



Co-funded by the European Union



Norwegian Embassy
Islamabad



PIPE FITTER



© TVET SSP

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019



Implemented by

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Published by

National Vocational and Technical Training Commission
Government of Pakistan

Headquarter

Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan
www.navttc.org

Responsible

Director General Skills Standard and Curricula, National Vocational and Technical Training Commission
National Deputy Head, TVET Sector Support Programme, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Layout & design

SAP Communications

Photo Credits

TVET Sector Support Programme

URL links

Responsibility for the content of external websites linked in this publication always lies with their respective publishers. TVET Sector Support Programme expressly dissociates itself from such content.

This document has been produced with the technical assistance of the TVET Sector Support Programme, which is funded by the European Union, the Federal Republic of Germany and the Royal Norwegian Embassy and has been commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close collaboration with the National Vocational and Technical Training Commission (NAVTTTC) as well as provincial Technical Education and Vocational Training Authorities (TEVTAs), Punjab Vocational Training Council (PVTC), Qualification Awarding Bodies (QABs)s and private sector organizations.

Document Version

November, 2019
Islamabad, Pakistan

PIPE FITTER



CBT Curriculum
National Vocational Certificate Level 2

Version 1 - November, 2019

Introduction	3
Definition/ Description of the training program for <i>Pipe Fitter Lev-2</i>	3
Purpose of the training program	3
Overall objectives of training program	3
Competencies to be gained after completion of course	3
Possible available job opportunities available immediately and later in the f uture	3
Trainee entry level	4
Minimum qualification for trainer	4
Recommended trainer: trainee ratio	4
Medium of instruction i.e. language of instruction	4
Duration of the course (Total time, Theory & Practical time)	4
Sequence of the modules	5
Summary – overview of the curriculum	7
Modules	10
Module 1: Comply Personal Health and Safety Guidelines	10
Module 2: Communicate the Workplace Policy and Procedure	13
Module 3: Perform Basic Communication (Specific)	17
Module 4: Perform Basic Computer Application (Specific)	19
Module 5: Fabricate Piping System	21
Module 6: Join Pipes	26
Module 7: Install Pipeline Support System	32
Module 8: Install Pipeline System	34
Module 9: Install Drainage System	37
General assessment guidance for <i>Pipe Fitter Lev-2</i>	40
Complete list of tools and equipment	44
List of consumable supplies	47
Credit values.....	52

Introduction

Definition/ Description of the training program for *Pipe Fitter Lev-2*

Pipe fitters are responsible for performing pipe work, in Light Engineering Sector especially for industry as well as at domestic level. While specific duties vary depending on the type of project, the duties of Pipe Fitter will include fabrication, joining and installation of supply pipe lines for fresh water/liquid/gases and drainage system. Also he/she will be able to perform the repair work of both sewerage and fresh water pipe lines. He/she is also qualified to assess and to perform all necessary preventive maintenance in the sector. The pipe fitter will be able to perform individually as well as in team work.

Purpose of the training program

The purpose of the Pipe Fitter course is to engage young people with a program of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. Upon completion of this qualification, trainees will be ready to join the workforce with a healthy number of options in the manufacturing and light engineering sector.

Overall objectives of training program

The overall objectives of the pipefitter program are:

- Managing a Plumbing Workshop (technically and economically)
- Selecting tools and equipment used to fabricate, joining and installing pipes
- Selecting tools, equipment's and consumables accurately according to Job specification
- Sequencing the different stages of preparation, development, fabrication and maintenance
- Working safely and professionally

Competencies to be gained after completion of course

At the end of the course, the trainee must have attained the following competencies:

1. Comply Personal Health and Safety Guidelines
2. Communicate the Workplace Policy and Procedure
3. Perform Basic Communication (Specific)
4. Perform Basic Computer Application (Specific)
5. Fabricate Piping System
6. Join Pipes
7. Install Pipeline Support System
8. Install Pipeline
9. Install Drainage System

Possible available job opportunities available immediately and later in the future

Pipefitters are employed in the light engineering sector especially in construction sector. Experienced Pipefitters may advance through promotions with the same employer or by moving to more advanced positions with other employers. They can become:

- Domestic Pipe Fitter
- Industrial Pipe Fitter
- Pipe Fabricator (within limitations)
- Plumbing foreman

Some experienced Pipe Fitters achieve a highly respected level of salaries. There are good prospects for travel both within Pakistan and abroad. The employment outlook in this occupation will be influenced by a wide variety of factors including:

- Trends and events affecting overall employment (especially in the Construction industry)
- Location in Pakistan
- Employment turnover (work opportunities generated by people leaving existing positions)
- Occupational growth (work opportunities resulting from the creation of new positions that never existed before)
- Size of the industry
- Flexibility of the applicant (concerning location and schedule of work)

Trainee entry level

Middle (Grade 8).

Minimum qualification for trainer

Must hold at least level 3 qualification in Pipe Fitting

He/she should hold or be working towards a formal teaching qualification.

Other formal qualifications in the construction industry would be useful in addition to the above.

Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for this program is 1 trainer for 20 trainees

Medium of instruction i.e. language of instruction

Instructions will be in Urdu/English/Local language.

Duration of the course (Total time, Theory & Practical time)

This curriculum comprises 9 modules. The recommended delivery time is approx. 600 hours. Delivery of the course could therefore be full time, 5 days a week, for 6 months. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follows:

Module	Theory hours	Workplace hours	Total hours
Module 1: Comply Personal Health and Safety Guidelines			30
Module 2: Communicate the Workplace Policy and Procedure			20
Module 3: Perform Basic Communication (Specific)			30
Module 4: Perform Basic Computer Application (Specific)			40
Module 5: Fabricate Piping System	18	82	100
Module 6: Join Pipes	26	74	100
Module 7: Install Pipeline Support System	12	38	50
Module 8: Install Pipeline System	20	100	120
Module 9: Install Drainage System	15	75	90

Sequence of the modules

This qualification is made up of 9 modules. A suggested distribution of these modules is presented overleaf. This is not prescriptive and training providers may modify this if they wish.

Module 1: Comply personal health and safety guidelines, covers various aspects related to occupational health & safety that are required for the students to understand in order to work in a safe environment. 3 other generic modules provide knowledge about workplace operational policies, communication skills and also about computer skills which are necessary to understand and for progression in each field.

2 modules relate to preparation of pipe fitting task, for example Module 5: Fabricate Piping System; and Module 6: Install Pipeline Support System

3 other modules are relating to cover the procedures of pipe installation that a Pipe fitter must learn and understand in order to become an effective professional, for example; Module 7: Join Pipes, Module 8: Install Pipeline system and Module 9:

Install Drainage System. These are interdependent with the preparation modules and need to be delivered in parallel. This is illustrated in the distribution table.

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial demand of Pakistan that make this qualification unique to Pakistan's industry needs.

The distribution table is shown below:

Module 5: Fabricate Piping System 100 hours	Module 6: Join Pipes 100 hours	Module 7: Install Pipeline Support System 50 hours	Module 9: Install Drainage System 90 hours
Module 8: Install Pipeline System 120 hours			
Module 1: Comply Personal Health and Safety Guidelines 30 hrs	Module 2: Communicate the Workplace Policy and Procedure 20 hrs	Module 3: Perform Basic Communication (Specific) 30 hrs	Module 4: Perform Basic Computer Application (Specific) 40 hours

Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: Comply Personal Health and Safety Guidelines Aim: The aim of this module is to develop advanced knowledge, skills and understanding to comply personal health and safety guidelines	LU 1: Identify Personal Hazards at Workplace LU 2: Apply Personal Protective and Safety Equipment (PPE) LU 3: Comply Occupational Safety and Health (OSH) LU 4: Dispose of hazardous Waste/materials from the designated area			30 Hrs
Module 2: Communicate the Workplace Policy and Procedure Aim: The aim of this module is to develop advanced knowledge, skills and understanding to communicate the workplace policy and procedure	LU 1: Identify workplace communication procedures LU 2: Communicate at workplace LU 3: Draft Written Information LU 4: Review Documents			20 Hrs
Module 3: Perform Basic Communication (Specific) Aim: The aim of this module is to develop advanced knowledge, skills and understanding to perform basic communication (specific)	LU 1: Communicate in a team to achieve intended outcomes LU 2: Follow Supervisor's instructions as per organizational SOPs LU 3: Develop Generic communication skills at workplace			30 Hrs

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 4: Perform Basic Computer Application (Specific) Aim: The aim of this module is to develop advanced knowledge, skills and understanding to perform basic computer application (specific)	LU 1: Create Word Documents LU 2: Use internet for Browsing			40 Hrs
Module 5: Fabricate Piping System Aim: The aim of this module is to develop advanced knowledge, skills and understanding to fabricate piping system.	LU 1: Interpret drawings/ layouts LU 2: Prepare work area LU 3: Cut pipes LU 4: Bend pipe LU 5: Perform threading on pipes LU 6: Perform Coating / Insulation on pipe	18 Hrs	82 Hrs	100 Hrs
Module 6: Join Pipes Aim: The aim of this module is to develop advanced knowledge, skills and understanding to join pipes.	LU 1: Make flanged joint LU 2: Make solvent joint LU 3: Perform pipe grinding LU 4: Braze pipe LU 5: Perform soldering on pipe LU 6: Make fusion joint LU 7: Make welded joint through arc welding	26 Hrs	74 Hrs	100 Hrs

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 7: Install Pipeline Support System Aim: The aim of this module is to develop advanced knowledge, skills and understanding to install pipeline support system.	LU 1: Prepare for anchoring LU 2: Perform anchoring LU 3: Perform masonry works	12 Hrs	38 Hrs	50 Hrs
Module 8: Install Pipeline System Aim: The aim of this module is to develop advanced knowledge, skills and understanding to install pipeline system.	LU 1: Install pipeline LU 2: Install different types of valves LU 3: Install water well pipe system	20 Hrs	100 Hrs	120 Hrs
Module 9: Install Drainage System Aim: The aim of this module is to develop advanced knowledge, skills and understanding to install drainage system.	LU 1: Lay hanging system LU 2: Lay buried system LU 3: Join drainage line	15 Hrs	75 Hrs	90 Hrs

Modules

Module 1: Comply Personal Health and Safety Guidelines

Objective of the module: The aim of this module is to develop knowledge, skills and understanding needed to comply personal health and safety guidelines.

Duration: 30 Hrs

Theory: Hrs

Practical: Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Identify Personal Hazards at Workplace	The trainee will be able to: Identify risk to personal health Identify hygiene and safety at work place Identify processes Identify tools, equipment and consumable materials that have the potential to cause harm Report, identified risk to Health, hygiene and safety to concerned				
LU 2: Apply Personal Protective and Safety Equipment (PPE)	The trainee will be able to: List the Personal Protective equipment				

	Select personal protective equipment in terms of type and quantity according to work orders. Wear personal protective equipment according to job requirements. Clean personal protective equipment Stored Personal Protective equipment in proper place after use.				
LU 3: Comply Occupational Safety and Health (OSH)	The trainee will be able to: Maintain cleanliness and hygiene as per organizational policy Comply with Health, hygiene and safety precautions before starting work Comply organizational Health, hygiene and safety guidelines during work				

	Deal with resolvable problems according to prescribed procedures Report un resolvable problems to concerned Place the tools equipment etc at their prescribed place after completion of work				
LU 4: Dispose of hazardous Waste/materials from the designated area.	The trainee will be able to: Identify hazardous waste materials which needs to be disposed off Segregate hazardous or non-hazardous waste carefully from the designated area as per approved procedure Use proper disposal hazardous containers for dispose-off hazardous waste as per procedure Take necessary precautions like putting masks and gloves while disposing hazardous waste/ materials as per standard operating procedure				

Module 2: Communicate the Workplace Policy and Procedure

Objective of the module: The aim of this module is to develop knowledge, skills and understanding needed to communicate the workplace policy and procedure.

Duration: 20 Hrs

Theory: Hrs

Practical: Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Identify workplace communication procedures	The trainee will be able to: Identify organizational communication requirements and workplace procedures with assistance from relevant authority Identify appropriate lines of communication with supervisors and colleagues. Seek advice on the communication method/equipment most appropriate for the task				
LU 2: Communicate at workplace	The trainee will be able to: Use effective questioning, and active				

	listening and speaking skills to gather and convey information Use appropriate non-verbal behavior at all times Encourage, acknowledge and act upon constructive feedback				
LU 3: Draft Written Information	The trainee will be able to: Identify and comply with required range of written materials in accordance with organizational policy and procedures Draft and present assigned written information for approval, ensuring it is written clearly, concisely and within designated timeframes. Ensure written information meets				

	required standards of style, format and detail. Seek assistance and/or feedback to aid communication skills development				
LU 4: Review Documents	The trainee will be able to: Check draft for suitability of tone for audience, purpose, format and communication style Check draft for readability, grammar, spelling, sentence and paragraph construction and correct any inaccuracies or gaps in content. Check draft for sequencing and structure				

	Check draft to ensure it meets organizational requirements Ensure draft is proofread, where appropriate, by supervisor or colleague				
--	---	--	--	--	--

Module 3: Perform Basic Communication (Specific)

Objective of the module: The aim of this module is to develop knowledge, skills and understanding needed to perform basic communication.

Duration: 30 Hrs

Theory: Hrs

Practical: Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Communicate in a team to achieve intended outcomes	The trainee will be able to: Treat team members with respect Maintain positive relationships to achieve common organizational goals Get work related information from team Identify interrelated work activities to avoid confusion Adopt communication skills, which are designed in a team. Identify problems in communication with a team				

	Resolve Communication barrier through discussion and mutual agreement				
LU2. Follow Supervisor's instructions as per organizational SOPs	The trainee will be able to: Receive the instructions from Supervisor Carry out the instructions of the supervisor Report to the supervisor as per organizational SOPs.				
LU 3. Develop Generic communication skills at workplace	The trainee will be able to: Develop basic reading skills Develop Basic writing Skills Develop basic listening skills Place the tools equipment etc. at their prescribed place after completion of work				

Module 4: Perform Basic Computer Application (Specific)

Objective of the module: The aim of this module is to develop knowledge, skills and understanding needed to perform basic computer application.

Duration: 40 Hrs

Theory: Hrs

Practical: Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Create Word Documents	The trainee will be able to: Open word processing application Create a word document Customize page layout with relevant name setting Set up page in a word document Edit word document as required Use simple formatting tools when creating the document Save word document to directory Insert table in a word document Insert appropriate				

	images into document as necessary Insert header/footer in a word document Insert section break in a word document Set style in word document Select basic Print settings Print the document				
LU 2: Use internet for Browsing	The trainee will be able to: Use search engines to open website Search data on different topics Refine search to increase relevance of information or content Navigate a website to access the information or content required.				

Module 5: Fabricate Piping System

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to fabricate piping system.

Duration: 100 Hrs

Theory: 18 Hrs

Practical: 82 Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Interpret drawings/ layouts	The trainee will be able to: Interpret symbols from the given drawing/ layout Read scale of the given drawing/ layout Interpret different types of abbreviations from the given drawing/ layout Take measurements from the given drawing/ layout Estimate material from the given job specification/ drawing/ layout Interpret different section views/ coordinated sections from the given drawing/ layout	Define drawings, types of drawings/specifications as per industrial requirement Knowledge of different scales of drawings i.e. triangular scale Knowledge of geometrical figures and angles Knowledge of drawing symbols and abbreviations State importance of drawing Procedure to extract information from drawings& specifications	Total 14 Hrs Theory: 4 Hrs Practical: 10 Hrs	Related drawings Drafting Scales Drawing sheets A4, A3, A2 sizes Drawing symbols charts	Class or demonstration room Workshop/Drawing Lab

	Interpret revisions in drawings/ layouts				
LU 2: Prepare work area	The trainee will be able to: Inspect work area, check on potential hazards Arrange material according to the given drawing/ specifications Arrange the required tools/ equipment to perform fabrication of piping system Ensure electrical & water supply to the work area Disconnect/ remove previously existing services from the work area according the given drawing/ layout Coordinate with coworkers according to the job	Understanding method of statement The importance of preparation of work area before starting of work Knowledge of potential hazards which can be presented and effected the work area Selecting and identification of work-related tools/equipment Shifting and rigging of material to work area Facilitating Work at height Cleaning procedure of work area Describe the safety features to check the working area The importance of PPEs Compliance with relevant regulations and standards when working with utility services for example; electric supply/gas supply The importance of potential hazards identification and taking appropriate measures to solve dangerous situations at the workplace area	Total 12 Hrs Theory: 2 Hrs Practical: 10 Hrs	Ladder Power cord/ extension wire Safety Equipment Relevant PPEs	Class or demonstration room Workshop/Lab
LU 3: Cut pipes	The trainee will be able to:		Total	Hacksaw	Class or demonstration room

	Perform measurement of pipe according to the drawing/ job specification Mark the job piece according to the drawing/ job specification Select appropriate tools/ equipment according to the given material Cut the pipe as per job requirement and according to safety rules Remove burr by using pipe reamer.	Identification of different tools for measuring, marking and cutting of pipes Purpose of measurements and accuracy of measurement Describe the necessity of marking and checking before carrying the cutting of pipes Explain the identification of different types of pipe used in industry or for domestic use Explain methods of cutting, different types of pipe The importance of PPEs when carrying out cutting in pipe work. Importance of health and safety	18 Hrs Theory: 3 Hrs Practical: 15 Hrs	Grinder Pipe cutter Measuring and marking tools (for example measuring tape, Vernier caliper, marker, pencil) Grinding disk Cutting Disk Power cutter Pipe; (for example GI, UPVC, CPVC, PPRC, SS, MS, Copper)	EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
LU 4: Bend pipes	The trainee will be able to: Perform measurement of pipe according to the given drawing/ job specification Mark the workpiece according the given drawing/ job specification	Understanding and identification of tools used for pipe bending Describe methods to bend different type of pipes (UPVC, copper, G.I. etc.) Pipe bending equipment Equipment: hydraulic, mechanical Use and maintenance of pipe bending equipment. Equipment: hydraulic, mechanical Use: types of pipe, manufacturers' instructions, safety Maintenance: cleaning, lubrication,	Total 20 Hrs Theory: 3 Hrs Practical: 17 Hrs	Measuring and marking tools (for example measuring tape, Vernier caliper, marker, pencil) Pipe bender Heat gun Bench vise Pipe; GI, UPVC, CPVC PPRC, SS, MS, Copper	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Select appropriate tools/ equipment to bend the given pipe Bend pipes by using pipe bender/sand according to the given job	hydraulic oil levels Purpose of measurements and accuracy of measurement The importance of PPEs when carrying out cutting in pipe work. Importance of health and safety			
LU 5: Perform threading on pipes	The trainee will be able to: Perform measurement of pipe according to the given drawing/ job specification Mark the workpiece according the given drawing/ job specification Select appropriate tools/ equipment to tread the given pipe Perform threading of pipes using pipe threading die as per standard	Understanding the threads of pipes Necessity of threading of pipes Pipe threading equipment. Equipment: hand, electrical Use and maintenance of pipe threading equipment. Equipment: hand, electrical Use: types of pipe, manufacturers' instructions, safety Maintenance: cleaning, lubrication, pipe, inspect dies Usage of appropriate measuring tools Knowledge of appropriate threading tools and their uses, for example; use of Ratchet Die , Moose and Die machine for different pipe sizes ($\frac{1}{2}$" $\frac{3}{4}$" 1" or 2") Different types of threads, for example internal or external threads. Threading operation of pipe using appropriate tools as per work place for example Making of grooves in pipe	Total 24 Hrs Theory: 4 Hrs Practical: 20 Hrs	Bench vise Pipe Vise Die set Threading machine Threading oil Pipe: GI, SS, MS	Class room Workshop/lab

		Using Pipe vise/Die and oiling for fine threading Define necessary points to consider during threading process The importance of PPEs when carrying out threading in pipe work. Importance of health and safety			
LU 6: Perform Coating / Insulation on pipe	The trainee will be able to: Perform primer on given pipe according to specification/ standards Select color code for coating according to standards Apply color coating according to standards Insulate the pipe as per job specifications	Describe the importance and purpose of color coating/insulation Explain types of coating/insulation Identify the coatings and their application The importance of PPEs when carrying out insulation process in pipe work. Importance of health and safety	Total 12 Hrs Theory: 2 Hrs Practical: 10 Hrs	Primer Red Oxide Glass wool Thermo pore Stenciling Pipe: GI, MS	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

Module 6: Join Pipes

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to join pipes.

Duration: 100 Hrs **Theory:** 26 Hrs **Practical:** 74 Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Make flanged joint	The trainee will be able to: Show how to use tools and equipment for different stages when making flange joint Install flanges as per to standard procedure Check alignment of joint Fix gasket and check leakage Follow health and safety requirement	Describe types and methods of pipe joints Explain the purpose and necessity of pipe joints application according to the material Identification of different pipe joints Knowledge of types of flanges Functioning of flanges Understanding of flange PCD (Pitch Circle Diameter) Explain procedure to make flange joint Knowledge of alignment procedures Identification of alignment tools Purpose of gaskets Procedure of applying tighten fasteners The importance of PPEs when making flange joint Importance of health and safety	Total 15 Hrs Theory: 3 Hrs Practical: 12 Hrs	Ratchet set Adjustable spanner Fix and ring spanners Small Grinder Hole tight Different types of flanges with fasteners Gasket sheet Threading machine Thread die set Pipe: MS, SS, PPRC	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

LU 2: Make solvent joint	The trainee will be able to: Select appropriate tools/ equipment and material according to the given task Measure and mark the pipe as per given task/ job specification Cut the pipe squarely and clean the surface of pipe & fitting as per given task/ job specification Apply solvent on pipe and fitting as per job requirement Make solvent joint as per standard Follow health and safety requirement	Knowledge of cleaning agents Knowledge of different solvent chemicals for example cementing solution Procedure to make solvent joint according to standard practice State different solvents for different types of pipes Explain procedure to make rubber ring/ push-fit joint The importance of PPEs when making solvent joint Importance of health and safety	Total 15 Hrs Theory: 3 Hrs Practical: 12 Hrs	Pipe: UPVC Heat gun Cementing Solution Cleaner Emery Paper Hacksaw with blade	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
LU 3: Perform pipe grinding	The trainee will be able to: Select appropriate tools/ equipment according to the given task Make bevel on pipe edge by using angle grinder Check degree of bevel by bevel protector	Identification and usage of different types of angle grinder Introduction of beveling on pipes and its importance Usage of bevel protector to measure the angles Explain procedure to perform grinding of pipe	Total 10 Hrs Theory: 2 Hrs Practical: 8 Hrs	Grinder Measuring and making tools Grinding disk Cutting Disk Pipe: SS, MS	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Follow health and safety requirement	Practice to perform grinding and cutting of pipes The importance of PPEs when carrying out pipe grinding Importance of health and safety			
LU 4: Braze pipe	The trainee will be able to: Select appropriate tools/ equipment and material according to the given task Ensure safety precautions Measure and mark pipe as per job requirement Cut and clean pipe surface by emery paper Perform brazing according to standard Follow health and safety requirement	Explain difference between soldering and brazing Describe procedure to make brazed joint Identification and use of tools/equipment/material required for brazing Application of brazed joint The importance of PPEs when carrying out the process Importance of health and safety	Total 10 Hrs Theory: 2 Hrs Practical: 8 Hrs	Tube cutter Flaring tool Swaging tool Spring pipe bender Oxyacetylene welding set Copper filler rod Emery Paper Wire brush Pipe: Copper, SS	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
LU 5: Perform soldering on pipe	The trainee will be able to: Select appropriate tools/ equipment according to the given task Clean pipe surface by emery paper	Explain difference between soldering and brazing Describe procedure to make solder joint Identification and use of tools/equipment/material required for soldering	Total 10 Hrs Theory: 2 Hrs Practical: 8 Hrs	Tube cutter Flaring tool Swaging tool Spring pipe bender	Class or demonstration room EITHER Workshop/Lab OR

	Perform soldering Follow health and safety requirement	Application of soldering joint The importance of PPEs when carrying out the process Importance of health and safety		Oxyacetylene welding set Silver brazing rod Emery Paper Wire brush Pipe: Copper, Aluminum	Professional field work in domestic building and industrial complex
LU 6: Make fusion joint	The trainee will be able to: Select appropriate tools/ equipment and material according to the given task Ensure safety precautions Measure and mark pipe as per job requirement Cut the pipe as per job requirement Adjust fusion machine temperature as per manufacturer's recommendation Make fusion Joint as per manufacturer's recommendation	State fusion method Different types of fusion joints (e.g. socket fusion, butt fusion, electro fusion) Explain procedure to make fusion joint State pre and post safety protections The importance of PPEs when making fusion joint	Total 20 Hrs Theory: 2 Hrs Practical: 18 Hrs	PPRC Fusion Machine PPRC Cutter Hacksaw Pipe: PPRC	Class room Workshop/Lab

	Follow health and safety requirement				
LU 7: Make welded joint through arc welding	The trainee will be able to: Select appropriate tools/ equipment and material according to the given task Ensure safety precautions & use PPE Measure pipe as per job requirement Mark pipe as per job requirement Cut pipe as per job requirement Ensure bevel on pipe edges as per standard Align both pipes as per standard Adjust electric current for welding plant Ensure level of both pipes and keep distance as per required standard Perform welding	State types of welding State importance of arc welding Explain procedure to make welded joint by arc welding Describe special precautions to be taken during jointing system The importance of PPEs when carrying out the process. Importance of health and safety	Total 20 Hrs Theory: 2 Hrs Practical: 18 Hrs	Welding plant with accessories Welding electrodes Grinder Grinding disk Pipe: MS, SS	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Follow health and safety requirement				
--	--------------------------------------	--	--	--	--

Module 7: Install Pipeline Support System

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to install pipeline support system.

Duration: 50 Hrs **Theory:** 12 Hrs **Practical:** 38 Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Prepare for anchoring	The trainee will be able to: Interpret and confirm layout from drawing Perform measurement and marking Ensure safety precautions & use PPE Arrange material/ tools/ equipment according to the job specification Drill holes as per given drawing/specifications	Support and anchoring system, for example, clevis hanger, rubber clamp, drop in anchor, rawal bolt, expansion bolt Different types of support/ anchoring system for example seismic support, engineering support Importance of position, spacing and alignment of support/anchoring system Hole size according to the diameter of anchors The importance of PPEs when preparing for anchor system in pipe work. Importance of health and safety	Total 15 Hrs Theory: 03 Hrs Practical: 12 Hrs	Measuring Tape Straight Peen Hammer 2 lbs. Open End Spanner Set Hammer Drill Machine (Hilti) Hand Drill Machine Laser level Chalk liner Centre Punch Masonry Drill Set PPEs	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
LU 2: Perform anchoring	The trainee will be able to: Fix drop-in anchors Fix the support Maintain distance and level of support system.	List tools and equipment required for fixing supports for example hammer drill(Hilti) hammer, fix spanner, drill bit Identification and marking of designated area for anchoring	Total 18 Hrs Theory: 02 Hrs Practical: 16 Hrs	Measuring Tape Straight Peen Hammer 2 lbs. Open End Spanner Set Hammer Drill Machine (Hilti)	Class or demonstration room EITHER Workshop/Lab OR

	Ensure health & safety requirements	Procedure of fixing drop in anchoring system Importance of position & alignment of support/anchoring system The importance of PPEs when performing anchoring system. Importance of health and safety		Hand Drill Machine Masonry Drill Set Dowels, screws Pipe clamps, different size and models PPEs	Professional field work in domestic building and industrial complex
LU 3: Perform masonry works	The trainee will be able to: Select & use appropriate PPE Arrange tools/ material as per the given job Mark the area for excavation as per the given drawing Cordon off the work area Excavate according to the given job requirement Mix sand and cement mortar as per the standard ratio Perform basic masonry work as per the required job Ensure housekeeping at all times during the job	Describe application of safe procedure before and after excavation State basic masonry materials and their usage with different ratios List tools and equipment required for execution Identification and marking of excavation area by using different material Procedure of layout/marketing of work area Importance of protect/cordon off the work area The importance of PPEs when carrying out cutting in pipe work. Importance of health and safety Basic concepts of housekeeping	Total 17 Hrs Theory: 03 Hrs Practical: 14 Hrs	Measuring Tape Combination Pliers Magnet Sprit Level Plumb bob with Mason Line Shovel Pick axe for digging Wheel barrow Mortar Pan Cement Sand Water crush	Class or demonstration room Professional field work in domestic building and industrial complex

Module 8: Install Pipeline System

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to install pipeline system.

Duration: 120 Hrs **Theory:** 20 Hrs **Practical:** 100 Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Install pipeline	The trainee will be able to: Arrange approved drawing for given task Adopt necessary PPEs according to the task Select tools/equipment/ material as per given task Figure out the placement of pipes (hot & cold) as per drawing Locate and mark the area for pipe installation as per requirement Measure the pipe to ensure the marking Prepare the pipe (cut, clean, bend, thread and apply seal tape) Fix accessories (fittings) as per given drawing	Identification and selection of tools/equipment/ material as per given task Understanding /Interpretation of drawings and layouts Explain the different class/schedule of pipes used for plumbing Purpose and usage of different pipe fittings Importance of leveling and alignment procedures Sequencing the appropriate preparation methods of pipe installation correctly, including measuring, marking, cutting, bending and threading Knowledge of loading/unloading and handling of materials The importance of PPEs when carrying out installation of pipe work Importance of health and safety	Total 60 Hrs Theory: 10 Hrs Practical: 50 hrs	Measuring Tape Combination Pliers Cold Chisel Straight Peen Hammer 2 lbs. Open End Spanner Set Hammer Drill Machine (Hilti) Masonry Drill Set Magnet Sprit Level Disc 14" Power Cutter Chiseler (Jack Hammer Machine) Baby Grinder 4" Laser Level MS Pipe UPVC Pipe	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Install the pipes according to standards Clean work area, clean & store tools/equipment to ensure good housekeeping			PPRC pipe	
LU 2: Install different types of valves	The trainee will be able to: Arrange approved drawing as per given task/job Ensure HSE requirements Select tools/equipment/material as per requirement Isolate/shut off the system as per requirement Install valve on its position according to given drawing Test system after completing the task Clean & store work area & tools to ensure good housekeeping	Knowledge of the types of valves Describe the function and usage of different types of valves Describe the procedure of isolate/ shut off system Requirements to isolate domestic water services from the main water supply. Requirement: avoid flood/damage Installing procedure of different valve with fittings Knowledge and identification of fittings The importance of PPEs when carrying out cutting in pipe work Importance of health and safety	Total 40 Hrs Theory: 05 Hrs Practical: 35 Hrs	Gate valve ½ in to 2 inch NRV ½ in to 2 inch Balancing valve ½ inch to 2 inch Injector valve PRV PPEs	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
LU 3: Install water well pipe system	The trainee will be able to: Arrange approved drawing as per given task/job Ensure HSE requirements	The importance of PPEs when carrying out piping for water well Importance of health and safety	Total 20 Hrs Theory: 5 Hrs	Gate valve ½ in to 2 inch	Class or demonstration room EITHER Workshop/Lab

	Select tools/equipment/material as per requirement Inspect the required components of submersible pump Insert appropriate casing pipe by joining each other Install injector valve for deep well pump Install pipes in both lines of injector Install top flange and fixing pump with flange Install discharge pipe as required Clamp steel wire with Submersible pump Connect electrical wire Follow relevant health and safety requirements for bending of pipe	Types of different fittings required for water well piping system Describe the procedure to install above ground piping and buried piping (support system, bedding, benching, levelling, invert levelling, ceiling level) Coordination with other services at the time of installation Knowledge of different types of Sleeves, sleeves grouting Fire stopping in different types of sleeves Knowledge of pipes and accessories Checking the details on the submersible motor looking for power supply rating, identify whether it is a 2-wire single phase, a 3 wire single phase and needs a pump starter box or 3 phase configuration Know how about electric connection and safety precautions	Practical: 15 Hrs	NRV ½ inch to 2 inch Balancing valve ½ inch to 2 inch Injector valve PRV PPEs Submersible pump	OR Professional field work in domestic building and industrial complex
--	---	--	--	--	---

Module 9: Install Drainage System

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to install drainage system.

Duration: 90 Hrs **Theory:** 15 Hrs **Practical:** 75 Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Lay hanging system	The trainee will be able to: Arrange approved drawings of working area for the given task Arrange PPE for the given task Arrange tools/ materials for the given task Mark out the working area for the given task with the help of laser or water level Install supports for hanging pipes as per given Bottom of Pipe (BOP) Lay pipes on supports as per given drawing using solvent/ push-fit jointing Clean work area & store tools to ensure good housekeeping	Differentiate between hanging and buried piping system Recognizing and using relative tools and materials Different types of drainage system (single stack, double stack and combine) Maintain invert levels of drainage system Coordination with other services Knowledge of using water level Calculating slope of drainage system Describe procedure to lay and clamp piping on supports Importance of health and safety	Total 25 Hrs Theory: 05 Hrs Practical: 20 Hrs	PPEs Measuring Tape Combination Pliers Cold Chisel Straight Peen Hammer 2 lbs. Open End Spanner Set Hammer Drill Machine (Hilti) Masonry Drill Set Magnet Sprit Level Disc 14" Power Cutter Chiseler (Jack Hammer Machine) Baby Grinder 4" Laser Level Upvc pipe bonding agent	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

LU 2: Lay buried system	The trainee will be able to: Arrange approved drawings of working area for the given task Arrange PPE for the given task Mark out the working area for the given task with the help of laser/ water level Prepare bench support for laying out buried pipes Lay the pipe on bench support as per invert level Clean & store work area & tools to ensure good housekeeping	Knowledge of trench and bedding Follow all safety measures to protect workers inside and outside the trench. Importance of removal of all loose dirt at the trench bottom and grade the trench bottom so the pipe will be installed over a smooth surface. Define materials used for bedding Procedure to mark and make benching for buried pipes The importance of PPEs when carrying out drainage system	Total 35 Hrs Theory: 05 Hrs Practical: 30 Hrs	warning tape Safety sign Trowel Mortar pan Shovel Solvent Sand paper Hammer Chisels Pipe level Drill machine (Hilti) Masonry drill bit set Open/ring wrench set Measuring tape Laser level	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
--------------------------------	---	--	--	---	---

LU 3: Join drainage line	The trainee will be able to: Arrange PPE for the given task Arrange tools/ material for the given task Prepare/ clean pipe edges at joint area Apply approved solvent on pipes and fittings as per specification Insert pipe fittings as per manufacturer recommendations Adjust/ fix the pipe on supports as per given invert level Clean & store work area & tools to ensure good housekeeping	Define invert level Calculate and observe invert level of piping Introduction and application of relevant solvent or lubricant on pipe and fittings Joining methods of pipe fittings as per SOP Tightness and pressure testing Different types of PVC solvent and cleaner and their curing time The importance of PPEs when carrying out joining of drainage system Importance of health and safety	Total 30 Hrs Theory: 5 Hrs Practical: 25 Hrs	Pipes (class B/ schedule 40) Pipe solvent Pipe cleaner Emery paper Hacksaw blade with frame Cotton waste Measuring tape PPEs	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex
---------------------------------	--	--	--	---	--

General assessment guidance for *Pipe Fitter Lev-2*

Good practice in Pakistan makes, use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan, is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- to the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final assessment is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of a Pipe Fitter Lev-2 include:

- Work performances, for example installing pipeline support system and pipelines with required safety precautions
- Demonstrations, for example demonstrating to join pipes
- Direct questioning, where the assessor would ask the student why he is considering the certain slope of pipes during installation of drainage system
- Paper-based tests, such as multiple choice or short answer questions on health & safety, fabrication and installation of pipes etc.

Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Pipe fitter Lev-2 include:

- Work products, such as a completed pipe arrangement
- Workplace documents, such as note book or practical activity journal

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess.

Reliability means that the assessment is consistent and reproducible.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a mishap during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for Pipe Fitter Lev-2 Curriculum

This curriculum consists of 9 modules:

- Module 1: Comply Personal Health and Safety Guidelines
- Module 2: Communicate the Workplace Policy and Procedure
- Module 3: Perform Basic Communication (Specific)
- Module 4: Perform Basic Computer Application (Specific)
- Module 5: Fabricate Piping System
- Module 6: Join Pipes
- Module 7: Install Pipeline Support System
- Module 8: Install Pipeline System
- Module 9: Install Drainage System

Sessional assessment

The sessional assessment shall be conducted after completion of each module in two parts: theoretical assessment and practical assessment.

Theoretical assessment for all learning modules must consist of a written paper lasting at least 30 minutes per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final assessment

Final assessment shall also be in two parts: theoretical assessment and practical assessment.

For the final practical assessment, each student shall be assessed over a period of 4-5 hours session. During this period, each student must be assessed on his ability to perform a complete job for each of the last 5 modules.

Module 1: Maintain Safety shall be assessed comprising with other 5 modules at the time of final assessment. Practical work for this module shall be assessed on a sessional basis only.

The assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 20 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 students, assessments would be carried out over a two-day period only.

Planning for assessment

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment program for each group of five students. Training providers must agree the dishes for practical assessments in advance.

Complete list of tools and equipment

S. No	Description	Quantity
1	Leather Gloves	20 pairs
2	Cotton Gloves	20 pairs
3	Goggles	20 nos.
4	Safety mask	100 pcs
5	Helmet	25 nos.
6	Safety belt	10 nos.
7	Safety Shoes	25 pairs
8	Ear plug / Ear Muff	25 pcs
9	Coverall	20 nos.
10	Measuring Tape	20 nos.
11	Combination Pliers	10 nos.
12	Vernier Caliper	10 nos.
13	Inside/Outside Caliper	10 nos.
14	Pointing chisel	10 nos.
15	Cold Chisel	10 nos.
16	Ball Peen Hammer	10 nos.
17	Straight Peen Hammer 2 lbs.	10 nos.
18	Club Hammer	10 nos.
19	Pipe Wrench 12" to 24"	10 nos.
20	Pipe Vise 6" with tripod	4 nos.
21	Ratchet die set ½" to 2"	3 nos.
22	Hand Hack Saw	20 nos.
23	Power Disc grinder 14"	5 nos.
24	Portable Welding Machine 3 Phase 300 Amp.	3 nos.
25	Face Shield and Holder with cable	20 nos.
26	File Set	5 sets
27	Pipe Reamer Set	10 nos.

28	Adjustable Wrench 8" to 12"	10 nos.
29	Phillips Screw Driver Set	5 set
30	Flat Screw Driver Set	5 set
31	Allen Key Set	5 set
32	Tin Snip Cutter	5 nos.
33	Pipe Cutter ½" to 2"	5 nos.
34	Open End Spanner Set (Metric)	5 set
35	Open End Spanner Set (Imperial)	5 set
36	Offset Ring Spanner Set (Metric)	5 set
37	Offset Ring Spanner Set (Imperial)	5 set
38	Combination Spanner Set (Metric)	5 set
39	Combination Spanner Set (Imperial)	5 set
40	Hammer Drill Machine (Hilti)	3 nos.
41	Hand Drill Machine	10 nos.
42	Twist Drill Set	5 set
43	Masonry Drill Set	5 set
44	Hydraulic Pipe Bender	2 nos.
45	Heat Gun	10 nos.
46	Fusion Machine (PPRC set 20 mm ~ 63 mm)	4 nos.
47	Gas Cutter Set with Torch, Pipe	3 set
48	Acetylene Cylinder	3 nos.
49	Oxygen Cylinder	3 nos.
50	Magnate Sprit Level	20 nos.
51	Water Level	4 nos.
52	Soldering Machine	10 nos.
53	Flaring Tool Set	5 set
54	Swaging Tool Set	5 set
55	Tube Cutter	10 nos.
56	Bench Vise 6"	10 nos.
57	Tri Square 12" - 24"	20 nos.
58	Plumb bob with Mason Line	10 nos.

59	Different Tags and Locks	100 nos.
60	Disc 14" Power Cutter	10 nos.
61	Pin Grinder	4 nos.
62	Stone for Pin Grinder	2 nos.
63	Wire Brush for Pin Grinder	5 nos.
64	Shovel	5 nos.
65	Pick axe for digging	5 nos.
66	Wheel barrow	4 nos.
67	Chiseler (Jack Hammer Machine)	4 nos.
68	Chalk Liner	10 nos.
69	Trowel Adhesive	10 nos.
70	Mortar Pan	10 nos.
71	Breathing apparatus	5 nos.
72	Fire extinguishers	5 nos.
73	Fire blankets	5 nos.
74	First aid kits	2 nos.
75	Stretchers	2 nos.

List of consumable supplies

1. Drill Bit Set
2. Process SOPs
3. Equipment Maintenance Manuals
4. Log Book
5. Stone for Pin Grinder
6. Wire Brush for Pin Grinder
7. Wire Brush (Steel Wire)
8. Chalk Liner
9. Kerosene Oil
10. Cutting Oil
11. WD-40
12. Grease
13. Cotton Rags
14. Hack Saw Blade
15. Emery Paper
16. Grinding Disc 4"
17. Cutting Disc 4"
18. Grinding Disc 7"
19. Cutting Disc 7"
20. Wall Cutting Disc 7"
21. **GI Pipes (1/2" ~ 1")**
22. GI Elbow (90, 45)
23. GI Tee
24. GI Bend
25. GI Union
26. GI Cross Tee
27. GI Socket

- 28. GI Reducer
- 29. Barrel Nipple
- 30. M/F Elbow
- 31. M/F Socket
- 32. End Plug
- 33. Bridge Bend
- 34. **Copper Pipes (3/8" ~ 3/4")**
- 35. Elbow (90, 45)
- 36. Tee
- 37. Bend
- 38. Union
- 39. Cross Tee
- 40. Socket
- 41. Reducer
- 42. **MS Pipes (1" ~ 4")**
- 43. Flanges (Welded/threaded)
- 44. Tee
- 45. Elbow (90/45)
- 46. Bends
- 47. Reducer
- 48. Flanges (Welded/treaded)
- 49. **UPVC pipes (1/2" ~ 4")**
- 50. UPVC Socket
- 51. UPVC Tee
- 52. UPVC Elbow (90/45)
- 53. UPVC Bends
- 54. UPVC Reducer
- 55. UPVC Y-Branch
- 56. UPVC P Trap

- 57. UPVC Multi flow Trap
- 58. Test Plug
- 59. UPVC Union
- 60. UPVC Male Adopter
- 61. Brass Thread Tee
- 62. Brass Thread Elbow
- 63. Brass Thread Union
- 64. Brass Thread Socket
- 65. **CPVC Pipe (1/2" ~ 1")**
- 66. CPVC Elbow
- 67. CPVC Tee
- 68. CPVC Union
- 69. CPVC Brass Male Adopter
- 70. **PPRC Pipes (20 mm ~ 32 mm)**
- 71. Socket
- 72. Reducer
- 73. Treaded Elbow
- 74. Male Adopter
- 75. Female Adopter
- 76. CP Nipple
- 77. PE Pipes (20 mm ~ 32 mm)
- 78. Socket
- 79. Elbow (90, 45)
- 80. Tee
- 81. Bend
- 82. Cross Tee
- 83. Reducer
- 84. Flanges (Welded/threaded)
- 85. Pressure Reducing Valve (1" ~ 3")

- 86. Injector Valve (1" ~ 1 1/2")
- 87. Teflon Tape
- 88. Lock tight/ Hold tight
- 89. Thread
- 90. Silicon
- 91. Epoxy
- 92. Non-return Valve (1/2" ~ 1")
- 93. Gate Valve (1" ~ 3")
- 94. Ball Valve (1/2" ~ 1")
- 95. Primer
- 96. Red Oxide
- 97. Glass wool
- 98. Thermo pore
- 99. Dowels, screws
- 100. Pipe clamps, different size and models
- 101. Cement
- 102. Sand

List of Stationary

1. Different Tags and Locks
2. ASTM – BS Standards
3. Process SOPs
4. Equipment Maintenance Manuals
5. Log Book
6. Handbooks
7. Design Books/ Sheets
8. Pencils
9. Erasers
10. Pencil Sharpeners
11. Paper Cutter
12. Scissors
13. Color Pencils
14. White chart paper
15. Brown Sheets
16. White Board Markers (red, blue, green, black)
17. Permanent markers (black)
18. File covers

Credit values

The credit value of the National Certificate Level 2 in Pipe Fitter is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

Competency Standard	Estimate of hours	Credit
1. Comply Personal Health and Safety Guidelines	30	03
2. Communicate the Workplace Policy and Procedure	20	02
3. Perform Basic Communication (Specific)	30	03
4. Perform Basic Computer Application (Specific)	40	04
5. Fabricate Piping System	100	10
6. Join Pipes	100	10
7. Install Pipeline Support System	50	05
8. Install Pipeline System	120	12
9. Install Drainage System	90	09

