



Model Curriculum

Fitter & Maintenance Water Cooling System

SECTOR: IRON & STEEL
SUB-SECTOR: MECHANICAL MAINTENANCE

OCCUPATION: FITTER
REF ID: ISC/Q0820
NSQF LEVEL: 3



  

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the
INDIAN IRON AND STEEL SECTOR SKILL COUNCIL
for the
MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Fitter & Maintenance Water Cooling System' QP No. 'ISC/Q0820 NSQF Level 3'

Date of issuance: **December 22nd, 2015**
Valid up to: **December 21st, 2016**

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


Authorised Signatory
(Indian Iron and Steel Sector Skill Council)



TABLE OF CONTENTS

1. Curriculum	04
2. Trainer Prerequisites	07
3. Annexure: Assessment Criteria	08

Fitter & Maintenance Water Cooling System

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Fitter & Maintenance Water Cooling System”, in the “Iron & Steel” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Fitter & Maintenance Water Cooling System		
Qualification Pack Name & Reference ID.	Fitter & Maintenance Water Cooling System ISC/Q0820		
Version No.	1.0	Version Update Date	25-03-2016
Pre-requisites to Training	Minimum qualification – 10th Pass		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Understand the assigned job of fitter water cooling system • Prepare for operation for water cooling system • Carry out the assigned sequence of operation for water cooling system • Use basic health and safety practices at the work place • Works effectively with others 		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Fitter & Maintenance Water Cooling System” Qualification Pack issued by “Indian Iron & Steel Sector Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Over view of Iron & Steel Industry Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm) 00:00 Corresponding NOS Code	<ul style="list-style-type: none"> • Understanding Iron & steel industry • Understanding types of Iron & Steel Industry • Understanding products of Iron & Steel industry • Activities in Iron & Steel Industry 	PPTs of Iron and steel manufacturing, Charts showing the same
2	Occupational, Health and Safety (OHAS) Theory Duration (hh:mm) 08:00	<ul style="list-style-type: none"> • Understanding the Occupational health & Safety • Understand What is hazard • Documentation for Health and safety • Working at Heights, confined spaces • Remedies for fire at work place 	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 12:00 Corresponding NOS Code ISC/N0008		Material
3	5S & House keeping Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code ISC/N0008	<ul style="list-style-type: none"> • Identification of bottlenecks in functioning of work place • Various methods of housekeeping both pre-work & post-work as well 	PPTs of 5S, Display Charts of 5S, Audit Checklists of 5S
4	Understand the assigned job of fitter water cooling system Theory Duration (hh:mm) 30:00 Practical Duration (hh:mm) 80:00 Corresponding NOS Code ISC/N0814	<ul style="list-style-type: none"> • Understand the assigned job of fitter water cooling system in accordance with the instructions / checklist • Understand the pipe line circuit drawings • Seek clarifications with respect to the equipment, pipe line circuit drawings • Identify the tools and tackles that are required to carry out the assigned job 	PPTs for various types of drawings, Blue prints, Hand tools, various measuring instruments
5	Prepare for operation for water cooling system Duration (hh:mm) 35:00 Practical Duration (hh:mm) 90:00 Corresponding NOS Code ISC/N0815	<ul style="list-style-type: none"> • Reach the site and inspect the pipe line circuit drawing for scheduled maintenance or defects and identify cause of problem • Prepare tools, tackles, hard wares, pipes, pipe line fittings and equipments required for assigned pipe line job 	Precision measuring tools, steam jointing, red lead powder, teflon tapes/grease, pipe wrench, pipe vice
6	Carry out assigned sequence of operation for water cooling system Theory Duration	<ul style="list-style-type: none"> • Conduct routine maintenance or rectify the problem, as appropriate for cooling water pipe line circuit • Conduct tests to ensure fitness of cooling water pipe line circuit 	PPTs for various types of drawings, Blue prints and respective machines Hand tools and

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 35:00 Practical Duration (hh:mm) 110:00 Corresponding NOS Code ISC/N0816	<ul style="list-style-type: none"> Communicate to supervisor about completion of work or deviations if any 	machines, pipes, pipes fittings
7	Use basic health and safety practices at the workplace Duration (hh:mm) 05:00 Practical Duration (hh:mm) 10:00 Corresponding NOS Code ISC/N0008	<ul style="list-style-type: none"> Health and safety procedures Fire safety procedures Emergencies, rescue and first aid procedures 	PPE, Different Type of Safety Sign, First Aid Box, Safety instrument and clothing, Step Ladder, Sample Accident reports, Fire Extinguishers, Items required for fire extinguisher and fire Safety
8	Work effectively with others Duration (hh:mm) 08:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code ISC/N0009	<ul style="list-style-type: none"> Ensure appropriate communication with superiors, peers and others as applicable at work place Demonstrate appropriate behaviour and etiquette at work place 	Communication skills PPTs, Posters Team management posters
	Total Duration 460:00 Theory Duration 134:00 Practical Duration 326:00	Unique Equipment Required: <ul style="list-style-type: none"> Mechanical Drawings, Blueprints, Basic Tools and Equipment's, measuring tools& precision measurement tools, pipe wrench, pipe vice Assembling tools , pipes and pipe fittings Material and Equipment for cleaning, pulling, lifting machines PPE, Safety Sign, First Aid Box, Fire Extinguishers 	

Grand Total Course Duration: **460 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Indian Iron and Steel Sector Skills Council](#))



Trainer Prerequisites for Job role: “Fitter & Maintenance Water Cooling System” mapped to Qualification Pack: “ISC/Q0820”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q0820”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Min. ITI Fitter pass and preferably CTI/ATI cleared/ Diploma Mechanical
4a	Domain Certification	Certified for Job Role: “Fitter & Maintenance Water Cooling System” mapped to QP: “ISC/Q0820”. Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402”. Minimum accepted score is 80%
5	Experience	Min. 5 years industry experience and minimum 2 years’ experience as Trained or un trained for same Job Role/ Trade



Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Fitter & Maintenance Water Cooling System
Qualification Pack	ISC/Q0820
Sector Skill Council	Indian Iron & Steel Sector Skill Council

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 Theory and Skills Practical 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 centre (as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.
5	To pass the Qualification Pack , every trainee should score a minimum of 60% in every NOS.
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
ISC/N0814: Understand the assigned job of fitter water cooling system	PC1. Interpret the checklist and understand the job requirements	350	20	5	15
	PC2. Plan, as appropriate to carry out the job		20	5	15
	PC3. Identify the source of leakage in water cooling system		20	5	15
	PC4. Identify part of the pipe line chocking due to scale formation or other reasons		20	5	15
	PC5. Identify the pipe line damage due to corrosion		20	5	15
	PC6. Understand the pipe line circuit drawings		20	5	15



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC7. Understand the symbols used in the pipe line circuit drawings		20	5	15
	PC8. Understand other specifications and identify the sequence of activities required to assemble the pipe line circuit		20	5	15
	PC9. Read and interpret pipe line circuit drawings to ensure correct layouts and quality of the material (pipes including fittings)		20	5	15
	PC10. Identify any clarifications that he/she wants to seek with respect to the given pipe line circuit drawing		20	5	15
	PC11. Recognize whom to contact for clarifications on the pipe line circuit drawing		20	5	15
	PC12. Escalate the concern to the supervisor or shift-in-charge, if needed		20	5	15
	PC13. Identify tools, tackles & equipment required to perform the pipe line job		20	5	15
	PC14. Ask helper to carry tools and tackles required to the desired work site		20	5	15
	PC15. Report to stores / supervisor in case of non-availability of tools, tackles, pipes and pipe line fittings etc. or stock-out		20	5	15
	NOS Total Marks	Total	300	75	225



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
ISC/N0815: Prepare for operation for water cooling system	PC1. Reach the site with desired tools, tackles, hard wares, pipes, pipe line fittings and equipments	200	20	5	15
	PC2. Identify the root cause of the problem, if any		20	5	15
	PC3. Identify the source of leakage in water cooling system		20	5	15
	PC4. Identify part of the pipe line chocking due to scale formation		20	5	15
	PC5. Identify the pipe line damage due to corrosion		20	5	15
	PC6. Identify the temperate rise of the discharged water		20	5	15
	PC7. Prepare the list of tools, tackles, hard wares, pipes, pipe line fittings and equipments required for completion of the assigned pipe line job and ensure availability at the work site		20	5	15
	PC8. Ensure that tools, tackles, hard wares, pipes, pipe line fittings match the desired specifications of the given job		20	5	15
	PC9. Ensure tools, tackles, hard wares, pipes, pipe line fittings and equipment required for assembly are free from physical damage and ready for operation		20	5	15
	PC10. Report damaged / defective pipes, pipe fittings and equipment as per the escalation matrix.		20	5	15
NOS Total Marks		Total	200	50	150



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
ISC/N0816: Carry out the assigned sequence of operation for water cooling system	PC1. Dismantle the damaged / choked pipe line circuit, as needed	250	15	5	10
	PC2. Correct the defect in the pipe line circuit part or replace the defective part		20	5	15
	PC3. Assemble the pipe line parts/fittings according to the pipe line circuit drawings, as required		20	5	15
	PC4. Replace damaged / choked / corroded pipes, pipe fittings and clamps etc.		20	5	15
	PC5. Adjust the water line valves for proper water flow in the pipe line circuit		20	5	15
	PC6. Check the discharge water temperature to ensure proper cooling		15	5	10
	PC7. Check proper water flow with adequate pressure in the pipe line circuit for proper cooling		20	5	15
	PC8. Check the opening of valves to ensure flow, pressure, temperature etc.		20	5	15
	PC9. Check the clamping of the pipe line circuit to ensure rigidity and safety		20	5	15
	PC10. Test the pipe line circuit to ensure it is leak proof and fit to use before handover		20	5	15
	PC11. Record the test results in the prescribed format of the organization		20	5	15



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC12. Ensure all activities are complete according to checklist		20	5	15
	PC13. Communicate to supervisor on completion of given job and in case of any deviations from checklist		20	5	15
	NOS Total Marks	Total	250	65	185
ISC/N0008: Use basic health and safety practices at the workplace	PC1. Use protective clothing/equipment for specific tasks and work conditions	150	10	5	5
	PC2. State the name and location of people responsible for health and safety in the workplace		4	0	4
	PC3. State the names and location of documents that refer to health and safety in the workplace		1	0	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace		10	5	5
	PC5. 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		10	5	5
	PC6. State location of general health and safety equipment in the workplace		5	0	5
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		5	0	5
	PC8. Work safely in and around trenches, elevated places and confined areas		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC9. Lift heavy objects safely using correct procedures		4	0	4
	PC10. Apply good housekeeping practices at all times		1	0	1
	PC11. Identify common hazard signs displayed in various areas		5	5	0
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		5	0	5
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		10	5	5
	PC14. Demonstrate rescue techniques applied during fire hazard		10	5	5
	PC15. Demonstrate good housekeeping in order to prevent fire hazards		1	0	1
	PC16. Demonstrate the correct use of a fire extinguisher		4	0	4
	PC17. Demonstrate how to free a person from electrocution		5	0	5
	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		10	5	5
	PC19. Demonstrate basic techniques of bandaging		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		10	5	5
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		5	0	5
	PC22. 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		5	0	5
	PC23. Demonstrate the artificial respiration and the CPR Process		5	0	5
	PC24. Participate in emergency procedures		4	0	4
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible		10	5	5
	PC26. Demonstrate correct method to move injured people and others during an emergency		1	0	1
	NOS Total Marks	Total	150	45	105
ISC/N0009: Work effectively with others	PC1. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	5	5
	PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand		10	0	10
	PC4. Display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	5	5
	PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	5	5
	PC6. Display appropriate communication etiquette while working		10	0	10
	PC7. Display active listening skills while interacting with others at work		10	0	10
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	5	5
	PC9. Demonstrate responsible and disciplined behaviors at the workplace		15	5	10
	PC10. Escalate grievances and problems to supervisor		5	0	5
	NOS Total Marks	Total	100	30	70
	Grand Total	1000	1000	265	735
	Percentage Weightage:			50%	50%
	Minimum Pass% to qualify (aggregate):			60%	