

Model Curriculum

Process Instrument Operator (Oil & Gas)

SECTOR: HYDROCARBON
SUB-SECTOR: MIDSTREAM
OCCUPATION: CALIBRATION & INSTRUMENTATION
REF ID: HYC/Q6201, V1.0
NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

HYDROCARBON SECTOR SKILLS COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Process Instrumentation Operator (Oil & Gas)' QP No. 'HYC/Q6201 NSQF Level 4'

Date of Issuance: July 16th, 2019

Valid up to: July 16th, 2023

* Valid up to the next review date of the Qualification Pack



Authorised Signatory
(Hydrocarbon Skill Development Council)

TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	08
3. Annexure: Assessment Criteria	09

Process Instrument Operator (Oil & Gas)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Process Instrument Operator (Oil & Gas)”, in the “Hydrocarbon” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Process Instrument Operator (Oil & Gas)		
Qualification Pack Name and Reference ID	HYC/Q6201, V1.0		
Version No.	1.0	Version Update Date	16-07-2019
Pre-requisites to Training	Class XII (Science) /or ITI with relevant trade		
Training Outcomes	<p>After completing this program, participants will be able to:</p> <ul style="list-style-type: none"> • Check hydraulic, pneumatic, mechanical measuring and control equipment for correct operation, calibrate, and analyze and report the test result. • Check the electrical and electronic measuring and control equipment for correct operation, calibrate, and analyze and report the test results. • Perform maintenance activities on instrumentation and control equipment, escalations of unresolved and delayed issue as per protocol. • Perform installation of custody meters; observe the process and diagnostic parameters; calibrate custody meters and auxiliary instruments; and analyze and report test results. • Prepare Pressure Safety Valves (PSV) for inspection, testing and calibration, perform maintenance of PSV and report preparation. • Prepare for LEL gas detection system testing and calibration, maintain LEL detection equipment and prepare reports. • Work effectively with colleagues, superiors, members of own work group, people in other work groups within or outside the organization • Follow health, safety and security procedures as defined by the organization. 		

This course encompasses 8 out of 8 National Occupational Standards (NOS) of “Process Instrument Operator-Oil & Gas” Qualification Pack issued by “Hydrocarbon Sector Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction to Hydrocarbon Sector</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 02:00</p> <p>Corresponding NOS Code Bridge Module</p>	<ul style="list-style-type: none"> • Explain about the Oil & Gas Sector/Sub-Sector • List the three major segments in the hydrocarbon sector • State the functions of midstream and downstream segment • List the different types of hydrocarbons • State the different types of fuel • List the roles and responsibilities of Process Instrument Technician (Oil & Gas) 	
2	<p>Calibrate hydraulic, pneumatic and mechanical measuring and control equipment</p> <p>Theory Duration (hh:mm) 40:00</p> <p>Practical Duration (hh:mm) 100:00</p> <p>Corresponding NOS Code CSC/N0801</p>	<ul style="list-style-type: none"> • Explain procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations • Check components, leads, fasteners, etc. for wear, loose connections or other faults • Carry out the testing/calibration activities in the specified sequence and in an agreed timescale • Identify work/test requirements and define as per standard operating procedures • Test the operation of instruments and systems to diagnose faults using testing devices • Select correct test application principles after inspection of instrumentation systems, equipment/components • Select appropriate test equipment in accordance with defined requirements • Observe device isolation methods/requirements and localize • Apply appropriate test procedures and application principles in assessing operation of instrumentation systems, equipment/components • Report any instances where the testing/calibration activities cannot be fully met or where there are identified defects outside the planned schedule • Complete relevant testing/calibration documentation accurately • evaluate faulty conditions and plan corrective action 	<ul style="list-style-type: none"> • Assortment of wrenches • Screwdrivers • Pliers • Wire cutters • Wire strippers • Channel locks • Punches, hammers • Dataloggers

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Record action plan and document according to standard operating procedures Report potential and real faults using standard operating procedures Calibrate equipment against appropriate physical standards using correct calibration tools, equipment, techniques using predetermined procedures Perform methods of adjustment using calibration devices and document prescribed procedures and operational specifications obtain help or advice from specialist if the problem is outside his/her area of competence or experience monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem complete documentation post operations as per organizational procedures 	
3	<p>Calibrate electrical and electronic measuring and control equipment</p> <p>Theory Duration (hh:mm) 40:00</p> <p>Practical Duration (hh:mm) 100:00</p> <p>Corresponding NOS Code CSC/N0802</p>	<ul style="list-style-type: none"> Comply with health and safety, environmental and other relevant regulations and guidelines at work Ensure work area is clean and safe from hazards Ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition Check components, leads, fasteners, etc. for wear, loose connections or other faults Prepare and update relevant testing/calibration schedules and plans carry out the testing/calibration activities in the specified sequence and in an agreed timescale Identify work/test requirements and define as per standard operating procedures Test the operation of instruments and systems to diagnose faults using testing devices Select appropriate test equipment in accordance with defined requirements Ensure appropriate device isolation methods/requirements are observed Apply appropriate test procedures and application principles in testing the operation of instrumentation systems, equipment/components complete relevant testing/calibration documentation accurately 	<ul style="list-style-type: none"> Digital multimeter Multifunction calibrator Loop calibrator Temperature bath Manometers Precision pressure gauges Tachometer Electronic thermometer Electronic pressure gauge Field calibrators

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Report any instances where the testing/calibration activities cannot be fully met or where there are identified defects outside the planned schedule Report potential and real faults using standard operating procedures Evaluate faulty conditions and plan corrective action Perform methods of adjustment using calibration devices and document prescribed procedures and operational specifications Re-commission equipment in accordance with standard operating procedures Refer the problem to a competent internal/external specialist if it cannot be resolved Obtain help from specialist if the problem is outside his/her area of competence or experience Monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem 	
4	<p>Maintenance of instrumentation and control equipment</p> <p>Theory Duration (hh:mm) 40:00</p> <p>Practical Duration (hh:mm) 100:00</p> <p>Corresponding NOS Code CSC/N0803</p>	<ul style="list-style-type: none"> Comply with health and safety, environmental and other relevant regulations and guidelines at work Ensure work area is clean and safe from hazards Ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition Obtain and use the correct version of company and/or manufacturer's drawings and maintenance documentation Produce and update relevant maintenance schedules and plans Carry out the maintenance activities by appropriate techniques and procedures on a range of instrumentation and control equipment Re-connect and return the system to service on completion of activities Conduct maintenance activities within the limits of their personal authority Carry out the maintenance activities in the specified sequence and in an agreed timescale Report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule Complete relevant maintenance documentation accurately 	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Dispose of waste materials in accordance with safe working practices and approved procedures • Identify on making improvements to maintenance processes and procedures • Refer the problem to a competent internal/external specialist if it cannot be resolved • Obtain help or advice from specialist if the problem is outside candidate's area of competence or experience • Monitor the problem and keep the superior informed about progress or any delays in resolving the problem • Comply with relevant legislation, standards, policies and procedures 	
5	<p>Perform custody transfer metering</p> <p>Theory Duration (hh:mm) 52:00</p> <p>Practical Duration (hh:mm) 158:00</p> <p>Corresponding NOS Code HYCC/N6201</p>	<ul style="list-style-type: none"> • Identify type of custody flow meter - eg - Turbine, Ultrasonic, Coriolis and principle of their operation • Check installation as per design considerations like maximum/minimum operating process parameters of the fluid, the general characteristics of the fluid, ambient conditions and location of skid • Check installation as per design consideration for uni-directional or bi-directional flow • Read general arrangement design for flowmeter skid as per the selected type of flowmeter • Apply relevant standard while installing flow meter depending on the type - eg - American Gas Association (AGA) report 7 for turbine flowmeter, AGA report 9 for ultrasonic flowmeter etc. • Interpret installation requirements for auxiliary instruments as per standard • Identify upstream and downstream header piping and pipe components as per relevant standard specifications eg-straight run requirements, flow condition etc. • Identify material of construction (MOC) and corrosion resistance of the materials used, hot/cold insulation requirements • Check meter body, bore, tapping, electronic housing, ports and cable entry as per relevant standard recommendations for the hazardous zone classification • Observe the physical condition of upstream & downstream piping, pipe components, hot/cold insulation, auxiliary instruments 	<ul style="list-style-type: none"> • Ultrasonic flow meter • Turbine flow meter • Coriolis mass flow meter • Flow straightner • Pressure Transmitter (PT) • Temperature Transmitter (TT) • Gas Chromatograph (GC) • Calorimeter • Densitometer • Typical Control system PLC, SCADA.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Practical Duration (hh:mm) 100:00</p> <p>Corresponding NOS Code HYC/N6203</p>	<ul style="list-style-type: none"> • Check LEL detector and ensure junction box is thoroughly inspected for any abnormality • Purge the detector with air and observe the reading on the display unit as applicable. If required, adjust the “zero” reading • Apply calibration gas, as applicable, to the detector and observe the reading on the display as per gas concentration. If required, adjust by “span” reading. • Apply suitable correction factors for the intended LEL application as per OEM manual • Clean and maintain LEL gas detection system and testing kit in accordance with procedures and return the work permit to operation shift in-charge • Update calibration data in the applicable format 	<p>toxic and combustible gases</p>
8	<p>Basic, health, safety and security procedures</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 20:00</p> <p>Corresponding NOS Code HYC/N6104</p>	<ul style="list-style-type: none"> • Identify job-site hazardous work and state possible causes of risk or accident in the workplace • Carry out safe working practices while dealing with hazards to ensure the safety of self and others • State location of general health and safety equipment in the workplace • Inspect for faults, set up and safely use steps and ladders in general use • Work safely in and around trenches, elevated places and confined areas • Lift heavy objects safely using correct procedures • Identify common hazard signs displayed in various areas • Use the various appropriate fire extinguishers on different types of fires correctly • Demonstrate rescue techniques applied during fire hazard • Record all incidents, damages, illness or injury • Comprehend the applicable laws, regulations and codes as per standard • Assess the threats and to protect from the threats • Report all incident to the supervisor • Identify and describes the property of different petroleum products • Operates and handle spills and respond to the spills 	<ul style="list-style-type: none"> • Hard hats • safety glasses • ear protectors • steel-toe shoes

Trainer Prerequisites for Job role: “Process Instrument Operator (Oil & Gas)” mapped to Qualification Pack: “HYC/Q6201, v1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>HYC/Q6201, V1.0</u> ”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Diploma in Mechanical Engineering/ Petroleum Engineering
4a	Domain Certification	Certified for Job Role: “Process Instrument Operator (Oil & Gas)” mapped to QP: “ <u>HYC/Q6201, V1.0</u> ”. Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “ <u>MEP/Q0102</u> ”. Minimum accepted score is 80%.
5	Experience	Minimum 5 years of industry experience in relevant job role and a Minimum of 2 years Training experience in relevant job role.

Note: For the assessment criteria please refer to the Qualification Pack of “HYC/Q6201, v.1.0”.