

PIPE FITTER



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CBT Curriculum
National Vocational Certificate Level 4

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Introduction

Definition/ Description of the training program for *Pipe Fitter Lev-4*

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 Install Steam Fittings, Install Process Piping System. Also he/she will be able to Develop Professionalism and Develop Basic Communication Skills. 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. Contribute to Work Related Health and Safety (WHS) Initiatives
2. Analyze Workplace Policy and Procedures
3. Perform Advanced Communication
4. Develop Advance Computer Application Skills
5. Manage Human Resource Services
6. Develop Entrepreneurial skills
7. Install Steam Fittings
8. Install Process Piping 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:

- Industrial Pipe Fitter
- Pipe Fabricator (within limitations)
- Plumbing foreman
- Supervisor
- Managers

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

Entry into formal training institute for this qualification is that the person having National Vocational Certificate level 3, in (Light Engineering Sector) “Pipefitter”.

Minimum qualification of trainer

B-Tech (Hons) / B.Sc. Eng. Tech. with 2 years relevant experience; or

Diploma of Associate Engineer (DAE) with 4 years relevant work experience; or

2 Year Certificate as Pipe Fitter with 10-12 years relevant work experience

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 8 modules. The recommended delivery time is 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: Contribute to Work Related Health and Safety (WHS) Initiatives			30
Module 2: Analyze Workplace Policy and Procedures			30
Module 3: Perform Advanced Communication			30
Module 4: Develop Advance Computer Application Skills			40
Module 5: Manage Human Resource Services			20
Module 6: Develop Entrepreneurial skills			30
Module 7: Install Steam Fittings	30	120	150
Module 8: Install Process Piping System	20	100	120

Sequence of the modules

This qualification is made up of 8 modules. A suggested distribution of these modules is presented overleaf. This is not prescriptive and training providers may modify this if they wish.

First 6 modules are generic, and provide knowledge about health & safety, workplace policies, communication skills and computer skills. It also comprise how to manage human resources and develop entrepreneur skills so that the pass out trainees can effectively manage their duties in professional environment. These modules need to be delivered in parallel.

Module 7: Install Steam Fittings, covers various aspects related to installation of steam fittings for low and high pressure. That are required for the students to understand, in order to work in a safe and professional environment. Module 8: Install Process Piping System; is relating to installation of a wide range of process piping that a Pipe fitter must learn and understand in order to become an effective professional. 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 7: Install Steam Fittings 150 hours	Module 8: Install Process Piping System 120 hours	Module 3: Perform Advanced Communication 30 hrs
		Module 4: Develop Advance Computer Application Skills 40 hrs
Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives 30 hrs	Module 2: Analyze Workplace Policy and Procedures 30 hrs	Module 5: Manage Human Resource Services 20 hrs
		Module 6: Develop Entrepreneurial skills 30 hrs

Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1 : Contribute to Work Related Health and Safety (WHS) Initiatives Aim: The aim of this module is to develop advanced knowledge, skills and understanding to contribute to work related health and safety (WHS) initiatives	LU 1: Contribute to initiate work-related health and safety measures LU 2: Contribute to establish work-related health and safety measures LU 3: Contribute to ensure legal requirements of WHS measures LU 4: Contribute to review WHS measures LU 5: Evaluate the organization's WHS system			30 Hrs
Module 2 : Analyze workplace policy and procedures Aim: The aim of this module is to develop advanced knowledge, skills and understanding to analyze workplace policy and procedures	LU 1: Manage work timeframes LU 2: Manage to convene meeting LU 3: Decision making at workplace LU 4: Set and meet own work priorities at instant LU 5: Develop and maintain professional competence LU 6: Follow and implement work safety requirements			30 Hrs

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 3 : Perform Advanced Communication Aim: The aim of this module is to develop advanced knowledge, skills and understanding to perform advanced communication	LU 1: Demonstrate professional skills LU 2: Plan and Organize work LU 3: Provide trainings at workplace			30 Hrs
Module 4 : Develop Advance Computer Application Skills Aim: The aim of this module is to develop advanced knowledge, skills and understanding to develop advance computer application skills	LU 1: Manage Information System to complete a task LU 2: Prepare Presentation using computers LU 3: Use Microsoft Access to manage database LU 4: Develop graphics for Design			40 Hrs
Module 5 : Manage Human Resource Services Aim: The aim of this module is to develop advanced knowledge, skills and understanding to manage human resource services	LU 1: Determine strategies for delivery of human resource services LU 2: Manage the delivery of human resource services LU 3: Evaluate human resource service delivery LU 4: Manage integration of business ethics in human resource practices			20 Hrs

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 6 : Develop Entrepreneurial Skills Aim: The aim of this module is to develop advanced knowledge, skills and understanding to Develop Entrepreneurial Skills	LU 1: Develop a business plan LU 2: Collect information regarding funding sources LU 3: Develop a marketing plan LU 4: Develop basic business communication skills			30 Hrs
Module 7: Install Steam Fittings Aim: The aim of this module is to develop advanced knowledge, skills and understanding to install steam fittings	LU 1: Install low pressure fittings LU 2: Install high pressure fittings LU 3: Install steam heating fittings	30 Hrs	120 Hrs	150 Hrs
Module 8: Install Process Piping System Aim: The aim of this module is to develop advanced knowledge, skills and understanding to install process piping system	LU 1: Prepare for installation of process piping system LU 2: Install process piping system LU 3: Install steam condensate system	20 Hrs	100 Hrs	120 Hrs

Modules

Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to contribute to work related health and safety (WHS) Initiatives.

Duration: 30 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Contribute to initiate work-related health and safety measures	The trainee will be able to: Compile database on work-related health and safety Identify measures that address legal obligations. Consult with individuals/ parties to formulate measures and initiatives Consult with individuals/parties to identify factors impacting on work-related health and safety				

	Participate in consultative meetings.				
LU 2: Contribute to establish work-related health and safety measures	The trainee will be able to: Assist in planning of work-related health and safety measures Contribute to the development of work-related health and safety measures Identify to implement work-related health and safety measures i.e. • resourcing requirements, • timelines • responsibilities Assist to implement work-related health and safety measures and initiatives i.e. • scheduling				

	- liaison - administering resources communication				
LU 3: Contribute to ensure legal requirements of WHS measures	The trainee will be able to: Identify WHS legal requirements Apply knowledge of all aspects of WHS measures to - Consultation - workplace policies - participation processes Ensure, WHS measures are in accordance with legal requirements				
LU 4: Contribute to review WHS measures	The trainee will be able to: Develop effective practices to review work-				

	related health and safety measures Assist individuals and parties related to WHS measures in following activities • preparing reports • communicating review evaluating outcomes				
LU 5: Evaluate the organization's WHS system	The trainee will be able to: Assess ongoing compliance with OHS (Occupational Health and safety) Take feedback from concerned persons regarding WHS measures. Assess the overall effectiveness of WHS management practices				

	Assist the development process of WHS measures in following ways • Suggest amendments • Document amendments • Implement amendments Take feedback from concerned persons regarding WHS measures. Communicate improvements in WHS Measures				
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Module 2: Analyze Workplace Policy and Procedures

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to analyze workplace policy and procedures.

Duration: 30 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Manage work timeframes	The trainee will be able to: Complete work tasks within deadlines in according to order of priority Supervisors are informed of any delays in work times or projects				
LU 2: Manage to convene meeting	The trainee will be able to: Develop agenda in line with meeting purpose Select participants and notify them accordingly Carryout meeting arrangements according to the time				

	Record the minutes of the meeting				
LU 3: Decision making at workplace					
LU 4: Set and meet own work priorities at instant	The trainee will be able to: Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives Use technology efficiently and effectively to manage work priorities and commitments Maintain appropriate work-life balance				
LU 5: Develop and maintain professional competence	The trainee will be able to: Assess personal knowledge and skills against competency				

	Participate in networks to enhance personal knowledge, skills and work relationships Seek feedback from employees, clients and colleagues to develop and improve competence				
LU 6: Follow and implement work safety requirements	The trainee will be able to: Identify and report emergency incidents Practice organizational policy and procedures for responding to emergency incidents Identify and implement workplace procedures and work instructions for controlling risks				

Module 3: Perform Advanced Communication

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

Duration: 30 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Demonstrate professional skills	The trainee will be able to: Use different modes of communication to communicate • Speaking • Reading • Writing • Listening • Presentation • Visual representation etc. Develop CV Skills according requirements Upgrade professional skills by attending				

	trainings, webinars, conferences etc. Perform Continuous professional development as required at workplace Develop interview skills				
LU 2: Plan and Organize work	The trainee will be able to: Identify task requirements. Plan steps to complete tasks. Review planning and organizing process. Organize work.				
LU 3: Provide trainings at workplace	The trainee will be able to: Assess the need for training Prepare trainees for the learning experience Present training session				

	Support trainees in managing their own learning Facilitate group learning Provide opportunity for practice Provide feedback on progress on trainees Review delivery experience				
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Module 4: Develop Advance Computer Application Skills

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to develop advance computer application skills

Duration: 40 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Manage Information System to complete a task	The trainee will be able to: Perform Data Entry in MS office Manage File/folder in MS office Perform Scanning of document Maintain Office Record in drives Perform Printing of document Search required Files/Folders Convert Files in required format.				

	Manage sizes of Files/Folders • Compress Zip /Unzip				
LU 2: Prepare Presentation using computers	The trainee will be able to: Prepare presentation as per requirements, i.e. • 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 Customize basic settings to meet user requirements Format presentation as require • Develop organizational charts • Add objects and manipulate to meet presentation purposes				
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	• Modify slide layout, including text and colours, to meet presentation requirements • Save presentation in another format • Save to storage device and close presentation Add slide show effect into presentation as required to enhance the presentation • Incorporate pre-set Animation • Apply Multimedia effects • Record Narration				
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	• Apply hyperlink • Apply video • Rehearse Timings • Test presentation for overall effect Print the presentation • 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				
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	presentation to appropriate person for feedback Practice verbal presentation Practice presentation through AV Aids				
LU 3: Use Microsoft Access to manage database	The trainee will be able to: Collect the data using a standard data base package. Start access to manage database .i.e. • 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				
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	• Save database to storage area • close down database to storage area • Apply criteria in the following Query • SQL view of Query • Wildcards of query • Query Criteria Customize basic settings: • Adjust page layout to meet user requirements • Open and view different toolbars • Format font as appropriate for				
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	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 Create forms • Use a wizard to create a simple form				
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	Open existing database and modify records through a simple form Rearrange objects within the form to accommodate information requirements				
LU 4: Develop graphics for Design	The trainee will be able to: Develop graphic design concepts based on a thorough understanding of the communication need Use design techniques confidently to produce designs Integrate design tools skillfully to produce designs				

	Evaluate the success of completed designs to meet objectives evaluate feedback from client / peers				
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Module 5: Manage Human Resource Services

Objective of the module: The aim of this module is to develop advanced knowledge, skills and understanding to manage human resource services.

Duration: 20 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Determine strategies for delivery of human resource services	The trainee will be able to: Analyze business strategy and operational plans to determine human resource requirements Review external business environment that likely impact on organization's human resource requirements Consult line and senior managers to identify human resource needs in their areas				

	Review organization's requirements for diversity in the workforce Deliver human resource services that comply with business goals Develop strategic action plan for delivery of human resource services Develop roles and responsibilities of human resource team Develop quality assurance policy				
LU 2: Manage the delivery of human resource services	The trainee will be able to: Communicate human resource strategies and services to internal and external stakeholders Develop and negotiate service agreements between				

	• The human resource team, • Service providers • Client groups Document service specifications, performance standards and timeframes Document /communicate service • Specifications, • Performance standards • Timeframes Monitor Quality assurance processes Ensure that services are delivered by appropriate providers, according to service agreements and operational plans				
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	Identify underperformance of human resource team or service providers				
LU 3: Evaluate human resource service delivery	The trainee will be able to: Establish Management information system for human resource services Conduct survey to determine level of satisfaction Analyze feedback of survey Recommend changes to service delivery Support agreed change processes across the organization				
LU 4: Manage integration of business ethics in human	The trainee will be able to:				

resource practices	Ensure ethics in personal behavior Ensure code of conduct is observed across the organization, Observe confidentiality requirements in dealing with all human resource information Deal promptly with unethical behavior Ensure all persons responsible for human resource functions understand requirements regarding their ethical behavior				
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Module 6: Develop Entrepreneurial Skills

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

Duration: 30 Hrs **Theory:** Hrs **Practical:** Hrs

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Develop a business plan	The trainee will be able to: Conduct a market survey to collect following information • Customer /demand • Tools, equipment, machinery and furniture with rates • Raw material • Supplier • Credit / funding sources • Marketing strategy				

	• Market trends • Overall expenses • Profit margin Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses Compile the information collected through the market survey, in the business plan format				
LU 2: Collect information regarding funding sources	The trainee will be able to: Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate Choose the best available option				

	according to investment requirement Prepare documents according to the loan agreement requirement Include the information of funding sources in the business plan				
LU 3: Develop a marketing plan	The trainee will be able to: Make a marketing plan for the business including product, price, placement, promotion, people, packaging and positioning Include the information of marketing plan in the business plan				
LU 4: Develop basic business communication skills	The trainee will be able to: Communicate with internal customers e.g.: labor, partners and				

	external customers e.g.: suppliers, customers etc., using effective communication skills Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc. Use specific business terms used in the market				
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Module 7: Install Steam Fittings

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

Duration: 150 **Theory:** 30 **Practical:** 120

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Install low pressure fittings	The trainee will be able to: Read and understand the relevant drawings Arrange required tool, material and PPEs Lay and install pipes on supports by performing welding as per SOPs Insulate the pipe and perform stenciling Clean the work area after completion of work and store the tools and material on proper place Report the activity to Supervisor	Interpret drawing and symbols for steam fitting Recognize and use proper tool for the activity Recognize and use proper PPEs for the activity Recognize and understand the material to be used How to Install Low Pressure fittings using welding method and subsequently installing the Pipe at the required work area following all necessary SOPs How to perform Insulation on the Pipes How to keep the work area clean during and after the activity. Using proper methods for reporting the work to supervisor.	Total 50 Hrs Theory: 10 Hrs Practical: 40 Hrs	Gloves Goggles Helmet Safety Belt Safety Shoes Measuring Tape Pipe Wrench Pipe Vice PRV Globe Valve Gate valve Check valve/NRV Strainer Flexible connector Solenoid	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

				Safety valve Gauges Steam trap Disc Grinder Welding Machine Face Sheet with Holder File Set Philips/Flat Screw Driver Set Hammer Drill Machine Twist/Masonry Drill Set Magnet Sprit Level Different Tag and Lock Cotton Rags Hack Saw Blade Emery Paper Baby Grinder 4" Grinding Disc 4"	
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				Cutting Disc 4" Wire Brush (Steel Wire) Boiler	
LU 2: Install high pressure fittings	The trainee will be able to: Read and understand the relevant drawings Arrange required tool, material and PPEs Lay and install pipes on supports by performing welding as per SOPs Insulate the pipe and perform stenciling Clean the work area after completion of work and store the tools and material on proper place Report the activity to Supervisor	Interpret drawing and symbols for steam fitting Recognize and use proper tools for the activity Recognize and use proper PPEs for the activity Recognize and understand the material to be used How to Install Low Pressure fittings using welding method and subsequently installing the Pipe at the required work area following all necessary SOPs How to perform Insulation on the Pipes How to keep the work area clean during and after the activity. Using proper methods for reporting the work to supervisor.	Total 50 Hrs Theory: 10 Hrs Practical: 40 Hrs	Gloves Goggles Helmet Safety Belt Safety Shoes Measuring Tape Pipe Wrench Pipe Vice Disc Grinder Welding Machine Face Sheet with Holder File Set Philips/Flat Screw Driver Set Hammer Drill Machine	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

				Twist/Masonry Drill Set Magnet Sprit Level Different Tag and Lock Cotton Rags Hack Saw Blade Emery Paper Baby Grinder 4" Grinding Disc 4" Cutting Disc 4" Wire Brush (Steel Wire) Boiler Electric Pressure switch	
LU 3: Install Steam Heating fittings	The trainee will be able to: Read and understand the relevant drawings Arrange required tool, material and PPEs	Interpret drawing and symbols for steam fitting Recognize and use proper tool for the activity	Total 50 Hrs Theory: 10 Hrs Practical:	Gloves Goggles Helmet Safety Shoes Measuring Tape	Class or demonstration room EITHER Workshop/Lab

	Lay and install pipes on supports by performing welding as per SOPs Insulate the pipe and perform stenciling Clean the work area after completion of work and store the tools and material on proper place Report the activity to Supervisor	Recognize and use proper PPEs for the activity Recognize and understand the material to be used How to Install Low Pressure fittings using welding method and subsequently installing the Pipe at the required work area following all necessary SOPs How to perform Insulation on the Pipes How to keep the work area clean during and after the activity. Using proper methods for reporting the work to supervisor.	40 Hrs	Pipe Wrench Pipe Vice Disc Grinder Welding Machine Face Sheet with Holder File Set Philips/Flat Screw Driver Set Hammer Drill Machine Twist/Masonry Drill Set Magnet Sprit Level Different Tag and Lock Cotton Rags Hack Saw Blade Emery Paper Baby Grinder 4" Grinding Disc 4"	OR Professional field work in domestic building and industrial complex
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				Cutting Disc 4" Wire Brush (Steel Wire)	
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Module 8: Install Process Piping System

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

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

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1: Prepare for installation of process piping system	The trainee will be able to: Arrange approved drawings for the given task and ensure HSE requirements are fulfilled for the given task. Select & use appropriate PPE and Make list of required material for the given task then Confirm the quantity & quality of the material as received. Prepare tools/ accessories & material according to SOP and	Interpret drawing and symbols for process piping. Recognize and use PPEs and use relevant tools and materials. Knowledge of pipe threads & weld pipe joints as per SOP. Recognize and use of different types of valves, flanges, couplings, gaskets and pipe supports. Tools Knowledge understanding and identification.	Total: 40 Hrs Theory: 10 Hrs Practical: 30 Hrs	Teaching materials White board, Markers, required piping layout Drawings. Multimedia projector Measuring Tools. Requirements PPE	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Give feedback to the supervisor				
LU 2: Install process piping system	The trainee will be able to: Select appropriate tools/material as per SOP. Erect piping as per specification & drawings. Ensure housekeeping after completion of task. Report to supervisor for task completion	Interpret drawing and symbols for process piping. Recognize and use PPEs and use relevant tools and materials. Knowledge of pipe threads & weld pipe joints as per SOP. Recognize and use of different types of valves, flanges, couplings, gaskets and pipe supports. Knowledge of performing hydrostatic test and tag out all system fitting as per manual.	Total: 40 Hrs Theory: 5 Hrs Practical: 35 Hrs	Cotton Gloves Goggles Safety mask Helmet Safety belt Safety Shoes Coverall Measuring Tape Vernier Caliper Ball Peen Hammer Club Hammer Pipe Wrench 12" to 24" Pipe Vise 6" with tripod Portable Welding Machine 3 Phase 300 Amp. Face Shield and Holder with cable File Set Phillips Screw Driver Set Flat Screw Driver Set	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

				Hammer Drill Machine (Hilti) Twist Drill Set Masonry Drill Set Magnet Sprit Level Bench Vise 6" Tri Square 12" 24" Plumb bob with Mason Line Threading die set Pipe vise Pipe cutter Different Tags & lock	
LU 3: Install steam condensate system	The trainee will be able to: Select appropriate tools/ material as per SOP. Install & connect piping to steam condensate pump & boiler. Conduct test run of the system. Ensure housekeeping after completion of task	Interpret drawing and symbols for process piping. Recognize and use PPEs Use relevant tools and materials. Knowledge of pipe threads & weld pipe joints as per SOP. Recognize and use of different types of valves, flanges, couplings, gaskets and pipe supports. Knowledge of performing hydrostatic test and tag out all system fitting as per manual.	Total: 40 Hrs Theory: 5 Hrs Practical: 35 Hrs	Cotton Gloves Goggles Safety mask Helmet Safety belt Safety Shoes Coverall Measuring Tape Vernier Caliper Ball Peen Hammer Club Hammer Pipe Wrench 12" to 24" Pipe Vise 6" with tripod	Class or demonstration room EITHER Workshop/Lab OR Professional field work in domestic building and industrial complex

	Report to supervisor for task completion			Portable Welding Machine 3 Phase 300 Amp. Face Shield and Holder with cable File Set Phillips Screw Driver Set Flat Screw Driver Set Hammer Drill Machine (Hilti) Twist Drill Set Masonry Drill Set Magnet Sprit Level Bench Vise 6" Tri Square 12" 24" Plumb bob with Mason Line Threading die set Pipe vise Pipe cutter valves, flanges, couplings, gaskets and pipe support Different Tags and Locks	
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General assessment guidance for *Pipe Fitter Lev-4*

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-4 include:

- Work performances, for example installing Steam Fittings
- Demonstrations, for example demonstrating to Process Piping System
- Direct questioning, where the assessor would ask question to the student to judge his understanding and knowledge

- Paper-based tests, such as multiple choice or short answer questions on Installation of Steam Fittings and Process Piping System and about professionalism/communication skills. 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-4 include:

- Work products, such as any completed process pipeline system
- 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-4 Curriculum

This curriculum consists of 8 modules:

- Module 1: Contribute to Work Related Health and Safety (WHS) Initiatives
- Module 2: Analyze Workplace Policy and Procedures
- Module 3: Perform Advanced Communication
- Module 4: Develop Advance Computer Application Skills
- Module 5: Manage Human Resource Services
- Module 6: Develop Entrepreneurial skills
- Module 7: Install Steam Fittings
- Module 8: Install Process Piping System

Sessional assessment

The sessional assessment shall be conducted after completion of each module in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least 30 minute 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. The final assessment marks shall contribute to the final qualification.

For the final practical assessment, each student shall be assessed over a period of 4-hour session. During this period, each student must be assessed on his ability to perform a complete job for each of the last 2 modules.

All generic modules shall be assessed at the time of final assessment with technical modules because they are interdependent on technical modules. Practical work for these modules shall also be assessed on a sessional basis.

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	Pointing chisel	10 nos.
13	Cold Chisel	10 nos.
14	Ball Peen Hammer	10 nos.
15	Straight Peen Hammer 2 lbs.	10 nos.
16	Club Hammer	10 nos.
17	Pipe Wrench 12" to 24"	10 nos.
18	Pipe Vise 6" with tripod	4 nos.
19	Ratchet die set ½" to 2"	3 nos.
20	Hand Hack Saw	20 nos.
21	Power Disc grinder 14"	5 nos.
22	File Set	5 sets
23	Pipe Reamer Set	10 nos.
24	Adjustable Wrench 8" to 12"	10 nos.
25	Phillips Screw Driver Set	5 set
26	Flat Screw Driver Set	5 set
27	Allen Key Set	5 set

28	Hammer Drill Machine (Hilti)	3 nos.
29	Hand Drill Machine	10 nos.
30	Twist Drill Set	5 set
31	Masonry Drill Set	5 set
32	Hydraulic Pipe Bender	2 nos.
33	Heat Gun	10 nos.
34	Bench Vise 6"	10 nos.
35	Tri Square 12" - 24"	20 nos.
36	Plumb bob with Mason Line	10 nos.
37	Different Tags and Locks	100 nos.
38	Disc 14" Power Cutter	10 nos.
39	Testing Plugs 2" to 4" expendable	5 nos.

List of consumable supplies

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

- 31. Bridge Bend
- 32. **Copper Pipes (3/8" ~ 3/4")**
- 33. Elbow (90, 45)
- 34. Tee**
- 35. Bend
- 36. Union
- 37. Cross Tee
- 38. Socket
- 39. Reducer
- 40. Barrel Nipple
- 41. End Plug
- 42. **MS Pipes (1" ~ 4")**
- 43. Flanges (Welded/threaded)
- 44. Tee**
- 45. Elbow (90/45)
- 46. Bends
- 47. Reducer
- 48. Flanges (Welded/treaded)
- 49. Barrel Nipple
- 50. End Plug
- 51. **PPRC Pipes (20 mm ~ 32 mm)**
- 52. Socket
- 53. Reducer**
- 54. Treaded Elbow
- 55. Male Adopter
- 56. Female Adopter
- 57. CP Nipple
- 58. PE Pipes (20 mm ~ 32 mm)
- 59. Socket
- 60. Elbow (90, 45)
- 61. Tee
- 62. Bend

- 63. Cross Tee
- 64. Reducer
- 65. Flanges (Welded/threaded)
- 66. Globe Valves (1" ~ 3")
- 67. Safety Valve (1/2" ~ 1")
- 68. Check Valve (1" ~ 3")
- 69. Pressure Reducing Valve (1" ~ 3")**
- 70. Butterfly Valve (1" ~ 3")
- 71. Injector Valve (1" ~ 1 1/2")
- 72. Foot valve (1/2" ~ 1")
- 73. Float Valve (1/2" ~ 1")
- 74. Gate Valve (1" ~ 3")**
- 75. Ball Valve (1/2" ~ 1")

76. Non-return Valve (1/2" ~ 1")

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 4 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. Contribute to Work Related Health and Safety (WHS) Initiatives	30	03
2. Analyze Workplace Policy and Procedures	30	03
3. Perform Advanced Communication	30	03
4. Develop Advance Computer Application Skills	40	04
5. Manage Human Resource Services	20	02
6. Develop Entrepreneurial skills	30	03
7. Install Steam Fittings	150	15
8. Install Process Piping System	120	12

