QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR HYDROCARBON SECTOR

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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Qualifications Pack – Pipe Fitter-City Gas Distribution

SECTOR/S: HYDROCARBON

SUB-SECTOR: Downstream

OCCUPATION: Pipe Fitting

REFERENCE ID: HYC/Q 6102

ALIGNED TO: NCO-2015/NIL

Brief Job Description: Pipefitting is a special trade which happens in City gas distribution i.e., Piped Natural Gas connection to Residential consumers such as apartments, Flats, houses etc. Commercial Consumers such as Shopping malls, hospitals, etc. and industrial consumers and CNG Station connections. In fact, any place with massive pipes, vents and ducts for gas in these areas may have a need for these professionals. A Pipe Fitter is a trade that specialises in the heavy industrial fabrication, installation & joining of metal piping, and installation & joining of PE piping.

Personal Attributes: The individual should have a good sense of responsibility, must be alert at all times, ability to work independently, concentrate on work, all to work as a team and Stress Management Skills.

Qualifications Pack Code	HYC/ Q 6102		
Job Role	Pipe Fitter-City Gas Distribution		
Credits(NSQF)	TBD	Version number	1.0
Sector	Hydrocarbon	Drafted on	31/03/17
Sub-sector	Midstream	Last reviewed on	31/03/17
Occupation	Pipe Fitting (Oil & Gas)	Next review date	31/03/19
NSQC Clearance on*	22/06/2017		

Job Role	Pipe Fitter – City Gas Distribution
Role Description	Pipefitter (CGD) will perform on pipe fitting activity in City Gas Distribution and metal the following, i.e. Threading, Grinding, Welding, Cutting, Rigging, Brazing, Soldering, Bending
NSQF Level	4
Minimum Educational Qualifications* Maximum Educational Qualifications*	Class X, preferably NA
Prerequisite License or Training	1. Some training on basic machining skill 2. Some training in stress management like yoga is recommended 3. Basic technical skills knowledge on pneumatics and hydraulics
Minimum Job Entry Age	18 Years
Experience	NA
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. HYC/N 6105 Fitting, Welding Basics and Joining Process of Materials 2. HYC/N 6106 Perform Electrofusion Welding 3. HYC/N 6103 Work effectively in a team 4. HYC/N 6104 Follow health, safety and security procedures
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
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.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
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 OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
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.
Organizational Context	Organizational 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.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or 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 OS , these include communication related skills that are applicable to most job roles.

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 basic pipe fabrication, fitting and assembly operations on various types of pipes to produce pipework systems as per given specifications.

Unit Code	HYC/ N 6105
Unit Title (Task)	**Fitting, Welding Basics and Joining Process of Materials**
Description	A refinery pipefitter's job entails building and ensuring the integrity of the pipes that will transport oil, gas or steam. This is achieved through many job functions
Scope	The unit/ task covers the following: • Understand the pipe line layout drawings • Mathematical skills with respect to plumbing • Knowledge on different types of materials used in plumbing • Preparation of pipe line • Identify the tools and tackles that are required to carry out the assigned job • Pipe fitting operation • Pipe Jointing
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Understand the pipe line layout drawings	The user/individual on the job needs to know and understand: PC1. Clearly the basics of Engineering drawing and how to make simple drawing. PC2. Draft and illustrate a pipe line system. PC3. Read the pipe chart, technical details etc. PC4. Prepare the bill of materials for doing the pipe line fabrication. PC5. Understand blue print reading including standard symbols used in plumbing and also different piping lines and valves used in plumbing. PC6. Read and interpret hangers and support drawing.
Mathematical skills with respect to plumbing	The user/individual on the job needs to know and understand: PC7. Mathematics –Knowledge of arithmetic, algebra, geometry, and their applications PC8. Calculate area, volume, angles and length PC9. Calculate length and diameter of the pipe system using the metric system as well as English system. PC10. Calculate dimensions of the bend required in plumbing.
Knowledge on different types of materials used in plumbing	PC11. Knowledge on different materials used for plumbing • Black iron • Galvanized iron • Cast iron • Stainless steel • Copper • Cement • Plastic/Synthetic PC12. Highlight the property of different pipe material and their

	workability.
Preparation of pipe line	The user/individual on the job needs to know and understand: PC13. The different bends, elbows, shapes, joints etc. used to fabricate the pipes. PC14. Identify and discriminate different types of nuts, bolts, screws, clamps, fixtures etc. used in plumbing. PC15. The different packing materials, adhesives, gaskets, ropes etc. and how to cut gaskets using a cutting machine. PC16. Install and check for the functions of different types of valves, gauges and other related accessories.
Identify the tools and tackles that are required to carry out the assigned job	PC17. Knowledge and ability to use different hand tools and power tools in plumbing and appreciate the advantage of correct tools used. • Pipe cutter • Copper pipe deburring tools • Pipe expander set • Pipe bending fixtures • Flaring set • Threading tools • Ratchet spanner • Valve fix • Bits and drive socket set • Pipe pliers • Chaim pipe vice • Spirit level • Steel rule • Try square • Plastic pipe cutter • Ratchet copper cutter • Pipe chamfering kit • Cartridge soldering torch • Drain cleaning spiral • Cast iron screw clamp\ • Flat chisel • Chisels with hand grip • Crow bar • Shovel • Lever bar • Scraper iron • Pick axe • Shop floor broom • Expander • Flaring tools • Portable power bender • Combination plier • Regular plier • Water pump plier

	• Pipe wrench • Adjustable wrench • Hammer type screw driver • Flat tip screw driver • C clamp • Double open ended spanner • Ring spanner • Tubular box spanner • Socket set • Universal socket joint set • Claw hammer • Ball peen hammer • Soft mallet hammer • Hacksaw and frames • Different types of blades (HCS,HSS and Bi-metal) • PTFE tape • Silicon paste • Saws • Portable drilling machine • Impact drill • Rotary hammer • Drills • Pullers • Portable tri-stand vice • Bench yoke vice • Thread cutting dies • Die stock
Perform Pipe fitting operation	The user/individual on the job should be able to: PC18. Install, repair and maintain high and low-pressure pipe systems used in manufacturing plants, oil refineries, chemical plants, breweries, power plants, food processing plants, paper mills, ships and factories PC19. Use the appropriate equipment, parts and accessories for the pipe fitting or assembling operation as per the standards. PC20. Check for the calibration date of all measuring equipment PC21. Identification and preparation of suitable datum from which to start the marking. PC22. Application of marking medium to enhance clarity of the marking and proper visibility. PC23. Carry out appropriate method of marking PC24. Use a range of marking out equipment (e.g. rules, squares, scribers, Vernier instruments) PC25. Mark out a range of feature Features: datum lines; cutting guidelines; square and rectangular profiles; circular and radial profiles; angles; holes linearly positioned, boxed and on pitch circles PC26. Plan the pipe fitting activities before starting as per the drawing.

	PC27. Cut the pipes to the appropriate lengths making allowances for bending using appropriate cutting operations and techniques PC28. Produce pipework bends using the appropriate tools and equipment for the types and sizes of pipe PC29. Assemble and secure the pipework as per job specifications using appropriate pipe assembly methods and techniques PC30. Produce pipework assemblies which combine a range of different fittings PC31. Dismantle pipework assemblies without damage to components and/or subassemblies PC32. 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 PC33. Keep the work area in a safe and tidy condition during and on completion of the manufacturing activities PC34. Return all tools and equipment to the correct location on completion of the fitting activities PC35. Perform the necessary checks for correct pipework assembly and dimensional accuracy PC36. Use the appropriate measuring equipment for checking activities PC37. Produce components within all of the applying standards PC38. Generate stage inspection reports
Pipe Jointing	PC39. Understanding of different methods of pipe joining PC40. Knowledge of different welding methods PC41. Care and preparation of pipe for welding depending on the material PC42. Importance of joints and different types of joints. PC43. Ensure the electrode positioning angle is correct. PC44. Select the correct welding mechanic and follow factors, PC45. Knowledge of the fundamentals of manual metal arc welding. PC46. Should be able to strike and maintain a stable arc. PC47. Identify welding defects and how to rectify. PC48. Check the weld joint condition. PC49. Knowledge of NDT. PC50. Knowledge of the AWS codification of electrodes. PC51. The individual should be able to do pipe welding in vertical down and should be able to do, • Preparation • Tacking • Joint in 5G position • Joint in 6G position PC52. Ability to welding in vertical up with basic different techniques PC53. knowledge to make ‘T-joints’ and outlets
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the	KA1. Company’s policies on: personnel management, duty reporting procedure and associated MIS compliance KA2. Legislation, standards, policies, and procedures followed in the

company / organization and its processes)	company relevant to own employment and performance conditions KA3. Own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities KA4. Reporting structure within organization and relevant people and their responsibilities within the work area KA5. Problem escalation procedure and escalation matrix for reporting work and employment related issues KA6. Standard operating procedure while working KA7. Relevant health and safety requirements applicable in the work place KA8. Importance of working in clean and safe environment KA9. Documentation and related procedures applicable in the context of employment and work KA10. Importance and purpose of documentation in context of employment and work
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Interpretation of drawing as per standard and knowledge of Geometric Dimensioning and Tolerance (GD&T). KB2. Knowledge of making Isometric drawing and orthographic projection. KB3. Selection of datum plain and its importance in piping. KB4. ensure to establish a proper datum KB5. Knowledge to determine limits, fits and tolerance. KB6. Plan sequence of operation applying the knowledge of geometry. KB7. Know the different protective coatings used in pipe and how it protects the pipe and also the care to be taken while handling. KB8. Understand the different thread geometry, types and its application in plumbing. KB9. make different types of threads on a pipe and also the different methods of thread production. KB10. Knowledge on different pipe materials and the performance of this material in different application. KB11. Basic knowledge of the property and behaviour of fluids, liquids and gases KB12. Awarness on basic hydraulic and pneumatic elements and the working KB13. Knowledge of heating and cooling including thermal expansion and contraction of piping system under various condition. KB14. knowledge to calculate pipe diameter. KB15. Knowledge on seal screw joint. KB16. Different types of equipment's used for threading of pipes. KB17. Knowledge on behaviour of flow of liquids, gaseous and solid materials. KB18. Making of drawing using standard symbols, proper representation and layout. KB19. Thorough understanding of location and environment where the

	piping is done in the different area KB20. Knowledge on different gadgets used in plumbing KB21. Knowledge on the different operation that can be carried out using earth moving equipment's. KB22. Application of different cutting fluids used while working on Ferrous metals: e.g. carbon steels, stainless steels, cast iron, tool steel, hard metals; Non-ferrous metals: e.g. bronze, aluminium, copper and copper alloys KB23. identify correct orientation of pipe fitting in regard to the flow. KB24. Methods used for testing the pipe line. KB25. Use of different fasteners for both temporary and permanent fastening. KB26. Importance of assembly methods, techniques and procedure to be maintained while pipe fitting. KB27. Knowledge to do positioning, aliening and fastening an assembly. KB28. Precaution to be taken while using adhesives, cements and sealing compound.
Skills (S) A. Core Skills/ Generic Skills	
	Basic reading and writing skills The user/individual on the job needs to know and understand how to: SA1. Fill in the attendance sheet and the requisite details SA2. Keep abreast by reading about new policies at an organization level SA3. Read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/or local language SA4. Fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language
	Communication skills The user/individual on the job needs to know and understand how to: SA5. Execute task, schedules, and work-loads with co-workers and supervisors SA6. Convey and share technical information clearly using appropriate language SA7. Check and clarify task-related information SA8. Liaise with appropriate authorities using correct protocol SA9. Communicate with people in respectful form and manner in line with organizational protocol
	Teamwork and multitasking SA10. Share work load as required SA11. Assist others who require help SA12. Share knowledge with co-workers/assistant.
	Numerical and computational skills SA13. Undertake numerical operations, and calculations using calculators Numerical computations: addition(with decimal digits and with carrying),subtraction(with decimal digits and with borrowing), multiplication(with decimal digits), division(with decimal digit), fractions and decimals, percentages and proportions, simple ratios

	and averages SA14. Identify and draw various basic, compound and solid shapes as per dimensions given Basic shapes: square, rectangle, triangle, circle Compound shapes: involving squares, rectangles, triangles, circles, semi-circles, quadrants of a circle Solid shapes: cube, rectangular prism, cylinder SA15. Demonstrate measurement and calculation of Angle, Perimeter, Area of a common geometrical shape and can co-relate with job area requirements SA16. Use appropriate measuring techniques and units of measurement SA17. Use British and metric system of measurement and make conversions between them SA18. Describe the difference between Celsius & Fahrenheit Scale and relationship between them SA19. Use appropriate units and number systems to express degree of accuracy Units and number systems representing degree of accuracy: decimals places, significant figures, fractions as a decimal quantity SA20. Interpret and express tolerance in terms of limits on dimensions perform SA21. Basic operations in a computer like switching it on/off, using the mouse and keyboard, accessing files, opening, closing, creating and deleting folders, etc. SA22. Use basic office applications like spread sheet, word processor, presentations SA23. Use organizational software specific to quality function SA24. Use email to communicate within the organization as per organization guidelines SA25. Retrieve and enter data using standard system forms and templates SA26. Take printouts of documents
	Learning The user/individual on the job needs to know and understand how to: SA27. Participate in on-the-job and other learning, training and development interventions and assessments SA28. Clarify task related information with appropriate personnel or technical adviser SA29. Seek to improve and modify own work practices SA30. Maintain current knowledge of application standards, legislation, codes of practice and product/process developments
B. Professional Skills	**Learning** The user/individual on the job needs to know and understand how to: SB1. Identify problems with work planning, procedures, output and behaviour 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 organise
	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 analyse 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. 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: SB15. Exercise restraint while expressing dissent and during conflict situations SB16. Avoid and manage distractions to be disciplined at work SB17. Manage own time for achieving better results
	Teamwork
	The user/individual on the job needs to know and understand how to: SB18. Work in a team in order to achieve better results SB19. Identify and clarify work roles within a team SB20. Communicate and cooperate with others in the team for better results SB21. Seek assistance from fellow team members

NOS Version Control

NOS Code	**HYC / N 6105**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Hydrocarbon**	**Drafted on**	**31/03/2017**
Industry Sub-sector	**Midstream**	**Last reviewed on**	**31/03/2017**
Occupation	**Pipe Fitting (Oil & Gas)**	**Next review date**	**31/03/2019**

National Occupational Standard

Overview

This unit covers the pipe Electrofusion Welding fabrication, Procedures & Techniques for PE Pipeline Installations

Unit Code	HYC/N 6106
Unit Title (Task)	**Electrofusion Welding**
Description	He will be able to join HDPE and other plastic pipes using special fittings that have built-in electric heating elements which are used to weld the joint together by Electrofusion.
Scope	The unit/ task covers the following: • Procedures & Techniques for PE Pipeline Installations • Electrofusion Principles • Preparing the pipe • Manual Welding Procedure • Electrofusion Principles • Physical properties
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Procedures & Techniques for PE Pipeline Installations	The user/individual on the job needs to know and understand: PC1. Understand conventionally Buried Pipelines PC2. Perform narrow/chain trenching PC3. Perform Mole ploughing PC4. Perform Impact moling PC5. Carry out directional drilling
Electrofusion Principles	The user/individual on the job needs to know and understand: PC6. Understand fusion technology PC7. Heating coils are as close to the joint surfaces as possible. PC8. Wire position is accurately controlled during manufacture and during the subsequent fusion process. PC9. The importance of heat distribution uniform over the length of the hot zone. PC10. ensure to melt pressure and temperature are both accurately controlled. PC11. Importance why coils are protected from damage prior to, during and after fusion. PC12. Define Electrofusion Control Units
Preparing the pipe	PC13. Check the pipe for any abrasions or impact damage that may provide a detrimental effect to the performance of the coupler. PC14. Ensure that the pipe end is cut square PC15. Mechanical scraper takes off approximately 0. 5mm of the pipe surface of the pipe diameter. PC16. mark the pipe end for the couplers insertion depth. PC17. Carry out scraping before clean the surface of the pipe to remove as much grease, oil or surface dirt as possible. PC18. use your hand scraper to create a chamfer on the leading edge of

	the pipe and remove all swarf from the pipe. PC19. mark the pipe end for the couplers insertion depth PC20. Importance of checking the scraper blade for its good condition. PC21. Scrape off any remaining line markings using hand scrapper PC22. Ensure not to touch the cleaned ends of the pipe or the inside of the coupler with your hands or rags. PC23. protect the end against the ingress of dirt, dust or water.
Manual Welding Procedure	The user/individual on the job needs to know and understand: PC24. Importance of placing the pipes in the clamps with the ends against the trimming tool and with the pipe markings aligned. PC25. align and level the components using the support rollers. PC26. Method of tightening the pipe clamps to grip and re-round the pipes. PC27. Understanding to cover the free ends of the pipes to prevent cooling of the plate by internal draughts. PC28. Switching on the trimming tool and close the clamps slowly so that the pipe ends are moved against the trimming tool until continuous shavings are cut from each surface. PC29. Ensure to Keep the trimming tool turning whilst opening the clamps to avoid steps on the trimmed surfaces. PC30. Method of removing the trimming tool taking care not to touch the trimmed ends. PC31. ensure to remove loose shavings from the machine and component ends. PC32. Importance of why not to touch the prepared surface PC33. Check that both surfaces are completely planed. If they are not then repeat the trimming process. PC34. Ensure to close the clamps and check that there is no visible gap between the trimmed faces. PC35. The maximum permitted outsider diameter mismatch is: 1.0 mm for pipe sizes 90 mm to 315 mm,2.0 mm for pipe sizes 316 mm to 800 mm PC36. ensure the mismatch is greater than these values then the pipe must be realigned and re-trimmed. PC37. Make certain to open and then close the clamps and note the drag pressure needed to move the pipes together using the hydraulic system.
Electrofusion Principles	The user/individual on the job needs to know and understand: PC38. heating coils are as close to the joint surfaces as possible. PC39. wire position is accurately controlled during manufacture and during the subsequent fusion process.

	PC40. Importance of heat distribution which has to be uniform over the length of the hot zone. PC41. melt pressure and temperature are accurately controlled. PC42. coils are to be protected from damage prior to, during and after fusion. PC43. spigot ends are scraped. PC44. Importance of cutting the pipe square and remove burrs. PC45. Carry out wipe loose dirt from pipe ends. PC46. place the centre of the electrofusion fitting alongside the pipe end and mark the pipe around the circumference. PC47. pipe end preparation tool, remove the entire surface of the pipe over the marked area PC48. Remove the fitting from its packaging and check that the bore of the fitting is clean and dry. PC49. insert the pipe ends into the fitting so that they are in contact with the centre stop. PC50. socket electrofusion fittings (couplers, reducers, elbows and tees) clamps must be used. PC51. remove the terminal protection caps from the terminal shrouds. PC52. Connect the output leads to the fitting terminals. PC53. Check that there is sufficient fuel in the generator to complete the joint. PC54. Operate as per the instructions, which should have been thoroughly read and understood prior to any welding operations. PC55. Understand that the joint must be left in the clamps for the cooling time specified on the fitting,
Physical properties	PC56. Understand different material properties & compatibility PC57. Understand Importance of Standard dimensional ratio PC58. Effect of expansion and contraction PC59. perform Pipe bending and the radius for PE PC60. electrofusion fittings are able to weld pipes having different wall thicknesses PC61. Carry out Pressure testing
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	KA1.Understand company's policies on: personnel management, duty reporting procedure and associated MIS compliance KA2.Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction KA3.Reviews and approves the requisition of materials/equipment by assigned employees KA4.Reviews and approves the requisition of materials/equipment by assigned employees; may tag and store material as necessary KA5.Maintains records and prepares reports on repairs completed or on units requiring future special service KA6.Works closely with project coordinates, administration, and/or other

	related staff to determine and coordinate projects, estimating and controlling craft-related project costs, operational needs, troubleshooting, etc. KA7.Ability to understand and carry out work direction in a safe manner KA8.Importance of working in clean and safe environment KA9.Ability to document related procedures applicable in the context of employment and work
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Describe the functions of typical components on gas pipeline facilities KB2. Describe the properties of hydrocarbons and basics of hydrocarbons processing KB3. understand the principles of corrosion control KB4. Knowledge of the principles of gas compression KB5. Explain the principles of gas measurement KB6. Explain the principles of operation of gas analysis systems including moisture analysers, gas chromatographs, densitometers, calorimeters KB7. Explain the principles of operation of typical pipeline instruments, monitoring and control systems (incl. SCADA) KB8. Explain the principles of petroleum geology, extraction and processing KB9. Explain the principles of pigging KB10. Explain the principles of rotating equipment, lubrication and bearings KB11. Interpret process and instrumentation diagrams for a facility KB12. Understand risks that transmission pipelines pose to the community and mitigation of those risks; KB13. Transmission pipeline historical safety performance; KB14. Describe what is blasting KB15. Explain the importance Fences and Grazing KB16. Advantage of telecommunications Towers KB17. Importance of Corrosion Protection and Detection Systems KB18. Measures to taken to allow Pipeline Expansion KB19. Explain Horizontal Earth Boring and Horizontal Auger Boring KB20. What is Micro tunnelling KB21. The Flux used to deoxidize and cleanse the weld metal. KB22. Safety precautions associated with natural gas pipelines KB23. Some knowledge of the performance of various pipe materials under a wide variety of conditions. KB24. Some knowledge of the hazards of the trade, and of necessary precautionary measures
Skills (S)	
A. Core Skills/ Generic Skills	**Basic reading and writing skills** The user/individual on the job needs to know and understand how to: SA1. Follow verbal and written instructions SA2. Communicate orally and in writing with other team members, leaders and operations personnel SA3. Determining personnel matters (such as job progress, schedule changes, time sheet review, and work performance) SA4. Knowledge of human resource and supervisory activities, including the

	coordination and management of people and resources
	Communication skills
	The user/individual on the job needs to know and understand how to: SA5. Work within company policy as outlined SA6. Read, write and communicate using English language sufficient to perform job functions SA7. Ability to understand and carry out work direction in a safe manner SA8. Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions SA9. Ability to listen to and understand information and ideas presented through spoken words and sentences
	Teamwork and multitasking
	SA10. Performs other related duties as assigned SA11. Ability to apply general rules to specific problems to produce answers that make sense SA12. Participates in the management of personnel matters/activities
	Numerical and computational skills
	SA13.Identify pipe fittings by size, type, material, and service type SA14.Read and interpret hanger and support drawings SA15.Identify pipe by size, type, and wall thickness SA16.Calculate how threaded is measured SA17.Install pipe hangers, supports, anchors, and guides SA18.Read and interpret pipe and hanger drawings SA19.Calculate pressure and heat in piping systems SA20.Mathematics –Knowledge of arithmetic, algebra, geometry, , and their applications
	Learning
	The user/individual on the job needs to know and understand how to: SA21. participate in on-the-job and other learning, training and development interventions and assessments SA22. clarify task related information with appropriate personnel or technical adviser SA23. seek to improve and modify own work practices SA24. maintain current knowledge of application standards, legislation, codes of practice and product/process developments
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB2. plan and organize work to achieve targets and deadlines
	Customer Centricity

	The user/individual on the job needs to know and understand how to: SB3. check that the work meets customer requirements SB4. deliver consistent and reliable service to customers
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. apply problem solving approaches in different situations
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB6. apply balanced judgments to different situations
	Teamwork
	The user/individual on the job needs to know and understand how to: SB4. work in a team in order to achieve better results SB5. identify and clarify work roles within a team SB6. communicate and cooperate with others in the team for better results SB7. seek assistance from fellow team members

NOS Version Control

NOS Code	**HYC / N 6106**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Hydrocarbon**	**Drafted on**	**02/03/2017**
Industry Sub-sector	**Midstream**	**Last reviewed on**	**02/03/2017**
Occupation	**Pipe Fitting (Oil & Gas)**	**Next review date**	**02/03/2019**

National Occupational Standard

Overview

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

Unit Code	HYC/N 6103
Unit Title (Task)	**Work effectively in a team**
Description	This NOS unit is about working effectively within a team, either in individual's own work group or in other work groups outside the organization.
Scope	This unit/task covers the following: • Effective team work
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Team Work	To be competent, the user/individual on the job must be able to: PC1. maintain clear communication with colleagues PC2. work with colleagues as a team PC3. pass on information to in line with organisational requirements PC4. work in ways that show respect for colleagues PC5. carry out commitments made to colleagues PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons PC7. identify problems in working with colleagues and take the initiative to solve these problems PC8. follow the organisation's policies and procedures for working with colleagues PC9. ability to share resources with other members as per priority of tasks
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organisational Context (Knowledge of the Company/Organisation and its processes)	The user/individual on the job needs to know and understand: KA1. the organization's policies and procedures for working with colleagues, role and responsibilities in relation to this KA2. the importance of effective communication and establishing good working relationships with colleagues KA3. different methods of communication and the circumstances in which it is appropriate to use these KA4. the importance of creating an environment of trust and mutual respect KA5. the implications of own work on the work and schedule of others
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. different types of information that colleagues might need and the importance of providing this information when it is required KB2. the importance of helping colleagues with problems, in order

	to meet quality and time standards as a team
Skills (S)w.r.t. the scope	
Element **A. Core Skills/ Generic Skills**	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. complete written work with attention to detail
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read instructions, guidelines/procedures
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA3. listen effectively and orally communicate information SA4. ask for clarification and advice from the concerned person
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB2. plan and organize work to achieve targets and deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB3. check that the work meets customer requirements SB4. deliver consistent and reliable service to customers
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. apply problem solving approaches in different situations
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB6. apply balanced judgments to different situations

NOS Version Control

NOS Code	**HYC / N 6103**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Hydrocarbon**	**Drafted on**	**31/03/2017**
Industry Sub-sector	**Midstream**	**Last reviewed on**	**31/03/2017**
Occupation	**Pipe Fitting (Oil & Gas)**	**Next review date**	**31/03/2019**

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.

Unit Code	HYC/N 6104
Unit Title (Task)	**Practice of health safety and security related guidelines**
Description	This OS unit is about knowledge and practices relating to health, safety and security that need to use. It covers responsibilities towards self, others, assets and the environment.
Scope	This unit/task covers the following: • Knowledge and practice Health and safety • Fire safety • Safety systems • Emergencies, rescue and first-aid • procedures
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Knowledge and practice Health and safety	The user/individual on the job should be able to: PC1. use protective clothing/equipment for specific tasks and work Conditions 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 PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others PC6. state methods of accident prevention in the work environment of the job role PC7. state location of general health and safety equipment in the workplace PC8. inspect for faults, set up and safely use steps and ladders in general use 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 PC12. identify common hazard signs displayed in various areas PC13. retrieve and/or point out documents that refer to health and safety in the workplace
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 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
Safety systems	PC18. List issue concerning the safety and familiar in your work style PC19. Empower to address the unsafe condition in your work place or to stop the unsafe behaviour PC20. Record all miss incidents, damages, illness or injury PC21. Comprehend the applicable laws, regulations and codes as per standard PC22. Promote and maintain a positive safety culture PC23. Apply and appraise the use and storage of hazardous substance and their safety PC24. Assess the threats and to protect from the threats PC25. Awareness of own safety and safety of others PC26. Bring the concern and report the HSE concern PC27. Report all incident to the supervisor PC28. Identifies and describes the property of different petroleum products. PC29. Operates and handle spills and respond to the spills
Emergencies, rescue and first-aid procedures	The user/individual on the job should be able to: PC29. demonstrate how to free a person from electrocution PC30. Administer appropriate first aid to victims were required eg. in case of bleeding, burns, choking, electric shock, poisoning etc. PC31. demonstrate basic techniques of bandaging PC32. respond promptly and appropriately to an accident situation or PC33. medical emergency in real or simulated environments PC34. perform and organize loss minimization or rescue activity during an accident in real or simulated environments PC35. 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 PC36. demonstrate the artificial respiration and the CPR Process PC37. participate in emergency procedures PC38. complete a written accident/incident report or dictate a report to another person, and send report to person responsible PC39. demonstrate correct method to move injured people and others during an emergency
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	KA1. company's policies on: personnel management, duty reporting procedure and associated MIS compliance KA2. reporting structure within organization KA3. problem escalation procedure KA4. Standard operating procedure while transporting petroleum products
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 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 KB11. importance of using protective clothing/equipment while working KB12. precautionary activities to prevent the fire accident KB13. various causes of fire KB14. techniques of using the different fire extinguishers KB15. different methods of extinguishing fire KB16. different materials used for extinguishing fire KB17. rescue techniques applied during a fire hazard KB18. various types of safety signs and what they mean 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**	**Communication skills** The user/ individual on the job needs to know and understand how to: SA1. communicate the safety, cleanliness and emergency issues to supervisor. SA2. read and comprehend basic content to read labels, charts, signage SA3. read and comprehend basic English to read manuals of operations SA4. 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: The user/individual on the job needs to know and understand how to: SA5. question co-workers appropriately in order to clarify instructions and other issues SA6. give clear instructions to co-workers, subordinates others
B. Professional Skills	**Decision making** The user/ individual on the job needs to know and understand how to: SB1. report potential sources of danger SB2. Follow prescribed procedure to address safety and emergency

	issues. 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
	Reflective thinking
	The user/individual on the job needs to know and understand how to: SB3. learn from past mistakes regarding use of safety and emergency issues
	Critical thinking
	The user/individual on the job needs to know and understand how to: SB4. spot safety and cleanliness issues

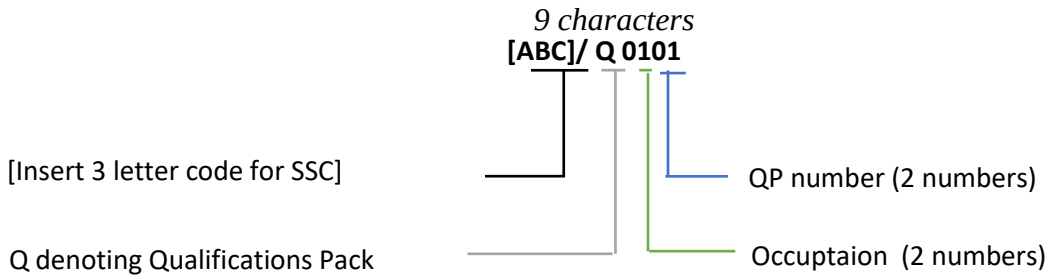
NOS Version Control

NOS Code	**HYC / N 6104**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Hydrocarbon**	**Drafted on**	**31/03/2017**
Industry Sub-sector	**Midstream**	**Last reviewed on**	**31/03/2017**
Occupation	**Pipe Fitting (Oil & Gas)**	**Next review date**	**31/03/2019**

Annexure

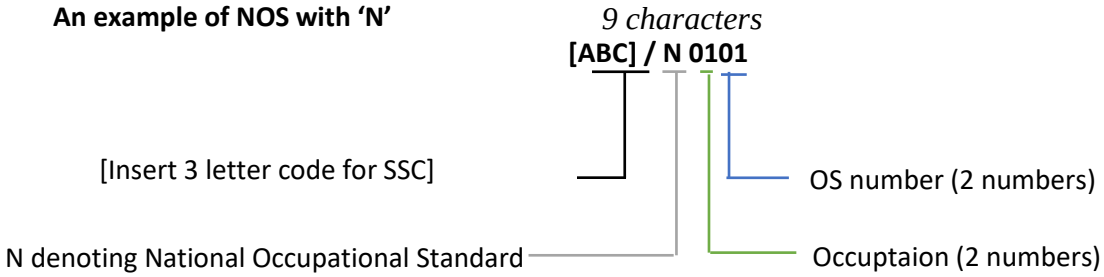
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



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CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Pipe Fitter- City Gas Distribution

Qualification Pack HYC/Q 6102

Sector Skill Council Hydrocarbon Sector Skill 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. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. 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 criterion.
5. To pass the Qualification Pack , every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
6. In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
Fitting, Welding Basics and Joining Process of Materials	PC1. Clearly the basics of Engineering drawing and how to make simple drawing.	100	2	1	1
	PC2. Draft and illustrate a pipe line system.		2	1	1
	PC3. Read the pipe chart, technical details etc.		2	2	0
	PC4. Prepare the bill of materials for doing the pipe line fabrication.		2	1	1
	PC5.Understand blue print reading including standard symbols used in plumbing and also different piping lines and valves used in plumbing.		2	1	1
	PC6. Read and interpret hangers and support drawing.		2	2	0
	PC7. Mathematics –Knowledge of arithmetic, algebra, geometry, and their applications		2	2	0
	PC8. Calculate area, volume, angles and length		2	2	0
	PC9. Calculate length and diameter of the pipe system using the metric system as well as English system.		2	1	1
	PC10. Calculate dimensions of the bend required		2	1	1

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	in plumbing.				
	PC11. Knowledge on different materials used for plumbing		2	2	0
	PC12. Highlight the property of different pipe material and their workability		2	2	0
	PC13. The different bends, elbows, shapes, joints etc. used to fabricate the pipes.		2	0	2
	PC14. Identify and discriminate different types of nuts, bolts, screws, clamps, fixtures etc. used in plumbing.		2	0	2
	PC15. The different packing materials, adhesives, gaskets, ropes etc. and how to cut gaskets using a cutting machine.		2	0	2
	PC 16. Install and check for the functions of different types of valves, gauges and other related accessories		2	0	2
	PC17. Knowledge and ability to use different hand tools and power tools in plumbing and appreciate the advantage of correct tools used		2	0	2
	PC18. Install, repair and maintain high and low-pressure pipe systems used in manufacturing plants, oil refineries, chemical plants, breweries, power plants, food processing plants, paper mills, ships and factories		2	0	2
	PC19. Use the appropriate equipment, parts and accessories for the pipe fitting or assembling operation as per the standards.		2	0	2
	PC20. Check for the calibration date of all measuring equipment		2	0	2
	PC21. Identification and preparation of suitable datum from which to start the marking.		2	0	2
	PC22. Application of marking medium to enhance clarity of the marking and proper visibility.		2	1	1
	PC23. Carry out appropriate method of marking Marking out methods: direct marking using tapes and markers, set-outs of pipework using templates, producing set wires, set-outs of pipework onto floor		2	0	2
	PC24. Use a range of marking out equipment (e.g. rules, squares, scribers, Vernier instruments) Marking tools: rules/tapes, dividers/trammels, scribers, punches, scribing blocks, squares, protractor, permanent markers		2	0	2
	PC25. Mark out a range of feature, Features: datum lines; cutting guidelines; square and rectangular profiles; circular and radial profiles; angles; holes linearly positioned, boxed and on		2	0	2

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	pitch circles				
	PC26. Plan the pipe fitting activities before starting as per the drawing.		1	1	0
	PC27. Cut the pipes to the appropriate lengths making allowances for bending using appropriate cutting operations and techniques		2	0	2
	PC28. Produce pipework bends using the appropriate tools and equipment for the types and sizes of pipe		2	0	2
	Pipe bending tools and equipment: hand operated pipe bender, bending springs, pipe expander, swaging kit, hydraulic pipe bending equipment, heating methods and fillers				
	Pipework bends and forms: angular bends, offsets, bridge sets, radii, internal, swaged ends, expansion loops, external swaged ends				
	PC29. Assemble and secure the pipework as per job specifications using appropriate pipe assembly methods and techniques		2	0	2
	Pipe assembly methods:				
	PC30. Produce pipework assemblies which combine a range of different fittings Pipe fittings: straight couplings, elbows, tee pieces, flanges, reduction pieces, drain/bleeding devices, unions		2	0	2
	PC31. Dismantle pipework assemblies without damage to components and/or subassemblies Methods to dismantle: procedure for isolation and locking off a device/system; sequence of operations used to dismantle a device/system; proof marking, correct storage procedures for removed parts; release of pressure/force; extraction		2	0	2
	PC32. 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
	PC33. Keep the work area in a safe and tidy condition during and on completion of the manufacturing activities		2	0	2
	PC34. Return all tools and equipment to the correct location on completion of the fitting activities		2	0	2
	PC35. Perform the necessary checks for correct pipework assembly and dimensional accuracy		2	0	2
	PC36. Use the appropriate measuring equipment for checking activities		2	0	2

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC37. Produce components within all of the applying standards		2	1	1
	PC38. Generate stage inspection reports		2	1	1
	PC39. Different methods of pipe joining		1	1	0
	PC40. Different welding methods		1	1	0
	PC41. Care and preparation of pipe for welding depending on the material		2	0	2
	PC42. Importance of joints and different types of joints.		2	1	1
	PC43. Ensure the electrode positioning angle is correct.		2	0	2
	PC44. Select the correct welding mechanic and follow factors		1	1	0
	PC45. Know the fundamentals of manual metal arc welding.		1	1	0
	PC46. Should be able to strike and maintain a stable arc.		2	0	2
	PC47. Identify welding defects and how to rectify.		2	0	2
	PC48. Check the weld joint condition.		2	0	2
	PC49. Knowledge of NDT.		1	1	0
	PC50. Know the AWS codification of electrodes.		2	0	2
	PC51. The individual should be able to do pipe welding in vertical down and should be able to do,		2	0	2
	PC52. Ability to welding in vertical up with basic technique of , Preparation, Tacking, Joint in 5G position, Joint in 2G position, Joint in 6G position,		2	0	2
	PC53. How to make 'T-joints' and outlets Knowledge and		2	0	2
			100	28	72

Compulsory NOS Total Marks: [125]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N6106 Perform Electrofusion Welding	PC1. What is conventionally Buried Pipelines	125	2	1	1
	PC2. Where narrow/chain trenching is done		2	1	1
	PC3 How Mole ploughing is done		2	0	2
	PC4. Why Impact moling is done		2	1	1

Compulsory NOS Total Marks: [125]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC5. What is directional drilling and how it is carried		2	1	1
	PC6.What is fusion technology		2	2	0
	PC7. Why Heating coils are as close to the joint surfaces as possible.		2	1	1
	PC8. Why Wire position is accurately controlled during manufacture and during the subsequent fusion process.		2	2	0
	PC9. The importance of heat distribution uniform over the length of the hot zone.		2	2	0
	PC10. Why melt pressure and temperature are both accurately controlled.		2	2	0
	PC11. Importance why coils are protected from damage prior to, during and after fusion.		2	2	0
	PC12. Define Electrofusion Control Units		2	2	0
	PC 13. Check the pipe for any abrasions or impact damage that may provide a detrimental effect to the performance of the coupler.		2	0	2
	PC 14. Ensure that the pipe end is cut square		2	0	2
	PC 15. Mechanical scraper takes off approximately 0. 5mm of the pipe surface of the pipe diameter.		2	1	1
	PC 16. How to mark the pipe end for the couplers insertion depth.		2	0	2
	PC 17. Why scraping takes place before clean the surface of the pipe to remove as much grease, oil or surface dirt as possible.		2	0	2
	PC 18. How to use your hand scraper to create a chamfer on the leading edge of the pipe and remove all swarf from the pipe.		2	0	2
	PC 19. How to mark the pipe end for the couplers insertion depth		2	0	2
	PC 20. Importance of checking the scraper blade for its good condition.		2	0	2
	PC 21. Scrape off any remaining line markings using hand scrapper		2	0	2
	PC 22. Why not to touch the cleaned ends of the pipe or the inside of the coupler with your hands or rags.		2	0	2
	PC 23. How to protect the end against the ingress of dirt, dust or water.		2	0	2
	PC 24. Importance of placing the pipes in the clamps with the ends against the trimming tool and with the pipe markings aligned.		2	1	1
	PC 25. How to align and level the components using the support rollers.		2	0	2
	PC 26. Method of tightening the pipe clamps to		2	1	1

Compulsory NOS Total Marks: [125]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	grip and re-round the pipes.				
	PC 27. How to cover the free ends of the pipes to prevent cooling of the plate by internal draughts.		2	0	2
	PC 28. Switching on the trimming tool and close the clamps slowly so that the pipe ends are moved against the trimming tool until continuous shavings are cut from each surface.		2	0	2
	PC 29. How to Keep the trimming tool turning whilst opening the clamps to avoid steps on the trimmed surfaces.		2	0	2
	PC 30. Method of removing the trimming tool taking care not to touch the trimmed ends.		2	1	1
	PC 31. How to remove loose shavings from the machine and component ends.		2	0	2
	PC 32. Importance of why not to touch the prepared surface		2	1	1
	PC 33 .Check that both surfaces are completely planed. If they are not then repeat the trimming process.		2	0	2
	PC 34. Why close the clamps and check that there is no visible gap between the trimmed faces.		2	0	2
	PC 35. The maximum permitted outsider diameter mismatch is: 1.0 mm for pipe sizes 90 mm to 315 mm,2.0 mm for pipe sizes 316 mm to 800 mm		2	0	2
	PC 36. If the mismatch is greater than these values then the pipe must be realigned and re-trimmed.		2	0	2
	PC 37. Open and then close the clamps and note the drag pressure needed to move the pipes together using the hydraulic system		2	0	2
	PC 38. Why heating coils are as close to the joint surfaces as possible.		2	1	1
	PC 39. How wire position is accurately controlled during manufacture and during the subsequent fusion process.		2	1	1
	PC 40. Importance of heat distribution which has to be uniform over the length of the hot zone.		2	1	1
	PC 41. Why melt pressure and temperature are accurately controlled.		2	1	1
	PC 42. Why coils are to be protected from damage prior to, during and after fusion.		2	1	1
	PC 43. Why spigot ends are scraped.		2	1	1
	PC 44. Importance of cutting the pipe square and remove burrs.		2	1	1
	PC 45. How to wipe loose dirt from pipe ends.		2	0	2
	PC 46. How to place the centre of the		2	0	2

Compulsory NOS Total Marks: [125]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	electrofusion fitting alongside the pipe end and mark the pipe around the circumference.				
	PC 47. How to use the pipe end preparation tool, remove the entire surface of the pipe over the marked area		2	0	2
	PC 48. Remove the fitting from its packaging and check that the bore of the fitting is clean and dry.		2	0	2
	PC 49. To insert the pipe ends into the fitting so that they are in contact with the centre stop.		2	0	2
	PC 50. What are the socket electrofusion fittings (couplers, reducers, elbows and tees) clamps must be used.		2	1	1
	PC 51. How to remove the terminal protection caps from the terminal shrouds.		2	0	2
	PC 52. Connect the output leads to the fitting terminals.		2	0	2
	PC 53. Check that there is sufficient fuel in the generator to complete the joint.		2	0	2
	PC 54. Operate as per the instructions, which should have been thoroughly read and understood prior to any welding operations.		2	0	2
	PC 55. Understand that the joint must be left in the clamps for the cooling time specified on the fitting,		2	1	1
	PC 56. What are the Material properties & compatibility		2	1	1
	PC 57. Importance of Standard dimensional ratio		2	1	1
	PC 58. Effect of expansion and contraction		2	1	1
	PC 59. How Pipe bending is done and the radius for PE		3	1	2
	PC 60. How electrofusion fittings are able to weld pipes having different wall thicknesses		3	1	2
	PC 61. How Pressure testing is done		3	1	2
				37	88

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC1. maintain clear communication with colleagues	100	10	5	5

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N6103 Work effectively in a team	PC2. work with colleagues as a team		10	5	5
	PC3. pass on information to in line with organisational requirements		10	5	5
	PC4. work in ways that show respect for colleagues		10	5	5
	PC5. carry out commitments made to colleagues		10	5	5
	PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons		10	5	5
	PC7. identify problems in working with colleagues and take the initiative to solve these problems		10	5	5
	PC8. follow the organisation's policies and procedures for working with colleagues		15	5	10
	PC9. ability to share resources with other members as per priority of tasks		15	5	10
				45	55

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N6104 Follow health, safety and security procedures	PC1. Use protective clothing/equipment for specific tasks and work Conditions	100	3	1	2
	PC2. State the name and location of people responsible for health and safety in the workplace		2	1	1
	PC3. State the names and location of documents that refer to health and safety in the workplace		2	1	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace		2	1	1
	PC5. Carry out safe working practices while dealing with hazards to ensure the safety of self and others		3	1	2
	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		3	1	2
	PC7. State location of general health and safety equipment in the workplace		3	1	2

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC8. Inspect for faults, set up and safely use steps and ladders in general use		3	1	2
	PC9. Work safely in and around trenches, elevated places and confined areas		2	1	1
	PC10. Lift heavy objects safely using correct procedures		3	1	2
	PC11. Apply good housekeeping practices		3	1	2
	PC12. Identify common hazard signs displayed in various areas		3	1	2
	PC 13. Retrieve and/or point out documents that refer to health and safety in the workplace		2	1	1
	PC14. Use the various appropriate fire extinguishers on different types of fires correctly		3	1	2
	PC15. Demonstrate rescue techniques applied during fire hazard		2	1	1
	PC16. Demonstrate good housekeeping in order to prevent fire hazards		2	1	1
	PC17. Demonstrate the correct use of a fire extinguisher		2	1	1
	PC18. List issue concerning the safety and familiar in your work style		2	1	1
	PC19. Empower to address the unsafe condition in your work place or to stop the unsafe behaviour		3	1	2
	PC20. Record all miss incidents ,damages, illness or injury		3	1	2
	PC21. Comprehend the applicable laws, regulations and codes as per standard		3	1	2
	PC22. Promote and maintain a positive safety culture		2	1	1
	PC23. Apply and appraise the use and storage of hazardous substance and their safety		2	1	1
	PC24. Assess the threats and to protect from the threats		3	1	2
	PC25. Awareness of own safety and safety of others		3	1	2
	PC26. Bring the concern and report the HSE concern		3	1	2
	PC27. Report all incident to the supervisor		3	1	2
	PC28. Identifies and describes the property of different petroleum products.		3	1	2
	PC29. Operates and handle spills and respond to the spills		2	1	1
	PC30. Demonstrate how to free a person from electrocution		2	1	1
	PC31. Administer appropriate first aid to victims were required eg. in case of bleeding, burns,		3	1	2

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	choking, electric shock, poisoning etc.				
	PC32. Demonstrate basic techniques of bandaging		2	1	1
	PC33. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		2	1	1
	PC34. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		2	1	1
	PC35. 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		2	1	1
	PC36. Demonstrate the artificial respiration and the CPR Process		3	1	2
	PC37. Participate in emergency procedures		3	1	2
	PC38. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible Incident		3	1	2
	PC39. Demonstrate correct method to move injured people and others during an emergency		3	1	2
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