NSQF QUALIFICATION FILE GUIDANCE

Version 6: Draft of 08 March 2016

NSDA Reference
To be added by NSDA

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Hydrocarbon Sector Skill Council
0120-2594659

Name and address of submitting body:
Hydrocarbon Sector Skill Council
OIDB Bhawan, 2nd Floor, Plot No.2, Sector-73
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List of documents submitted in support of the Qualifications File

1. Hydrocarbon Sector Profile
2. Qualification Pack- Industrial Welder (Oil & Gas)
3. Occupational Map – Hydrocarbon Sector
4. MoM held at MoPNG on 19.01.2017 on Skill Development and Apprenticeship programme, wherein it was decided that Oil PSU's will develop the QP for high priority trades
5. List of the companies participated in the development of QP
6. Composition of Task Force committee members
7. Industry Validation/Communication

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SUMMARY

<table>
<tr><td>Qualification Title</td><td>Industrial Welder (Oil & Gas)</td></tr>
<tr><td>Qualification Code</td><td>HYC/Q 9101</td></tr>
<tr><td>Nature and purpose of the qualification</td><td>Learners after attaining the certificate of Industrial Welder (Oil & Gas) will be competent to perform the job of welding using manual and semi-automatic welding equipment to weld different types of metals together (ferrous/non-ferrous), following drawing and welding process specifications Petroleum Refineries, while following standard safety procedures</td></tr>
<tr><td>Body/bodies which will award the qualification</td><td>Hydrocarbon Sector Skill Council</td></tr>
<tr><td>Body which will accredit providers to offer courses leading to the qualification</td><td>Hydrocarbon Sector Skill Council</td></tr>
<tr><td>Body/bodies which will carry out assessment of learners</td><td>Body/Bodies empanelled by Hydrocarbon Sector Skill Council will carry out the assessment of learners</td></tr>
<tr><td>Occupation(s) to which the qualification gives access</td><td>This Qualification give the access to learners in the Industrial Welding Occupation in Oil & Gas sector</td></tr>
<tr><td>Licensing requirements</td><td>N/A</td></tr>
<tr><td>Level of the qualification in the NSQF</td><td>Level 4</td></tr>
<tr><td>Anticipated volume of training/learning required to complete the qualification</td><td>1000 Hours</td></tr>
<tr><td>Entry requirements and/or recommendations</td><td>18 years</td></tr>
<tr><td>Progression from the qualification</td><td>An individual may progress to the Supervisory position</td></tr>
<tr><td>Planned arrangements for the Recognition of Prior learning (RPL)</td><td>Yes</td></tr>
<tr><td>International comparability where known</td><td>Study for the international comparability is yet to be done, however during desk research, qualification is mapped with the Qualification/Standards of other countries which is as follows:
<table>
<tr><th>S No</th><th>Country with Comparability</th><th>Title</th><th>Code</th></tr>
<tr><td>1.</td><td>UK</td><td>Preparing mechanised arc welding equipment for production</td><td>SEMME 3169</td></tr>
<tr><td>2.</td><td>Canada</td><td>Welders</td><td>(7265)</td></tr>
</table></td></tr>
<tr><td>Date of planned review of the qualification.</td><td>2 years after approval of the Qualification</td></tr>
</table>

Formal structure of the qualification			
Title of component and identification code.	**Mandatory / Optional**	**Estimated size (learning hours)**	**Level**
HYC/N 9101 General work shop practice followed in the shop floor	M	1000	4
HYC/N 9102 Welding using Manual Metal Arc welding/Shielded metal arc welding	M		4
HYC/N 9103 Manually (semi-automatic) welding joints using the MIG/MAG	M		4
HYC/N 9104 Perform Tungsten Inert Gas (TIG) Welding also known as Gas Tungsten Arc Welding (GTAW) Welding)	M		4
HYC/N 6103 Work effectively in a team	M		4
HYC/N 6104 Follow health, safety and security procedures	M		4

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum Document or a Qualification Pack.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information. Qualification Pack – Industrial Welder (Oil & Gas)

SECTION 1
ASSESSMENT

Body/Bodies which will carry out assessment:

Bodies/Bodies empanelled by Hydrocarbon Sector Skill Council for conducting the assessment will carry out the assessment of learners

How will RPL assessment be managed and who will carry it out?

Under the Recognition of Prior Learning (RPL), the candidates enrolled and the assessment will be carried out as per the assessment criteria and assessment outcome of the full Qualification and the process of assessment will be carry out by the body/bodies empanelled by Hydrocarbon Sector Skill Council

In RPL, the candidate already has the skills and knowledge while working on the job from long, the learners only requires to undergo the assessment process and certification to awarded to the candidates who successfully clears the assessment. The tentative process of RPL would include the flowing stages:

1 Cluster Mapping and Mobilisation of the candidates
2 Counselling & Pre-Screening
4 Enrolment/Batch formation
5 Orientation, Impartation of minimum hour training program and Feedback
7 Assessment by HSSC empanelled body
8 Evaluation of Assessment Result
9 Issuance of the Certificate to successful candidates

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.

The assessment of candidates/trainees will be on the basis on assessment outcome/assessment criteria of the Qualification. In the assessment criteria for each NOS marks have been defined for theoretical and practical skills, on which the candidate will be assessed. The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria.

Theory/Knowledge test – This section will test the trainee on his/her knowledge on the subject/trade. The test will be carried out online/offline with a set of random Question paper. that include multiple choice questions, True/False Statement, audio-video question etc.

The Question Bank will be developed by Subject Matter Experts (SME) of the Oil & Gas sector and these Questions again be vetted by the Industry Experts, the assessments are designed so as to assess maximum parts during the practical hands on work.

Practical/Demonstration Test – This stage involves the face to face interaction between Assessor and each trainee. The practical knowledge will be tested through Trade Test which demonstrates the skill required for the job, by which assessor would be able to evaluate the trainee on his/her practical knowledge on respective Qualification.

To ensure the maximum possible consistency in the assessment by different assessors at different locations, the assessors are to be elaborated about the stages involved in the assessment and the

assessor role in the assessment process, the following also elaborated to the assessor before assessment:

- Qualification Pack Structure
- Guidance for the assessor to conduct theory and practical assessments
- Guidance for trainees to be given by assessor before the start of the assessments.
- Guidance on assessments process, practical brief with steps of operations practical observation checklist
- Practical/Demonstration Test guidance for uniformity and consistency.
- Guidance on assessment evidence collection (signed attendance copy, verification of the authenticity of the candidate by checking the photo ID card, Photographs-while assessment undergoing etc.)

The empanelled assessment agencies will be instructed to hire assessors with integrity, reliability and fairness. Each assessor shall sign a document with its assessment agency by which they commit themselves to comply with the rules of confidentiality and conflict of interest, independence from commercial and other interests that would compromise impartiality of the assessments. The assessment agencies are instructed to Ideally have assessor with sufficient amount of relevant industry experience related to Qualification. The assessors will also have scrutinized and made to undergo induction of Assessment Framework, competency based assessments etc.

Assessment strategy:

- For each Qualification Pack assessment criteria has developed, which describe the weightage for each NOS/Performance criteria (PC) and assigned marks based for each NOS separately for theoretical and practical skill
- The question bank will be developed by the subject matter expert to assess the theoretical and practical knowledge.
- The accredited assessment agency will carry out the assessment process on the date proposed after completion of the training. The assessment will be carried out on the basis of the two parameters i.e. Theoretical test and Practical test.
- The result of the assessment will be shared by assessment body to the HSSC for review and compliance then after the result will be process for the generation of the certificates of passed candidates.
- Assessments can be conducted in the regional languages in case of any specific requirement form the concerned Training Provider.
- For ensuring the impartial assessment it will be ensured that the Assessment Bodies (AB) will not involve in training delivery.

Please attach any documents giving further information about assessment and/or RPL.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in "Formal structure of the the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.

Title of Component:

Job Role: Industrial Welder (Oil & Gas)
Qualification Pack: HYC/Q 9101
Sector Skill Council: Hydrocarbon Sector Skill Council

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned
marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 60% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Outcomes to be assessed		**Assessment criteria for the outcome**				
			Total marks 550	**Out of**	**Theory**	**Practical skills**
HYC/N 9101 General workshop practice followed in the shop floor.	**Understand the basic Engineering practice**	PC1.Consistently apply and promote health and safety legislation and best practice and work in a safe manner on a worksite	100	3	1	2
		PC2.Health and safety legislation and best practice		2	0	2
		PC3.The range and uses of trade related equipment's		3	1	2
		PC4.How to use and operate tools safely		2	0	2
		PC5.Specific safety issues relating to work involving cutting tools		2	1	1
		PC6.The importance of working logically and in a well-organized manner.		2	1	1
		PC7.Operate trade machinery effectively, safely and in accordance with manufacturers' instructions		3	1	2
		PC8.Select and use appropriate machine tools safely and effectively		3	1	2
	Mathematical	PC9. Basic mathematical manipulation		3	1	2

	skills with respect to welding	and unit conversion				
		PC10.Geometrical principles, techniques and calculations		2	1	1
		PC11.Understand basic mathematical calculation.		2	1	1
		PC12. Select and apply basic Calculation of area and volume		2	1	1
		PC13.use appropriate mathematical concepts and skills to solve problems in Fractions, Decimals, Percentage and ratio		2	1	1
		PC14.Develop ability to perform basics of Algebra and understand Simple algebraic equations and problems		2	1	1
		PC15.Acquire the techniques of solving simple Trigonometric problems		2	1	1
	Knowledge on different types of materials and Heat Treatment	PC16. Ability to apply knowledge of Metals and non-metals		3	1	2
		PC17. Types and characteristics of materials used in the manufacturing industry		2	1	1
		PC18.Ability to identify Ferrous and non-ferrous metals		3	1	2
		PC19Ability to integrate Steel - Properties and applications of the following Carbon Steels and Alloy Steels (With Reference to welding)		2	1	1
		PC20Apply the basic principles of material selection to specific applications Stainless Steel		2	1	1
		PC21. Highlight the property of different material and their workability.		3	1	2
		PC22Explain the differences in properties of different materials, including metals, alloys, ceramics, polymers and composites		2	1	1
		PC23.Describe the basics of Heat treatment principles		2	1	1
		PC24.Highlight Different Heat treatment operations, their purpose		3	1	2
		PC25.Apply and explain the application of Stress relieving with reference to welding		2	0	2

	Fundamentals of Electricity	PC26.Understanding written sentences and paragraphs in work related documents.		2	0	2
		PC27.Primary electrical supply circuit terminology and its operation		2	0	2
		PC28.Secondary electrical / welding circuit terminology and operation		2	1	1
		PC29.Knowledge of the practical application of electricity an technology.		2	1	1
		PC30.This includes applying principles, techniques, procedures like AC and DC current, Single phase circuit and Three phase circuit etc		3	1	2
		PC31.Perform routine maintenance on equipment and determining when and what kind of maintenance is needed. Will, require you to manage systems and ensure they work smoothly.		2	1	1
		PC32.Testing existing wiring for safety and quality control.		2	1	1
		PC33. Understanding of work shop safety and welding Safety		2	1	1
	Knowledge on basic workshop practice and tools used	PC34.To be able to work independently or as part of a team in the following areas **Filing** -Files – types, Specification, Application care and maintenance, Filing – straight filing, cross filing, Vices – Types and its application Safety		3	1	2
		PC35.Understand the task required and plan ahead what steps must be taken to achieve the outcome. **Hack Sawing** - Types of hack saw blades, Specification, Application, Hack sawing-selection of blade, fixing blade, Hack sawing procedure Safety and precautions,		3	1	2
		PC36.Cary out marking on the materials as per the drawing using **Marking**-Scribers, dot punch, centre punch, letter and – no punches Scribing and punching procedure		3	1	2
		PC37.Will be able to do the drilling as per **Drilling**-Specification of drills, Selection of drills, Drilling machine- types specification application, care and maintenance. Tools holding methods, work holding methods, determination of RPM		2	0	2

		PC38.Set up and adjust metalworking tools and do threading **Tapping-** Specification of taps, Determination of tap drill size for tapping, Tapping procedure and care		3	1	2
		PC39.Set up and/or operate hand tools **Chisels -**Types of chisels, Specification, Application, Precautions to be taken while chiselling.		2	0	2
		PC40.Correctly use and maintain the tools **Hammers** -Types of hammers, Specification, Application **Spanners , Fasteners** -Types, Specification, Application PC41.Measure and mark materials as per the drawing and Check accuracy and quality of finished parts **Measuring / Checking Instruments** - Steel rule and tape- Application, specification and care, Inside and Outside Calliper- Application, specification and care, Vernier Calliper- Application, specification and care, Micro meter- Application, specification and care, Radius and Fillet Gauges, use and care		3	1	2
		PC42.Safe operation of equipment and apply occupational health and safety policy and procedures to minimise risk.		3	1	2
		PC43. Knowledge and ability to use different hand tools and power tools		2	0	2
		Total.		100	34	66
HYC/N 9102 Welding using Manual Metal Arc welding/Shielded metal arc	**Element**	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
		PC2. adhere to procedures or systems in place for health and safety, persona protective equipment (PPE) and other relevant safety regulations		2	1	1
		PC3. check the condition of, welding leads, earthling arrangements and electrode holder		2	0	2
		PC4. report any faults or potential hazards to appropriate authority		2	0	2

welding		PC5. follow fume extraction safety procedures		2	0	2
	Welding Process	PC6. Explain different types of welding		2	1	1
		PC7. Use specific terminology used in the welding industry		2	1	1
		PC8. The selection, use and techniques of the various welding process		2	1	1
		PC9. The most Common Welding Processes		2	2	0
		PC10. What are the different Welding Terminology		2	2	0
	Welding Equipment's	PC11.Able to differentiate AC/DC Machines		2	0	2
		PC12.Narrate and justify the advantages of DC machines		2	1	1
		PC13.Know how the specification of DC machines are done		2	2	0
		PC14.Ability to select the machine as per job specification Practical Setup the machine for welding		2	1	1
		PC15.What all Care and maintenance of machine		3	1	1
		PC16.Arc welding accessories -Electrode holder, Earth lamp welding cables		2	0	2
		PC17.The selection and use of safety equipment related to specific or dangerous tasks		3	1	2
		PC18.Knowledge on components of the Essential equipment required for welding are:		2	1	1
	Welding preparation	PC20.Ability to interpretation of welding / engineering drawings and weld symbols welding procedure specifications and standard operating procedures as given below-welding process (ISO codes); parent metal consumables, pre welding ,joint preparation (edge preparation, assembly, pre-heat) welding parameters welding positions weld joints electrode sizes for joint thicknesses electrode & covering electrical conditions required electrode polarity welding techniques(string/weave) welding sequence heat input control bead length/travel speed preheat/ post heat inter pass run cleaning/back gouging		4	1	3

		methods post welding activities post-weld heat treatment.				
		PC21.Correct alignment of process with material being used		2	1	1
		PC22.How surface contamination can influence the finished weld characteristics		2	1	1
		PC23.The correct machine settings to be aligned to:		2	1	1
		PC24.Use the correct welding electrodes Types of electrodes Specification of electrodes AWS coding of electrodes Selection of electrodes		2	1	1
		PC25.The characteristics and properties of filler materials		2	1	1
		PC26.The methods of edge preparation to align with joint profile, strength, material and drawing specification		2	1	1
		PC27.perform measurements for joint preparation and routine MMAW		2	1	1
		prepare the materials and joint in readiness for welding ,made rust free, cleaned – free from scaling, paint, oil/grease; made dry and free from moisture, edges to be welded prepared as per job requirement - such as flat, square or bevelled		2	1	1
		PC28.use manual metal-arc welding and related equipment to include alternating current (AC) equipment direct current (DC) equipment		2	1	1
		PC29.report any faults or problem to appropriate authority		2	1	1
	Carrying out welding operations	PC30. strike and maintain a stable arc		2	1	1
		PC31. stop and properly re-start arc to avoid welding defects (scratch start, tapping techniques)		2	1	1
		PC32 maintain constant puddle by using		2	1	1

		appropriate travel speed				
		PC33. maintain proper bead sequence with respect to groove/fillet configurations and positions		2	1	1
		PC34. remove slag in an appropriate manner (eg. wire brush, hammer, etc.)		2	1	1
		PC35. produce welded joints to the specified quality, dimensions and profile		2	1	1
		PC36. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as per the WPS specified using single or multi-run welds		2	1	1
		PC37. 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	1	1
		PC38. produce joints on carbon and low alloy steel materials using various methods **Methods**: drag, weave, whip PC39. shut down and make safe the welding equipment on completion of the welding activities		2	1	1
	Testing for quality	PC40. measure and check that all dimensional and geometrical aspects of the weld are as per instructions		4	1	3
		PC41. check that the welded joint conforms to the instructions given, by checking various quality parameters by visual inspection		4	1	3
		PC42. identify various weld defects using visual inspection		4	1	3
		PC43. Detect and report surface imperfections to appropriate authority		4	1	3
		PC44. deal with defects in welding as per instructions given		4	1	3
		TOTAL		100	41	59

HYC/N 9103 Manually (semi-automatic) welding joints using the MIG/MAG	**Work Safely**	PC1.work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	5	2	3
		PC2.adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for MIG/MAG welding operations		5	2	3
		PC3.check the condition of welding leads, gas connection arrangements, earthing arrangements and electrode holder		3	1	2
		PC4.report any faults or potential hazards to appropriate authority		3	1	2
	Prepare for welding operations	PC5.interpret weld procedure data sheets specifications, PQR and WPS		3	1	2
		PC6.select welding machines such as inverters, rectifiers and generators, according to the task		3	1	2
		PC7. select electrodes according to classification and specifications PC8. prepare the materials and joint in readiness for welding		4	2	2
		PC9.check the condition of, and correctly connect, welding leads/cables, hoses, shielding gas supply and wire feed mechanisms		4	2	2
		PC10.prepare the welding equipment for a range of given applications **Welding equipment**: rectifier		3	1	2
		PC12.plan the welding activities before they start them effectively and efficiently for achieving specifications as per WPS		4	2	2
		PC13. clean wire feeder and torch tip		3	1	2
		PC14. connect torches and components		3	1	2
		PC15. connect and adjust regulators and flow meters to cylinders		3	1	2
		PC16. adjust wire feed rate and read and set current as required		3	1	2

		PC17.set other welding parameters (eg. voltage, slope of current versus voltage curve where required)		4	2	2
		PC18. choose appropriate mode of metal transfer		3	1	2
		PC19. set pre-purge with shielding gas as required		3	1	2
		PC20. set and verify gas flow rates		3	1	2
		PC21. prepare and support the joint, using the appropriate methods		3	1	2
		PC22.tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding		3	1	2
	Carry out welding operations	PC23.use manual welding and related equipment, to carry out MIG/MAG welding processes		3	1	2
		PC24.perform MIG/MAG welding operations using various welding techniques to meet welding procedure specification requirements		5	2	3
		PC25. adjust wire stick-out as per requirement		3	1	2
		PC26.use welding consumables appropriate to the material and application to DC current types		3	1	2
	Post welding activities	PC35. assist in preparation for non-destructive testing of the welds, for a range of tests **Non-destructive tests (NDT)**: dye penetrant (DPT), fluorescent penetrant (FPT), magnetic particle (MPT)		4	2	2
		PC36. prepare for destructive tests on weld specimens for fillet, butt and corner **Destructive tests (DT)**: macro examination, nick break test, bend tests (such as face, root or side, as appropriate), mechanical (peel, tensile and shear, fatigue, impact tests), chemical		4	2	2
		PC37. shut down and make safe the welding equipment on completion of the welding activities		4	2	2
		PC38. follow the established organisational process for dealing with the welded pieces including handover, storage, safety and security, record		4	2	2

		keeping, etc.				
				100	40	60
HYC/N 9104 Manually welding joints using the TIG (GTAW) Process	**Work Safely**	PC1.work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	2	1	1
		PC2.adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for TIG welding operations		2	1	1
		PC3.check the condition of welding leads, gas connection arrangements, earthing arrangements and electrode holder		2	1	1
		PC4.report any faults or potential hazards to appropriate authority		2	0	2
		PC5.interpret weld procedure data sheets specifications **Interpreting the WPS**: welding process (ISO Codes); parent metal; consumables; pre welding joint preparation		2	1	1
		PC6.select welding machines eg. transformer, inverters (AC/DC), rectifiers and generators, according to the materials and task		2	1	1
		PC7.select proper welding torch and tungsten electrode that meet the job requirement and specification **Selection and preparation of tungsten electrode**:		2	1	1
		PC8.obtain filler wire according to specifications		2	1	1
		PC9.prepare for the TIG welding process		2	1	1
		PC10. prepare the materials and joint in readiness for welding		2	1	1
		PC11.select tungsten electrode by the colour of the tip according to base metal, and correct diameter		2	1	1
		PC12. select and fit the welding shielding gases for a range of given applications		2	1	1
		PC13. plan the welding activities before they start them effectively and efficiently for achieving specifications as per WPS		2	1	1

		Checking activities: correct set-up of the joint; proper condition of electrical connections; welding return and earthing arrangements; operating parameters				
		PC14. connect torches and the components **Torch components**: cables, water carrying tubes, ceramic nozzle, collet, collet holder, gas lens, teflon washers, bakelite cap, ceramic shields/nozzles		2	1	1
		PC15. connect and adjust regulators and flow meters to cylinders		2	1	1
		PC16. read, set and adjust current (amperage) as required		2	1	1
		PC17. set pre-purge with shielding gas as required		2	1	1
		PC18. prepare tungsten by sharpening or balling it to desired tip shape		2	1	1
		PC19. set and verify gas flow rates		2	1	1
		PC20. prepare and support the joint, using the appropriate methods		2	1	1
		PC21.tack weld the joint at appropriate intervals, and check the joint for accuracy before final welding		2	1	1
		PC22. obtain clearance from quality control for weld joint before welding		2	1	1
		PC23. match feed and travel speed as required		2	1	1
	Carry out welding operations	PC24. perform TIG welding operations using appropriate welding techniques to meet welding procedure pacification requirements		2	1	1
		PC25. use correct technique for starting the arc (using HF (high frequency) unit, scratching the electrode on the job material, lifting the electrode immediately		2	1	1
		PC26. use correct angle of torch and filler wire		2	1	1
		PC27. weld the joint to the specified quality, dimensions and profile		2	1	1
		PC28. use manual welding and related equipment, to carry out TIG welding processes		2	1	1

		PC29. use welding consumables appropriate to the material and application, to include AC current types and DC current types		2	1	1
		PC30. produce joints of the required quality and of specified dimensional accuracy		2	1	1
		PC31. use both methods to produce the various joints a) with filler wire b) without filler wire (autogenously)		2	1	1
		PC32. produce joints from various materials in different forms **Materials**: ferrous : carbon steel, stainless steel (all grades); non-ferrous: aluminum and aluminum alloys; nickel and nickel alloys; titanium; copper and copper alloys		2	1	1
		PC33. weld joints in good access situations, in select positions		2	1	1
		PC34. shut down and make safe the welding equipment on completion of the welding activities		2	1	1
		PC35. make sure that the work area is maintained and left in a safe and tidy		2	1	1
	Test for quality	PC36.use appropriate methods and equipment to check the quality, and that all dimensional and geometrical aspects of the weld are to the specification		2	1	1
		PC37. check that the welded joint conforms to the specification, by checking various quality parameters using visual inspection Quality parameters: dimensional accuracy; alignment/squareness; size and profile of weld; visual defects; NDT/DT tested defects		3	1	1
		PC38. identify various weld defects Types of weld defects: lack of continuity of the weld; uneven and irregular ripple formation, incorrect weld size or profile, undercutting, overlap, inclusions, porosity, internal cracks, surface cracks, lack of fusion, lack of penetration, welding spatter, gouges, stray arc strikes, sharp edges		2	1	1
		PC39. detect surface imperfections and deal with them appropriately		2	1	1
		PC40. carry out LPT tests to assess fine defect open to the surface not detected by visual inspection (VT)		2	1	1
	Post welding activities	PC41. assist in preparation for non-destructive testing of the welds for a range of Tests **Non-destructive tests (NDT)**: visual inspection, leak test: dye penetrant (DPT), fluorescent penetrant		2	1	1

		(FPT); magnetic particle (MPT); radiographic (RT); ultrasonic (UT)				
		PC42. prepare for destructive tests on weld specimens for select tests **Destructive tests (DT)**: nick break test; bend tests (such as face, root or side,as appropriate); metallographic; mechanical (peel, tensile and shear, fatigue,impact tests); chemical		3	1	2
		PC43. follow the established organisational process for dealing with the welded pieces including handover, storage, safety and security, record keeping, etc.		2	1	1
	Other related operation	PC44. Ability do the following related operation **Oxy fuel Cutting-**Type of gas its property and application, Colour coding of cylinder, Lighting of cutting charger, Controlling of gas, Selection of cutting nozzle, Introduction to process **Manual Cutting-**Safety on handling gas cylinders, Setting up cylinders and cutting torch, Regulators flash back and back fire arrestors, Process of cutting Straight cutting, bevel cutting **Machine Cutting-**PUG cutting machine and its parts and functions, Setting machine and machine parameters, Straight, bevel and circular cutting ,**Plasma Cutting-** Equipment, precautions, parameters process		4	1	3
		PC45.Ability to do pipe welding following the practice: Types of pipe welding,Preparation of pipes ,Welding procedure in different position ,Different welding processes and their advantages and disadvantages .		4	1	3
				100	44	56
HYC/N 6104 Use basic, health, safety and security procedures	Health and safety	PC1.use protective clothing/equipment for specific tasks and work Conditions	100	2	1	1
		PC2.state the name and location of		2	1	1

		people responsible for health and safety in the workplace				
		PC3.state the names and location of documents that refer to health and safety in the workplace		2	1	1
		PC4.identify job-site hazardous work and state possible causes of risk or accident in the workplace		2	1	1
		PC5.carry out safe working practices while dealing with hazards to ensure the safety of self and others		2	1	1
		PC6.state methods of accident prevention in the work environment of the job role Methods of accident prevention: training in health and safety procedures; using health and safety procedures; use of equipment and working practices (such as safe carrying procedures); safety notices, advice; instruction from colleagues and supervisors		3	1	2
		PC7.state location of general health and safety equipment in the workplace		2	1	1
		PC8.inspect for faults, set up and safely use steps and ladders in general use		2	1	1
		PC9.work safely in and around trenches, elevated places and confined areas		2	1	1
		PC10. lift heavy objects safely using correct procedures		2	1	1
		PC11. apply good housekeeping practices		2	1	1
		PC12. identify common hazard signs displayed in various areas		2	1	1
		PC13.retrieve and/or point out documents that refer to health and safety in the workplace		2	1	1
	Fire safety	PC14. use the various appropriate fire extinguishers on different types of fires		3	1	2

		correctly				
		PC15. demonstrate rescue techniques applied during fire hazard		3	1	2
		PC16. demonstrate good housekeeping in order to prevent fire hazards		3	1	2
		PC17. demonstrate the correct use of a fire extinguisher		3	1	2
	Safety systems	PC18. List issue concerning the safety and familiar in your work style		3	1	2
		PC19. Empower to address the unsafe condition in your work place or to stop the unsafe behaviour		3	1	2
		PC20. Record all miss incidents ,damages, illness or injury		2	1	1
		PC21. Comprehend the applicable laws, regulations and codes as per standard		3	1	2
		PC22. Promote and maintain a positive safety culture		2	1	1
		PC23. Apply and appraise the use and storage of hazardous substance and their safety		3	1	2
		PC24. Assess the threats and to protect from the threats		2	1	1
		PC25. Awareness of own safety and safety of others		3	1	2
		PC26. Bring the concern and report the HSE concern		2	1	1
		PC27. Report all incident to the supervisor		3	1	2
		PC28. Identifies and describes the property of different petroleum products.		2	1	1
		PC29. Operates and handle spills and respond to the spills		3	1	2
	Emergencies ,rescue and	PC30. demonstrate how to free a person from electrocution		2	1	1

	first-aid procedures	PC31. Administer appropriate first aid to victims were required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.		3	1	2
		PC32. demonstrate basic techniques of bandaging		2	1	1
		PC33. respond promptly and appropriately to an accident situation		3	1	2
		PC34. perform and organize loss minimization or rescue activity during an accident in real or simulated environments		3	1	2
		PC35. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		3	1	2
		PC36. demonstrate the artificial respiration and the CPR Process		2	1	1
		PC37. participate in emergency procedures		2	1	1
		PC38. complete a written accident/incident report or dictate a report to another person, and send report to person responsible Incident Report includes details of: name, date/time of incident, date/time of report, location, environment conditions, persons involved, sequence of events, injuries sustained, damage sustained, actions taken, witnesses, supervisor/manager notified		5	2	3
		PC39. demonstrate correct method to move injured people and others during an emergency		2	1	1
		TOTAL		100	41	59
HYC/N 6103 Work	Compulsory	PC1. maintain clear communication with colleagues	50	5	2	3

effectively in a team		PC2. work with colleagues as a team		5	2	3
		PC3. pass on information to in line with organisational requirements		6	2	4
		PC4. work in ways that show respect for colleagues		5	2	3
		PC5. carry out commitments made to colleagues		6	2	4
		PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons		6	2	4
		PC7. identify problems in working with colleagues and take the initiative to solve these problems		5	2	3
		PC8. follow the organisation's policies and procedures for working with colleagues		6	3	3
		PC9. ability to share resources with other members as per priority of tasks		6	3	3
		TOTAL		50	21	29

Means of assessment 1

The assessment comprises of:

- Theory/Knowledge test
- Practical/Demonstration Test

Means of assessment 2

Add boxes as required.

Pass/Fail

As per the NSDC, SSC guidelines, the passing percentage will be on aggregate 60%.

SECTION 2
EVIDENCE OF LEVEL

Industrial Welder (Oil & Gas) - HYC/ Q 6101					
Process required	**Professional Knowledge**	**Professional Skills**	**Core Skills**	**Responsibility**	**Level**
The Industrial Welders (Oil & Gas) perform welding using manual and semi-automatic welding equipment to weld different types of metals together (ferrous/non-ferrous), following drawing and welding process specifications. They are specialised in certain types of welding, such as welding in petroleum refinery The individual must able to working logically and in a well-organized manner and expected to operate trade machinery effectively, safely and in accordance with manufacturers' instructions also expected to have the knowledge of selection of appropriate machine & tools/Welding Equipment's safely	The individual is expected to have factual knowledge of processes and understand the risk of not following defined procedures. The Industrial Welders (Oil & Gas) must able to plan and think in steps and three-dimensionally, the individual should keep up to date with changing technology in the process also the person should also know the range of destructive and non-destructive weld testing. The individual should know the Interpretation of drawing as per standard and knowledge of Geometric Dimensioning and Tolerance (GD&T) and should have the knowledge of making Isometric drawing and orthographic projection The user/individual on the job needs to know the types of fire extinguishers and their suitable uses/	The individual should able to Identify problems with work planning, procedures, practical skill, output and behavior and their implications also able to Plan, prioritize and sequence work operations as per job requirements also expected to know the usage of appropriate tools required to perform the job by applied quality concepts The individual should must able to 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 and also able to fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language	The individual is expected to have basic communication skills to fill appropriate forms, process charts and activity logs, etc. and also understand application of basic arithmetic principles. The individual expected to execute task, schedules, and work-loads with co-workers and supervisors and able to convey and share technical information clearly using appropriate language and expected to work in a team, communicate and cooperate with others in team in order to achieve better results The individual is expected to conduct themselves in ways, which show a basic understanding of the social and professional environment of working	The individual is responsible for for manual and semi-automatic welding equipment to weld different types of metals together (ferrous/non-ferrous), in certain types of welding, such as welding in petroleum refinery , the individual is completely responsible for own learning and continuously engaged in the self-learning process The Industrial Electrician (Oil & Gas) is majorly responsible for his own job and self-learning process which justifies the pegging of the QP at level 4.	4

and effectively The individual expected to Plan installation work using drawings and documentation provided and keep himself update on the trends and developments in the industry including new technology, standards and working methods The activities for this Qualification are the familiar and routine activities in nature and he handles all this independently (with minimal or no supervision).	Welding equipment's/ Shielding gases equipment/ Basic principles of TIG welding/ Welding concepts and mechanisms/ Consumables classification/ Safety precautions/ Shielding gases/ Types of joints/ Welding Positions/ Electrical characteristics and Handling specimens for tests	The individual should have the capacity to apply professional skills needed to operate equipment with the understanding of principles needed to explore and adapt systems.			
Level 4	Level 4	Level 4	Level 4	Level 4	

SECTION 3
EVIDENCE OF NEED

What evidence is there that the qualification is needed? The Industrial Welder (Oil & Gas) work in the petroleum refinery, there are no standard training / Qualification Pack all across the Oil Industry, which the work force should possess at the time of recruiting / enrolling the work force for performing the job role. Hence there was need felt by the Ministry of Petroleum & Natural Gas (MOP&NG) in consultation with the members of Industry Task force (Members representing Oil & Gas PSU's), to develop Qualification Pack for this trade.
What is the estimated uptake of this qualification and what is the basis of this estimate? Since Skill Gap study of the Hydrocarbon Sector yet to take place to figure out the estimated uptake of this qualification, However the estimated uptake of Industrial Welder (Oil & Gas) would be of around 4200 Nos. in next five year. The basis of this estimate is emerged out from the Task Force.
What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Qualifications for Various related trades of other Sector studied to ensure that there is no duplicity. The QP of this trade is required because of the nature of Oil & Gas Industry as the individual will be handing inflammable and hazardous product. QP is very specific to Petroleum Industry and the individual under this Qualification will be handling hazardous and inflammable products therefore requires specialised safety tasks
What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? The Qualification Pack was circulated among the industry members for their inputs and feedback, however the Qualification shall be reviewed by the industry members after two years of the approval.

Please attach any documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4
EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

An individual may progress to the Supervisory Position

Please attach any documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.