



Model Curriculum

1. Pipe Fitter - Shipbuilding

SECTOR: STRATEGIC MANUFACTURING
**SUB-SECTOR: DEFENCE EQUIPMENT, SHIPBUILDING
AND SHIP REPAIR, ELECTRONIC
SECURITY EQUIPMENT, FIRE FIGHTING
AND SAFETY EQUIPMENT**
OCCUPATION: FABRICATION AND ASSEMBLY
REF ID: SMC/Q 3101, V1.0
NSQF LEVEL: 4



  

Certificate

**CURRICULUM COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL
STANDARDS**

is hereby issued by the

STRATEGIC MANUFACTURING SECTOR SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of

Job Role/Qualification Pack : 'Pipe Fitter - Shipbuilding', QP No. SMC/Q3101, Version 1.0, NSQF Level 4

Date of Issue: December 23rd, 2016
Valid Up to* : August 19th, 2019

*Valid upto to the next review date of the Qualification Pack or the
Valid up to 'date mentioned above (whichever is earlier)


Authorised Signatory

Strategic Manufacturing Sector Skill Council



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Pipe Fitter – Shipbuilding

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Pipe Fitter – Shipbuilding”, in the “Strategic Manufacturing” Sector/Industry and aims at building the following key competencies amongst the learner

| | | | |
|---|---|----------------------------|-------------|
| Program Name | Pipe Fitter – Shipbuilding | | |
| Qualification Pack Name & Reference ID. ID | SMC/Q 3101, v1.0 | | |
| Version No. | 1.0 | Version Update Date | 10/ 07/2015 |
| Pre-requisites to Training | 10 th Standard | | |
| Training Outcomes | After completing this programme, participants will be able to: <ul style="list-style-type: none">• Pipe fitter lays out, assembles, fabricates, tests, maintains and repairs piping systems which carry water, steam, chemicals or fuel used in heating, cooling, lubricating and other processes. | | |

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Pipe Fitter – Shipbuilding” Qualification Pack issued by “Strategic Manufacturing Sector Skill Council”.

| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|---|
| 1 | <p>Prepare for fabrication, fitting and assembly to produce piping systems</p> <p>Theory Duration (hh:mm) 36:00</p> <p>Practical Duration (hh:mm) 40:00</p> <p>Corresponding NOS Code SMC/ N 3101</p> | <p>The user/individual on the job needs to know and should be able to perform/understand the following :</p> <ul style="list-style-type: none"> • how to extract and use information from engineering drawings and related specifications in relation to work. • how to interpret isometric drawings, imperial and metric systems of measurement, work-piece reference points and system of tolerance. • how to prepare the pipes in readiness for the marking out activities. <p>Kinds of Pipes: Carbon and alloys, steel and alloys, copper and alloys, plastic, iron</p> <p>Types of Pipe depending on pressure and temperature: Class I - operating above 16 bar pressure or above 150°C, and steam pipes operating above 16 bar or where the temperature exceeds 300°C. Class II Class III below 7 bar pressure and 60°C</p> <p>Parts and accessories: — flanges with gaskets and bolts and other pipe connections, expansion elements, valves, including hydraulic and pneumatic actuators, and fittings — hangers and supports — flexible hoses , pump housings, system fittings and components: ball, stop, gate, angle, cocks, flanges, t- pieces, elbows, plugs, caps, unions, connectors, reducers.</p> <ul style="list-style-type: none"> • preparation of pipes • standard specification of pipes, fittings and flanges. • how to fix high end stainless steel • how to fix high end aluminium pipes with pipe size 250 mm above. • how to fix high end carbon alloy pipes with pipe size 177 mm and above and with wall thickness of 4.5 mm. • how to fix pipes for Cargo, inert gases, flammable liquids, seawater, fresh water, sanitary and drains & scuppers, steam system • how to install different kinds of pipes for following pumps :- <ul style="list-style-type: none"> ✓ sea-water cooling pumps for main engine ✓ fresh-water cooling pumps for main engine ✓ main condenser circulating pumps for main condenser | <ol style="list-style-type: none"> 1. Skids and surface plate. 2. Abrasive Cutter to cut (up to 100dia pipes). 3. Bench / Pipe vice. 4. Heavy Duty Grinder 5. Portable Grinder (4” and 5”). 6. Power Hack Saw (up to 300 NB). 7. Pipe Threading Machine (up to 2”). 8. Pipe Bending Machine (up to 50dia& up to 150dia). 9. All hand tools – Hammer, Chiesel, etc., 10. Chain block for lifting purpose. 11. Jig saw. 12. Portable electric baking oven. 13. Hand pump for pressure test and gauges. <p>Micrometers Vernier caliper, rules Tri-squares</p> |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|--------|--|---|
| | | <ul style="list-style-type: none"> ✓ air pumps for main condenser ✓ feed-water pumps • functioning of various pumps like positive displacement pump, dynamic. • pressure pump, reciprocating pump, centrifugal pump, gear pump, screw pump, rotary pump, submersible pump etc. • type of welding to be used based on the kind of pipe • standard parts, valves and accessories used in piping • tools and equipment used in the cutting and preparing the pipes • types of pipe fittings and components • different types of industrial pipe systems. • terminology associated with industrial piping systems, Ships- bilge system, ballast system etc. • how to determine the overall length of the pipework required. • the characteristics of the various materials that are to be used with regard to the bending operations • tools to produce the various bends required • type of bending operation for pipes like hot bending, hot air bending, cold die bending etc. • material used to seal screwed joints (such as tapes and sealing compounds • types of flanges to connect pipes; use of gaskets; and torque loading of flange bolts • various types of soldered connectors available • methods used to prepare pipe ends and fittings. • material used to cement the joints. • various types of adhesives and sealing compounds for non-metallic pipework • types of compression fittings • types of push-fit connectors, and their advantages and disadvantages. • supporting methods that are used when assembling pipework. • mechanical fastenings and joining material. • material used for cutting and their uses | <p>15. Combination squares,</p> <p>16. Protractors</p> <p>17. Feeler gauges,</p> <p>18. Bore/hole gauges</p> <p>19. radius/profile gauges</p> <p>20. Thread gauges</p> <p>21. Safety Items.</p> |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|--|--|
| | | <ul style="list-style-type: none"> tools to test pipework systems for leaks (using air, water or hydraulic testing methods). application of cutting fluids. types of tools and equipment to check the work piece. types of measuring equipment how to measure internal and external dimensions. the importance of leaving the work area and equipment in a safe and clean condition on completion of fitting activities, material used in different types of pipe welding methods material and tools used for fuel brazing/soldering and cutting method. the hazards associated with the pipe fitting activities and how the hazards can be minimized. | |
| 2 | <p>Perform fabrication, fitting and assembly to produce piping systems</p> <p>Theory Duration (hh:mm) 29:00</p> <p>Practical Duration (hh:mm) 60:00</p> <p>Corresponding NOS Code SMC/ N 3102</p> | <p>The user/individual on the job needs to know and should be able to perform / understand the following :</p> <ul style="list-style-type: none"> how to extract and use information from engineering drawings and related specifications in relation to work undertaken with the help of supervisor/engineer when needed. the specific safety practices and procedures to be observed when working with marine ancillary plant and equipment. material handling techniques and preparation methods the hazards associated with the pipe fitting how to interpret isometric drawings, workpiece reference points and system of tolerancing the basic operating principles of the marine ancillary plant. <p>Types of pipework components viz pipe lengths, prefabricated pipework assemblies, gaskets, bolt, nut and washer assemblies.</p> <ul style="list-style-type: none"> how to fix high end stainless steel with outside diameter of 450 mm and above wall thickness of 3.5 mm how to fix high end aluminium pipes with pipe size 250 mm and above and with wall thickness of 4.2 mm | <ol style="list-style-type: none"> Rectifier, DC Welding Machines. Co2 Welding (MIG) Machine. TIG Welding Machine. Cuttogen for manual cutting. Pipe Bending Machine, Hydraulic manually operated up to 3". Pipe coaster for profile cutting (gear system). CNC, Plasma cutting (all available pipes) up to 4000 mm dia. Drilling Machine, upright and radial. |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|--------|---|--|
| | | <ul style="list-style-type: none">• how to fix high end carbon alloy pipes with pipe size 177 mm and above and with wall thickness of 4.5 mm• how to fix pipes for Cargo, inert gases, flammable liquids, seawater, fresh water, sanitary and drains & scuppers, steam system at temperatures exceeding 450°C• how to install different kinds of pumps.• how to fix pipes for dry compartment• how to prepare the pipes in readiness for the marking out activities.• the various mechanical fasteners that will be used and their method of installation (such as keys, keyways, threaded fasteners, special securing devices).• selection and establishment of a suitable datum• importance of ensuring that marking out is undertaken from the selected datum• possible effects of working from an incorrect datum.• tools and techniques for making out and mark-out conventions when marking out the workpiece• how to determine the overall length taking into account allowances for pipe fittings and (where appropriate) screwed connections• tools and equipment used in the geometrical construction methods• various materials that that are to be used while doing bending operation• method used to hand bend and form the pipes. Need and use of heat / hot air to aid bending process.• use of correct procedure and tools while doing bending operation and precaution to avoid breaking of pipes.• the reasons for incorporating expansion loops in a system, and where they should be positioned• range of pipe fittings that can be used, and how to identify them• how to produce pipe threads on the pipe ends, and the tools and equipment be used for stocks and dies, pipe threading machines• methods used to seal screwed joints as sealing compounds• use of gaskets; and torque loading of flange bolts | <ol style="list-style-type: none">9. Lathe small.10. Arc Welding Transformer.11. Brazing Torch for brazing and gas welding.12. Die set, Taps for threading duties.13. Gantry cranes. |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|--------|--|--------------------|
| | | <ul style="list-style-type: none"> • methods used to prepare pipe ends for soldering or brazing. • the techniques used to align and secure the components to the vessel without damage by using various support technique. • solder the joints and how to recognise when the fitting is correctly soldered • precautions to be taken when using gas torches to form the joint, and the effect of overheating the joint. • methods used to prepare pipe and how to recognise when the fitting is correctly secured • precautions to be taken when using the adhesives, cements and sealing compounds (such as adequate ventilation, fume extraction, away from naked flames, avoiding skin contact). • the effects of over tightening the fittings, use of push-fit connectors, and their advantages and disadvantages • how to identify the correct orientation of fittings consequences of incorrect orientation • supporting methods and the type of fittings that are used • Mechanical fastenings and joining techniques: non-permanent - nuts, bolts, studs, permanent - welded, soldered, brazed, riveted • technique and procedures to be used for testing pipework system for static and dynamic testing. • application of cutting fluids and why some materials do not require cutting fluids to be used. • pipe cutting and pipe end weld process which includes: alignment (bore and ovality), bore cleaning prior to welding, counter boring, edge preparations for welding operations, external diameter turning, surface finishing for welding operations, taper turning of inside and outside diameters, weld excavation. • Range of Materials: Ferrous metals: e.g. carbon steels, stainless steels, cast iron, tool steel, hard metals; Non-ferrous metals: e.g. bronze, aluminium, copper and copper alloys. • how to modify, repair and install piping and support structures. | |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|--|--|--------------------|
| | | <ul style="list-style-type: none"> • how install parts and assemblies with reference to base lines, centerlines, frame lines and other reference points.. • how to check the measuring equipment that is used for measuring the equipment internally and externally both. • need to check that the measuring equipment is within current calibration dates, and that the instruments are correctly zeroed. • basic principles of blueprint reading and procedures used in pipefitting – areas include. • principles of shipboard piping systems and their operation which includes propulsion, seawater, hydraulics, plumbing drains, potable water. • testing and analysis methods for system testing and environmental controls relating to testing • working knowledge for performance and condition specifications in relation to obtaining method statements, procedures • techniques used to establish compliance with the testing specification formats for recording test procedures and results | |
| 3 | <p>Work effectively with others</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code SMC/ N 9101</p> | <p>The user/individual on the job needs to know, understand and perform / understand the following action:</p> <ul style="list-style-type: none"> • importance of effective communication in the workplace. • various people that one is required to communicate and co-ordinate within the organization. • various components of effective communication. • barriers to effective communication. • importance of tone and pitch in effective communication. • key elements of active listening. • importance of teamwork in organizational and individual success. • value and importance of active listening and assertive communication. • importance of avoiding casual expletives and unpleasant terms while communicating in professional circles • how poor communication practices can disturb people and environment | |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|--------------------|
| | | <p>importance of ethics for professional success</p> <ul style="list-style-type: none"> • importance of discipline for professional success • what constitutes disciplined behavior for a working professional • common reasons for interpersonal conflict • importance of developing effective working relationships • expressing and addressing grievances appropriately and effectively. • importance and ways of managing interpersonal conflict effectively. • importance of communicating clearly and effectively with people face-to-face, by telephone and in writing • importance of effective working relationships and how these can contribute towards effective working relationships on a day-to-day basis • types of working relationships that help people to work well together and the types of relationships that need to be avoided • how to deal with difficult working relationships with people to sort out problems | |
| 4 | <p>Maintain a healthy, safe and secure working environment</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 05:00</p> <p>Corresponding NOS Code SMC/ N 9102</p> | <p>The user/individual on the job needs to know and should be able to perform/understand the following:</p> <ul style="list-style-type: none"> • general rules on hygiene that one must follow. • why correct clothing, footwear and headgear should be worn at all times. • what one should do in case of cuts, grazes and wounds and why it is important. • meaning of “hazards” and “risks”. • health and safety hazards commonly present in the work environment and related precautions • possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible • methods of accident prevention • hazards one can deal with oneself and hazards that must be reported to someone else • how to warn other people about hazards and why this is important. • types of emergencies that may happen at the workplace and how to deal with these. | |

| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|--------|--|--------------------|
| | | <ul style="list-style-type: none"> • where to find first aid equipment and who the registered first-aider is in the workplace • safe lifting and handling techniques to be followed • other ways of working safely that are relevant to the job and why these are important • precautionary activities to minimize the risk of fire and prevent fire accidents • various causes of fire at the workplace • techniques of using the different fire extin • rescue techniques applied during a fire hazard • organization's emergency procedures, in particular for fire, and how one should follow these • where to find fire alarms and how to set them off • why one should never approach a fire unless it is safe to do so • why it is important to follow fire safety laws • organization's security procedures and why these are important • where to find all the general health and safety equipment in the workplace. • various dangers associated with the use of electrical equipment • preventive and remedial actions to be taken in the case of exposure to toxic materials • importance of using protective clothing/equipment while working. • potential injuries and ill health associated with incorrect manual handling. • personal safety, health and dignity issues relating to the movement of a person by others • potential impact to a person who is moved incorrectly • various types of safety signs and what they mean • appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, eye injuries. • the correct procedures for dealing with customers in case of emergencies. • why it is important to report all usual/non-routine incidents to the | |



| Sr. No. | Module | Key Learning Outcomes | Equipment Required |
|---------|---|---|--------------------|
| | | appropriate person safe working practices while working at various hazardous sites. | |
| | Total Duration 210 Hours Theory Duration 95:00 Practical Duration 115:00 | Unique Equipment Required: NIL | |

Grand Total Course Duration: **210 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by Strategic Manufacturing Sector Skill Council)



Trainer Prerequisites for Job role: “Pipe Fitter – Shipbuilding” mapped to Qualification Pack: “SMC/Q3101, V1.0”

| Sr. No. | Area | Details |
|---------|---|---|
| 1 | Description | It involves marking out the pipes as per specifications, and then use hand tools, portable power tools, manually operated machine tools and shaping, fabricating, fitting and assembly techniques appropriate to the operations being performed. The candidate will be expected to check the quality of the workpiece, using measuring equipment. |
| 2 | Personal Attributes | Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness |
| 3 | Minimum Educational Qualifications | 10th Standard |
| 4a | Domain Certification | Certified for Job Role: “ <u>Pipe Fitter Shipbuilding</u> ” mapped to QP: <u>SMC/Q_3101</u> ”. Minimum accepted score is 60%. |
| 4b | Platform Certification | Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q0102 ”. Minimum accepted score is 80%. |
| 5 | Experience | Minimum 3 years experience is required. |



Annexure: Assessment Criteria

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|-----------------------------|-----------------------------------|
| Assessment Criteria | |
| Job Role | Pipe Fitter – Shipbuilding |
| Qualification Pack | SMC/Q3101, v1.0 |
| Sector Skill Council | Strategic Manufacturing |

| Sr. No. | Guidelines for Assessment |
|----------------|---|
| 1 | Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for each PC. |
| 2 | The assessment for the theory part will be based on knowledge bank of questions created by the SSC. |
| 3 | Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below) |
| 4 | Individual assessment agencies will create unique evaluations for skill practical for every student at each Examination/training center based on this criteria. |
| 5 | To pass the Qualification Pack, every trainee should score a minimum of 70% in every QP. The pass percentage will be applicable on a QP in aggregate and not at NOS Level. |
| 6 | Each Student at Level – 4 has to pass in skill, Knowledge and Behaviour as the percentage given below in totality. |



| Assessable Outcome | Assessment Criteria | Total Mark (600) | Out Of | Marks Allocation | |
|---|--|------------------|------------|------------------|------------------|
| | | | | Theory | Skills Practical |
| 1. SMC/N 3101: Prepare for fabrication, fitting and assembly to produce piping systems | PC1. Obtain information about the piping system requirement. | 100 | 5 | 2 | 3 |
| | PC2. Ensure that data and information received is complete and correct | | 4 | 2 | 2 |
| | PC3. Determine the requirement of material to be used from job specification | | 6 | 2 | 4 |
| | PC4. Establish the procedures to complete the pipe fitting or assembling operations | | 5 | 4 | 1 |
| | PC5. Assess the appropriate equipment, various types of pipes required, parts and accessories for the pipe fitting or assembling operation | | 5 | 2 | 3 |
| | PC6. Identify PPE to be used. | | 5 | 2 | 3 |
| | PC7. Check that all tools and machines are fit for purpose and measuring equipments are within calibration date | | 6 | 2 | 4 |
| | PC8. Prepare the work area | | 10 | 3 | 7 |
| | PC9. Obtain the PPE required | | 4 | 1 | 3 |
| | PC10. Obtain the appropriate tools, equipment and materials and consumables | | 5 | 2 | 3 |
| | PC11. Adhere to protocols and guidelines for personal protective equipment (PPE) and other relevant safety regulations | | 5 | 2 | 3 |
| | PC12. Ensure work area is clean and safe from hazards | | 5 | 2 | 3 |
| | PC13. Work safely in trenches, confined spaces and excavated areas | | 5 | 2 | 3 |
| | PC14. Observe safety measures while working on high pressure line/system with steam, compressed air, hydraulic etc. | | 5 | 2 | 3 |
| | PC15. Follow warning and safety signs (danger, out of service, etc.) While working with energized system viz. Electrical systems, steam & gases, chemicals and/or compressed air system etc. | | 5 | 2 | 3 |
| | PC16. Ensure that all tools, equipment and machines are secured at all times | | 5 | 2 | 3 |
| | PC17. Complete preparation for piping work following workplace procedures | | 5 | 2 | 3 |
| | PC18. Complete checklists and records for preparation for laying down piping systems | | 5 | 2 | 3 |
| | PC19. Comply with relevant legislation, standards, policies and procedures | | 5 | 2 | 3 |
| Total | | | 100 | 40 | 60 |
| 2. SMC/ N 3102 Perform fabrication, fitting and assembly to produce piping systems | PC1. Determine suitable medium from which to mark out on the material | 100 | 2 | 1 | 1 |
| | PC2. Use an appropriate method of marking out | | 2 | 1 | 1 |
| | PC3. Apply a marking medium to mark out the area to work | | 2 | 1 | 1 |
| | PC4. Mark out a range of features viz. Lines, square and rectangular profiles, angles; holes , | | 4 | 1 | 3 |



| | | | |
|--|---|---|---|
| bore & hole gauges, radius & profile gauges, thread gauges | | | |
| PC5. Plan the pipe fitting activities as per specification | 4 | 2 | 2 |
| PC6. Cut the pipes to the appropriate lengths making allowances for bending using appropriate cutting operations and techniques | 5 | 0 | 5 |
| PC7. Bend the pipe to produce pipework using the appropriate tools and equipment for the types and sizes of pipe | 5 | 0 | 5 |
| PC8. Assemble and secure the pipe-work as per job specifications using appropriate pipe assembly methods and techniques | 5 | 0 | 5 |
| PC9. Produce pipe-work assemblies which combine a range of different fittings | 5 | 0 | 5 |
| PC10. Arrange pipework assemblies without damage to components and/or Subassemblies | 5 | 0 | 5 |
| PC11. Deal promptly and effectively with problems within their control, and seek help and take guidance from the relevant people if they have problems that they cannot resolve | 3 | 1 | 2 |
| PC12. Keep the work area in a safe and tidy condition during and on completion of the manufacturing activities | 2 | 0 | 2 |
| PC13. Return all tools and equipment to the correct location on completion of the fitting activities | 2 | 0 | 2 |
| PC14. Perform the necessary checks for correct pipe-work assembly and dimensional accuracy | 2 | 0 | 2 |
| PC15. Use the appropriate measuring equipment for checking activities | 2 | 0 | 2 |
| PC16. Produce components within all of the applying standards | 4 | 1 | 3 |
| PC17. Follow the appropriate procedures for use of tools and equipment to carry out the required tests | 5 | 2 | 3 |
| PC18. Set up and carry out the tests using the correct procedures and within agreed timescales | 5 | 2 | 3 |
| PC19. Use the correct issue of the vessel or craft installation drawings and planning documentation | 2 | 1 | 1 |
| PC20. Use copies of relevant COSHH sheets, risk assessment and marine standards | 2 | 1 | 1 |
| PC21. Adhere to protocols and guidelines for personal protective equipment (PPE) and other relevant safety regulations | 2 | 1 | 1 |
| PC22. Ensure work area is clean and safe from hazards | 2 | 1 | 1 |
| PC23. Work safely in trenches, confined spaces and excavated areas | 2 | 1 | 1 |
| PC24. Observe safety measures while working on high pressure line/system with steam, compressed air, hydraulic etc. | 2 | 1 | 1 |
| PC25. Follow warning and safety signs (danger, out of service, etc.) While working with energized system viz. Electrical systems, steam & gases, chemicals and/or compressed air system etc. | 3 | 1 | 2 |



| | | | | | |
|---|---|------------|------------|-----------|-----------|
| | PC26. Ensure that all tools, equipment and machines are secured at all times | | 2 | 1 | 1 |
| | PC27. Record the results of the tests in the appropriate format | | 2 | 1 | 1 |
| | PC28. Review the results and carry out further tests if necessary | | 2 | 1 | 1 |
| | PC29. Fill up inspection reports as per process | | 2 | 1 | 1 |
| | PC30. Complete the relevant paperwork, to include one or multiple records from the following and pass it to the appropriate people: | | 2 | 1 | 1 |
| | PC31. Complete preparation for piping work following workplace procedures | | 2 | 1 | 1 |
| | PC32. Complete checklists and records for preparation for laying down piping systems | | 2 | 1 | 1 |
| | PC33. Comply with relevant legislation, standards, policies and procedures | | 4 | 1 | 3 |
| | Total | | 100 | 30 | 70 |
| 3.SMC/ N 9101 Work effectively with others | PC1. Communicate with other people clearly and effectively | 100 | 7 | 2 | 5 |
| | PC2. Receive information and instructions accurately from the supervisor and fellow workers, getting clarification where required | | 6 | 2 | 4 |
| | PC3. Pass on accurate information to authorized persons who require it and within agreed timescale and confirm its receipt | | 6 | 2 | 4 |
| | PC4. Pass on essential information to other people on timely basis | | 6 | 2 | 4 |
| | PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks | | 7 | 2 | 5 |
| | PC6. Work in a way that shows respect for other people | | 6 | 2 | 4 |
| | PC7. Carry out any commitments made to other people | | 6 | 2 | 4 |
| | PC8. Integrate one's work with other people's work effectively | | 7 | 2 | 5 |
| | PC9. Display helpful behavior by assisting others in performing tasks in a positive manner | | 6 | 2 | 4 |
| | PC10. Identify any problems with team members and other people and take the initiative to solve these problems | | 7 | 2 | 5 |
| | PC11. Follow the organisation's policies and procedure | | 7 | 2 | 5 |
| | PC12. Display active listening skills while interacting with others at work | | 6 | 2 | 4 |
| | PC13. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism | | 8 | 2 | 6 |
| | PC14. Demonstrate responsible and disciplined behaviors at the workplace | | 8 | 2 | 6 |
| | PC15. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict | | 7 | 2 | 5 |
| | Total | | 100 | 30 | 70 |
| 4. SMC/ N 9102: | PC1. Maintain personal health and hygiene | 100 | 4 | 2 | 2 |
| | PC2. Wear clean and appropriate clothing, footwear and headgear | | 4 | 2 | 2 |



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|---|--|---|---|---|
| Maintain a safe, hygienic and secure working environment | PC3. Follow health and hygiene procedures in all the work at all times | 4 | 2 | 2 |
| | PC4. Keep a look out for hazards in the workplace | 4 | 1 | 3 |
| | PC5. Identify any hazards or potential hazards and deal with these correctly | 4 | 1 | 3 |
| | PC6. Report any accidents or near accidents quickly and accurately to the proper person | 4 | 1 | 3 |
| | PC7. Follow safety procedures at the workplace | 4 | 1 | 3 |
| | PC8. Practice emergency procedures correctly | 4 | 1 | 3 |
| | PC9. Follow the organization's security procedure | 4 | 1 | 3 |
| | PC10. Use protective clothing/equipment for specific tasks & work conditions | 4 | 1 | 3 |
| | PC11. Identify job-site hazardous work and state possible causes of risk or accident in the workplace | 4 | 1 | 3 |
| | PC12. Carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role | 4 | 1 | 3 |
| | PC13. Inspect for faults, set up and safely use steps and ladders in general use | 4 | 1 | 3 |
| | PC14. Lift heavy objects safely using correct procedures | 4 | 1 | 3 |
| | PC15. Identify common hazard signs displayed in various areas | 3 | 1 | 2 |
| | PC16. Retrieve and/or point out documents that refer to safety at workplace | 3 | 1 | 2 |
| | PC17. Use appropriate fire extinguishers on different types of fires correctly | 3 | 1 | 2 |
| | PC18. Demonstrate rescue techniques applied during fire hazard | 3 | 1 | 2 |
| | PC19. Demonstrate good housekeeping in order to prevent fire hazards | 3 | 1 | 2 |
| | PC20. Demonstrate the correct use of a fire extinguisher | 3 | 1 | 2 |
| | PC21. Demonstrate how to free a person from electrocution, as per laid down procedure | 4 | 1 | 3 |
| | PC22. Administer appropriate first aid to victims where required eg. In case of bleeding, burns, choking, electric shock, poisoning etc. | 4 | 1 | 3 |
| | PC24. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments | 3 | 1 | 2 |
| | PC25. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments | 3 | 1 | 2 |
| | PC26. Administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases | 3 | 1 | 2 |
| | PC27. Participate in emergency procedures and move injured people and others during an emergency | 3 | 1 | 2 |



| | | | | | |
|--|--|------------|------------|-------------|-------------|
| | PC28. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible | | 3 | 1 | 2 |
| | Total | | 100 | 30 | 70 |
| | | | 100 | 30 | 70 |
| | Grand Total | 400 | 400 | 400 | 400 |
| | <u>Percentage Weightage:</u> | | | 100% | 100% |
| | <u>Minimum Pass% to qualify (aggregate):</u> | | | 60% | |