



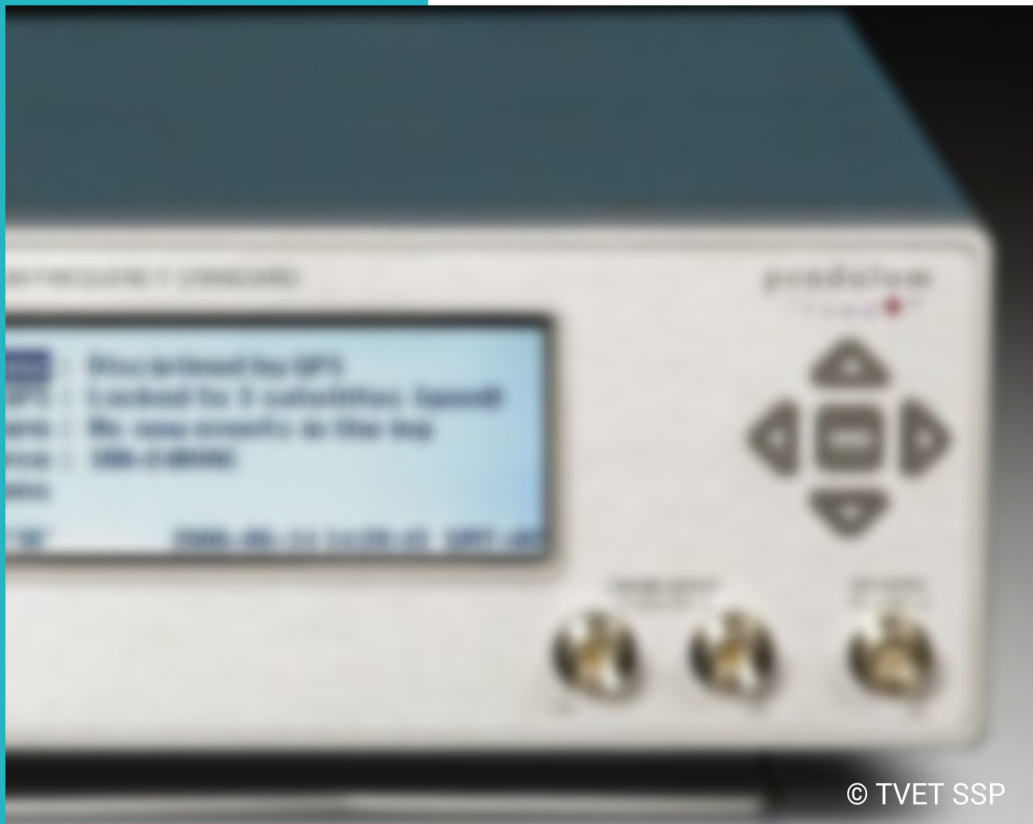
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PRECISION INSTRUMENTATION



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COMPETENCY STANDARDS

National Vocational Certificate Level 3-4

Version 1 - November, 2019



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1. Introduction

Instrumentation can be broadly defined as any automated devices to facilitate processes related to science and technology, such as engineering, medicine, or scientific laboratory research. **Instrument technicians** maintain and repair these devices, as well as ensuring that they comply with industry standards. Technicians often are on call or work overtime.

Precision instrument technicians maintain and repair delicate equipment and need to have a steady hand and excellent eyes to work with the tiny gears and parts of these instruments.

In order to build the capacity of technical and vocational training institutes in Pakistan through provision of demand driven and market-oriented competency-based trainings in the light engineering sector the NAVTTTC, and TEVT Sector Support Program (TSSP) have joined hands together to develop qualifications for the light engineering sector. These qualifications will not only build the capacity of existing workers of this sector but also support the youth to acquire skills best fit for this sector. The benefits and impact of development of these qualifications will be on both demand and supply side.

Based upon this demand of industry these competency-based qualifications for precision instrument technician are developed under National Vocational Qualification Framework (NVQF) (Level 3 to 4). The qualifications mainly cover competencies along with related knowledge and professional skills which are essential for getting a job or self-employed.

The National Vocational & Technical Training Commission (NAVTTTC) has approved the Qualification Development Committee (QDC). The QDC consists of experts from the relevant industries from different geographical locations across Pakistan and academicians including TVET instructors and practitioners. The National Competency Standards could be used as a referral document for the development of curricula to be used by training institutions.

Potential precision instrument technicians need to develop the ability to understand technical manuals and follow blueprints. Precision instrument technicians must have excellent vision and hearing, which will help them with their problem-solving and troubleshooting skills.

Precision instrument technicians are responsible for installing, repairing, and maintaining complex instruments, such as watches, photography equipment, medical equipment, or musical instruments. Many of the instruments that technicians work on are used for communication, entertainment, research, environmental, and scientific purposes.



2. Detail of National Vocational Certificate Levels

The detail of the competency standards included in this qualification are given below:

- National Vocational Certificate level 3, in (Light Engineering Sector) “Precision Instrumentation”
 - Ensure Health, hygiene and safety of other individuals at work
 - Perform Benchwork
 - Fabricate Piping & Tubing System
 - Install & Commission Instruments
 - Calibrate Instruments
 - Communicate at workplace
- National Vocational Certificate level 4, in (Light Engineering Sector) “Precision Instrumentation”
 - Measure Process Variables
 - Set Up Process Controller
 - Perform Fault Diagnosis
 - Carryout Repair & Maintenance of Instruments
 - Perform Advanced Communication
 - Establish and maintain the occupational health and safety system

3. Purpose of the Qualification

The purpose of the training is to provide skilled manpower to improve the existing capacity of the light engineering sector. This training will provide the requisite skills to the trainees to become Instrumentation Technicians. It will enable the participants to meet the challenges in the field of light engineering industry. Further, to improve the skill level of the Instrumentation Technicians and prepare them for the light engineering industry to meet the market competition nationally and internationally.

The core purpose of this qualification is to produce employable Instrumentation Technicians who could perform Precision Instrumentation according to national and international standards. In addition, this qualification will prepare unemployable youth to be employed in the light engineering sector.



4. Main Objectives of the Qualification

The Precision Instrumentation qualifications level 3- 4 consists of theoretical and practical details required to perform operations related to instrumentation in the process & light engineering industries. The main objectives of the qualification are as follows:

1. Ensure Health, hygiene and safety of other individuals at work
2. Perform benchwork
3. Fabricate Piping & Tubing System
4. Install & Commission Instruments
5. Calibrate Instruments
6. Communicate at workplace
7. Measure Process Variables
8. Set Up Process Controller
9. Perform Fault Diagnosis
10. Carryout Repair & Maintenance of Instruments
11. Perform advanced communication
12. Establish and maintain the occupational health and safety system



5. Date of Validation

The level 3-4 of National vocational qualification on Precision Instrumentation has been validated by the Qualifications Development Committee (QDC) members on July 14, 2019 and will remain in force until December 2021.

6. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:

ISCED Classification for Pipefitter level 2-4	
Code	Description
0714 E&A 18	National Vocational Certificate level 3, in (Light Engineering Sector) "Precision Instrumentation"
0714 E&A 19	National Vocational Certificate level 4, in (Light Engineering Sector) "Precision Instrumentation"



7. Members of Qualification Development Committee

The following members participated in the Qualification development and validation process:

S#	Name	Designation	Organization	Role in QDC
1	Mr. Nazir Ahmed	Instrument Supervisor	Hub Power Station (HUBCO)	Chairman QDC
2	Mr. Riaz ul Islam Khan	Plant Manager	MNA Energy Pvt. Ltd.	QDC+OP+CS+Validation
3	Mr. Babar Saeed	HOD- IPC	PSTC	QDC+OP+CS+Validation
4	Mr. Syed Farhan Hamid Ali	Sr. Instructor- Instrumentation	PSTC	QDC+OP+CS+Validation
5	Dr. Rana Javed Masood	Asst. Professor- Electrical/ Electronics	Usman Institute of Technology	QDC+OP+CS+Validation
6	Mr. Azam Ali Noori	Technical Assistant- Instrumentation	PSTC	QDC+OP+CS+Validation
7	Hunain Asghar	Mechanical Engineer	Dewan Cement	QDC+OP+CS+Validation
8	Muhammad Monawar	Chief Instructor- Instrumentation	GCT, PTEVTA, Faisalabad	QDC+OP+CS
9	Mr. Abid Iqbal	Associate Professor	GCT, Peshawar, KP TEVTA	QDC+OP+CS
10	Mr. Liaqat Ali Jamro	Director, A&T	STEVTA	QDC+OP+CS+Validation
11	Mr. Aijaz Ahmed Zia Qureshi	D&A Engineer	Intech Process Automation, Lahore	QDC+OP+CS
12	Mr. Mubeen Ahmed	Lecturer	National Textile University, Karachi Campus	QDC+OP+CS+Validation
13	Mr. Usman Ali	Assistant Manager- QC	Orient Automotive Industries	CS+Validation
14	Mr. Tariq Aziz	Managing Director	MEGA Factor Engineering	CS Validation
15	Mr. Hassan Ali	Assistant Manager	Lucky Cement	CS Validation
16	Mr. Safwaan Ahmad Khan	Assistant Manager	Dewan Cement	CS Validation
17	Mr. Muhammad Jawwad Arshad	Assistant Manager- QA	Orient Automotive Industries	CS+Validation
18	Mr. Muhammad Yasir	Asst. Director	NAVTTC, HQ	OP+CS
19	Mr. Shaikh Asim Qamar	CBTA Expert	Freelance	QDC+OP+CS+Validation
20	Mr. Hammad Mateen	Program Head	TAFF-VTI, TAF Foundation	OP+CS+Validation



8. Entry Requirements

The entry requirements for National Vocational Certificate level 3-4, in (Light Engineering Sector) “Precision Instrumentation” are given below:

Title	Entry Requirements
National Vocational Certificate level 3, in (Light Engineering Sector) “Precision Instrumentation”	Matriculation (Science) or Qualified in Level 2 in qualifications like: Industrial Electrician or General Electrician or Machinist or or any other light engineering qualification or Level 2 RPL qualified in a similar qualification
National Vocational Certificate level 4, in (Light Engineering Sector) “Precision Instrumentation”	Qualified in Level 3 in Precision Instrumentation or Level 3 RPL Qualified in Precision Instrumentation



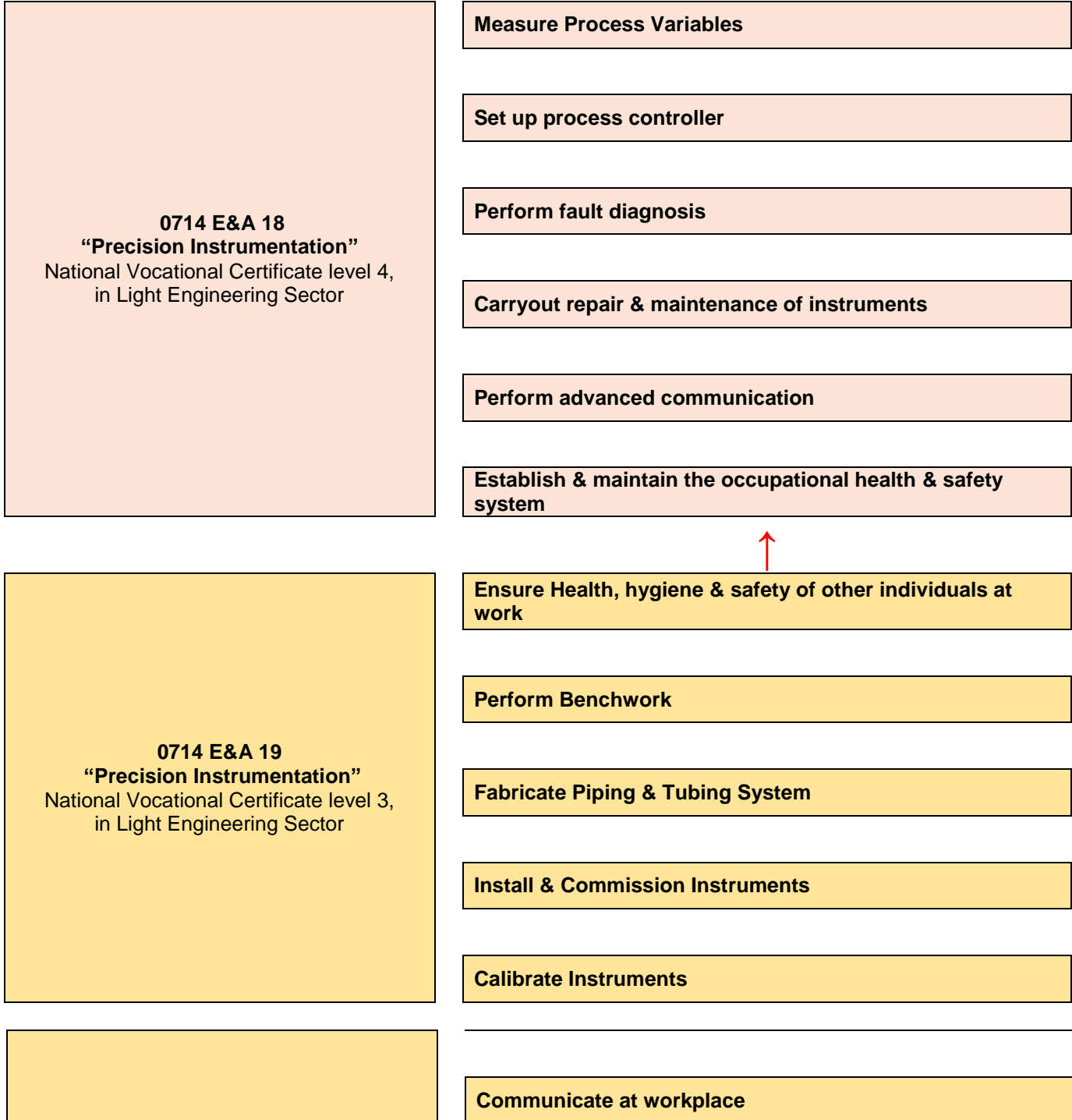
9. Categorization and Levelling of the Competency Standards

Code	Name of Duty or (Module)	Level	Credit	Category
102200846	Apply Work Health and Safety Practices (WHS)	3	3	Generic
041700840	Identify and Implement Workplace Policy and Procedures	3	2	Generic
001100852	Communicate at Workplace	3	3	Generic
061100858	Perform Computer Application Skills	3	4	Generic
041300867	Manage Personal Finances	3	3	Generic
0714001033	Perform Benchwork	3	7	Technical
0714001034	Fabricate Piping & Tubing System	3	13	Technical
0714001035	Install & Commission Instruments	3	16	Technical
0714001036	Calibrate Instruments	3	16	Technical
102200848	Contribute to Work Related Health and Safety (WHS) Initiatives	4	3	Generic
041700841	Analysis Workplace Policy and Procedures	4	3	Generic
001100853	Perform Advanced Communication	4	3	Generic
061100858	Develop Advance Computer Application Skills	4	4	Generic
041300869	Manage Human Resource Services	4	2	Generic
041300860	Develop Entrepreneurial Skills	4	3	Generic
0714001037	Measure Process Variables	4	13	Technical
0714001038	Set Up Process Controller	4	13	Technical
0714001039	Perform Fault Diagnosis	4	13	Technical
0714001040	Carryout Repair & Maintenance of Instruments	4	13	Technical



10. Packaging of Qualifications

The National Vocational Qualifications have been packaged as detailed below:





11. Detail of Competency Standards

102200846 Apply Work Health and Safety Practices (WHS)

Overview: This unit describes the skills to work with safety and participate in hazard assessment activities, follow emergency procedures and participate OHS practices in process.

Competency Units	Performance Criteria
CU1. Implement safe work practices at work place	P1. Implement relevant rules and procedures of WHS at work place. P2. Comply with duty of care requirements P3. Use personal protective equipment according to safe work practices P4. Contribute to WHS consultative activities P5. Raise WHS issues with relevant personnel
CU2. Participate in hazard assessment activities a work place	P1. Identify hazards or WHS issues in the workplace to relevant personnel P2. Assess and control risks according to own level of responsibility, in line with workplace procedures P3. Report hazards or WHS issues in the workplace to relevant personnel P4. Document risk control actions as required
CU3. Follow emergency procedures at workplace	P1. Report emergencies or incidents promptly to relevant personnel P2. Deal with emergencies in line with own level of responsibility P3. Implement evacuation procedures as required
CU4. Participate in OHS consultative processes	P1. Contribute to workplace meetings, inspections or other consultative activities P2. Raise OHS (Occupational Health and Safety) issues with designated persons in accordance with organizational procedures P3. Take actions to eliminate workplace hazards or to reduce risks



Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Outline the WHS rights and responsibilities that apply to own role
- K2:** Explain the term duty of care
- K3:** Describe typical health and safety roles in the workplace
- K4:** List and describe common safety signs and symbols
- K5:** Explain procedures for reporting hazards, risks, incidents and accidents
- K6:** Identify and describe common hazards and major causes of accidents relevant to the workplace
- K7:** Explain what the term risk control means
- K8:** List and describe potential emergency situations and how to respond to them

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

Demonstrate evidences of the Health and safety Processes to avoid any incident.



041700840 Identify and Implement Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to develop and implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Competency Units	Performance Criteria
CU1. Identify workplace policy & procedures	P1. Identify the workplace policy & procedures P2. Apply appropriate strategies that can be used to measure whether your workplace health and safety obligations are being met. P3. Assure the policies are realistic, resources and personnel to implement P4. Implement the policy & procedures that reflects the organizations commitments P5. Ensure the appropriate methods of implementation, outcomes and performance indicators
CU2. Implement workplace policy & procedures	P1. Apply and assign responsibility for recording systems to track continuous improvements in policy & procedures P2. Implement strategies for continuous improvement in effective and efficient information
CU3. Communicate workplace policy & procedures	P1. Communicate procedures to help implement workplace policy P2. Inform those involved in implementing the policy about expected outcomes, activities to be undertaken and assigned responsibilities
CU4. Review the implementation of workplace policy & procedures	P1. Identify the trends that may require remedial actions P2. Record the trends that may require remedial actions. P3. Ensure policy and procedures as required are made for continuous improvement of performance



Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Legislation, regulations and codes of practice applicable to the organization
- K2:** internal and external sources of information and organizational policy & procedures
- K3:** Typical barriers to implementing policies and procedures in an organization.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

Identify evidences of the ability to implement work place policy and procedures. briefly identify work place procedures to avoid incident.



001100852 Communicate at Workplace

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.

Competency Units	Performance Criteria
CU1. Communicate within the organization	P1. Communicate within a department P2. Communicate with other departments. P3. Use various media to communicate effectively P4. Communicate orally and written
CU2. Communicate outside the organization	P1. Deal with vendors P2. Deal with clients/customers P3. Interact with other organisations P4. Use various media to communicate effectively P5. Work with people of different cultures / backgrounds
CU3. Communicate effectively in workgroup	P1. Assess the issues to provide relevant suggestion to group members P2. Resolve the issues/ problems /conflicts within the group P3. Arrange group working sessions to increase the level of participation in the group processes P4. Communicate messages to group members clearly to ensure interpretation is valid P5. Communicate style /manner to reflect professional standards/ awareness of appropriate cultural practices P6. Act upon constructive feedback
CU4. Communicate in writing	P1. Identify relevant procedures for written information P2. Use strategies to ensure correct communication in writing .i.e. <ul style="list-style-type: none">• correct composition• clarity• comprehensiveness• accuracy• appropriateness



	<p>P3. Draft assigned written information for approval, ensuring it is written within designated timeframes</p> <p>P4. Ensure written information meets required standards of style, format and detail</p> <p>P5. Seek assistance / feedback to aid communication skills development</p>
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Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1:** Importance of intra and inter organizational communication
- K2:** Basics of business communication
- K3:** Defining Modes of communication
- K4:** Effective communication in workgroup
- K5:** Communicating through writing
- K6:** The importance of teamwork

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

In your current position, what types of written communication do you use most often? (List them all).



061100858 Perform Computer Application Skills

Overview: This unit describes the skills and knowledge required to use spreadsheet applications, prepare in page documents, develops familiarity with Word, Excel, Access, PowerPoint, email, and computer graphics basics.

It applies to individuals who perform a range of routine tasks in the workplace using a fundamental knowledge of spreadsheets, Microsoft office and computer graphics in under direct supervision or with limited responsibility

Competency Units	Performance Criteria
CU1. Prepare In-page documents as per required information	P1. Set keyboard preferences according to information requirements P2. Layout Page according to information requirements P3. Toggle between Languages P4. Identify the usage of tool bar P5. Insert Columns as per requirement P6. Print the document
CU2. Prepare Spreadsheets as per required information	P1. Create workbook according to information requirements P2. Insert sheet according to information requirements P3. Enter basic formulae / functions using cell referencing when required P4. Correct formulas when error messages occur P5. Use a range of common tools during spreadsheet development P6. Edit columns and rows within the spreadsheet Filter data P7. Save the spreadsheet to a folder on a storage device P8. Format spreadsheet using formatting features as required P9. Incorporate object and chart in spreadsheet P10. Print spreadsheet
CU3. Use MS Office as per required information	P1. Use Microsoft Word for documentation P2. Use Microsoft Excel for documentation P3. Use Microsoft PowerPoint for presentation P4. Perform OneNote



	<p>P5. Perform Outlook for emails</p> <p>P6. Perform Publisher applications</p>
<p>CU4. Perform computer graphics in basic applications</p>	<p>P1. Perform graphic fundamentals in basic applications</p> <p>P2. Draw Points and lines to make images</p> <p>P3. Draw Dots in space to make images</p> <p>P4. Draw lightening blot Shapes to make images</p> <p>P5. Enlarge circles and rectangles to block in forms</p>
<p>CU5. Create Email account for communications</p>	<p>P1. Make email account for communications</p> <p>P2. . Compose text of an email message according to organizational guidelines as required</p> <p>P3. Create an automatic signature for the user</p> <p>P4. Attach files to email message where required</p> <p>P5. Send email message</p> <p>P6. Reply to / forward a received message using available features</p> <p>P7. Save an attachment to the relevant folder</p> <p>P8. Save email message using available settings</p> <p>P9. Adjust email accounts to restrict and quarantine possible email security problems</p> <ul style="list-style-type: none">• Print email message as per requirements

Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1:** List basic technical terminology related to reading help files and prompts
- K2:** Explain the effect of formatting and appearance on the readability and usability of spreadsheets
- K3:** Outline log-in procedures relating to accessing a personal computer (PC)
- K4:** Describe the purpose, use and function of spreadsheet applications.
- K5:** Understand **MS Word** to create documents, flyers, publications



K6: Understand **MS PowerPoint** to create presentations

K7: Understand **MS Excel** to store, organize, and manipulate data

K8: Understand **OneNote** to organize data you collect including handwritten notes, drawings, screen captures, audio clips, and more

K9: Understand of Publisher to create extensive publications, posters, flyers, menus

K10: Understand **Outlook** to manage email and calendars, to do lists, and contacts

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Create spreadsheets
- Customize basic settings
- Format spreadsheets
- Apply basic formulas
- Insert objects and charts in spreadsheets
- Save and print spreadsheets.



041300867 Manage Personal Finances

Overview: This unit of competency describes the outcomes required to manage develop, implement and monitor a personal budget in order to plan regular savings and manage debt effectively.

Competency Units	Performance Criteria
CU1. Develop a personal budget	<p>P1. Calculate current living expenses using available information to prepare a personal budget.</p> <p>P2. Keep a record of all income and expenses for a short period of time to help estimate ongoing expenses.</p> <p>P3. Subtract total expenses from total income to determine a surplus or deficit budget for the specified period.</p> <p>P4. Find reasons for a deficit budget and ways to reduce expenditure identified.</p> <p>P5. Identify ways to increase income</p>
CU2. Develop long term personal budget	<p>P1. Analyze income and expenditure and set long term personal financial goals.</p> <p>P2. Develop a long-term budget based on the outcomes of short-term budgeting.</p> <p>P3. Identify obstacles that might affect the business</p> <p>P4. Formulate a regular savings plan based on budget</p>
CU3. Identify ways to maximize future finances	<p>P1. Determine sources to maximize personal income,</p> <p>P2. Get further education or training to maintain or improve future income.</p> <p>P3. Identify the need for debt to finance living and other expenses,</p> <p>P4. Determine the appropriate levels of debt and repayment.</p> <p>P5. Consolidate existing debt, where possible, to minimize interest costs and fees.</p> <p>P6. Seek professional money management services.</p>



Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Explain the abilities to plan and organize to keep records and monitor a personal budget
- K2:** Describe abilities to set and review goals
- K3:** Explain basic financial management and record keeping to enable development and management of a personal budget
- K4:** Describe benefits of financial goal setting and personal budgeting to enable effective management of personal finances
- K5:** Outline numeracy skills to compare income and expenditure

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

Demonstrates competency to provide evidence of the ability to manage personal finances. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



0714001033 Perform Benchwork

Overview: This competency standard covers the skills and knowledge required to perform bench work operations including sawing, filing, drilling, tapping, reaming, countersinking and counter boring.

Competency Unit	Performance Criteria
CU1. Perform sawing	<p>P1. Select appropriate blade according to the material and set in hacksaw frame</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform sawing as per standard procedures</p> <p>P5. Verify the final job with the given drawing</p>
CU2. Perform filing	<p>P1. Select appropriate file type according to the material & profile</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform filing as per standard procedures</p> <p>P5. Verify the final job with the given drawing</p>
CU3. Perform Drilling	<p>P1. Select appropriate drilling bit according to the material</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Set the machine RPM according to the drill size and work piece material</p> <p>P5. Perform drilling as per standard procedures</p> <p>P6. Perform post drilling operations</p> <p>P7. Verify the final job with the given drawing</p>
CU4. Perform hand tapping	<p>P1. Select appropriate tap according to the job specification</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling to produce hole according to tap size</p> <p>P5. Perform tapping as per job specification</p> <p>P6. Verify the final job with given drawing</p>
	<p>P1. Select appropriate reamer according to the job specification</p>



CU5. Perform hand reaming	<p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling to produce hole according to the size of reamer</p> <p>P5. Perform reaming as per job specification</p> <p>P6. Verify the final job with given drawing</p>
CU6. Perform counter boring	<p>P1. Select appropriate counter boring tool according to the drawing</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling operation as per drawing</p> <p>P5. Set the machine RPM according to the bore size and work piece material</p> <p>P6. Perform counter boring as per standard procedures</p> <p>P7. Perform post drilling operations</p> <p>P8. Verify the final job with the given drawing</p>
CU7. Perform counter sinking	<p>P1. Select appropriate counter sinking tool according to the drawing</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling operation as per drawing</p> <p>P5. Set the machine RPM according to the counter sink size and work piece material</p> <p>P6. Perform counter sinking as per standard procedures</p> <p>P9. Verify the final job with the given drawing</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define different types of blades and their use
- Define file types and their use
- Define the different types of drill bits
- Describe the methods to calculate & set RPM of machine
- Describe types and applications of reamers
- Define the types of counter boring & counter sinking tools
- Describe the methods of tapping
- Understand and interpret basic engineering drawings
- Describe the types & applications of clamping devices
- Describe types & properties of material



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

Prepare a work piece demonstrating the following competencies with following safety procedures:

- Sawing
- Filing
- Drilling
- Taping
- Counter boring & countersinking

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Vernier caliper (0-150mm)
2.	Micrometer (0-25mm)
3.	Steel rule (0-300mm)
4.	Tri Square (0-100mm)
5.	Centre & Dot Punch
6.	Scriber
7.	Hammer (Ball Peen 250gm)
8.	Power disc cutter (14inch)
9.	Hacksaw blades (18-24 TPI)
10.	Second cut files 8-12in (Flat, Round, Triangle, Square)
11.	Drill bits of different sizes (4-20mm)
12.	Bench vices 4 inches
13.	Bench type drill machine
14.	Drill chuck
15.	Countersinking & counter boring tools (10-20mm)
16.	Hand grinder (4inch & 7inch)
17.	Hand reamers with handle (8-16mm)
18.	Tap set with handle (M3-M12)
19.	Emery paper (200-400)



0714001034 Fabricate Piping & Tubing system

Overview: This competency standard covers the skills and knowledge required to interpret drawings/ layouts, prepare work area & perform different operations to fabricate a piping system.

Competency Unit	Performance Criteria
CU1. Interpret Drawings/ Layout	<p>P1. Interpret symbols from the given drawing/ layout</p> <p>P2. Read scale of the given drawing/ layout</p> <p>P3. Interpret different types of abbreviations from the given drawing/ layout</p> <p>P4. Take measurements from the given drawing/ layout</p> <p>P5. Estimate material from the given job specification/ drawing/ layout</p> <p>P6. Interpret different section views/ coordinated sections from the given drawing/ layout</p> <p>P7. Interpret revisions in drawings/ layouts</p>
CU2. Prepare work area	<p>P1. Inspect work area, check on potential hazards</p> <p>P2. Arrange material according to the given drawing/ specifications</p> <p>P3. Arrange the required tools/ equipment to perform fabrication of piping system</p> <p>P4. Ensure electrical & water supply to the work area</p> <p>P5. Disconnect/ remove previously existing services from the work area according the given drawing/ layout</p> <p>P6. Coordinate with co-workers according to the job</p>
CU3. Bend/ Cut pipes & tubes	<p>P1. Perform measurement of pipe according to the drawing/ job specification</p> <p>P2. Mark the work piece according to the drawing/ job specification</p> <p>P3. Select appropriate tools/ equipment according to the given material</p> <p>P4. Bend/ Cut the pipe as per job requirement and according to safety rules</p>
CU4. Perform threading	<p>P1. Perform measurement of pipe according to the given drawing/ job specification</p> <p>P2. Mark the workpiece according the given drawing/ job specification</p> <p>P3. Select appropriate tools/ equipment to thread the given pipe.</p> <p>P4. Perform threading of pipes using pipe threading die as per</p>



	standard
CU5. Braze pipes	<p>P1. Arrange tools/ equipment/ material as per job requirement</p> <p>P2. Ensure safety precautions</p> <p>P3. Measure pipe as per job requirement</p> <p>P4. Mark pipe as per job requirement</p> <p>P5. Cut pipe as per job requirement</p> <p>P6. Clean pipe surface with emery paper</p> <p>P7. Perform brazing according to standard</p> <p>P8. Clean brazing area with emery paper</p>
CU6. Make welded joints through arc welding	<p>P1. Arrange tools/ equipment/ material as per job requirement</p> <p>P2. Ensure safety precautions & use PPE</p> <p>P3. Measure pipe as per job requirement</p> <p>P4. Mark pipe as per job requirement</p> <p>P5. Cut pipe as per job requirement</p> <p>P6. Ensure bevel on pipe edges as per standard</p> <p>P7. Align pipe/ pipe & pipefitting/ both pipes as per standard</p> <p>P8. Adjust electric current for welding plant</p> <p>P9. Ensure level of both pipes and keep distance as per required standard</p> <p>P10. Perform welding</p>
CU7. Install pipelines	<p>P1. Arrange approved drawing for given task</p> <p>P2. Adopt necessary PPEs according to the task</p> <p>P3. Select tools/equipment/ material as per given task</p> <p>P4. Figure out the placement of pipes (hot & cold) as per drawing</p> <p>P5. Locate and mark anchor/ support points as per requirement</p> <p>P6. Remeasure to ensure the marking</p> <p>P7. Cut/ drill object/ wall as per requirement</p> <p>P8. Cut and clean pipe</p> <p>P9. Thread the pipe and apply seal tape</p> <p>P10. Fix accessories as per given drawing</p> <p>P11. Level the pipe</p> <p>P12. Install the pipes according to standards</p> <p>P13. Clean & store work area & tools to ensure good housekeeping</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Describe types of pipe joints
- Explain the purpose and necessity of pipe joints' application according to the material
- State joining methods of pipe
- Identification of different pipe joints
- State difference of material used for solvent joint
- Explain procedure to make solvent joint
- State use of angle grinder & bevel protector
- Explain procedure to perform grinding of pipe
- State brazing standard
- State different types of soldering
- Explain difference between soldering and brazing
- Explain procedure to make brazing/ soldering joint
- Explain procedure to make fusion joint
- State types of welding
- State importance of arc welding
- Explain procedure to make welded joint by arc welding

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Make welded joint through arc welding
- Perform brazing of pipe

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Leather Gloves
2.	Cotton Gloves
3.	Goggles
4.	Safety mask
5.	Helmet
6.	Safety belt
7.	Safety Shoes
8.	Ear plug / Earmuff
9.	Overall
10.	Face Shield and Holder with cable
11.	Face Shield (Transparent)
12.	Welding Gloves
13.	Measuring Tape
14.	Combination Pliers
15.	Vernier Caliper
16.	Inside/Outside Caliper



17.	Pointing chisel
18.	Cold Chisel
19.	Ball Peen Hammer
20.	Straight Peen Hammer 2 lbs
21.	Club Hammer
22.	Pipe Wrench 12" to 24"
23.	Pipe Vise 6" with tripod
24.	Ratchet die set 1/2" to 2"
25.	Hand Hack Saw
26.	Power Disc grinder 14"
27.	Portable Welding Machine 3 Phase 300 Amp.
28.	File Set
29.	Pipe Reamer Set
30.	Adjustable Wrench 8" to 12"
31.	Phillips Screwdriver Set
32.	Flat Screwdriver Set
33.	Allen Key Set
34.	Tin Snip Cutter
35.	Pipe Cutter 1/2" to 2"
36.	Open End Spanner Set (Metric)
37.	Open End Spanner Set (Imperial)
38.	Offset Ring Spanner Set (Metric)
39.	Offset Ring Spanner Set (Imperial)
40.	Combination Spanner Set (Metric)
41.	Combination Spanner Set (Imperial)
42.	Hand Drill Machine
43.	Twist Drill Set
44.	Masonry Drill Set
45.	Heat Gun
46.	Fusion Machine (PPRC set 20mm to 63mm)
47.	Gas Cutter Set with Torch, Pipe and Cylinders
48.	Magnet Sprit Level
49.	Water Level 12 meter
50.	Soldering Machine
51.	Flaring Tool Set
52.	Swaging Tool Set
53.	Tube Cutter
54.	Bench Vise 6"
55.	Tri Square 12", 24"
56.	Disc 14" Power Cutter
57.	Pin Grinder
58.	Chalk Liner
59.	Testing Plugs 2" to 4" expendable
60.	Baby Grinder 4"



61.	Grip Pliers
62.	Laser Level
63.	Fusion Machine (PE Pipe Set) Butt Fusion



0714001035 Install & Commission Instruments

Overview: This competency standard covers the skills and knowledge required to install & commission instruments including temperature, pressure flow and level instruments along with recommissioning the process loop.

Competency Unit	Performance Criteria
CU1. Install & Commission Temperature Instruments	<p>P1. Perform site inspection</p> <p>P2. Analyse process instrument to be installed.</p> <p>P3. Apply standard techniques necessary for installation procedures as per manual.</p> <p>P4. Inspect installed components for damage.</p> <p>P5. Ensure that the installed instrument is intact and working properly</p> <p>P6. Generate an output report as per standard.</p> <p>P7. Ensure good housekeeping and safe working practices at all time</p>
CU2. Install & Commission Pressure Instruments	<p>P1. Perform site inspection.</p> <p>P2. Analyse process instrument to be installed.</p> <p>P3. Apply standard techniques necessary for installation procedures as per manual.</p> <p>P4. Inspect installed components for damage.</p> <p>P5. Ensure that the installed instrument is intact and working properly</p> <p>P6. Generate an output report as per standard.</p> <p>P7. Ensure good housekeeping and safe working practices at all time</p>
CU3. Install & Commission Level Instruments	<p>P1. Perform site inspection as per drawing.</p> <p>P2. Analyse process instrument to be installed.</p> <p>P3. Apply standard techniques necessary for installation procedures as per manual.</p> <p>P4. Inspect installed components for damage.</p> <p>P5. Ensure that the installed instrument is intact and working properly</p> <p>P6. Generate an output report as per standard.</p> <p>P7. Ensure good housekeeping and safe working practices at all time</p>
CU4. Install & Commission Flow Instruments	<p>P1. Perform site inspection as per drawing.</p> <p>P2. Analyse process instrument to be installed.</p> <p>P3. Apply standard techniques necessary for installation procedures as per manual.</p>



	<p>P4. Inspect installed components for damage.</p> <p>P5. Ensure that the installed instrument is intact and working properly</p> <p>P6. Generate an output report as per standard.</p> <p>P7. Ensure good housekeeping and safe working practices at all time</p>
CU5. Recommission Process Loop	<p>P1. Make visual inspection for faults in the system</p> <p>P2. Verify installation as per SOPs.</p> <p>P3. Ensure that the connections/ terminations are secure</p> <p>P4. Perform test run</p> <p>P5. Perform sensory inspection</p> <p>P6. Verify accurate signal transmission for satisfactory measurement and transmission</p> <p>P7. Identify modifications and improvements required in the system</p> <p>P8. Validate specification & procedure as per manual/ SOP</p> <p>P9. Finalize documentation and report to relevant personnel</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define types of hazard.
- Understand and implement P & ID drawing.
- Understanding a Process Control Loop.
- Understanding of IFCD (Interface Control Diagram)
- Describe standard calibration procedure.
- Basic electrical and electronic circuit theory.
- Describe electrical & electronic test equipment
- Explain safety regulations
- Explain indicating, integrating and recording instruments
- Explain Electrical/ Electronic/Instrumentation symbols
- Describe the functional parameters of Sensors.
- Explain Tagging techniques of connections.
- Describe assembling & dismantling techniques.
- Explain testing techniques of connections.
- Explain electronic fault diagnosis.
- Define the documented data and data sheet for sensors.
- Define the component parameter, ratings and application of sensors.
- Understand and interpret technical drawings.
- Differentiate between various types of measuring instruments.
- Apply different techniques necessary for installation procedures.
- Identify damage in installed components.
- Examine proper working of installed instrument
- Prepare report for final results



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Identify Flow, level, pressure and temperature instruments.
- Install Flow, level, pressure and temperature instruments.
- Perform test run of instruments.
- Understand and implement P & ID drawing.
- Understanding of Process Control Loop.
- Understanding of IFCD (Interface Control Diagram)

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Digital thermometer (-10~400 C°)
2.	Infrared thermometer (0~2000 C°)
3.	Bourdon tube pressure gauge (0~20 Bar)
4.	Bourdon tube pressure gauge (0~400 Bar)
5.	Bourdon tube pressure gauge (0~200 Bar)
6.	Surface level gauge (2 feet)
7.	Surface level gauge (8 feet)
8.	Capacitance type level instrument
9.	Work Bench (4x8 feet, height 3 feet)
10.	Bench vice
11.	Pipe vice
12.	Combination plier electrical
13.	Nose plier
14.	Wire stripper
15.	Side cutter
16.	Pipe cutting tool
17.	Tube flaring tool
18.	Hacksaw
19.	Chisel (8")
20.	Pin punch set
21.	Hole punch set (5~ 20mm)
22.	Center punch
23.	Soldering / de soldering station
24.	Digital multimeter
25.	Digital RPM meter (0~10000 RPM)
26.	Digital clamp meter (0~400A)
27.	Frequency meter (0~20MHZ)
28.	Digital Micrometer set (0~200mm)
29.	Phase tester
30.	Tape measures (0~3m)



31.	Tape measures (0~50m)
32.	Protection suite
33.	Safety shoes
34.	Safety goggles
35.	Hearing protection
36.	Respiratory mask
37.	First Aid Box
38.	Hand glove
39.	Flat Screwdriver set
40.	Philips Screwdriver set
41.	Watchmaker Screwdriver set
42.	Tweezers
43.	Open end spanner set (5~32mm)
44.	Ring spanner set (5~22mm)
45.	Allen key set (1~10mm)
46.	Tagging marks
47.	Hand drill machine
48.	Lugs punch (up to 10mm)

Consumable Items:

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Lugs (1~10mm)
2.	Number strips
3.	Teflon tape
4.	Insulation tape
5.	Welding electrodes
6.	Brass & Copper rods for brazing
7.	Soldering wire
8.	Oxygen cylinder
9.	Acetylene cylinder
10.	Contact cleaner
11.	PVC flexible pipe
12.	Drill bits (HSS)
13.	Drill bits (Masonry)
14.	Cotton gloves
15.	Cotton waste
16.	Permanent marker
17.	Chalk
18.	Blind rivets
19.	Machine screw & nuts
20.	Cut screws



21.	Cutting disc
22.	Grinding disc
23.	Multi-purpose grease
24.	WD-40



0714001036 Calibrate Instruments

Overview: This competency will enable the students to identify calibration errors, select calibration standards and follow SOPs to calibrate Process Instruments and generate calibration report.

Competency Unit	Performance Criteria
CU1. Calibrate Temperature Instruments	<p>P1. Plan and organize standard/master calibrator necessary for calibration.</p> <p>P2. Prepare standard/master calibrator necessary for calibration</p> <p>P3. Check and verify instrument reliability or any damage.</p> <p>P4. Ensure proper working of temperature calibration apparatus.</p> <p>P5. Install and set-up standard/master calibrator required for calibration activities (i.e. software/hardware)</p> <p>P6. Perform calibration tasks as per standards.</p> <p>P7. Verify performance of instrument as per reference standards prior to use and adjust calibrate if necessary.</p> <p>P8. Document test results as per SOP</p> <p>P9. Ensure good housekeeping & safe working practices at all times</p>
CU2. Calibrate Pressure Instruments	<p>P1. Plan and organize standard/master calibrator necessary for calibration.</p> <p>P2. Prepare standard/master calibrator necessary for calibration</p> <p>P3. Check and verify instrument reliability or any damage.</p> <p>P4. Ensure proper working of pressure calibration apparatus.</p> <p>P5. Install and set-up standard/ master calibrator required for calibration activities (i.e. software/hardware)</p> <p>P6. Perform calibration tasks as per standards.</p> <p>P7. Verify performance of instrument as per reference standards prior to use and adjust calibrate if necessary.</p> <p>P8. Document test results as per SOP</p> <p>P9. Ensure good housekeeping & safe working practices at all times</p>
CU3. Calibrate Level Instruments	<p>P1. Plan and organize standard/ master calibrator necessary for calibration.</p> <p>P2. Prepare standard/master calibrator necessary for calibration</p> <p>P3. Check and verify instrument reliability or any damage.</p> <p>P4. Ensure proper working of level calibration apparatus.</p> <p>P5. Install and set-up standard/master calibrator required for calibration</p>



	<p>activities (i.e. software/hardware)</p> <p>P6. Perform calibration tasks as per standards.</p> <p>P7. Verify performance of instrument as per reference standards prior to use and adjust calibrate if necessary.</p> <p>P8. Document test results as per SOP</p> <p>P9. Ensure good housekeeping & safe working practices at all times</p>
<p>CU4. Calibrate Flow Instruments</p>	<p>P1. Plan and organize standard/master calibrator necessary for calibration.</p> <p>P2. Prepare standard/master calibrator necessary for calibration</p> <p>P3. Check and verify instrument reliability or any damage.</p> <p>P4. Ensure proper working of flow calibration apparatus.</p> <p>P5. Install and set-up standard/master calibrator required for calibration activities (i.e. software/hardware)</p> <p>P6. Perform calibration tasks as per standards.</p> <p>P7. Verify performance of instrument as per reference standards prior to use and adjust calibrate if necessary.</p> <p>P8. Document test results as per SOP</p> <p>P9. Ensure good housekeeping & safe working practices at all times</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Describe safety regulations.
- Understand and implement P & ID (Piping & Instrument Diagram)
- Understanding a Process Control Loop.
- Understanding of IFCD (Interface Control Diagram)
- Describe standard calibration procedure.
- Basic Electrical & Electronic Devices theory
- Basic electrical and electronic circuit theory.
- Describe electrical & electronic test equipment
- Explain indicating, integrating and recording instruments
- Explain Electrical/ Electronic/Instrumentation symbols.
- Describe the functional parameters of Instruments & Sensors
- Explain Tagging techniques of connections.
- Describe assembling & dismantling techniques of Instruments.
- Describe assembling & dismantling techniques of Mechanical / Electrical Installation
- Explain testing techniques of connections.
- Explain electronic fault diagnosis.
- Define the documented data and data sheet for sensors.
- Define the documented data and data sheet for process instruments
- Define the component parameter, ratings and application of sensors
- Understanding Technical Mathematics



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Demonstrate method of routine calibration process of Flow, level, pressure and temperature Instruments.
- Perform routine Calibration of Process Instruments.
- Diagnose faults in Process Instruments.
- Generate fault report as per SOP.

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Temperature Calibrator (0~600C ^o)
2.	Temperature Calibrator (400~2000C ^o)
3.	Pressure Calibrator (0~20bar)
4.	Pressure Calibrator (100~600bar)
5.	Pressure Calibrator (-1~0bar)
6.	Level Calibrator (0~20feet)
7.	Gas Flow Calibrator (0~10m ³)
8.	Liquid Flow Calibrator (0~10m ³)
9.	Work Bench (8ftx4ftx3ft)
10.	Digital multimeter
11.	Digital Leak tester
12.	Millivolt source (-10~10v)
13.	Milliampere source (0~20mA)
14.	Safety shoes
15.	Safety goggles
16.	First Aid Kit
17.	Test probes
18.	Hand glove
19.	Digital Thermometer (0~400C ^o)
20.	Screwdriver set
21.	Tweezers
22.	Wire Cutter
23.	Combination Plier
24.	Nose pliers
25.	Watch makers screwdriver set
26.	Allen key set
27.	Spanner set metric / imperial
28.	Adjustable spanner set



Consumable Items:

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Teflon tape
2.	Insulation tape
3.	Soldering wire
4.	Contact cleaner
5.	Cotton gloves
6.	Cotton waste
7.	Permanent marker
8.	PU tube
9.	WD-40



102200848 Contribute to Work Related Health and Safety (WHS) Initiatives

Overview: This unit describes the skills and knowledge required to manage the identification, review, development, implementation and evaluation of effective participation and consultation processes as an integral part of managing work health and safety (WHS).

Competency Units	Performance Criteria
CU1. Contribute to initiate work-related health and safety measures	<p>P1. compile database on work-related health and safety</p> <p>P2. Identify measures that address legal obligations.</p> <p>P3. Consult with individuals/ parties to formulate measures and initiatives</p> <p>P4. Consult with individuals/parties to identify factors impacting on work-related health and safety</p> <p>P5. Participate in consultative meetings.</p>
CU2. Contribute to establish work-related health and safety measures	<p>P1. Assist in planning of work-related health and safety measures</p> <p>P2. Contribute to the development of work-related health and safety measures</p> <p>P3. Identify to implement work-related health and safety measures i.e.</p> <ul style="list-style-type: none"> • resourcing requirements, • timelines • responsibilities <p>P4. Assist to implement work-related health and safety measures and initiatives i.e.</p> <ul style="list-style-type: none"> • scheduling • liaison • administering resources • communication
CU3. Contribute to ensure legal requirements of WHS measures	<p>P1. Identify WHS legal requirements</p> <p>P2. Apply knowledge of all aspects of WHS measures to</p> <ul style="list-style-type: none"> • Consultation • workplace policies • participation processes



	P3. Ensure, WHS measures are in accordance with legal requirements
CU4. Contribute to review WHS measures	P1. Develop effective practices to review work-related health and safety measures P2. Assist individuals and parties related to WHS measures in following activities <ul style="list-style-type: none">• preparing reports• communicating review• evaluating outcomes
CU5. Evaluate the organization's WHS system	P1. Assess ongoing compliance with OHS (Occupational Health and safety) P2. Take feedback from concerned persons regarding WHS measures. P3. Assess the overall effectiveness of WHS management practices P4. Assist the development process of WHS measures in following ways <ul style="list-style-type: none">• Suggest amendments• Document amendments• Implement amendments P5. Take feedback from concerned persons regarding WHS measures. P6. Communicate improvements in WHS Measures

Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Explain the application of relevant mandatory health monitoring, including biological monitoring, to help secure work health and safety



- K2:** Explain the difference between work-related health and safety measures and initiatives designed to meet specific legislative requirements and obligations, and those designed to support non-statutory health promotion programs, and give examples of each
- K3:** List factors that impact on work-related health and safety and their potential effects
- K4:** Identify internal and external sources of WHS information and data, and how to access them
- K5:** Outline organizational WHS and other relevant policies, procedures, processes and systems, including human resources
- K6:** Summarize relevant WHS legislation, other legislation (such as privacy and workers compensation) and common law rights and duties specific to work-related health and safety measures and initiatives
- K7:** Describe work-related health and safety measures and initiatives that either address specific legislative requirements and obligations, or support non-statutory health prevention programs, including:
- The factors impacting on worker health and safety that they address
 - Effectiveness
 - Costs and benefits
 - Criteria for decisions regarding their implementation in a specific workplace
 - How they should be implemented.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

A person who demonstrates competency in this unit must be able to provide evidence of the ability to contribute work-related health and safety measures and initiatives. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



041700841 Comply with Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Competency Units	Performance Criteria
CU1. Manage work timeframes	P1. Complete work tasks within deadlines in according to order of priority P2. Supervisors are informed of any delays in work times or projects
CU2. Manage to convene meeting	P1. Develop agenda in line with meeting purpose P2. Select participants and notify them accordingly P3. Carryout meeting arrangements according to the time P4. Record the minutes of the meeting
CU3. Decision making at workplace	P1. Identify the problem, challenge or opportunity P2. Generate an array of possible solutions or responses P3. Evaluate the costs and benefits associated with each option P4. Assess the impact of the decision and modify the course of action as needed
CU4. Set and meet own work priorities at instant	P1. Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives P2. Use technology efficiently and effectively to manage work priorities and commitments P3. Maintain appropriate work-life balance
CU5. Develop and maintain professional competence	P1. Assess personal knowledge and skills against competency P2. Participate in networks to enhance personal knowledge, skills and work relationships P3. Seek feedback from employees, clients and colleagues to develop and improve competence



CU6. Follow and implement work safety requirements	P1. Identify and report emergency incidents P2. Practice organizational policy and procedures for responding to emergency incidents P3. Identify and implement workplace procedures and work instructions for controlling risks
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Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Healthy work life balance
- K2:** Meeting terminologies, structures and arrangements
- K3:** Relevant organizational procedures and policies regarding meetings, chairing and minutes.
- K4:** Barriers to implement policies and procedures in an organization and possible strategies to address them.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

A person who demonstrates competency in this unit must be able to provide evidence of the ability to understand workplace policy and procedures. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments



001100853 Perform Advanced Communication

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently.

Competency Units	Performance Criteria
<p>CU1. Demonstrate professional skills</p>	<p>P1. Use different modes of communication to communicate</p> <ul style="list-style-type: none"> • Speaking • Reading • Writing • Listening • Presentation • visual representation etc <p>P2. Develop CV Skills according requirements</p> <p>P3. Upgrade professional skills by attending trainings, webinars, conferences etc.</p> <p>P4. Perform Continuous professional development as required at workplace</p> <p>P5. Develop interview skills</p>
<p>CU2. Plan and Organize work</p>	<p>P1. Identify task requirements.</p> <p>P2. Plan steps to complete tasks.</p> <p>P3. Review planning and organizing process.</p> <p>P4. Organize work.</p>
<p>CU3. Provide trainings at workplace</p>	<p>P1. Assess the need for training</p> <p>P2. Prepare trainees for the learning experience</p> <p>P3. Present training session</p> <p>P4. Support trainees in managing their own learning</p> <p>P5. Facilitate group learning</p> <p>P6. Provide opportunity for practice</p> <p>P7. Provide feedback on progress on trainees</p> <p>P8. Review delivery experience</p>



Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1:** Explaining the training skills
- K2:** Identification of the professional skills
- K3:** Describing the advanced language skills
- K4:** Understanding of the assessment and trainees feedback methods
- K5:** Direct and indirect communication methods
- K6:** Explaining the need of the training type at the work place

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Job sheet
- Office emails and coordination reports
- Feedback proforma



061100858 Develop Advance Computer Application Skills

Overview: This unit provides an overview of Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards, i.e. Data Entry, Power Point Presentation and managing data base and graphics for Design

It applies to individuals employed in a range of work environments who need to be able to present a set range of data in a simple and direct forms

Competency Units	Performance Criteria
CU1. Manage Information System to complete a task	P1. Perform Data Entry in MS office P2. Manage File/folder in MS office P3. Perform Scanning of document P4. Maintain Office Record in drives P5. Perform Printing of document P6. Search required Files/Folders P7. Convert Files in required format. P8. Manage sizes of Files/Folders <ul style="list-style-type: none">• Compress• Zip /unzip
CU2. Prepare Presentation using computers	P1. Prepare presentation as per requirements, i.e. <ul style="list-style-type: none">• Open blank presentation and add text / graphics• Create a simple design for a presentation• Apply existing styles within a presentation• Use presentation template and slides to create a presentation• Use various tools to improve the look of the presentation• Save presentation to the appropriate storage device and folder with required name P2. Customize basic settings to meet user requirements P3. Format presentation as require <ul style="list-style-type: none">• Develop organizational charts• Add objects and manipulate to meet presentation purposes• Modify slide layout, including text and colours, to meet presentation requirements



	<ul style="list-style-type: none">• Save presentation in another format• Save to storage device and close presentation <p>P4. Add slide show effect into presentation as required to enhance the presentation</p> <ul style="list-style-type: none">• Incorporate pre-set Animation• Apply Multimedia effects• Record Narration• Apply hyperlink• Apply video• Rehearse Timings• Test presentation for overall effect <p>P5. Print the presentation</p> <ul style="list-style-type: none">• Select appropriate print format for presentation• Select preferred slide orientation• Add notes and slide numbers• Preview slides and run spell check before presentation• Print selected slides and submit presentation to appropriate person for feedback <p>P6. Practice verbal presentation</p> <p>P7. Practice presentation through AV Aids</p>
<p>CU3. Use Microsoft Access to manage database</p>	<p>P1. Collect the data using a standard data base package.</p> <p>P2. Start access to manage database.</p> <ul style="list-style-type: none">• identify problem statement of Data• Develop a table with fields /attributes according to database usage/ user requirements• Create a primary key and establish an index for each table• Modify table layout and field attributes as required• Create a relationship between the two tables• Add data in a table according to information requirements• Add records as required• delete records as required• Save database to storage area• close down database to storage area



	<ul style="list-style-type: none">• Apply criteria in the following Query• SQL view of Query• Wildcards of query• Query Criteria <p>P3. Customize basic settings:</p> <ul style="list-style-type: none">• Adjust page layout to meet user requirements• Open and view different toolbars• Format font as appropriate for the purpose of the database entries• Create reports• Design reports to present data in a logical sequence• Modify reports to include or exclude additional requirements• Distribute reports to appropriate person in a suitable format <p>P4. Create forms</p> <ul style="list-style-type: none">• Use a wizard to create a simple form• Open existing database and modify records through a simple form• Rearrange objects within the form to accommodate information requirements
<p>CU4. Develop graphics for Design</p>	<p>P1. Develop graphic design concepts based on a thorough understanding of the communication need</p> <p>P2. Use design techniques confidently to produce designs</p> <p>P3. Integrate design tools skillfully to produce designs</p> <p>P4. Evaluate the success of completed designs to meet objectives</p> <p>P5. evaluate feedback from client / peers</p>



Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1:** List basic technical terminology to read help files and prompts
- K2:** Outline the different types of formal and informal presentations
- K3:** Explain Power point presentation
- K4:** Segregation of Data
- K5:** Define the relation among data
- K6:** Define criteria in the query
- K7:** Creates and modify reports and forms.
- K8:** Outline basic database design principles
- K9:** Current graphic design software
- K10:** Discuss features of current and emerging technologies used in graphic design practice and the options they present for effective graphic design solution

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Design and develop a simple database using a standard database package
- Create, format and prepare presentations for distribution and display
- Customize basic settings
- Add slide show effects.
- Generate employment report from given data by using Microsoft Access.



041300869 Manage Human Resource Services

Overview: This unit describes the skills and knowledge required to plan, manage and evaluate delivery of human resource services, integrating business ethics. It applies to individuals with responsibility for coordinating a range of human resource services across an organization. They may have staff reporting to them.

Competency Units	Performance Criteria
<p>CU1. Determine strategies for delivery of human resource services</p>	<p>P1. Analyze business strategy and operational plans to determine human resource requirements</p> <p>P2. Review external business environment that likely impact on organization's human resource requirements</p> <p>P3. Consult line and senior managers to identify human resource needs in their areas</p> <p>P4. Review organization's requirements for diversity in the workforce</p> <p>P5. Deliver human resource services that comply with business goals</p> <p>P6. Develop strategic action plan for delivery of human resource services</p> <p>P7. Develop roles and responsibilities of human resource team</p> <p>P8. Develop quality assurance policy</p>
<p>CU2. Manage the delivery of human resource services</p>	<p>P1. Communicate human resource strategies and services to internal and external stakeholders</p> <p>P2. Develop and negotiate service agreements between</p> <ul style="list-style-type: none"> • The human resource team, • Service providers • Client groups <p>P3. Document service specifications, performance standards and timeframes</p> <p>P4. Document /communicate service</p> <ul style="list-style-type: none"> • Specifications, • Performance standards • Timeframes <p>P5. Monitor Quality assurance processes</p> <p>P6. Ensure that services are delivered by appropriate providers,</p>



	according to service agreements and operational plans P7. Identify underperformance of human resource team or service providers
CU3. Evaluate human resource service delivery	P1. Establish Management information system for human resource services P2. Conduct survey to determine level of satisfaction P3. Analyze feedback of survey P4. Recommend changes to service delivery P5. Support agreed change processes across the organization
CU4. Manage integration of business ethics in human resource practices	P1. Ensure ethics in personal behavior P2. Ensure code of conduct is observed across the organization, P3. Observe confidentiality requirements in dealing with all human resource information P4. Deal promptly with unethical behavior P5. Ensure all persons responsible for human resource functions understand requirements regarding their ethical behavior

Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Identify the key provisions of legal and compliance requirements that apply to managing human resources
- K2:** Summarize the organization's code of conduct
- K3:** Explain human resource strategies and planning processes and their relationship to business and operational plans
- K4:** Describe performance and contract management
- K5:** Explain how feedback is used to modify the delivery of human resources.



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

A person who demonstrates competency in this unit must be able to provide evidence of the ability to manage human resource services. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.

Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- Plan and manage human resource delivery within legislative, organizational and business ethics frameworks
- Communicate effectively with a range of senior personnel
- Identify and arrange training support where appropriate
- Calculate human resource return on investment within the organization.



041300860 Develop Entrepreneurial Skills

Overview: This Competency Standard identifies the competencies required to develop entrepreneurial skills, in accordance with the organization's approved guidelines and procedures. You will be expected to develop a business plan, collect information regarding funding sources, develop a marketing plan and develop basic business communication skills. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Develop a business plan	<p>P1. Conduct a market survey to collect following information</p> <ul style="list-style-type: none">• Customer /demand• Tools, equipment, machinery and furniture with rates• Raw material• Supplier• Credit / funding sources• Marketing strategy• Market trends• Overall expenses• Profit margin <p>P2. Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses</p> <p>P3. Compile the information collected through the market survey, in the business plan format</p>
CU2. Collect information regarding funding sources	<p>P1. Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate</p> <p>P2. Choose the best available option according to investment requirement</p> <p>P3. Prepare documents according to the loan agreement requirement</p> <p>P4. Include the information of funding sources in the business plan</p>
CU3. Develop a marketing plan	<p>P1. Make a marketing plan for the business including product, price, placement, promotion, people, packaging and positioning</p> <p>P2. Include the information of marketing plan in the business</p>



	plan
CU4. Develop basic business communication skills	P1. Communicate with internal customers e.g.: labor, partners and external customers e.g.: suppliers, customers etc., using effective communication skills P2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc. P3. Use specific business terms used in the market

Knowledge and Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1:** Explain the 7ps of marketing including product, price, placement, promotion, people, packaging and positioning
- K2:** Describe 7Cs of business communication
- K3:** Define different modes of communication and their application in the industry
- K4:** Enlist specific business terms used in the industry
- K5:** Enlist the available funding sources
- K6:** Explain how to get loan to start a new business
- K7:** Explain market survey and its tools e.g: questionnaire, interview, observation etc
- K8:** Describe the market trends for specific product offering
- K9:** State the main elements of business plan
- K10:** Explain how to fill the business plan format

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

A person who demonstrates competency in this unit must be able to provide evidence of the ability to develop Entrepreneurial Skills.



Performance requirements

- Conduct market survey and formulate business plans in terms of feasibility, investment potential, risk, and completeness.
- Demonstrate the use of both verbal and non-verbal business communication.
- Effectively present business ideas and profile



0714001037 Measure Process Variables

Overview: This competency standard covers the basic knowledge and specific skills related to measurement of process variable including Temperature, pressure, flow and level Instruments.

Competency Unit	Performance Criteria
CU1. Operate temperature measuring instruments	<p>P1. Select the type of instrument to be operated</p> <p>P2. Select measuring range of the instrument</p> <p>P3. Connect the instrument to the process as per manual</p> <p>P4. Verify accuracy of the instrument</p> <p>P5. Record results</p> <p>P6. Ensure good housekeeping & safe working practices at all times</p>
CU2. Operate pressure measuring instruments	<p>P1. Select the type of instrument to be operated</p> <p>P2. Select measuring range of the instrument</p> <p>P3. Connect the instrument to the process as per manual</p> <p>P4. Verify accuracy of the instrument</p> <p>P5. Record results</p> <p>P6. Ensure good housekeeping & safe working practices at all times</p>
CU3. Operate flow measuring instruments	<p>P1. Select the type of instrument to be operated</p> <p>P2. Select measuring range of the instrument</p> <p>P3. Connect the instrument to the process as per manual</p> <p>P4. Verify accuracy of the instrument</p> <p>P5. Record results</p> <p>P6. Ensure good housekeeping & safe working practices at all times</p>
CU4. Operate level measuring instruments	<p>P1. Select the type of instrument to be operated</p> <p>P2. Select measuring range of the instrument</p> <p>P3. Connect the instrument to the process as per manual</p> <p>P4. Verify accuracy of the instrument</p> <p>P5. Record results</p> <p>P6. Ensure good housekeeping & safe working practices at all times</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define Hazardous Areas.
- Knowledge of Electrical and Electronic theories.
- Describe Analog & Digital Test Equipment.
- Describe safety regulations for Instrumentation.
- Understand operating principle of analog and digital process instruments.
- Explain indication of measuring instruments.
- Understand P&ID symbols.
- Knowledge of various parts of the instrument.
- Explain tagging techniques of connections.
- Describe assembling & dismantling techniques of Instruments.
- Explain basic principles of instrumentation.
- Describe the measuring range of instruments.
- Understand and interpret component data sheet of Instruments.
- Define the component parameter, ratings and applications of Instruments

Critical Evidence(s)

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform Electrical & Electronic Fault diagnosis of process Instruments.
- Verify measuring range of Instruments
- Verify accuracy of Instruments with the help of test standards
- Generate verification report

Tools and Equipment required

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Temperature Calibrator (0~600C°)
2.	Temperature Calibrator (400~2000C°)
3.	Pressure Calibrator (0~20bar)
4.	Pressure Calibrator (100~600bar)
5.	Pressure Calibrator (-1~0bar)
6.	Level Calibrator (0~20feet)
7.	Gas Flow Calibrator (0~10m ³)
8.	Liquid Flow Calibrator (0~10m ³)
9.	Digital Thermometer (0~400C°)
10.	Digital multimeter
11.	Millivolt source (-10~10v)
12.	Milliampere source (0~20mA)
13.	Clamp meter (0~400A)
14.	Digital leak Tester
15.	Protective clothing
16.	Safety shoes
17.	Safety goggles
18.	Hand gloves



19.	Earmuff/ plug
20.	Respiratory mask
21.	First Aid Box
22.	Static hand gloves

Consumable Items:

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Lugs (1~10mm)
2.	Number strips
3.	Cotton gloves
4.	Cotton waste
5.	Permanent marker



0714001038 Set Up Process Controller

Overview: This competency standard covers the basic knowledge and specific skills required for setup, adjust, update and verify process controller.

Competency Unit	Performance Criteria
CU1. Set up & adjust control loops	<p>P1. Select the appropriate P&ID as per job requirement</p> <p>P2. Confirm the specification of instrument as per job requirement</p> <p>P3. Ensure the location of process controller as per P&ID/ job requirement</p> <p>P4. Set up and adjust the process controller</p> <p>P5. Verify the function of the process controller according to the SOP</p> <p>P6. Provide feedback to the concerned personnel</p> <p>P7. Record the job in the logbook/ relevant documents.</p>
CU2. Set up & adjust advanced process control loops	<p>P1. Identify process variables as per requirement</p> <p>P2. Select appropriate P&ID as per job requirement.</p> <p>P3. Confirm the process control loop of advance instrument as per job requirement</p> <p>P4. Ensure the location of process controller as per job requirement</p> <p>P5. Set up and adjust the advanced process controller.</p> <p>P6. Verify the function of the advanced process controller as per manual.</p> <p>P7. Provide feedback to the concerned personnel.</p> <p>P8. Record the job in the logbook/relevant documents</p>
CU3. Update Control Programmes	<p>P1. Prepare inspection schedule for up gradation and prioritization</p> <p>P2. Conduct inspections for the short comings in the existing process control programmes</p> <p>P3. Conduct upgrading of control programmes as per given requirement</p>
CU4. Verify control programmes	<p>P1. Prepare verification plan for control programmes</p> <p>P2. Verify up gradation of control programmes</p> <p>P3. Provide feedback to the concerned personnel</p> <p>P4. Record the job in the logbook & history card / relevant documents</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:



1. Classify control loops.
2. Classify process controller and control modes.
3. Understand and interpret P&ID.
4. Describe process variables with their units.
5. Knowledge of control programmes and their up gradation
6. Knowledge of calibration standards and calibrator

Critical Evidence(s)

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Locate process controller as per P&ID
- Connect instruments to measure process variables with control system and interpret results
- Set up & adjust control loops
- Set up & adjust advanced process control loops
- Update Control Programmes
- Verify control programmes

Tools and Equipment required

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Multimeter
2.	Spanner combination set
3.	Allen key set (inch/mm)
4.	Watchmaker screwdriver
5.	Combination plier
6.	Diagonal(cutter) plier
7.	Lan cable cutter
8.	Hacksaw
9.	Socket wrench set
10.	Soldering iron
11.	Solder sucker
12.	Blower
13.	Hand drill machine
14.	Drill bit set
15.	Phase tester
16.	Vernier caliper
17.	Measuring tape
18.	Sprit level
19.	Screwdriver set
20.	Test lamp
21.	Digital thermometer
22.	Instrument air supply system
23.	Tube cutter/ bender
24.	Pipe wrench set
25.	Safety harness belt



Consumable Tools & Equipment:

Consumable tools & equipment required for this competency standards are given below:

S. No.	Items
1.	Hacksaw blades
2.	Drill bit set
3.	Soldering iron wire
4.	PVC tape
5.	Contact Cleaner
6.	Cable tie
7.	Cotton rag
8.	Fuses
9.	Breakers
10.	Terminal block
11.	Lugs
12.	Industrial Hand Gloves
13.	Ear Plugs
14.	Dust Mask
15.	Battery cell



0714001039 Perform Fault Diagnosis

Overview: The competency standard deals with the diagnosis, verification and the reasons of faults during operation of control system.

Competency Unit	Performance Criteria
CU1. Plan & prepare for fault diagnosis	<p>P1. Interpret work requisition and verify by site inspection.</p> <p>P2. Determine potential hazards for prevention in accordance with work plan.</p> <p>P3. Plan the work in detail including sequencing and prioritizing</p> <p>P4. Select appropriate tools and equipment in accordance with the job requirements.</p> <p>P5. Coordinate requirements, including requests for isolations (if required).</p> <p>P6. Follow the occupational health and safety standards.</p>
CU2. Verify fault	<p>P1. Identify faults through fault indicators in accordance with the work plan.</p> <p>P2. Identify abnormalities in the system</p> <p>P3. Verify abnormalities in the system</p> <p>P4. Ensure personnel safety & plant security according to the work plan</p>
CU3. Diagnose fault	<p>P1. Confirm system isolations, where appropriate, in accordance with the requirements.</p> <p>P2. Disconnect suspected faulty components in accordance with the work plan</p> <p>P3. Inspect system equipment, components and accessories for obvious faults in accordance with the work plan.</p> <p>P4. Identify appropriate fault finding / diagnostic techniques to determine the fault in accordance with the work plan.</p> <p>P5. Carryout Test and measurement in accordance with manufacturer's instructions and job requirements.</p>
CU4. Determine cause of fault/ Perform root cause analysis	<p>P1. Collect relevant data regarding the fault</p> <p>P2. Asses the acquired information for root cause analysis</p> <p>P3. Make conclusion about the nature and cause of the fault from available evidence & generate report</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Understand and interpret process control loop.
- Understand basic Electrical/ Electronic devices and circuits
- Understand and interpret P&ID/ IFCD.
- Understand and interpret the electrical / electronic circuit diagrams.
- Explain the testing of electrical / electronic components using test equipment.
- Explain Sensors/ transducers and its types.
- Understand functionality of process instruments.
- Distinguish faults in electronic cards.
- Understand electrical wiring and standards.
- Describe Standard safety procedures and safe practices in process industry.
- Explain abnormalities in the system.
- Understand fault diagnosis techniques

Critical Evidence(s)

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Check Electrical & Electronic components.
- Interpret P&ID/IFCD from operation/installation manual.
- Plan & prepare for fault diagnosis
- Diagnose & Verify fault
- Determine cause of fault/Perform root cause analysis

Tools and Equipment required

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	General Tools kit
2.	Set of screw drivers
3.	Set of spanners (mm)
4.	Set of Allen keys (inch/mm)
5.	Pipe wrench set (8"/12")
6.	Leakage test equipment
7.	Vernier Caliper
8.	Digital Thermometer
9.	Electrical / Electronic Test equipment
10.	Tachometer
11.	Operations Manual
12.	Safety Helmet
13.	Safety goggles
14.	Hand gloves
15.	Safety Shoes
16.	Ear Muffler/ Plug



17.	Computer & printer
18.	Safety harness belt
19.	Electrician tool kit
20.	IR Temperature gun
21.	Insulation Tester
22.	Soldering gun

Consumable Tools & Equipment:

Consumable tools & equipment required for this competency standards are given below:

S. No.	Items
1.	Hacksaw blades
2.	Drill bit set
3.	Soldering iron wire
4.	PVC tape
5.	Teflon tape
6.	WD-40 Oil
7.	Contact Cleaner
8.	Cable tie
9.	Emery paper
10.	Rawal Bolt/ Rivets
11.	Cotton rag
12.	Fuses
13.	Breakers
14.	Terminal block
15.	Lugs
16.	Industrial Hand Gloves
17.	Ear Plugs
18.	Dust Mask
19.	Grease
20.	Silicone Sealants & Adhesive
21.	Nuts & Screws of different sizes
22.	Battery cell



0714001040 Carryout repair & maintenance of instruments

Overview: This competency standard covers the skills and knowledge required to carryout repair and maintenance of instruments.

Competency Unit	Performance Criteria
CU1. Perform Scheduled Maintenance	<p>P1. Prepare maintenance schedule according to the relevant operational manual</p> <p>P2. Fill up/ check maintenance schedule according to SOP</p> <p>P3. Prepare job list of scheduled shutdowns</p> <p>P4. Arrange tools and equipment according to the scheduled maintenance job list</p> <p>P5. Raise work permit for each job</p> <p>P6. Perform maintenance activity</p> <p>P7. Conduct final inspection according to SOP</p> <p>P8. Clean & store work area & tools to ensure good housekeeping</p> <p>P9. Provide feedback to the concerned personnel</p> <p>P10. Prepare maintenance report of performed job</p> <p>P11. Ensure good housekeeping & safe working practices at all times</p>
CU2. Perform Preventive Maintenance	<p>P1. Prepare inspection plan for preventive maintenance</p> <p>P2. Perform inspections according to plan</p> <p>P3. Perform Servicing of equipment</p> <p>P4. Ensure good housekeeping & safe working practices at all times</p>
CU3. Perform Corrective Maintenance	<p>P1. Prepare plan for corrective maintenance</p> <p>P2. Arrange alternate/ backup system at breakdown</p> <p>P3. Study the log sheet/ history card thoroughly before corrective maintenance</p> <p>P4. Arrange tools and equipment according to the job</p> <p>P5. Raise work permit for each job</p> <p>P6. Perform maintenance according to the SOP</p> <p>P7. Check/ Run as per standard</p> <p>P8. Provide feedback to the concerned personnel</p> <p>P9. Prepare maintenance report of performed job</p> <p>P10. Ensure good housekeeping & safe working practices at all times</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define maintenance & its types
- Define work permit & its types
- Knowledge of SOPs
- Knowledge of backup system
- Knowledge of appropriate tools as per job requirement

Critical Evidence(s)

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Identify work sequence and perform necessary actions.
- Perform preventive/ corrective maintenance as per SOPs.
- Identify and rectify faults

Tools and Equipment

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Multimeter
2.	Spanner combination set
3.	Adjustable spanner set
4.	Allen key set (inch/mm)
5.	Watchmaker screwdriver
6.	Circlip plier
7.	Combination plier
8.	Diagonal(cutter) plier
9.	Monkey plier
10.	Lan cable cutter
11.	Hammer
12.	Chisel
13.	Hacksaw
14.	Bearing puller
15.	Pipe wrench set
16.	Socket wrench set
17.	Soldering iron
18.	Solder sucker
19.	Files
20.	Hand drill machine
21.	Drill bit set
22.	Vernier caliper



23.	Measuring tape
24.	Spirit level
25.	Master level
26.	Pin punch set
27.	Screwdriver set
28.	Digital thermometer
29.	Instrument Air System
30.	Oil funnel
31.	Oil spray gun
32.	Grease gun
33.	Safety harness belt
34.	Source meter

Consumable Tools & Equipment:

Consumable tools & equipment required for all competency standards are given below:

S. No.	Items
1.	Hacksaw blades
2.	Drill bit set
3.	Soldering iron wire
4.	PVC tape
5.	Teflon tape
6.	WD-40 Oil
7.	Contact Cleaner
8.	Cable tie
9.	Emery paper
10.	Rawal Bolt/ Rivets
11.	Cotton rag
12.	Fuses
13.	Breakers
14.	Terminal block
15.	Instrument Air Cylinder
16.	Lugs
17.	Industrial Hand Gloves
18.	Ear Plugs
19.	Dust Mask
20.	Grease
21.	Silicone Sealants & Adhesive
22.	Nuts & Screws of different sizes
23.	Battery cell



Complete List of Tools and Equipment

List of Machines and Tools

S. No.	Items	QTY
1.	Adjustable spanner set	3
2.	Allen key set (inch/mm)	5
3.	Bearing puller Small, Medium Large	02 set
4.	Bench type drill machine	5
5.	Bench vice 4 inch	6
6.	Bench Vice 6 inch	25
7.	Blower	3
8.	Bourdon tube pressure gauge (0~20 Bar)	10
9.	Bourdon tube pressure gauge (0~200 Bar)	10
10.	Bourdon tube pressure gauge (0~400 Bar)	5
11.	Capacitance type level instrument	3
12.	Centre & Dot Punch	25
13.	Chalk Liner	2
14.	Chisel	25
15.	Chisel (8")	25
16.	Circlip plier	5
17.	Clamp meter (0~400A)	10
18.	Club Hammer	3
19.	Combination Plier	25
20.	Combination Spanner Set (Imperial)	3
21.	Combination Spanner Set (Metric)	5
22.	Computer	5
23.	Countersinking & counter boring tools (10-20mm)	5
24.	Diagonal(cutter) plier	25
25.	Digital clamp meter (0~400A)	5
26.	Digital Leak tester	3
27.	Digital Micrometer set (0~200mm)	5
28.	Digital multimeter	25
29.	Digital RPM meter (0~10000 RPM)	3
30.	Digital Thermometer (0~400Co)	5
31.	Digital thermometer (-10~400 Co)	5
32.	Ear Muffler/ Plug	20
33.	Electrician tool kit	25
34.	Face Shield (Transparent)	10
35.	First Aid Box	10
36.	Flaring Tool Set	5



37.	Flat Screw driver set	25
38.	Frequency meter (0~20MHZ)	5
39.	Fusion Machine (PE Pipe Set) Butt Fusion	2
40.	Fusion Machine (PPRC set 20mm to 63mm)	2
41.	Gas Cutter Set with Torch, Pipe and Cylinders	2
42.	Gas Flow Calibrator (0~10m3)	2
43.	General Tools kit	5
44.	Goggles	25
45.	Grease gun	5
46.	Grip Pliers	25
47.	Hacksaw Frame	25
48.	Hammer (Ball Peen 250gm)	25
49.	Hand Drill Machine	4
50.	Hand glove	50
51.	Hand grinder (4inch & 7inch)	3
52.	Hand reamers with handle (8-16mm)	5
53.	Heat Gun	5
54.	Helmet	25
55.	Hole punch set (5~ 20mm)	5
56.	Infrared thermometer (0~2000 Co)	5
57.	Inside/Outside Caliper	5
58.	Instrument air supply system	3
59.	Insulation Tester	2
60.	IR Temperature gun	2
61.	Lan cable cutter	5
62.	Laser Level	2
63.	Leather Gloves	50
64.	Level Calibrator (0~20feet)	2
65.	Liquid Flow Calibrator (0~10m3)	2
66.	Lugs punch (up to 10mm)	25
67.	Magnet Sprit Level	3
68.	Masonry Drill Set	10
69.	Measuring Tape	5
70.	Mechanical File Set	25
71.	Micrometer (0-25mm)	25
72.	Milliampere source (0~20mA)	2
73.	Millivolt source (-10~10v)	2
74.	Monkey plier	5
75.	Multimedia projector	5
76.	Nose plier	25
77.	Offset Ring Spanner Set (Imperial)	3
78.	Offset Ring Spanner Set (Metric)	3
79.	Oil funnel	10
80.	Oil spray gun	25



81.	Open End Spanner Set (Imperial)	5
82.	Open End Spanner Set (Metric)	5
83.	Operations Manual	
84.	Overall	25
85.	Phase tester	25
86.	Philips Screwdriver set	25
87.	Pin Grinder	3
88.	Pin punch set	25
89.	Pipe Cutter ½" to 2"	3
90.	Pipe Reamer Set	10
91.	Pipe Vise 6" with tripod	5
92.	Pipe Wrench 12" to 24"	3
93.	Pipe wrench set (8"/12")	3
94.	Pointing chisel	5
95.	Portable Welding Machine 3 Phase 300 Amp.	2
96.	Power disc cutter (14inch)	3
97.	Pressure Calibrator (0~20bar)	2
98.	Pressure Calibrator (-1~0bar)	2
99.	Pressure Calibrator (100~600bar)	2
100.	Printer	5
101.	Protection suite	10
102.	Ratchet die set ½" to 2"	3
103.	Respiratory mask	10
104.	Rivet gun	3
105.	Safety goggles	25
106.	Safety harness belt	10
107.	Safety Helmet	25
108.	Safety mask	25
109.	Safety Shoes	25
110.	Scriber	25
111.	Second cut files 8-12in (Flat, Round, Triangle, Square)	25
112.	Side cutter	25
113.	Socket wrench set	3
114.	Solder sucker	25
115.	Soldering / de soldering station	10
116.	Soldering Machine	3
117.	Source meter	2
118.	Speakers	5
119.	Spirit level	3
120.	Static hand gloves	10
121.	Steel Rule (0-300mm)	25
122.	Straight Peen Hammer 2 lbs	25
123.	Surface level gauge (2 feet)	2
124.	Surface level gauge (8 feet)	2



125.	Swaging Tool Set	10
126.	Tachometer	2
127.	Tagging marks	10
128.	Tap set with handle (M3-M12)	5
129.	Tape measures (0~50m)	25
130.	Temperature Calibrator (0~600Co)	2
131.	Temperature Calibrator (400~2000Co)	2
132.	Test lamp	10
133.	Test probes	10
134.	Testing Plugs 2" to 4" expendable	5
135.	Tin Snip Cutter	5
136.	Tri Square (0-100mm)	25
137.	Tri Square 12", 24"	5
138.	Tube cutter/ bender	10
139.	Tube flaring tool	10
140.	Tweezers	25
141.	Vernier Caliper (0-150mm)	25
142.	Watchmaker Screwdriver set	25
143.	Welding Gloves	10
144.	Wire Cutter	25
145.	Wire stripper	25
146.	Work Bench (8ftx4ftx3ft)	6

Consumable Items:

The tools and equipment required for this competency standard are given below:

S. No.	Items	QTY
1.	Acetylene cylinder	2
2.	Battery cell	50
3.	Blind rivets assorted sizes	1000 each
4.	Brass & Copper rods for brazing	1000
5.	Breakers	5
6.	Cable tie (assorted sizes)	10 pkt
7.	Chalk	20 boxes
8.	Contact cleaner	20
9.	Cotton gloves	100
10.	Cotton waste	100 kg
11.	Cut screws assorted sizes	05 box each
12.	Cutting disc	100
13.	Drill bits (HSS)	200
14.	Drill bits (Masonry)	50
15.	Dust Mask	25
16.	Ear Plugs	20
17.	Emery paper	500
18.	Fuses 1A to 20 A	100
19.	Grinding disc	100
20.	Hacksaw blades	500
21.	Industrial Hand Gloves	20



22.	Instrument Air Cylinder	5
23.	Insulation tape	100
24.	Lugs (1~10mm)	1000
25.	Machine screw & nuts M3 to M12	100 each
26.	Multi-purpose grease	5 kg
27.	Number strips	1000
28.	Oxygen cylinder	2
29.	Permanent marker	100
30.	PU tube	1000 m
31.	PVC flexible pipe	500 m
32.	PVC tape	100
33.	Rawal Bolt	50
34.	Sealants & Adhesives	50
35.	Soldering wire 500gm	25
36.	Teflon tape	100
37.	Emery paper (200-400)	200
38.	Terminal block	50
39.	WD-40	20
40.	Welding electrodes	1000

List of Stationary

S. No.	Items	QTY
1.	Different Tags and Locks	100
2.	ASTM – BS Standards	
3.	Process SOPs	
4.	Equipment Maintenance Manuals	
5.	Logbook	
6.	Handbooks	
7.	Design Books/ Sheets	
8.	Pencils	100
9.	Erasers	100
10.	Pencil Sharpeners	50
11.	Paper Cutter	20
12.	Scissors	10
13.	Color Pencils	20
14.	White chart paper	100
15.	Brown Sheets	100
16.	White Board Markers (red, blue, green, black)	100 each
17.	Permanent markers (black)	50
18.	File covers	100
19.	Box File	50
20.	Printing paper A4	20 Rims

