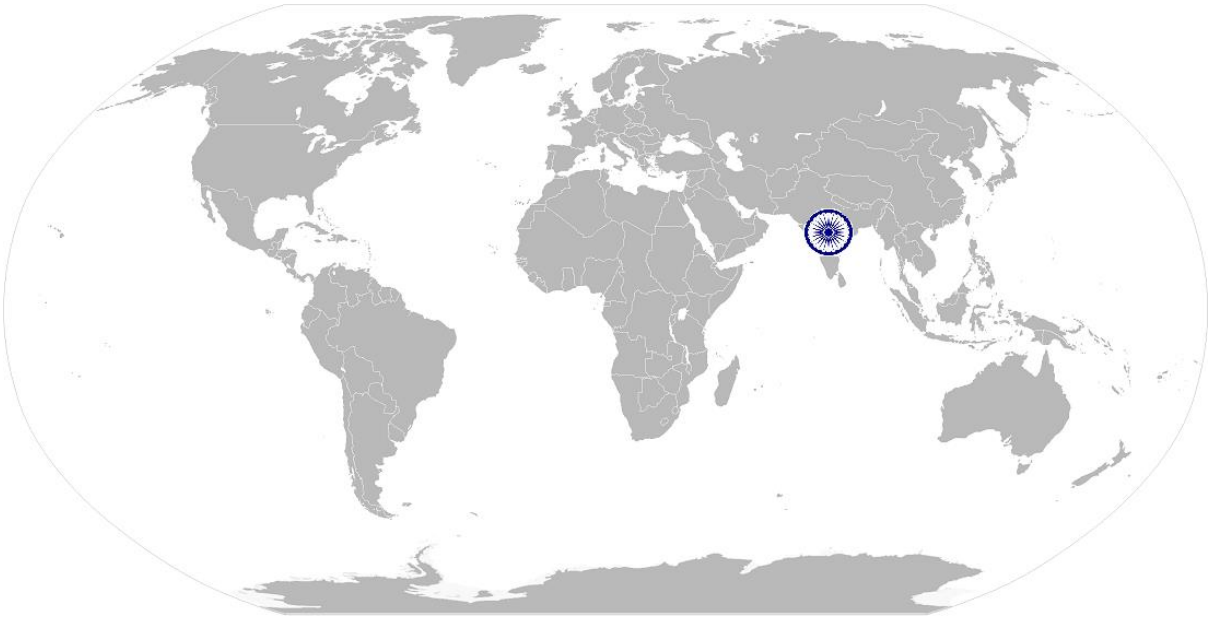
Definitions

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

National Occupational Standard



Overview

This unit covers the performing of manual metal arc welding (MMAW) also known as shielded metal arc welding (SMAW) for producing various types of joints on low carbon and low alloy steels in a range of welding positions as per specific instructions given.

CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding

National Occupational Standard

Unit Code	CSC/ N 0204
Unit Title (Task)	**Manually weld carbon and low alloy steels in 1G/1F, 2G/2F, 3G/3F welding positions using 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, 2G/2F and 3G/3F welding positions as per specific instructions given. The welder can perform these operations under supervision as per WPS and can set-up and prepare for operations interpreting the right information from the WPS, obtaining the right consumables and raw materials, etc.
Scope	This unit/task covers the following: • 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	The user/individual on the job should be able to: PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines PC2. adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations **Safety precautions (general)** : general workshop safety; fire prevention; general hazards; manual lifting; overhead lifting; shopfloor housekeeping including surface conditions; waste disposal; stability of surrounding structures, furniture etc. PC3. check the condition of, welding leads, earthing arrangements and electrode holder PC4. report any faults or potential hazards to appropriate authority PC5. follow fume extraction safety procedures
Preparing for welding operations	The user/individual on the job should be able to: PC6. read and interpret routine information on written job instructions and drawings, welding procedure specifications and standard operating procedures **Interpreting the WPS**: e.g. welding process (ISO codes); parent metal; consumables; pre welding joint preparation (edge preparation, assembly, pre-heat); welding parameters; welding positions (ISO 6947 – PA, PB, PC, PD, PE, PF, PG; ASME IX–I-6 G/1-6 F); number & arrangement of runs to fully fill /weld joints; electrode sizes for joint thicknesses; electrode & covering; electrical conditions required (type of current, alternating [A.C.] direct [D.C.], electrode polarity (positive or negative), welding current ranges); welding techniques (string/weave);welding sequence;heat input control; bead length/travel speed

CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding

	preheat/ post heat; interpass run cleaning/back gouging methods; post welding activities (wire brushing and grinding, removal of excess weld metal where required); post-weld heat treatment (normalising, stress relief); etc. PC7. identify welding machines eg. transformers, rectifiers, inverters and generators, according to the task PC8. prepare the work area for the welding activities PC9. perform measurements for joint preparation and routine MMAW PC10. prepare the materials and joint in readiness for welding **Materials**: carbon, low alloy steel, **Form**: plate(1.5 - 24mm)/ sheet (1.5mm) **Joint 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 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 joint in correct position & alignment) PC11. 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.) PC12. connect equipment to power source PC13. connect cables, electrode holders, return leads and ground clamps to appropriate terminal PC14. re-dry electrodes as per electrode classification requirement PC15. set, read and adjust amperage controls PC16. verify set up by running test weld specimen (scrap plate) PC17. tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding PC18. report any faults or problem to appropriate authority
Carrying out welding operations	The user/individual on the job should be able to: PC19. strike and maintain a stable arc PC20. stop and properly re-start arc to avoid welding defects (scratch start, tapping techniques) PC21. maintain constant puddle by using appropriate travel speed PC22. maintain proper bead sequence with respect to groove/fillet configurations and positions PC23. remove slag in an appropriate manner (eg. wire brush, hammer, etc.) PC24. produce welded joints to the specified quality, dimensions and profile applicable to carbon and low alloy steel sheets and plates from 1.5 – 24 mm **Quality standards**: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joins 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;

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	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 formations); welds are adequately fused, there is minimal undercut, overlap and surface inclusions; tack welds are blended in to form part of the finished weld, without excessive hump; corner joints have minimal burn through to the underside of the joint or, where appropriate **Joints**: fillet lap joints, tee fillet joints, corner joints, butt joints (square, single, vee, double vee) PC25. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as per the WPS specified using single or multi-run welds **Positions**: flat (PA) IG/1F, horizontal vertical (PB)2F, horizontal (PC)2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F PC26. 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 PC27. produce joints on carbon and low alloy steel materials using various methods **Methods**: drag, weave, whip PC28. shut down and make safe the welding equipment on completion of the welding activities **MMAW equipment**: e.g. 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.
Testing for quality	The user/individual on the job should be able to: PC29. measure and check that all dimensional and geometrical aspects of the weld are as per instructions PC30. check that the welded joint conforms to the instructions given, by checking various quality parameters by visual inspection **Quality parameters**: dimensional accuracy; alignment/squareness; size and profile of weld; visual defects PC31. 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. PC32. detect and report surface imperfections to appropriate authority PC33. deal with defects in welding as per instructions given
Knowledge and Understanding (K)	

CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding

A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. relevant legislation, standards, policies, and procedures followed in the company KA2. department structure and hierarchy protocols KA3. work flow and own role in the workflow KA4. dependencies and interdependencies in the workflow KA5. support functions and types of support available for incumbents in this role
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. health and safety hazards associated with MMAW/SMAW welding **Safety precautions (MMAW/SMAW Welding)**: 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); 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.) KB2. effects of exposure to the electric arc KB3. types of fire extinguishers and their suitable uses KB4. effects of exposure to welding fume KB5. methods of managing welding fume hazards KB6. personal protective equipment (PPE) and clothing to be worn during MMAW/SMAW welding **Personal protective equipment (PPE)**: (suitable aprons, welding gloves, respirators, safety boots, correctly fitting overalls, suitable eye shields/goggles, hard hat/helmet KB7. welding specific equipment requirements for MMAW/SMAW welding **MMAW equipment:** e.g. 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. KB8. main components and controls of welding equipment KB9. how to connect electrical components correctly KB10. type of current used and implication KB11. welding symbols used and their correct interpretation KB12. types of consumables used for MMAW/SMAW welding KB13. 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 KB14. types of joint configurations for welding **Types**: groove and fillet KB15. 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) KB16. types of beads, characteristics and uses (stringer, weave, weave patterns)

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	Bead characteristics: spatter deposits, roughness, evenness, fill, crater, overlap KB17. factors that affect weld quality standards **Quality standards**: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joins 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 formations); 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, without excessive hump; corner joints have minimal burn through to the underside of the joint or, where appropriate KB18. weld positions such as flat, horizontal, vertical and overhead **Positions**: flat (PA) IG/1F, horizontal vertical (PB) 2F, horizontal (PC) 2G and 3G/3F vertical downwards and upwards KB19. types of equipment components such as electrode holders, work leads cables and ground clamps KB20. awareness and importance of cable size and length KB21. types of polarity such as DC electrode negative and DC electrode positive for welding purposes KB22. various types of base metals used in welding and their implications KB23. distortion and how to control distortion **Distortion (causes and control methods):** Causes (improper sequence of weld runs; direction of weld runs; heat input errors; lack of inaccuracy of jigs and fixture); Control Methods (sequence of welding as materials; proper direction; tacking and its frequency (where applicable); use clamping and jigs and fixtures (where applicable) KB24. magnetic arc blow or arc deflection, causes and methods to avoid or compensate KB25. significance of diffusible hydrogen for welds KB26. storage requirements for consumable electrodes KB27. welding process specification sheet, process qualification record (PQR) and related essential variables KB28. travel speed and heat inputs KB29. amperage requirements for different classification of electrodes and positions KB30. importance and implications of various diameters of electrodes KB31. gouging and back gouging principles, methods and procedures KB32. purpose and importance of pre-heating requirements for base metals KB33. tools and methods to measure temperature for pre-heat and post-heat requirements such as thermal chalk, thermocouple, etc. KB34. purpose and importance of post-heating in welding KB35. 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

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	weld gauges, etc. KB36. awareness of common welder testing codes and their purpose **Welder testing codes**: ASME section IX, EN 287, ISO 9606, IS 7310
Skills (S) [Optional]	
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 SA9. calculate tolerance in terms of limits of size SA10. check measurements, angles, orientation and slopes SA11. types of reference lines such as tangent lines, datum lines, centre lines and work points SA12. select and use tools and equipment such as measuring tapes, levels, squares, protractors and dividers SA13. ability to check dimensions of components SA14. calculate the value of angles in a triangle
	Learning
	The user/individual on the job needs to know and understand how to: SA15. participate in on-the-job and other learning, training and development interventions and assessments SA16. clarify task related information with appropriate personnel or technical adviser SA17. seek to improve and modify own work practices SA18. 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

CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding

	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
	The user/individual on the job needs to know and understand how to: 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
	Initiative and Enterprise
	The user/individual on the job needs to know and understand how to: 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
	Self-Management
	The user/individual on the job needs to know and understand how to: 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
	Teamwork
	The user/individual on the job needs to know and understand how to: SB19. work in a team in order to achieve better results SB20. identify and clarify work roles within a team SB21. communicate and cooperate with others in the team for better results SB22. seek assistance from fellow team members

CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding

NOS Version Control

NOS Code	CSC/ N 0204		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry 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	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 Carbon steels using oxy fuel gas

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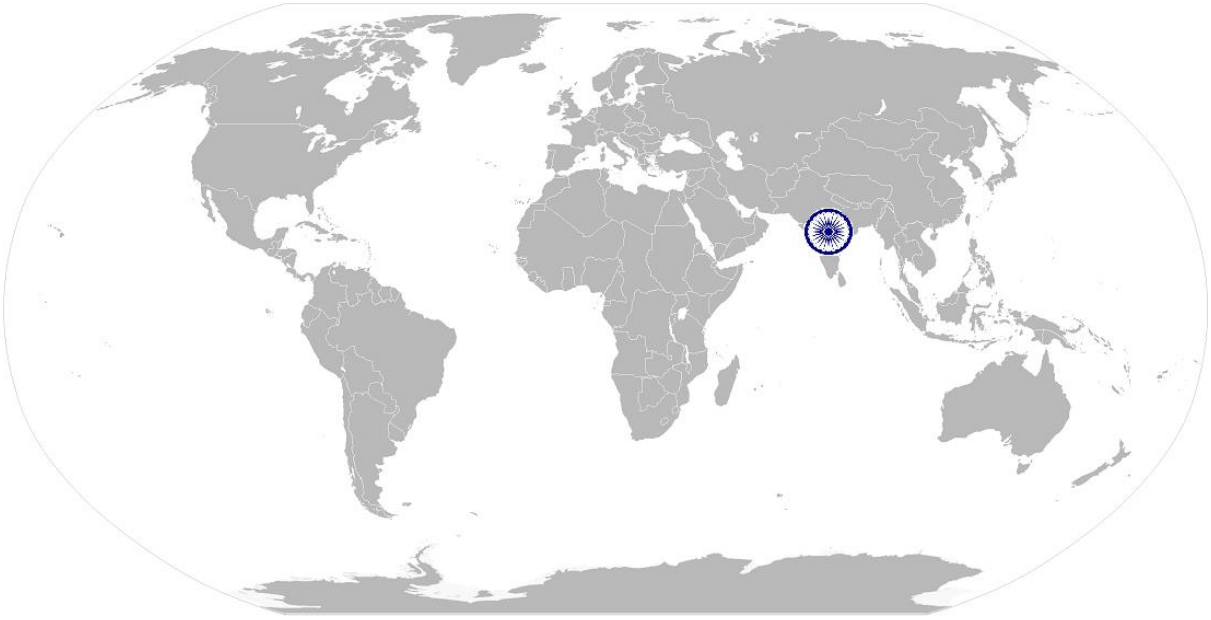
National Occupational Standard



Overview

This unit is about competencies required for manual cutting operations using oxy-fuel gas. The person would be able to carry out basic oxy-fuel gas cutting operations under constant supervision as per instructions received.

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

National Occupational Standard

Unit Code	CSC / N 0201
Unit Title (Task)	**Perform simple manual cutting operations on carbon steels using oxy-fuel gas**
Description	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. The candidate will be expected to work under constant supervision, taking no responsibility.
Scope	This unit/task covers the following: • 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	The user/individual on the job should be able to: 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. PC2. take necessary safety precautions for gas cutting operations including equipment, processes and checks
Preparing for cutting operations	The user/individual on the job should be able to: 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 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

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

	PC13. check if the locations for cutting have been marked out by authorised persons PC14. use appropriate and safe procedures for handling and storing of gas cylinders PC15. prepare the work area for the cutting activities 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 **Equipment**: hand-held oxy-fuel gas cutting equipment, simple, portable, track-driven cutting equipment (electrical or mechanical),fixed bench gas cutting equipment PC17. check that the oxy-fuel gas cutting equipment is set up for the operations to be performed PC18. adjust cylinder valves and adjust regulator for operating pressure to achieve specifications for required operations PC19. seek clarification where marking out is not done or is not clear from authorised person PC20. perform trial cut to check for cut defects
Carrying out cutting operations	The user/individual on the job should be able to: PC21. operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles as per instructions given PC22. use various oxy-fuel gas lighting and cutting procedures PC23. perform various cutting operations correctly **Cutting operations**: down-hand straight cuts (freehand), making straight cuts (track guided), cutting regular shapes, making angled cuts, bevelled edge – weld preparations PC24. produce thermal cuts in low carbon steel (1.5mm to 10mm thickness) PC25. produce cut profiles for various type of materials and forms **Materials**: carbon steels **Forms:** plate; sheet; pipe/tube; bars and rods PC26. produce thermally-cut components which meet specified quality criteria **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 PC27. recognize and correct burnback and flashback PC28. detect and correct defects in cut PC29. ensure the work area is left in a safe and tidy condition on completion of the cutting activities
Testing for accuracy	The user/individual on the job should be able to: PC30. check that the finished components meet the standard required 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 PC32. identify various cutting defects and follow organisation recommended procedures to address them **Defects**: distortion; grooved, fluted or ragged cuts; poor draglines; rounded

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

	edges; tightly adhering slag
Dealing with contingencies	The user/individual on the job should be able to: PC33. report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions PC34. detect equipment malfunctions and deal with them appropriately 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 PC36. shut down and make safe the cutting equipment on completion of the cutting activities PC37. in case of emergencies follow standard emergency procedures **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.
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: KA1. job relevant legislation, standards, policies, and procedures followed in the company KA2. key purpose of the organization KA3. department structure and hierarchy protocols KA4. work flow and own role in the workflow KA5. dependencies and interdependencies in the workflow KA6. support functions and types of support available for incumbents in this role
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. types of fire extinguishers and their suitable uses in case of gas cutting related fires KB2. specific safety precautions to be taken when working with oxy-fuel gas cutting equipment in a fabrication environment

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

	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 KB3. personal protective clothing and equipment (PPE) to be worn when working with gas cutting equipment **Personal protective equipment**: suitable aprons; gloves ; safety boots; correctly fitting overalls; suitable eye shields/goggles; respirators KB4. hazards associated with carrying out gas cutting activities and how they can be minimized KB5. safe working practices and procedures for using thermal equipment KB6. principles of oxy-fuel gas cutting KB7. procedure for obtaining job instructions and other related specifications KB8. various types of gas cutting equipment available **Equipment**: hand-held oxy-fuel gas cutting equipment, simple, portable, track-driven cutting equipment (electrical or mechanical), fixed bench gas cutting equipment KB9. various components of the gas cutting equipment **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) KB10. construction of the heating and cutting torch KB11. types of oxy-fuel gases such as acetylene, natural gas and propane KB12. accessories that can be used with handheld gas cutting equipment to aid cutting operations (such as cutting guides, trammels, templates) **Cutting operations**: down-hand straight cuts (freehand), making straight cuts (track guided), cutting regular shapes, making angled cuts, beveled edge – weld preparations KB13. types of regulators such as low- and high-pressure, and single- and two-stage KB14. how to identify the gases used in the cutting process, and the color coding of gas cylinders KB15. type and thickness of base metals related to nozzle type 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) KB17. holding methods that are used to aid thermal cutting, and the equipment that can be used

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

	KB18. correct procedure for lighting, cutting and extinguishing the flame KB19. types of flames and their implication for cutting KB20. importance of following the correct procedure for lighting, cutting and extinguishing a 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 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) KB22. effects of oil, grease, scale or dirt on the cutting process KB23. gas mixture ratio required to get various flames KB24. quality parameters for gas cut materials **Quality parameters**: shape and length of the dragline, smoothness of the sides, sharpness of the top edges, amount of slag adhering to the metal KB25. causes of cutting defects, how to recognize them, and methods of correction and prevention KB26. importance of leaving the work area in a safe and clean condition on completion of activities KB27. correct handling and storage of gas cylinders KB28. emergency procedures for backfires, flashback and other fires **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. KB29. how to close down the cutting equipment safely and correctly KB30. purging tools and their function
Skills (S) [Optional]	
A. Core Skills/	**Communication**

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

Generic Skills	The user/ individual on the job needs to know and understand how to: SA1. read and interpret information correctly from various job specification documents, health and safety instructions, memos, etc. applicable to the job in English and/or local language SA2. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language SA3. convey and share technical information clearly using appropriate language SA4. check and clarify task-related information SA5. liaise with appropriate authorities using correct protocol 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
	The user/individual on the job needs to know and understand how to: 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,

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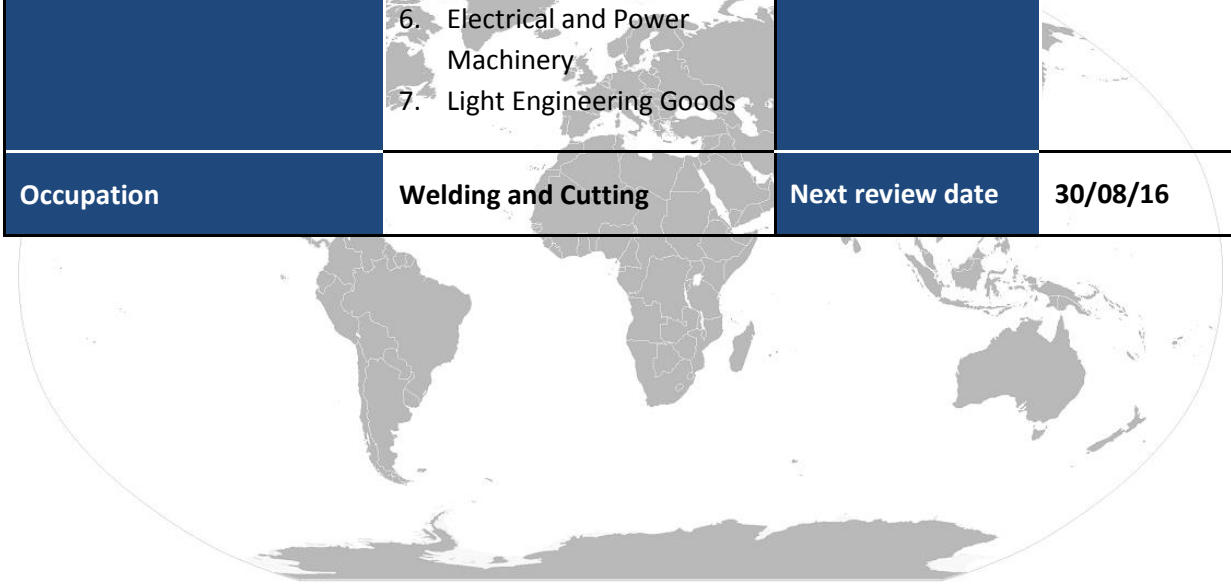
	efficient material usage and optimization of time
	Initiative and Enterprise
	The user/individual on the job needs to know and understand how to: SB12. undertake and express new ideas and initiatives to others SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work 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
	Self-Management
	The user/individual on the job needs to know and understand how to: 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
	Teamwork
	The user/individual on the job needs to know and understand how to: SB19. work in a team in order to achieve better results SB20. identify and clarify work roles within a team SB21. communicate and cooperate with others in the team for better results SB22. seek assistance from fellow team members

CSC/ N 0201: Perform simple manual cutting operations on carbon 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	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

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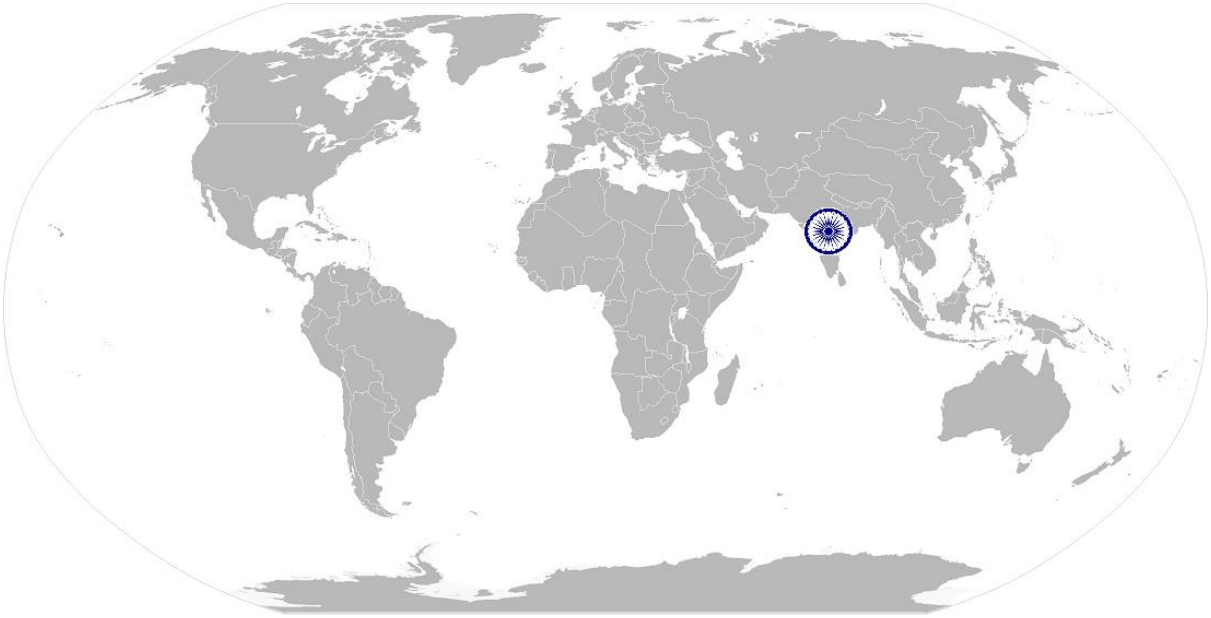
National Occupational Standard



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

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. It includes understanding of risks and hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies, etc. It covers knowledge of fire safety, common first aid applications, safe practices and emergency procedures.
Scope	This unit/task covers the following: • 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	The user/individual on the job should be able to: PC1. use protective clothing/equipment for specific tasks and work conditions **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 **Equipment**: hand shields, machine guards, residual current devices, shields, dust sheets, respirator PC2. state the name and location of people responsible for health and safety in the workplace PC3. state the names and location of documents that refer to health and safety in the workplace PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace **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

	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) PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others **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. PC6. state methods of accident prevention in the work environment of the job role **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 PC7. state location of general health and safety equipment in the workplace **General health and safety equipment**: fire extinguishers; first aid equipment; safety instruments and clothing; safety installations(eg fire exits, exhaust fans) PC8. inspect for faults, set up and safely use steps and ladders in general use **Ladder faults**: corrosion of metal components, deterioration, splits and cracks timber components, imbalance, loose rungs, missing/ unfixed nuts or bolts, etc. **Ladders set up**: firm/level base, clip/lash down, leaning at the correct angle, etc. PC9. work safely in and around trenches, elevated places and confined areas PC10. lift heavy objects safely using correct procedures PC11. apply good housekeeping practices at all times **Good housekeeping practices**: clean/tidy work areas, removal/disposal of waste products, protect surfaces PC12. identify common hazard signs displayed in various areas **Various areas**: on chemical containers; equipment; packages; inside buildings; in open areas and public spaces, etc. 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: PC14. use the various appropriate fire extinguishers on different types of fires correctly **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) PC15. demonstrate rescue techniques applied during fire hazard PC16. demonstrate good housekeeping in order to prevent fire hazards 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: PC18. demonstrate how to free a person from electrocution PC19. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc. PC20. demonstrate basic techniques of bandaging PC21. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments PC22. perform and organize loss minimization or rescue activity during an accident in real or simulated environments 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 PC24. demonstrate the artificial respiration and the CPR Process PC25. participate in emergency procedures **Emergency procedures**: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work PC26. complete a written accident/incident report or dictate a report to another person, and send report to person responsible **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 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

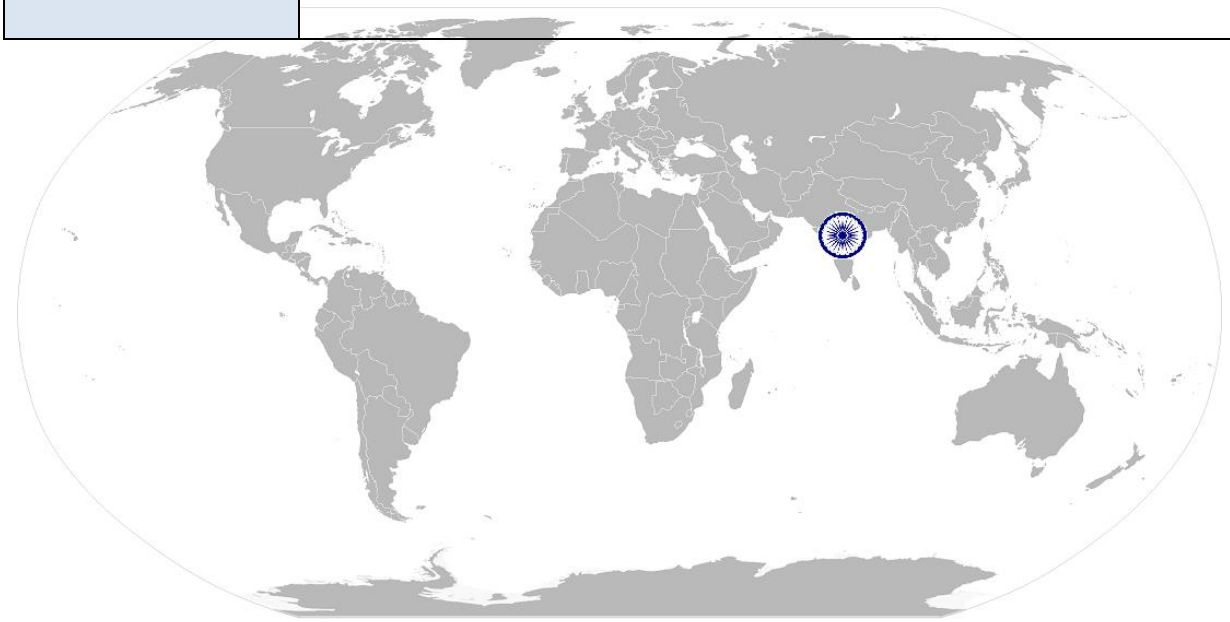
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace. KA2. names and location of documents that refer to health and safety in the workplace.
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. meaning of "hazards" and "risks" KB2. health and safety hazards commonly present in the work environment and related precautions KB3. possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible 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) 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 KB6. safe working practices when working with tools and machines KB7. safe working practices while working at various hazardous sites KB8. where to find all the general health and safety equipment in the workplace KB9. various dangers associated with the use of electrical equipment 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 KB11. importance of using protective clothing/equipment while working KB12. precautionary activities to prevent the fire accident KB13. various causes of fire **Causes of fires**: heating of metal; spontaneous ignition; sparking; electrical heating; loose fires (smoking, welding, etc.); chemical fires; etc. KB14. techniques of using the different fire extinguishers KB15. different methods of extinguishing fire KB16. different materials used for extinguishing fire **Materials**: sand, water, foam, CO2, dry powder KB17. rescue techniques applied during a fire hazard 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 KB20. content of written accident report KB21. potential injuries and ill health associated with incorrect manual handing KB22. safe lifting and carrying practices KB23. personal safety, health and dignity issues relating to the movement of a person by others 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: 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 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: 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



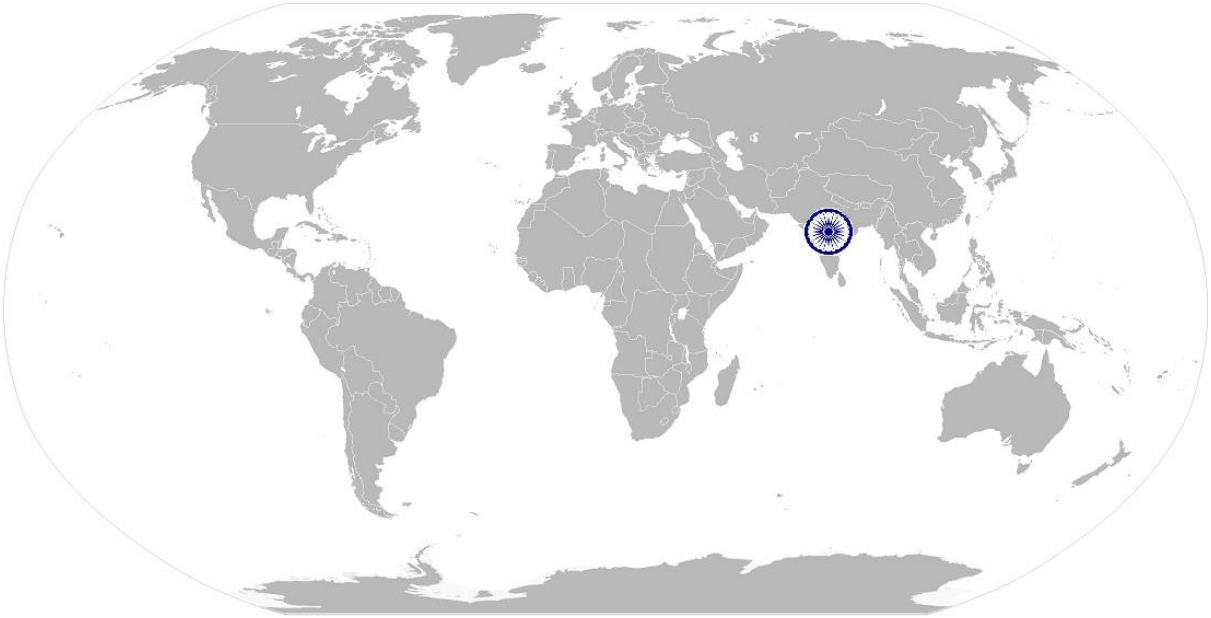
CSC/ N 1335: Use basic health and safety practices at the workplace

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	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.

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. These cover areas such as communication etiquette, discipline, listening, handling conflict and grievances.
Scope	This unit/task covers the following: • 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: PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt PC3. give information to others clearly, at a pace and in a manner that helps them to understand PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks PC6. display appropriate communication etiquette while working **Communication etiquette:** do not use abusive language; use appropriate titles and terms of respect; do not eat or chew while talking (vice versa)etc. PC7. display active listening skills while interacting with others at work PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism PC9. demonstrate responsible and disciplined behaviors at the workplace **Disciplined behaviors:** e.g. punctuality; completing tasks as per given time and standards; not gossiping and idling time; eliminating waste, honesty, etc. 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: KA1. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions KA2. reporting structure, inter-dependent functions, lines and procedures in the work area KA3. relevant people and their responsibilities within the work area 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: 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**

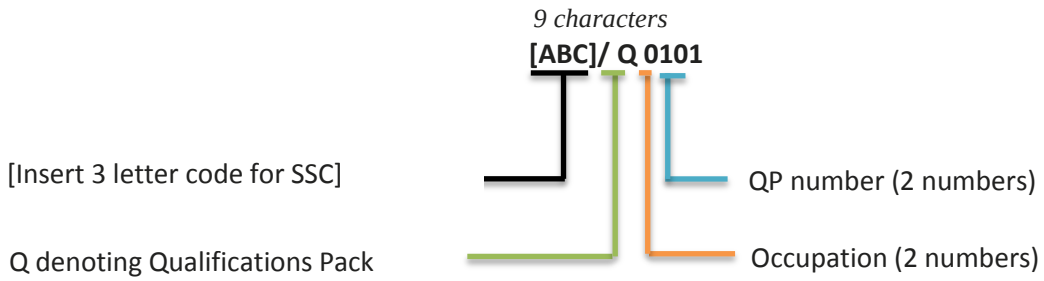
NOS Version Control

NOS Code	CSC / N 1336		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	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

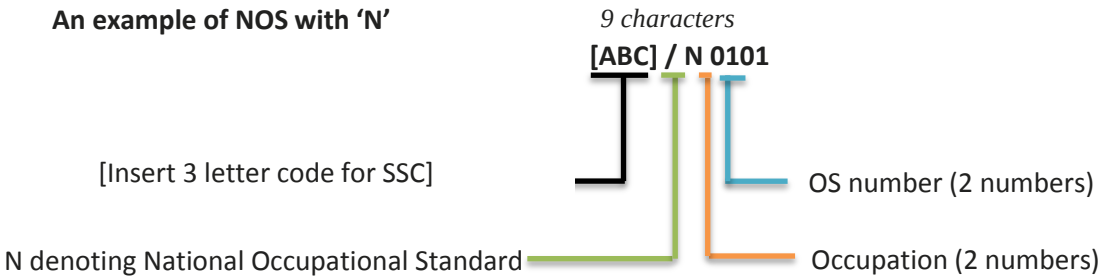
Nomenclature for QP and NOS

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 **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	**MMAW/SMAW Welder Level 3**
Qualification Pack	**CSC/ Q 0204**
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 evaulations 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 outcome	Assessment Criteria	Total Mark	Out of	Theory	Practical Skill
CSC/ N 0204: Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F 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, welding procedure specifications and standard operating procedures		3	1	2
	PC7. identify welding machines eg. transformers, rectifiers, inverters and generators, according to the task		2	0	2
	PC8. prepare the work area for the welding		2	0	2

	activities				
	PC9. perform measurements for joint preparation and routine MMAW		3	0	3
	PC10. prepare the materials and joint in readiness for welding		3	0	3
	PC11. use manual metal-arc welding and related equipment to include a. alternating current (AC) equipment b. direct current (DC) equipment		3	0	3
	PC12. connect equipment to power source		2	0	2
	PC13. connect cables, electrode holders, return leads and ground clamps to appropriate terminal		3	0	3
	PC14. re-dry electrodes as per electrode classification requirement		4	1	3
	PC15. set, read and adjust amperage controls		2	0	2
	PC16. verify set up by running test weld specimen (scrap plate)		3	0	3
	PC17. tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding		3	0	3
	PC18. report any faults or problem to appropriate authority		3	0	3
	PC19. strike and maintain a stable arc		2	0	2
	PC20. stop and properly re-start arc to avoid welding defects (scratch start, tapping techniques)		2	0	2
	PC21. maintain constant puddle by using appropriate travel speed		2	0	2
	PC22. maintain proper bead sequence with respect to groove/fillet configurations and positions		2	0	2
	PC23. remove slag in an appropriate manner (eg. wire brush, hammer, etc.)		6	2	4
	PC24. produce welded joints to the specified quality, dimensions and profile		5	1	4
	PC25. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as per the WPS specified using single or multi-run welds		4	0	4
	PC26. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant		3	0	3

	people if they have problems that they cannot resolve				
	PC27. produce joints on carbon and low alloy steel materials using various methods		5	1	4
	PC28. shut down and make safe the welding equipment on completion of thewelding activities		2	0	2
	PC29. measure and check that all dimensional and geometrical aspects of the weld are as per instructions		4	1	3
	PC30. check that the welded joint conforms to the instructions given, by checkingvarious quality parameters by visual inspection		3	0	3
	PC31. identify various weld defects using visual inspection		4	1	3
	PC32. detect and report surface imperfections to appropriate authority		3	0	3
	PC33. deal with defects in welding as per instructions givenKnowledge		3	0	3
			100	**11**	**89**
CSC/ N 0201: Perform simple manual cutting operations on carbon steels using oxyfuel gas	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	**100**	4	1	3
	PC2. take necessary safety precautions for gas cutting operations including equipment, processes and checks		3	0	3
	PC3. interpret cutting procedure data sheets specifications		3	1	2
	PC4. check regulators, hoses and check that valves are securely connected and free from leaks and damage		2	0	2
	PC5. check equipment is calibrated and approved for use		2	0	2
	PC6. check the correct size gas nozzle to the torch		2	0	2
	PC7. ensure preheat and oxygen holes on the tips are clean		2	0	2
	PC8. check that a flashback arrestor is fitted		2	0	2
	PC9. set appropriate gas pressures		2	0	2
	PC10. use the correct procedure for lighting, adjusting and extinguishing the		2	0	2

	flame				
	PC11. adjust torch valve for type of flame such as neutral, carburizing and oxidizing		3	0	3
	PC12. follow sequence of operations such as pre-heating material and initiating cut		3	1	2
	PC13. check if the locations for cutting have been marked out by authorised persons		2	0	2
	PC14. use appropriate and safe procedures for handling and storing of gas cylinders		3	1	2
	PC15. prepare the work area for the cutting activities		2	0	2
	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		2	0	2
	PC17. check that the oxy-fuel gas cutting equipment is set up for the operations to be performed		2	0	2
	PC18. adjust cylinder valves and adjust regulator for operating pressure to achieve specifications for required operations		3	0	3
	PC19. seek clarification where marking out is not done or is not clear from authorised person		2	0	2
	PC20. perform trial cut to check for cut defects		3	0	3
	PC21. operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles as per instructions given		5	1	4
	PC22. use various oxy-fuel gas lighting and cutting procedures		5	1	4
	PC23. perform various cutting operations correctly		4	0	4
	PC24. produce thermal cuts in low carbon steel (1.5mm to 10mm)		3	0	3
	PC25. produce cut profiles for various type of materials and forms		3	0	3
	PC26. produce thermally-cut components which meet specified quality criteria		4	1	3
	PC27. recognize and correct burnback and		2	0	2

	flashback				
	PC28. detect and correct defects in cut		2	0	2
	PC29. ensure the work area is left in a safe and tidy condition on completion of the cutting activities		2	0	2
	PC30. check that the finished components meet the standard required		3	1	2
	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		3	1	2
	PC32. identify various cutting defects and follow organisation recommended procedures to address them		3	1	2
	PC33. report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions		2	0	2
	PC34. detect equipment malfunctions and deal with them appropriately		3	0	3
	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		2	0	2
	PC36. shut down and make safe the cutting equipment on completion of the cutting activities		2	0	2
	PC37. in case of emergencies follow standard emergency procedures		3	1	2
			100	**11**	**89**
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		4	2	2

	environment of the job role				
	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