HYDROCARBON SECTOR SKILL COUNCIL

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

Pipe Fitter (Oil & Gas)

QP Code: HYC/Q6103

Version: 1.0

NSQF Level: 4

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HYC/Q6103: Pipe Fitter (Oil & Gas)

Brief Job Description

Pipefitting is a special trade which happens in oil refineries, Petrochemicals, factories, residential apartments, commercial complexes etc. In fact, any place with massive pipes, vents and ducts for gas, liquid or air may have a need for these professionals. A Pipe Fitter is a metal trades that specialises in the heavy industrial fabrication and installation of metal 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.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. HYC/N6103: Work effectively in a team
2. HYC/N6104: Follow health, safety and security procedures
3. HYC/N6109: Perform Pipe Fitting activity
4. HYC/N6110: Perform Pipe laying and joining activity

Qualification Pack (QP) Parameters

Sector	Hydrocarbon
Sub-Sector	Midstream
Occupation	Pipe Fitting in Oil & Gas
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7126.0301
Minimum Educational Qualification & Experience	10th with 2 year of exp./ or XII(science) / or ITI

Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Training on basic machining skill Training in stress management like yoga is recommended Basic technical skills knowledge on pneumatics and hydraulics
Minimum Job Entry Age	18 Years
Last Reviewed On	27/01/2022
Next Review Date	26/01/2025
Deactivation Date	
NSQC Approval Date	27/01/2022
Version	2.0
Reference code on NQR	2017/HYC/HSSCI/01963
NQR Version	2.0

HYC/N6109: Perform Pipe Fitting activity

Description

A refinery pipefitters 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

Elements and Performance Criteria

Understand the pipe line layout drawings

To be competent, the user/individual on the job must be able to:

PC1. able to understand clearly the basics of engineering drawing and how to make simple drawing.

PC2. able to draft and illustrate a pipe line system.

PC3. read the pipe chart , technical details etc

PC4. ability to 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 Pipe fitting

To be competent, the user/individual on the job must be able to:

PC7. mathematics knowledge of arithmetic, algebra, geometry, and their applications

PC8. basic knowledge on 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 Pipe fitting

To be competent, the user/individual on the job must be able to:

PC11. knowledge on different materials used for plumbing

PC12. highlight the property of different pipe material and their workability.

Preparation of pipe line

To be competent, the user/individual on the job must be able to:

PC13. understand 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. able to understand the different packing materials, adhesives, gaskets, o ring, 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

To be competent, the user/individual on the job must be able to:

PC17. knowledge and ability to use different hand tools and power tools in pipe fitting (oil & gas) 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

Pipe fitting Operation

To be competent, the user/individual on the job must 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

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

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. companys policies on: personnel management, duty reporting procedure and associated mis compliance

KU2. legislation, standards, policies, and procedures followed in the company relevant toown employment and performance conditions

KU3. own job role and responsibilities and sources for information pertaining toemployment terms, entitlements, job role and responsibilities

KU4. reporting structure within organization and relevant people and their responsibilities within the work area

KU5. problem escalation procedure and escalation matrix for reporting work and employment related issues

KU6. standard operating procedure while working

KU7. relevant health and safety requirements applicable in the work place

KU8. importance of working in clean and safe environment

KU9. documentation and related procedures applicable in the context of employment andwork

KU10. importance and purpose of documentation in context of employment and work

KU11. interpretation of drawing as per standard and knowledge of geometric dimensioning and tolerance (gd&t).

KU12. knowledge of making isometric drawing and orthographic projection.

KU13. selection of datum plain and its importance in piping.

KU14. understand to establish a proper datum

KU15. ensure to determine limits, fits and tolerance.

KU16. plan sequence of operation applying the knowledge of geometry.

KU17. know the different protective coatings used in pipe and how it protects the pipe and also the care to be taken while handling.

KU18. understand the different thread geometry, types and its application in plumbing.

KU19. how to make different types of threads on a pipe and also the different methods of thread production.

KU20. knowledge on different pipe materials and the performance of this material in different application.

KU21. basic knowledge of the property and behaviour of fluids, liquids and gases,

KU22. awareness on basic hydraulic and pneumatic elements and the working.

KU23. knowledge of heating and cooling including thermal expansion and contraction of piping system under various condition.

KU24. knowledge to calculate pipe diameter.

KU25. knowledge on seal screw joint.

KU26. different types of equipments used for threading of pipes.

KU27. knowledge on behaviour of flow of liquids, gaseous and solid materials.

KU28. making of drawing using standard symbols, proper representation and layout.

KU29. thorough understanding of location and environment where the piping is done in the following area:

KU30. knowledge on different gadgets used in plumbing

KU31. knowledge on the different operation that can be carried out using earth moving equipments.

KU32. application of different cutting fluids used while working on ferrous metals: e.g. carbon steels, stainless steels, cast iron, toolsteel, hard metals; non-ferrous metals: e.g. bronze, aluminium, copper and copper alloys

KU33. knowledge to identify correct orientation of pipe fitting in regard to the flow.

KU34. methods used for testing the pipe line.

KU35. use of different fasteners for both temporary and permanent fastening.

KU36. importance of assembly methods, techniques and procedure to be maintained while pipe fitting.

KU37. how to do positioning, aliening and fastening an assembly.

KU38. precaution to be taken while using adhesives, cements and sealing compound.

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill in the attendance sheet and the requisite details

GS2. keep abreast by reading about new policies at an organization level

GS3. 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

GS4. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language

GS5. execute task, schedules, and work-loads with co-workers and supervisors

GS6. convey and share technical information clearly using appropriate language

GS7. check and clarify task-related information

GS8. liaise with appropriate authorities using correct protocol

GS9. communicate with people in respectful form and manner in line with organizational protocol

GS10. share work load as required

GS11. assist others who require help

GS12. share knowledge with co-workers/assistant.

GS13. Undertake numerical operations, and calculations using calculatorsNumerical 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 andproportions, simple ratios and averages

GS14. identify and draw various basic, compound and solid shapes as per dimensions given Basic shapes: square, rectangle, triangle, circleCompound shapes: involving squares, rectangles, triangles, circles, semi-circles, quadrants of a circle Solid shapes: cube, rectangular prism, cylinder

GS15. demonstrate measurement and calculation of Angle, Perimeter, Area of a commongeometrical shape and can co-relate with job area requirements

GS16. use appropriate measuring techniques and units of measurement

GS17. use British and metric system of measurement and make conversions between them

GS18. describe the difference between Celsius & Fahrenheit Scale and relationshipbetween them

GS19. 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

GS20. interpret and express tolerance in terms of limits on dimensionsperform

GS21. basic operations in a computer like switching it on/off, using the mouse and keyboard, accessing files, opening, closing, creating and deleting folders, etc.

GS22. use basic office applications like spread sheet, word processor, presentations

GS23. use organizational software specific to quality function

GS24. use email to communicate within the organization as per organization guidelines

GS25. retrieve and enter data using standard system forms and templates

GS26. take printouts of documents

GS27. participate in on-the-job and other learning, training and development interventionsand assessments

GS28. clarify task related information with appropriate personnel or technical adviser

GS29. seek to improve and modify own work practices

GS30. maintain current knowledge of application standards, legislation, codes of practiceand product/process developments

GS31. identify problems with work planning, procedures, output and behaviour and theirimplications

GS32. prioritize and plan for problem solving

GS33. communicate problems appropriately to others

GS34. identify sources of information and support for problem solving

GS35. seek assistance and support from other sources to solve problems

GS36. identify effective resolution techniques

GS37. select and apply resolution techniques

GS38. seek evidence for problem resolution

GS39. plan, prioritize and sequence work operations as per job requirements

GS40. organize and analyse information relevant to work

GS41. basic concepts of shop-floor work productivity including waste reduction, efficientmaterial usage and optimization of time

GS42. undertake and express new ideas and initiatives to others

GS43. modify work plan to overcome unforeseen difficulties or developments that occuras work progresses

GS44. ones competencies in new and different situations and contexts to achieve more

GS45. exercise restraint while expressing dissent and during conflict situations

GS46. avoid and manage distractions to be disciplined at work

GS47. manage own time for achieving better results

GS48. work in a team in order to achieve better results

GS49. identify and clarify work roles within a team

GS50. communicate and cooperate with others in the team for better results

GS51. seek assistance from fellow team members

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Understand the pipe line layout drawings	**6**	**9**	**-**	**-**
PC1. able to understand clearly the basics of engineering drawing and how to make simple drawing.	1	2	-	-
PC2. able to draft and illustrate a pipe line system.	1	1	-	-
PC3. read the pipe chart , technical details etc	1	1	-	-
PC4. ability to prepare the bill of materials for doing the pipe line fabrication.	1	1	-	-
PC5. understand blue print reading including standard symbols used in plumbing and also different piping lines and valves used in plumbing.	1	2	-	-
PC6. read and interpret hangers and support drawing.	1	2	-	-
Mathematical skills with respect to Pipe fitting	**4**	**7**	**-**	**-**
PC7. mathematics knowledge of arithmetic, algebra, geometry, and their applications	1	2	-	-
PC8. basic knowledge on area, volume, angles and length	1	2	-	-
PC9. calculate length and diameter of the pipe system using the metric system as well as english system.	1	1	-	-
PC10. calculate dimensions of the bend required in plumbing.	1	2	-	-
Knowledge on different types of materials used in Pipe fitting	**2**	**4**	**-**	**-**
PC11. knowledge on different materials used for plumbing	1	2	-	-
PC12. highlight the property of different pipe material and their workability.	1	2	-	-
Preparation of pipe line	**4**	**7**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. understand the different bends, elbows, shapes, joints etc used to fabricate the pipes.	1	1	-	-
PC14. identify and discriminate different types of nuts, bolts, screws, clamps, fixtures etc. used in plumbing.	1	2	-	-
PC15. able to understand the different packing materials, adhesives, gaskets, o ring, ropes etc. and how to cut gaskets using a cutting machine.	1	2	-	-
PC16. install and check for the functions of different types of valves, gauges and other related accessories.	1	2	-	-
Identify the tools and tackles that are required to carry out the assigned job	**1**	**2**	**-**	**-**
PC17. knowledge and ability to use different hand tools and power tools in pipe fitting (oil & gas) 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	1	2	-	-
Pipe fitting Operation	**21**	**33**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	1	1	-	-
PC19. use the appropriate equipment, parts and accessories for the pipe fitting or assembling operation as per the standards.	1	2	-	-
PC20. check for the calibration date of all measuring equipment	1	2	-	-
PC21. identification and preparation of suitable datum from which to start the marking .	1	2	-	-
PC22. application of marking medium to enhance clarity of the marking and proper visibility.	1	1	-	-
PC23. carry out appropriate method of marking	1	1	-	-
PC24. use a range of marking out equipment (e.g. rules, squares, scribers, vernier instruments)	1	2	-	-
PC25. mark out a range of feature	1	2	-	-
PC26. plan the pipe fitting activities before starting as per the drawing.	1	2	-	-
PC27. cut the pipes to the appropriate lengths making allowances for bending using appropriate cutting operations and techniques	1	2	-	-
PC28. produce pipework bends using the appropriate tools and equipment for the types and sizes of pipe	1	2	-	-
PC29. assemble and secure the pipework as per job specifications using appropriate pipe assembly methods and techniques	1	1	-	-
PC30. produce pipework assemblies which combine a range of different fittings	1	1	-	-
PC31. dismantle pipework assemblies without damage to components and/or subassemblies	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	1	1	-	-
PC33. keep the work area in a safe and tidy condition during and on completion of the manufacturing activities	1	1	-	-
PC34. return all tools and equipment to the correct location on completion of the fitting activities	1	1	-	-
PC35. perform the necessary checks for correct pipework assembly and dimensional accuracy	1	1	-	-
PC36. use the appropriate measuring equipment for checking activities	1	2	-	-
PC37. produce components within all of the applying standards	1	2	-	-
PC38. generate stage inspection reports	1	2	-	-
NOS Total	**38**	**62**	**-**	**-**

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Qualification Pack

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National Occupational Standards (NOS) Parameters

NOS Code	HYC/N6109
NOS Name	Perform Pipe Fitting activity
Sector	Hydrocarbon
Sub-Sector	Midstream
Occupation	Pipe Fitting in Oil & Gas
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	31/03/2017
Next Review Date	31/03/2019
Deactivation Date	NA
NSQC Clearance Date	22/06/2017

HYC/N6110: Perform Pipe laying and joining activity

Description

A refinery pipefitters job entails building and ensuring the integrity of the pipes that will transport oil, gas or steam.

Scope

The unit/ task covers the following:

- Understand the pipe
- line layout for petroleum product distribution
- Oil and products
- Knowledge on different types of joining in plumbing
- Pipe line laying
- Physical requirement

Elements and Performance Criteria

Understand the pipe line layout for petroleum product distribution

To be competent, the user/individual on the job must be able to:

PC1. the different procedures involved in planning of pipe line laying Natural Gas Transmission System

PC2. knowledge of what material to be transported

PC3. understand specific regulations covering pipe line operation and that could affect the populated area, drinking water sources and ecological sensitive area.

PC4. plan procedure for long distance pipe line. Preliminary planning Route selection Acquisition Soil boring Testing Pipe line design reading Check for legal permit availability.

PC5. start and execute the pipe line work Way preparation Stringing Trenching River crossing Welding, coating and wrapping Pipe laying Inspecting Back filing and restoration of land

Oil and products

To be competent, the user/individual on the job must be able to:

PC6. knowledge of refining and how the crude oil is converted into useable products.

PC7. knowledge of petroleum products and their property

PC8. knowledge of Liquefied Natural Gas (LNG)

PC9. knowledge of different methods of pipe joining

PC10. understanding of the different welding methods used in performing pipe laying and jointing activity such as Oxyacetylene welding Shielded metal arc welding Gas-tungsten arc welding Gas-metal arc welding Flux-core arc welding Plasma arc welding Submerged arc welding Electro slag welding Electron beam welding Laser beam welding Resistance welding Friction welding

PC11. Care and preparation of pipe for welding depending on the material

PC12. Importance of joints and different types of joints.

PC13. Ensure the electrode positioning angle is correct.

PC14. Knowledge of the pipes are classified and identify the material and dimensional and Physical characteristics as per types.

PC15. Read and interpret routine information on written job instructions, welding procedure specification.

PC16. Knowledge of the Selection of correct welding mechanic and follow factors

PC17. Know the fundamentals of manual metal arc welding.

PC18. Should be able to strike and maintain a stable arc.

PC19. Identify welding defects and how to rectify.

PC20. Check the weld joint condition.

PC21. Knowledge of NDT.

PC22. Know the AWS codification of electrodes.

PC23. able to do pipe welding in vertical down and should be able to do, Preparation Tacking Joint in 5G position Joint in 6G position

PC24. Ability to welding in vertical up with basic technique of pipe jointing

PC25. Highlight the automatic pipe welding and to compare with other methods.

PC26. Select the right tube for the job and able to recommend different types of tubes as per applications.

PC27. Understanding of different design and installation datas like, Main Pressure Pressure losses Pressure consideration Frictional losses Velocity unit Hydrostatic

PC28. knowledge on safety standards.

PC29. Perform different work with tubes.

PC30. Perform different joining methods. Soldering Brazing Electrical resistance by Butt welding

PC31. Knowledge on different solders and fluxes used for joining.

PC32. Carry out different filling operations like, Measuring and cutting Reaming Cleaning Assembly Support Testing

PC33. Carry out brazing with correct filler material, flux, heating and assembly.

PC34. Ability to create a flared joint, Roll groove joint, Press connect joint and Push connect joint.

PC35. knowledge to make T-joints and outlets

Pipe line laying

To be competent, the user/individual on the job must be able to:

PC37. Understanding of the importance of the following in pipe layout process Survey Clear and grade easement Stringing and bending Welding and ultrasonic testing Weld joint coating Pre-trenching Lowering in Tie-ins Padding and backfilling Pressure testing Reinstatement Signage

PC38. Know the importance of physical requirements in this provision Stand or walk for long periods of time Use arms and hands to reach for, handle or manipulate objects Lift and carry materials weighing Climb up and down ladders, scaffolds and other objects Stoop, kneel, crouch and crawl See well (naturally or with correction) Eye-hand coordination Good physical fitness Good sense of balance Work at great heights

PC36. Determine pipeline diameter is on the basis of the main operational parameters for the pipeline system, such as: Flowrate Expected system availability e.g. tolerated uptime and downtime Requirements for delivery pressure Properties of the transported medium

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. understand companys policies on: personnel management, duty reporting procedure and associated MIS compliance

KU2. 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

KU3. reviews and approves the requisition of materials/equipment by assigned employees

KU4. reviews and approves the requisition of materials/equipment by assigned employees; may tag and store material as necessary

KU5. maintains records and prepares reports on repairs completed or on units requiring future special service

KU6. 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.

KU7. ability to understand and carry out work direction in a safe manner

KU8. importance of working in clean and safe environment

KU9. ability to document related procedures applicable in the context of employment andwork

KU10. describe the functions of typical components on gas pipeline facilities

KU11. describe the properties of hydrocarbons and basics of hydrocarbons processing

KU12. knowledge of the principles of corrosion control

KU13. understand the principles of gas compression

KU14. explain the principles of gas measurement

KU15. explain the principles of operation of gas analysis systems including moisture analysers, gas chromatographs, densitometers, calorimeters

KU16. explain the principles of operation of typical pipeline instruments, monitoring and control systems (incl. SCADA)

KU17. explain the principles of petroleum geology, extraction and processing

KU18. know the principles of pigging

KU19. explain the principles of rotating equipment, lubrication and bearings

KU20. interpret process and instrumentation diagrams for a facility

KU21. understand risks that transmission pipelines pose to the community and mitigation of those risks;

KU22. transmission pipeline historical safety performance;

KU23. describe what is blasting

KU24. explain the importance fences and grazing

KU25. advantage of telecommunications towers

KU26. importance of corrosion protection and detection systems

KU27. measures to taken to allow pipeline expansion

KU28. explain horizontal earth boring and horizontal auger boring

KU29. knowledge of the micro tunnelling

KU30. the flux used to deoxidize and cleanse the weld metal.

KU31. safety precautions associated with natural gas pipelines

KU32. some knowledge of the performance of various pipe materials under a wide variety of conditions.

KU33. some knowledge of the hazards of the trade, and of necessary precautionary measures

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. follow verbal and written instructions

GS2. communicate orally and in writing with other team members, leaders and operations personnel

GS3. determining personnel matters (such as job progress, schedule changes, time sheet review, and work performance)

GS4. knowledge of human resource and supervisory activities, including the coordination and management of people and resources

GS5. work within company policy as outlined

GS6. 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

GS7. identifying complex problems and reviewing related information to develop and evaluate options and implement solutions

GS8. ability to listen to and understand information and ideas presented through spoken words and sentences

GS9. performs other related duties as assigned

GS10. ability to apply general rules to specific problems to produce answers that make sense

GS11. participates in the management of personnel matters/activities

GS12. identify pipe fittings by size, type, material, and service type

GS13. read and interpret hanger and support drawings

GS14. identify pipe by size, type, and wall thickness

GS15. calculate how threaded is measured

GS16. install pipe hangers, supports, anchors, and guides

GS17. read and interpret pipe and hanger drawings

GS18. calculate pressure and heat in piping systems

GS19. mathematics knowledge of arithmetic, algebra, geometry, , and their applications

GS20. participate in on-the-job and other learning, training and development interventionsand assessments

GS21. clarify task related information with appropriate personnel or technical adviser

GS22. seek to improve and modify own work practices

GS23. maintain current knowledge of application standards, legislation, codes of practiceand product/process developments

GS24. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments

GS25. plan and organize work to achieve targets and deadlines

GS26. check that the work meets customer requirements
GS27. deliver consistent and reliable service to customers
GS28. apply problem solving approaches in different situations
GS29. apply balanced judgments to different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Understand the pipe line layout for petroleum product distribution	**5**	**8**	**-**	**-**
PC1. the different procedures involved in planning of pipe line laying Natural Gas Transmission System	1	2	-	-
PC2. knowledge of what material to be transported	1	1	-	-
PC3. understand specific regulations covering pipe line operation and that could affect the populated area, drinking water sources and ecological sensitive area.	1	1	-	-
PC4. plan procedure for long distance pipe line. Preliminary planning Route selection Acquisition Soil boring Testing Pipe line design reading Check for legal permit availability.	1	2	-	-
PC5. start and execute the pipe line work Way preparation Stringing Trenching River crossing Welding, coating and wrapping Pipe laying Inspecting Back filing and restoration of land	1	2	-	-
Oil and products	**28**	**50**	**-**	**-**
PC6. knowledge of refining and how the crude oil is converted into useable products.	1	2	-	-
PC7. knowledge of petroleum products and their property	1	2	-	-
PC8. knowledge of Liquefied Natural Gas (LNG)	1	2	-	-
PC9. knowledge of different methods of pipe joining	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understanding of the different welding methods used in performing pipe laying and jointing activity such as Oxyacetylene welding Shielded metal arc welding Gas-tungsten arc welding Gas-metal arc welding Flux-core arc welding Plasma arc welding Submerged arc welding Electro slag welding Electron beam welding Laser beam welding Resistance welding Friction welding	1	2	-	-
PC11. Care and preparation of pipe for welding depending on the material	1	2	-	-
PC12. Importance of joints and different types of joints.	1	2	-	-
PC13. Ensure the electrode positioning angle is correct.	-	3	-	-
PC14. Knowledge of the pipes are classified and identify the material and dimensional and Physical characteristics as per types.	1	2	-	-
PC15. Read and interpret routine information on written job instructions, welding procedure specification.	1	2	-	-
PC16. Knowledge of the Selection of correct welding mechanic and follow factors	1	2	-	-
PC17. Know the fundamentals of manual metal arc welding.	1	2	-	-
PC18. Should be able to strike and maintain a stable arc.	1	1	-	-
PC19. Identify welding defects and how to rectify.	1	2	-	-
PC20. Check the weld joint condition.	1	2	-	-
PC21. Knowledge of NDT.	1	2	-	-
PC22. Know the AWS codification of electrodes.	1	1	-	-
PC23. able to do pipe welding in vertical down and should be able to do, Preparation Tacking Joint in 5G position Joint in 6G position	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. Ability to welding in vertical up with basic technique of pipe jointing	-	2	-	-
PC25. Highlight the automatic pipe welding and to compare with other methods.	-	2	-	-
PC26. Select the right tube for the job and able to recommend different types of tubes as per applications.	1	2	-	-
PC27. Understanding of different design and installation datas like, Main Pressure Pressure losses Pressure consideration Frictional losses Velocity unit Hydrostatic	1	2	-	-
PC28. knowledge on safety standards.	2	-	-	-
PC29. Perform different work with tubes.	1	1	-	-
PC30. Perform different joining methods. Soldering Brazing Electrical resistance by Butt welding	1	1	-	-
PC31. Knowledge on different solders and fluxes used for joining.	1	2	-	-
PC32. Carry out different filling operations like, Measuring and cutting Reaming Cleaning Assembly Support Testing	1	1	-	-
PC33. Carry out brazing with correct filler material, flux, heating and assembly.	1	1	-	-
PC34. Ability to create a flared joint, Roll groove joint, Press connect joint and Push connect joint.	1	1	-	-
PC35. knowledge to make T-joints and outlets	1	1	-	-
Pipe line laying	**3**	**6**	**-**	**-**
PC37. Understanding of the importance of the following in pipe layout process Survey Clear and grade easement Stringing and bending Welding and ultrasonic testing Weld joint coating Pre-trenching Lowering in Tie-ins Padding and backfilling Pressure testing Reinstatement Signage	1	2	-	-

HYC/N9301: Working effectively in a team

Description

This unit is about working effectively within a team.

Scope

The scope covers the following :

- Effective team work

Elements and Performance Criteria

Effective team work

To be competent, the user/individual on the job must be able to:

PC1. maintain clear communication with colleagues
PC2. pass on information to colleagues in line with organisational requirements
PC3. provide support to the team members
PC4. respect the colleagues
PC5. fulfil commitments made to colleagues
PC6. inform team members timely, if timelines can't be met
PC7. take the necessary initiatives to resolve the issues while working in team
PC8. adopt gender neutral behaviour while interacting with colleagues
PC9. offer assistance to a person with disability (PWD), only if required

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the organization policies and procedures related to team performance
KU2. the importance of effective communication and establishing good working relationships with colleagues
KU3. the importance of creating an environment of trust and mutual respect
KU4. the implications of own work on the work and schedule of others
KU5. the standard practices in organisation w.r.t communication at various levels
KU6. the personal responsibility for completing the task in time
KU7. importance of gender equality
KU8. importance of showing empathy while interacting with a PwD

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively in writing

GS2. read instructions, guidelines/procedures
GS3. work in a disciplined manner for meeting commitments and deadline
GS4. how to plan and prioritise the work
GS5. the importance of consistent and reliable services
GS6. apply problem solving approaches in different situations
GS7. apply balanced judgments to different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Effective team work	**20**	**30**	**-**	**-**
PC1. maintain clear communication with colleagues	2	3	-	-
PC2. pass on information to colleagues in line with organisational requirements	2	3	-	-
PC3. provide support to the team members	2	4	-	-
PC4. respect the colleagues	3	4	-	-
PC5. fulfil commitments made to colleagues	2	3	-	-
PC6. inform team members timely, if timelines can't be met	2	4	-	-
PC7. take the necessary initiatives to resolve the issues while working in team	3	4	-	-
PC8. adopt gender neutral behaviour while interacting with colleagues	2	2	-	-
PC9. offer assistance to a person with disability (PWD), only if required	2	3	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	HYC/N9301
NOS Name	Working effectively in a team
Sector	Hydrocarbon
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

HYC/N9302: Maintain health, safety and security procedures

Description

This unit is about maintaining health, safety and security procedure at workplace. It covers responsibilities towards self, others, assets and the environment.

Scope

The scope covers the following :

- Follow health and safety measures
- Follow safety procedures during emergency

Elements and Performance Criteria

Follow health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. use protective clothing/equipment such as face mask, hand gloves, goggle etc for specific tasks and work conditions

PC2. identify the people responsible for maintaining health and safety in the workplace

PC3. identify possible causes of risk or accident in the workplace

PC4. follow safe working practices while dealing with hazards to ensure the safety of self and others

PC5. lift heavy objects safely using correct procedures

PC6. follow safety signages

PC7. maintain hands hygiene by washing hand frequently and thoroughly with soap and water or alcohol-based hand rub

PC8. inform the concerned person of any illness related to self and others

PC9. maintain workplace hygiene by disinfecting the equipment and tools regularly

Follow safety procedures during emergency

To be competent, the user/individual on the job must be able to:

PC10. respond promptly and appropriately to an accident or in an emergency situation

PC11. use appropriate fire extinguishers for different types of fires correctly

PC12. follow appropriate rescue techniques during fire hazard

PC13. follow good housekeeping practice in order to prevent fire hazards

PC14. inform fire safety department about any near-miss incidents in the work place

PC15. provide appropriate first aid to victims in an emergency situation

PC16. follow the applicable regulations and codes as per safety standard

PC17. prepare written accident/incident report and share with the concerned officer/department

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company's policies on personnel management and duty reporting procedure
KU2. reporting structure within organization
KU3. health and safety hazards commonly affecting the work environment and related precautions
KU4. importance of maintaining personal hygiene using PPE kit, sanitizer and soap
KU5. importance of maintaining workplace hygiene
KU6. preventative and remedial actions to be taken in the case of exposure to toxic materials
KU7. importance of using protective clothing/equipment while working
KU8. various causes of fire
KU9. techniques of using different types of fire extinguishers
KU10. different materials used for extinguishing fire
KU11. various types of safety signs and their significance

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively by writing
GS2. read instructions, guidelines/procedures and reports
GS3. identify and report potential sources of danger
GS4. how to plan the work to meet the deadline
GS5. the importance of on time services
GS6. apply problem solving approaches in different situations
GS7. apply balanced judgments in different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow health and safety measures	**9**	**15**	**-**	**-**
PC1. use protective clothing/equipment such as face mask, hand gloves, goggle etc for specific tasks and work conditions	1	2	-	-
PC2. identify the people responsible for maintaining health and safety in the workplace	1	-	-	-
PC3. identify possible causes of risk or accident in the workplace	1	2	-	-
PC4. follow safe working practices while dealing with hazards to ensure the safety of self and others	1	2	-	-
PC5. lift heavy objects safely using correct procedures	1	2	-	-
PC6. follow safety signages	1	2	-	-
PC7. maintain hands hygiene by washing hand frequently and thoroughly with soap and water or alcohol-based hand rub	1	2	-	-
PC8. inform the concerned person of any illness related to self and others	1	1	-	-
PC9. maintain workplace hygiene by disinfecting the equipment and tools regularly	1	2	-	-
Follow safety procedures during emergency	**11**	**15**	**-**	**-**
PC10. respond promptly and appropriately to an accident or in an emergency situation	1	2	-	-
PC11. use appropriate fire extinguishers for different types of fires correctly	2	2	-	-
PC12. follow appropriate rescue techniques during fire hazard	1	2	-	-
PC13. follow good housekeeping practice in order to prevent fire hazards	1	1	-	-
PC14. inform fire safety department about any near-miss incidents in the work place	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. provide appropriate first aid to victims in an emergency situation	1	2	-	-
PC16. follow the applicable regulations and codes as per safety standard	1	2	-	-
PC17. prepare written accident/incident report and share with the concerned officer/department	2	2	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	HYC/N9302
NOS Name	Maintain health, safety and security procedures
Sector	Hydrocarbon
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC38. Know the importance of physical requirements in this provision Stand or walk for long periods of time Use arms and hands to reach for, handle or manipulate objects Lift and carry materials weighing Climb up and down ladders, scaffolds and other objects Stoop, kneel, crouch and crawl See well (naturally or with correction) Eye-hand coordination Good physical fitness Good sense of balance Work at great heights	1	2	-	-
PC36. Determine pipeline diameter is on the basis of the main operational parameters for the pipeline system, such as: Flowrate Expected system availability e.g. tolerated uptime and downtime Requirements for delivery pressure Properties of the transported medium	1	2	-	-
NOS Total	**36**	**64**	**-**	**-**

HYC/N6105: Fitting, Welding Basics and Joining Process of Materials

Description

A pipefitters 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

Elements and Performance Criteria

Understand the pipe line layout drawings

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

PC17. knowledge and ability to use different hand tools and power tools in plumbing and appreciate the advantage of correct tools used. i.e. 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

To be competent, the user/individual on the job must 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

To be competent, the user/individual on the job must be able to:

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 (KU)

The individual on the job needs to know and understand:

KU1. companys policies on: personnel management, duty reporting procedure and associated mis compliance
KU2. legislation, standards, policies, and procedures followed in the company relevant to own employment and performance conditions
KU3. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities
KU4. reporting structure within organization and relevant people and their responsibilities within the work area

KU5. problem escalation procedure and escalation matrix for reporting work and employment related issues

KU6. standard operating procedure while working

KU7. relevant health and safety requirements applicable in the work place

KU8. importance of working in clean and safe environment

KU9. documentation and related procedures applicable in the context of employment and work

KU10. importance and purpose of documentation in context of employment and work

KU11. interpretation of drawing as per standard and knowledge of geometric dimensioning and tolerance (gd&t).

KU12. knowledge of making isometric drawing and orthographic projection.

KU13. selection of datum plain and its importance in piping.

KU14. ensure to establish a proper datum

KU15. knowledge to determine limits, fits and tolerance.

KU16. plan sequence of operation applying the knowledge of geometry.

KU17. know the different protective coatings used in pipe and how it protects the pipe and also the care to be taken while handling.

KU18. understand the different thread geometry, types and its application in plumbing.

KU19. make different types of threads on a pipe and also the different methods of thread production.

KU20. knowledge on different pipe materials and the performance of this material in different application.

KU21. basic knowledge of the property and behaviour of fluids, liquids and gases

KU22. awarness on basic hydraulic and pneumatic elements and the working

KU23. knowledge of heating and cooling including thermal expansion and contraction of piping system under various condition.

KU24. knowledge to calculate pipe diameter.

KU25. knowledge on seal screw joint.

KU26. different types of equipments used for threading of pipes.

KU27. knowledge on behaviour of flow of liquids, gaseous and solid materials.

KU28. making of drawing using standard symbols, proper representation and layout.

KU29. thorough understanding of location and environment where the piping is done in the different area

KU30. knowledge on different gadgets used in plumbing

KU31. knowledge on the different operation that can be carried out using earth moving equipments.

KU32. 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

KU33. identify correct orientation of pipe fitting in regard to the flow.

KU34. methods used for testing the pipe line.

KU35. use of different fasteners for both temporary and permanent fastening.

KU36. importance of assembly methods, techniques and procedure to be maintained while pipe fitting.

KU37. knowledge to do positioning, aliening and fastening an assembly.

KU38. precaution to be taken while using adhesives, cements and sealing compound

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. Fill in the attendance sheet and the requisite details

GS2. Keep abreast by reading about new policies at an organization level

GS3. 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

GS4. Fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language

GS5. Execute task, schedules, and work-loads with co-workers and supervisors

GS6. Convey and share technical information clearly using appropriate language

GS7. Check and clarify task-related information

GS8. Liaise with appropriate authorities using correct protocol

GS9. Communicate with people in respectful form and manner in line with organizational protocol

GS10. Share work load as required

GS11. Assist others who require help

GS12. Share knowledge with co-workers/assistant.

GS13. 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

GS14. 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

GS15. Demonstrate measurement and calculation of Angle, Perimeter, Area of a common geometrical shape and can co-relate with job area requirements

GS16. Use appropriate measuring techniques and units of measurement

GS17. Use British and metric system of measurement and make conversions between them

GS18. Describe the difference between Celsius & Fahrenheit Scale and relationship between them

GS19. 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

GS20. Interpret and express tolerance in terms of limits on dimensions perform

GS21. Basic operations in a computer like switching it on/off, using the mouse and keyboard, accessing files, opening, closing, creating and deleting folders, etc.

GS22. Use basic office applications like spread sheet, word processor, presentations

GS23. Use organizational software specific to quality function
GS24. Use email to communicate within the organization as per organization guidelines
GS25. Retrieve and enter data using standard system forms and templates
GS26. Take printouts of documents
GS27. Participate in on-the-job and other learning, training and development interventions and assessments
GS28. Clarify task related information with appropriate personnel or technical adviser
GS29. Seek to improve and modify own work practices
GS30. Maintain current knowledge of application standards, legislation, codes of practice and product/process developments
GS31. Identify problems with work planning, procedures, output and behaviour and their implications
GS32. Prioritize and plan for problem solving
GS33. Communicate problems appropriately to others
GS34. Identify sources of information and support for problem solving
GS35. Seek assistance and support from other sources to solve problems
GS36. Identify effective resolution techniques
GS37. Select and apply resolution techniques
GS38. Seek evidence for problem resolution
GS39. Plan, prioritize and sequence work operations as per job requirements
GS40. Organize and analyse information relevant to work
GS41. Basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time
GS42. Undertake and express new ideas and initiatives to others
GS43. Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses
GS44. Ones competencies in new and different situations and contexts to achieve more
GS45. Exercise restraint while expressing dissent and during conflict situations
GS46. Avoid and manage distractions to be disciplined at work
GS47. Manage own time for achieving better results
GS48. Work in a team in order to achieve better results
GS49. Identify and clarify work roles within a team
GS50. Communicate and cooperate with others in the team for better results
GS51. Seek assistance from fellow team members

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Understand the pipe line layout drawings	**8**	**4**	**-**	**-**
PC1. clearly the basics of engineering drawing and how to make simple drawing.	1	1	-	-
PC2. draft and illustrate a pipe line system.	1	1	-	-
PC3. read the pipe chart, technical details etc.	2	-	-	-
PC4. prepare the bill of materials for doing the pipe line fabrication.	1	1	-	-
PC5. understand blue print reading including standard symbols used in plumbing and also different piping lines and valves used in plumbing.	1	1	-	-
PC6. read and interpret hangers and support drawing.	2	-	-	-
Mathematical skills with respect to plumbing	**6**	**2**	**-**	**-**
PC7. mathematics knowledge of arithmetic, algebra, geometry, and their applications	2	-	-	-
PC8. calculate area, volume, angles and length	2	-	-	-
PC9. calculate length and diameter of the pipe system using the metric system as well as english system.	1	1	-	-
PC10. calculate dimensions of the bend required in plumbing.	1	1	-	-
Knowledge on different types of materials used in plumbing	**4**	**-**	**-**	**-**
PC11. Knowledge on different materials used for plumbing Black iron Galvanized iron Cast iron Stainless steel Copper Cement Plastic/Synthetic	2	-	-	-
PC12. highlight the property of different pipe material and their workability.	2	-	-	-
Preparation of pipe line	**-**	**8**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. the different bends, elbows, shapes, joints etc. used to fabricate the pipes.	-	2	-	-
PC14. identify and discriminate different types of nuts, bolts, screws, clamps, fixtures etc. used in plumbing.	-	2	-	-
PC15. the different packing materials, adhesives, gaskets, ropes etc. and how to cut gaskets using a cutting machine.	-	2	-	-
PC16. install and check for the functions of different types of valves, gauges and other related accessories.	-	2	-	-
Identify the tools and tackles that are required to carry out the assigned job	**-**	**2**	**-**	**-**
PC17. knowledge and ability to use different hand tools and power tools in plumbing and appreciate the advantage of correct tools used. i.e. 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	-	2	-	-
Perform Pipe fitting operation	**4**	**37**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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	-	-
PC19. use the appropriate equipment, parts and accessories for the pipe fitting or assembling operation as per the standards.	-	2	-	-
PC20. check for the calibration date of all measuring equipment	-	2	-	-
PC21. identification and preparation of suitable datum from which to start the marking.	-	2	-	-
PC22. application of marking medium to enhance clarity of the marking and proper visibility.	1	1	-	-
PC23. carry out appropriate method of marking	-	2	-	-
PC24. use a range of marking out equipment (e.g. rules, squares, scribers, vernier instruments)	-	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 pitch circles	-	2	-	-
PC26. plan the pipe fitting activities before starting as per the drawing.	1	-	-	-
PC27. cut the pipes to the appropriate lengths making allowances for bending using appropriate cutting operations and techniques	-	2	-	-
PC28. produce pipework bends using the appropriate tools and equipment for the types and sizes of pipe	-	2	-	-
PC29. assemble and secure the pipework as per job specifications using appropriate pipe assembly methods and techniques	-	2	-	-
PC30. produce pipework assemblies which combine a range of different fittings	-	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC31. dismantle pipework assemblies without damage to components and/or subassemblies	-	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	-	-
PC33. keep the work area in a safe and tidy condition during and on completion of the manufacturing activities	-	2	-	-
PC34. return all tools and equipment to the correct location on completion of the fitting activities	-	2	-	-
PC35. perform the necessary checks for correct pipework assembly and dimensional accuracy	-	2	-	-
PC36. use the appropriate measuring equipment for checking activities	-	2	-	-
PC37. produce components within all of the applying standards	1	1	-	-
PC38. generate stage inspection reports	1	1	-	-
Pipe Jointing	**6**	**19**	**-**	**-**
PC39. understanding of different methods of pipe joining	1	-	-	-
PC40. knowledge of different welding methods	1	-	-	-
PC41. care and preparation of pipe for welding depending on the material	-	2	-	-
PC42. importance of joints and different types of joints.	1	1	-	-
PC43. ensure the electrode positioning angle is correct.	-	2	-	-
PC44. select the correct welding mechanic and follow factors,	1	-	-	-
PC45. knowledge of the fundamentals of manual metal arc welding.	1	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC46. should be able to strike and maintain a stable arc.	-	2	-	-
PC47. identify welding defects and how to rectify.	-	2	-	-
PC48. check the weld joint condition.	-	2	-	-
PC49. knowledge of ndt.	1	-	-	-
PC50. knowledge of the aws codification of electrodes.	-	2	-	-
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	-	2	-	-
PC52. ability to welding in vertical up with basic different techniques	-	2	-	-
PC53. knowledge to make t-joints and outlets	-	2	-	-
NOS Total	**28**	**72**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	HYC/N6105
NOS Name	Fitting, Welding Basics and Joining Process of Materials
Sector	Hydrocarbon
Sub-Sector	Midstream
Occupation	Pipe Fitting in Oil & Gas
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	31/03/2017
Next Review Date	31/03/2019
Deactivation Date	NA
NSQC Clearance Date	22/06/2017

HYC/N6106: Perform 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

Elements and Performance Criteria

Procedures & Techniques for PE Pipeline Installations

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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.

Perform Electrofusion

To be competent, the user/individual on the job must be able to:

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

To be competent, the user/individual on the job must be able to:

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 (KU)

The individual on the job needs to know and understand:

KU1. understand companys policies on: personnel management, duty reporting procedure and associated mis compliance

KU2. 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

KU3. reviews and approves the requisition of materials/equipment by assigned employees

KU4. reviews and approves the requisition of materials/equipment by assigned employees; may tag and store material as necessary

KU5. maintains records and prepares reports on repairs completed or on units requiring future special service

KU6. 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.

KU7. ability to understand and carry out work direction in a safe manner

KU8. importance of working in clean and safe environment
KU9. ability to document related procedures applicable in the context of employment and wor
KU10. describe the functions of typical components on gas pipeline facilities
KU11. describe the properties of hydrocarbons and basics of hydrocarbons processing
KU12. understand the principles of corrosion control
KU13. knowledge of the principles of gas compression
KU14. explain the principles of gas measurement
KU15. explain the principles of operation of gas analysis systems including moisture analysers, gas chromatographs, densitometers, calorimeters
KU16. explain the principles of operation of typical pipeline instruments, monitoring and control systems (incl. scada)
KU17. explain the principles of petroleum geology, extraction and processing
KU18. explain the principles of pigging
KU19. explain the principles of rotating equipment, lubrication and bearings
KU20. interpret process and instrumentation diagrams for a facility
KU21. understand risks that transmission pipelines pose to the community and mitigation of those risks;
KU22. transmission pipeline historical safety performance;
KU23. describe what is blasting
KU24. explain the importance fences and grazing
KU25. advantage of telecommunications towers
KU26. importance of corrosion protection and detection systems
KU27. measures to taken to allow pipeline expansion
KU28. explain horizontal earth boring and horizontal auger boring
KU29. knowledge of micro tunnelling
KU30. the flux used to deoxidize and cleanse the weld metal.
KU31. safety precautions associated with natural gas pipelines
KU32. some knowledge of the performance of various pipe materials under a wide variety of conditions.
KU33. knowledge of the hazards of the trade, and of necessary precautionary measures

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. follow verbal and written instructions
GS2. communicate orally and in writing with other team members, leaders and operations personnel
GS3. determining personnel matters (such as job progress, schedule changes, time sheet review, and work performance)
GS4. knowledge of human resource and supervisory activities, including the coordination and management of people and resources

GS5. work within company policy as outlined
GS6. read, write and communicate using english language sufficient to perform job functions
GS7. ability to understand and carry out work direction in a safe manner
GS8. identifying complex problems and reviewing related information to develop and evaluate options and implement solutions
GS9. ability to listen to and understand information and ideas presented through spoken words and sentences
GS10. Performs other related duties as assigned
GS11. Ability to apply general rules to specific problems to produce answers that make sense
GS12. Participates in the management of personnel matters/activities
GS13. pipe fittings by size, type, material, and service type
GS14. and interpret hanger and support drawings
GS15. pipe by size, type, and wall thickness
GS16. how threaded is measured
GS17. pipe hangers, supports, anchors, and guides
GS18. and interpret pipe and hanger drawings
GS19. pressure and heat in piping systems
GS20. Knowledge of arithmetic, algebra, geometry, , and their applications
GS21. participate in on-the-job and other learning, training and development interventions and assessments
GS22. clarify task related information with appropriate personnel or technical adviser
GS23. seek to improve and modify own work practices
GS24. maintain current knowledge of application standards, legislation, codes of practice and product/process developments
GS25. make decisions on a suitable course of action or response keeping in view resource utilization while meeting commitments
GS26. plan and organize work to achieve targets and deadlines
GS27. check that the work meets customer requirements
GS28. deliver consistent and reliable service to customers
GS29. apply problem solving approaches in different situations
GS30. apply balanced judgments to different situations
GS31. work in a team in order to achieve better results
GS32. identify and clarify work roles within a team
GS33. communicate and cooperate with others in the team for better results
GS34. seek assistance from fellow team members

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Procedures & Techniques for PE Pipeline Installations	**4**	**6**	**-**	**-**
PC1. understand conventionally buried pipelines	1	1	-	-
PC2. perform narrow/chain trenching	1	1	-	-
PC3. perform mole ploughing	-	2	-	-
PC4. perform impact moling	1	1	-	-
PC5. carry out directional drilling	1	1	-	-
Electrofusion Principles	**13**	**1**	**-**	**-**
PC6. understand fusion technology	2	-	-	-
PC7. heating coils are as close to the joint surfaces as possible.	1	1	-	-
PC8. wire position is accurately controlled during manufacture and during the subsequent fusion process.	2	-	-	-
PC9. the importance of heat distribution uniform over the length of the hot zone.	2	-	-	-
PC10. ensure to melt pressure and temperature are both accurately controlled.	2	-	-	-
PC11. importance why coils are protected from damage prior to, during and after fusion.	2	-	-	-
PC12. define electrofusion control units	2	-	-	-
Preparing the pipe	**1**	**21**	**-**	**-**
PC13. check the pipe for any abrasions or impact damage that may provide a detrimental effect to the performance of the coupler.	-	2	-	-
PC14. ensure that the pipe end is cut square	-	2	-	-
PC15. mechanical scraper takes off approximately 0. 5mm of the pipe surface of the pipe diameter.	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. mark the pipe end for the couplers insertion depth.	-	2	-	-
PC17. carry out scraping before clean the surface of the pipe to remove as much grease, oil or surface dirt as possible.	-	2	-	-
PC18. use your hand scraper to create a chamfer on the leading edge of the pipe and remove all swarf from the pipe.	-	2	-	-
PC19. mark the pipe end for the couplers insertion depth	-	2	-	-
PC20. importance of checking the scraper blade for its good condition.	-	2	-	-
PC21. scrape off any remaining line markings using hand scrapper	-	2	-	-
PC22. ensure not to touch the cleaned ends of the pipe or the inside of the coupler with your hands or rags.	-	2	-	-
PC23. protect the end against the ingress of dirt, dust or water.	-	2	-	-
Manual Welding Procedure	**4**	**24**	**-**	**-**
PC24. importance of placing the pipes in the clamps with the ends against the trimming tool and with the pipe markings aligned.	1	1	-	-
PC25. align and level the components using the support rollers.	-	2	-	-
PC26. method of tightening the pipe clamps to grip and re-round the pipes.	1	1	-	-
PC27. understanding to cover the free ends of the pipes to prevent cooling of the plate by internal draughts.	-	2	-	-
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.	-	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC29. ensure to keep the trimming tool turning whilst opening the clamps to avoid steps on the trimmed surfaces.	-	2	-	-
PC30. method of removing the trimming tool taking care not to touch the trimmed ends.	1	1	-	-
PC31. ensure to remove loose shavings from the machine and component ends.	-	2	-	-
PC32. importance of why not to touch the prepared surface	1	1	-	-
PC33. check that both surfaces are completely planed. if they are not then repeat the trimming process.	-	2	-	-
PC34. ensure to close the clamps and check that there is no visible gap between the trimmed faces.	-	2	-	-
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	-	2	-	-
PC36. ensure the mismatch is greater than these values then the pipe must be realigned and re-trimmed.	-	2	-	-
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.	-	2	-	-
Perform Electrofusion	**9**	**27**	**-**	**-**
PC38. heating coils are as close to the joint surfaces as possible.	1	1	-	-
PC39. wire position is accurately controlled during manufacture and during the subsequent fusion process.	1	1	-	-
PC40. importance of heat distribution which has to be uniform over the length of the hot zone.	1	1	-	-
PC41. melt pressure and temperature are accurately controlled.	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC42. coils are to be protected from damage prior to, during and after fusion.	1	1	-	-
PC43. spigot ends are scraped.	1	1	-	-
PC44. importance of cutting the pipe square and remove burrs.	1	1	-	-
PC45. carry out wipe loose dirt from pipe ends.	-	2	-	-
PC46. place the centre of the electrofusion fitting alongside the pipe end and mark the pipe around the circumference.	-	2	-	-
PC47. pipe end preparation tool, remove the entire surface of the pipe over the marked area	-	2	-	-
PC48. remove the fitting from its packaging and check that the bore of the fitting is clean and dry.	-	2	-	-
PC49. insert the pipe ends into the fitting so that they are in contact with the centre stop.	-	2	-	-
PC50. socket electrofusion fittings (couplers, reducers, elbows and tees) clamps must be used.	1	1	-	-
PC51. remove the terminal protection caps from the terminal shrouds.	-	2	-	-
PC52. connect the output leads to the fitting terminals.	-	2	-	-
PC53. check that there is sufficient fuel in the generator to complete the joint.	-	2	-	-
PC54. operate as per the instructions, which should have been thoroughly read and understood prior to any welding operations.	-	2	-	-
PC55. understand that the joint must be left in the clamps for the cooling time specified on the fitting	1	1	-	-
Physical properties	**6**	**9**	**-**	**-**
PC56. understand different material properties & compatibility	1	1	-	-

GS2. read instructions, guidelines/procedures
GS3. work in a disciplined manner for meeting commitments and deadline
GS4. how to plan and prioritise the work
GS5. the importance of consistent and reliable services
GS6. apply problem solving approaches in different situations
GS7. apply balanced judgments to different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Effective team work	**20**	**30**	**-**	**-**
PC1. maintain clear communication with colleagues	2	3	-	-
PC2. pass on information to colleagues in line with organisational requirements	2	3	-	-
PC3. provide support to the team members	2	4	-	-
PC4. respect the colleagues	3	4	-	-
PC5. fulfil commitments made to colleagues	2	3	-	-
PC6. inform team members timely, if timelines can't be met	2	4	-	-
PC7. take the necessary initiatives to resolve the issues while working in team	3	4	-	-
PC8. adopt gender neutral behaviour while interacting with colleagues	2	2	-	-
PC9. offer assistance to a person with disability (PWD), only if required	2	3	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	HYC/N9301
NOS Name	Working effectively in a team
Sector	Hydrocarbon
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

HYC/N9302: Maintain health, safety and security procedures

Description

This unit is about maintaining health, safety and security procedure at workplace. It covers responsibilities towards self, others, assets and the environment.

Scope

The scope covers the following :

- Follow health and safety measures
- Follow safety procedures during emergency

Elements and Performance Criteria

Follow health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. use protective clothing/equipment such as face mask, hand gloves, goggle etc for specific tasks and work conditions

PC2. identify the people responsible for maintaining health and safety in the workplace

PC3. identify possible causes of risk or accident in the workplace

PC4. follow safe working practices while dealing with hazards to ensure the safety of self and others

PC5. lift heavy objects safely using correct procedures

PC6. follow safety signages

PC7. maintain hands hygiene by washing hand frequently and thoroughly with soap and water or alcohol-based hand rub

PC8. inform the concerned person of any illness related to self and others

PC9. maintain workplace hygiene by disinfecting the equipment and tools regularly

Follow safety procedures during emergency

To be competent, the user/individual on the job must be able to:

PC10. respond promptly and appropriately to an accident or in an emergency situation

PC11. use appropriate fire extinguishers for different types of fires correctly

PC12. follow appropriate rescue techniques during fire hazard

PC13. follow good housekeeping practice in order to prevent fire hazards

PC14. inform fire safety department about any near-miss incidents in the work place

PC15. provide appropriate first aid to victims in an emergency situation

PC16. follow the applicable regulations and codes as per safety standard

PC17. prepare written accident/incident report and share with the concerned officer/department

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company's policies on personnel management and duty reporting procedure
KU2. reporting structure within organization
KU3. health and safety hazards commonly affecting the work environment and related precautions
KU4. importance of maintaining personal hygiene using PPE kit, sanitizer and soap
KU5. importance of maintaining workplace hygiene
KU6. preventative and remedial actions to be taken in the case of exposure to toxic materials
KU7. importance of using protective clothing/equipment while working
KU8. various causes of fire
KU9. techniques of using different types of fire extinguishers
KU10. different materials used for extinguishing fire
KU11. various types of safety signs and their significance

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively by writing
GS2. read instructions, guidelines/procedures and reports
GS3. identify and report potential sources of danger
GS4. how to plan the work to meet the deadline
GS5. the importance of on time services
GS6. apply problem solving approaches in different situations
GS7. apply balanced judgments in different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow health and safety measures	**9**	**15**	**-**	**-**
PC1. use protective clothing/equipment such as face mask, hand gloves, goggle etc for specific tasks and work conditions	1	2	-	-
PC2. identify the people responsible for maintaining health and safety in the workplace	1	-	-	-
PC3. identify possible causes of risk or accident in the workplace	1	2	-	-
PC4. follow safe working practices while dealing with hazards to ensure the safety of self and others	1	2	-	-
PC5. lift heavy objects safely using correct procedures	1	2	-	-
PC6. follow safety signages	1	2	-	-
PC7. maintain hands hygiene by washing hand frequently and thoroughly with soap and water or alcohol-based hand rub	1	2	-	-
PC8. inform the concerned person of any illness related to self and others	1	1	-	-
PC9. maintain workplace hygiene by disinfecting the equipment and tools regularly	1	2	-	-
Follow safety procedures during emergency	**11**	**15**	**-**	**-**
PC10. respond promptly and appropriately to an accident or in an emergency situation	1	2	-	-
PC11. use appropriate fire extinguishers for different types of fires correctly	2	2	-	-
PC12. follow appropriate rescue techniques during fire hazard	1	2	-	-
PC13. follow good housekeeping practice in order to prevent fire hazards	1	1	-	-
PC14. inform fire safety department about any near-miss incidents in the work place	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. provide appropriate first aid to victims in an emergency situation	1	2	-	-
PC16. follow the applicable regulations and codes as per safety standard	1	2	-	-
PC17. prepare written accident/incident report and share with the concerned officer/department	2	2	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	HYC/N9302
NOS Name	Maintain health, safety and security procedures
Sector	Hydrocarbon
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	