NCVET Code
2022/HYC/HSSCI/05178

NSQF QUALIFICATION FILE
Approved in 15th NSQC Meeting – NCVET – 27th January 2022

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Hydrocarbon Sector Skill Council
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List of documents submitted in support of the Qualifications File

1. Annexure-1: Hydrocarbon Sector Profile
2. Annexure-2: Model Curriculum
3. Annexure-3: Qualification Pack
4. Annexure-4: Occupational Map of Hydrocarbon Sector
5. Annexure-5: List of the companies participated in the development of QP
6. Annexure-6: Industry Validations

Model Curriculum to be added which will include the following:

- **Indicative list of tools/equipment to conduct the training**
- **Trainers qualification**
- **Lesson Plan**
- **Distribution of training duration into theory/practical/OJT component**

SUMMARY

1	**Qualification Title**	Industrial Welder (Oil & Gas)
2	**Qualification Code, if any**	HYC/Q 9101
3	**NCO code and occupation**	NCO/2015 8131.31
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	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
5	**Body/bodies which will award the qualification**	Hydrocarbon Sector Skill Council
6	**Body which will accredit providers to offer courses leading to the qualification**	Hydrocarbon Sector Skill Council
7	**Whether accreditation/ affiliation norms are already in place or not, if applicable (if yes, attach a copy)**	Yes
8	**Occupation(s) to which the qualification gives access**	Oil & Gas Exploration & Production
9	**Job description of the occupation**	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 refinery, aerospace precision welding, manufacturing welding, pipeline, automotive and construction welding.
10	**Licensing requirements**	NA
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NA
12	**Level of the qualification in the NSQF**	Level 4
13	**Anticipated volume of training/learning required to complete the qualification**	600 Hours
14	**Indicative list of training**	10mm hand drill, Electrode drying oven - 25

	tools required to deliver this qualification	Kg, HSS drill 6.0mm, Screw driver 250mm, LPG ISI Regulator bse, Welding Apron leather, Beval protector 0 to 180, Hand Sleeves, External micro metre 25m, Chipping Hammer, Dissolved Acetylene gas of capacity 6.00 cum, C. Clamp 200mm, HSS drill 6.8mm, HSS Drill bit 10mm, Welding helmet, welding hand Shield, DC Arc Welding Machine 200A, Dot punch 100mm, Metal buffing Machine with all Accessories (Straight Grinder M/C), Welding leg guard, CO2 GAS, manual gas welding torch with 6 tips & 4 Tips double stage Oxygen regulator, acetylene regulator, flash back arrestor for oxygen, acetylene torch mounted, Argon gas of capacity 7.00 CUM, DC Arc Welding Machine 400A, Plasma Cutting equipment with plasma cutting torch-cap: 20mm, Measuring tape 5mtr, Hacksaw frame 300mm fixed frame, Portable electric drilling machine(12mm capacity 250V AC), C 300 A welding transformer, Anvil 50 Kg, Auto helmet tech 9-13 yellow, Oxygen capacity - 7.00 cum, Tig welding equipment tig 3000i AC/DC,TA24 AC/DC/with cool midi1800,TXH 401W,4mtr OKC 50 TIG torch, trolly, Mig Welding Equipment with accessories, Ball pen hammer 200gm, C. Clamp 100mm, Measuring tape 3mtr, Portable Angle Grinder 175 mm, Portable Angle Grinder 100 mm, DE metric Spanner, Welding hand gloves
15	**Entry requirements and/or recommendations and minimum age**	Class X with minimum 2 years of relevant experience **OR** Class XII **OR** ITI (two years after class 10th in engineering trade) **Minimum age:** 18 years
16	**Progression from the qualification (Please show Professional and academic progression)**	Supervisor Industrial Welder (Oil & Gas)
17	**Arrangements for the Recognition of Prior learning (RPL)**	Yes
18	**International comparability where known (research**	International comparability with the following countries qualification, mapped with during

	evidence to be provided)	desk research:

No	Country	Title	Code
1.	UK	Preparing mechanised arc welding equipment for production	SEMME3169
2.	Canada	Welders	(7265)

19	**Date of planned review of the qualification.**	Three-years from the date of approval	
20	**Formal structure of the qualification Mandatory components**		
	Title of component and identification code/NOSs/Learning outcomes	**Estimated size (learning hours)**	**Level**
(i)	1. Introduction to Hydrocarbon Sector 2. HYC/N 9101 General work shop practice followed in the shop floor 3. HYC/N 9102 Welding using Manual Metal Arc welding/Shielded metal arc welding 4. HYC/N 9103 Manually (semi-automatic) welding joints using the MIG/MAG 5. HYC/N 9104 Perform Tungsten Inert Gas (TIG) Welding also known as Gas Tungsten Arc Welding (GTAW) Welding) 6. HYC/N 9301 Working effectively in a team 7. HYC/N 9302 Maintain health, safety and security procedures	500	4
	Sub Total (A)	500 hours	4
	OJT components		
	Title of component and identification code/NOSs/ Learning outcomes	**Estimated size (learning hours)**	**Level**
	On Job Training	100 Hour	
	Sub Total (B)	100	

Total (A+B)	**600 Hours**	

SECTION 1
ASSESSMENT

21	**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. Presently, following six assessment agencies are empanelled with HSSC; 1) M/s Aspiring Minds Ltd 2) M/s Mercer Mettl 3) M/s FICCI 4) M/s CII 5) M/s India Skills 6) M/s IQAG (P) Ltd.
22	**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 a brief orientation training and the subsequent assessment process and certification is awarded to those 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 Candidate registration, batch creation and enrolment 5 Orientation/bridge training of candidates prior to assessment 7 Assessment by HSSC 8 Evaluation of Assessment Result 9 Issuance of the Certificate to successful candidates
23	**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 performance criteria is based on the practical demonstration of skills and knowledge.

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 in multilingual, True/False Statement, audio-video question etc.

The Question Bank will be developed by Subject Matter Experts (SME) of the hydrocarbon sector and these questions again be vetted by the Industry Experts, each performance criteria have its marks for theory based on the level of question i.e. easy, medium and difficult.

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 for his/her practical knowledge on respective Qualification.
To ensure the maximum possible consistency in the assessment by different assessors at different locations, orientation of the assessors is also required about the stages involved in the assessment and the assessor role in the assessment process. The assessor must have knowledge of the following concepts 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 have to undergo orientation of assessment framework, competency-based assessments etc.

	Assessment strategy: • For each Qualification Pack assessment criteria has been developed, which describe the weightage for each NOS/Performance criteria (PC) and assigned marks based on each NOS separately for theoretical and practical skills • The question bank will be developed by the subject matter experts 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, after that result will be processed and certificates will be generated • Assessments shall be conducted in the regional languages in case of any specific requirement from the concerned Training Provider. • For ensuring the impartial assessment it will be ensured that the Assessment Bodies (AB) are not involved in any type of training delivery with respect to this project.

Please attach most relevant and recent 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.

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 70% in every NOS 6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N 9101 General workshop practice followed in the shop floor.	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

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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
	PC9. Basic mathematical manipulation and unit conversion		3	1	2
	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		2	1	1

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	problems				
	PC15.Acquire the techniques of solving simple Trigonometric problems		2	1	1
	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
	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

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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
	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.		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

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC37.Will be able to do the drilling as per		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		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

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N 9102 Welding using Manual Metal Arc welding/Shielded metal arc welding	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
	PC2. adhere to procedures or systems in place for health and safety, 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
	PC5. follow fume extraction safety procedures		2	0	2
	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. the different Welding Terminology		2	2	0
	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		2	1	1

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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
	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		4	1	3
	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

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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
	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 appropriate travel speed		2	1	1
	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

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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
	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

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	TOTAL		100	41	59

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N 9103 Manually (semi-automatic) welding joints using the MIG/MAG	PC1.work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	3	1	2
	PC2.adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for MIG/MAG welding operations		3	1	2
	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		2	1	1
	PC5.interpret weld procedure data sheets specifications, PQR and WPS		2	1	1

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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		2	1	1
	PC8. prepare the materials and joint in readiness for welding		2	1	1
	PC9.check the condition of, and correctly connect, welding leads/cables, hoses, shielding gas supply and wire feed mechanisms		3	1	2
	PC10.prepare the welding equipment for a range of given applications Welding equipment: rectifier		3	1	2
	PC 11. select the welding shielding gases and equipment for a range of given applications		3	1	2
	PC12.plan the welding activities before they start them effectively and efficiently for achieving specifications as per WPS		2	1	1
	PC13. clean wire feeder and torch tip		2	1	1
	PC14. connect torches and components		3	1	2
	PC15. connect and adjust regulators and flow meters to cylinders		2	1	1

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC16. adjust wire feed rate and read and set current as required		2	1	1
	PC17.set other welding parameters (eg. voltage, slope of current versus voltage curve where required)		2	1	1
	PC18. choose appropriate mode of metal transfer		2	1	1
	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
	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		3	1	2
	PC25. adjust wire stick-out as per requirement		2	1	1
	PC26.use welding consumables appropriate to the material and application to DC current types		4	2	2
	PC27 produce joints of the required quality and of specified dimensional accuracy which achieve a weld quality equivalent to Level C of ISO 5817		2	1	1
	PC28. produce joints from various materials in different forms		2	1	1
	PC29. weld joints in good access situations, in select positions		3	1	2
	PC30. make sure that the work area is maintained and left in a safe and tidy condition		3	1	2
	PC31. identify various weld defects use appropriate methods and		2	1	1

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	equipment to check the quality, and that all dimensional and geometrical aspects of the weld are to the specification				
	PC32. . check that the welded joint conforms to the specification, by checking various quality parameters by visual inspection		2	2	0
	PC33. detect surface imperfections and deal with them appropriately		3	1	2
	PC34. carry out DPT tests to assess fine defect open to the surface not detected by visual inspection (VT)		3	1	2
	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)		3	1	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		3	1	2
	PC37. shut down and make safe the welding equipment on completion of the welding activities		3	1	2
	PC38. follow the established organisational process for dealing with the welded pieces including handover, storage, safety and security, record keeping, etc.		3	1	2
			100	40	60

Compulsory NOS **Total Marks: [100]**				**Marks Allocation**	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
HYC/N 9104 Perform Manually welding joints using the TIG (GTAW) Process	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		3	1	2
	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		3	1	2

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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 **Checking activities**: correct set-up of the joint; proper condition of electrical connections; welding return and earthing arrangements; operating parameters		2	1	1
	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		3	1	2
	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		3	1	2
	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
	PC24. perform TIG welding operations using appropriate welding		2	1	1

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	techniques to meet welding procedure pacification requirements				
	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

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	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	2
	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
	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 (FPT); magnetic particle (MPT); radiographic (RT); ultrasonic (UT)		2	1	1
	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

Compulsory NOS Total Marks: [100]				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
	PC43. follow the established organisational process for dealing with the welded pieces including handover, storage, safety and security, record keeping, etc.		2	1	1
	PC44. Ability do the following related operation		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

Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Theory**	**Skills Practical**
HYC/N 9301 Working effectively in a team	PC1. maintain clear communication with colleagues	50	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

Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Theory**	**Skills Practical**
HYC/N 9302 Maintain	PC1. use protective clothing/equipment such as face mask, hand gloves, goggle etc for specific		1	2

health, safety and security procedures	tasks and work conditions			
	PC2. identify the people responsible for maintaining health and safety in the workplace		1	0
	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
	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
	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

Means of assessment 1
The assessment comprises of:
- Theory/Knowledge test
- Practical/Demonstration Test
- Assessment evidence in form of assessment event photograph and attendance sheet

Means of assessment 2
Add boxes as required.

Pass/Fail
the passing percentage will be on aggregate 70%. (NSQF level 4)

SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Industrial Welder (Oil & Gas)			**Level:** 4
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Process	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 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	The activities for this Qualification are the familiar and routine activities in nature and he handles all this independently (with minimal supervision).	4

Title/Name of qualification/component: Industrial Welder (Oil & Gas)			**Level:** 4
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	including new technology, standards and working methods		
Professional knowledge	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 individual shall have knowledge various activities to be performed during operation and procedure The individual should know the maintenance requirements of measurement/control/ protection and detection systems and equipment The user/individual on the job needs to know the types of fire extinguishers and their suitable uses/ 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	4
Professional skill	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	The individual will demonstrate practical skill, which are routine and repetitive using appropriate rule, tools and quality concepts The individual must have capacity to apply professional skills needed to operate equipment with the understanding of principles needed to	4

Title/Name of qualification/component: Industrial Welder (Oil & Gas)			**Level:** 4
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	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	explore and adapt systems.	
Core skill	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 should able to read and understand manuals, work orders, health and safety instructions, memos, reports etc.	The individual will be able to communicate well within or outside the organization and conduct in always, which show a basic understanding of the social and professional environment of working in workplace The individual is expected to conduct themselves in ways, which show a basic understanding of the social and professional environment of working environment.	4
Responsibility	The individual is responsible for for manual and semi-automatic welding equipment to	The individual is majorly responsible for his own job and self-learning process which justifies the	4

Title/Name of qualification/component: Industrial Welder (Oil & Gas)			**Level:** 4
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	weld different types of metals together (ferrous/non-ferrous), in certain types of welding, such as welding in petroleum refinery/oil & gas project sites	pegging of the QP at level 4	

OPTION B

Title/Name of qualification/component: Enter the title here		**Level:** Add level number	
NSQF Domain	**Key requirements of the job role**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
Process			
Professional knowledge			
Professional skill			
Core skill			
Responsibility			

SECTION 3
EVIDENCE OF NEED

26	**What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?** The Industrial Welder (Oil & Gas) work in the petroleum refinery, there were 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 job roles. The estimated uptake of this qualification is 4000 personnel in next-five years. The estimation has been arrived in consultation with the industry members.
27	**Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences** Minutes of the Meeting (MoM) of Line Ministry is enclosed as Annexure-7. The decision on development of this qualification were taken in the meeting.
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** This is already NSQC approved Qualification, being represented herewith for extension. Qualifications for Various related trades of other Sector studied to ensure that there is no duplicity. The Qualification of this job role 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
29	**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? Specify the review process here**

	The Qualification was circulated among the industry members for their inputs and feedback; however, the Qualification shall be reviewed by the industry members as per NCVET Qualification review timelines from the date of approval

Please attach most relevant and recent 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

30	**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?** ***Show the career map here to reflect the clear progression*** An individual may progress to the Supervisory position 

Please attach most relevant and recent 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.