



Model Curriculum

Technician Furnace Transformer: Ferro Alloys

SECTOR: IRON & STEEL
SUB-SECTOR: Ferro Alloys
OCCUPATION: Electrical Maintenance
REF ID: ISC/Q5601
NSQF LEVEL: 4



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: **Technician Furnace** QP No. **ISC/Q5601 NSQF Level 4**
Transformer:
Ferro Alloys

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)



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TECHNICIAN FURNACE TRANSFORMER: FERRO ALLOYS

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Technician Furnace Transformer: Ferro Alloys”, in the “Iron & Steel” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Technician Furnace Transformer: Ferro Alloys		
Qualification Pack Name & Reference ID.	Technician Furnace Transformer: Ferro Alloys ISC/Q5601		
Version No.	1.0	Version Update Date	30-12-2014
Pre-requisites to Training	Minimum qualification – ITI (Electrical / Electronics) pass		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Understand the job requirement of technician furnace transformer • Prepares for furnace transformer operation • Carries out the furnace transformer operation • Activities specific to furnace transformer maintenance • Use basic health and safety practices at the workplace • Work effectively with others 		

This course encompasses 6 out of 6 National Occupational Standards (NOS) of “Technician Furnace Transformer: Ferro Alloys” 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) 04:00 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) 12:00 Practical Duration	<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 Material



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 20:00 Corresponding NOS Code ISC/N0008		
3	5S & House keeping Theory Duration (hh:mm) 12:00 Practical Duration (hh:mm) 20:00 Corresponding NOS Code ISC/N0004	<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 job requirement of technician furnace transformer Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 50:00 Corresponding NOS Code ISC/N5601	<ul style="list-style-type: none"> • Understand the assigned job in accordance with the instructions / checklist • Understand the Circuits, if required • Seek clarifications with respect to the equipment, circuit diagrams, if any • Identify the tools and tackles that are required to carry out the assigned job 	PPTs for various types of drawings, Blue prints, Subassemblies, furnace transformer, Hand tools and lifting machines, various measuring instruments
5	Prepares for furnace transformer operation Duration (hh:mm) 25:00 Practical Duration (hh:mm) 60:00 Corresponding NOS Code ISC/N5602	<ul style="list-style-type: none"> • Reach the site and inspect the equipment to identify cause of problem • Prepare equipment and material for assembly 	Subassemblies, furnace transformer, Hand tools and lifting machines, various measuring instruments
6	Carries out the furnace transformer operation Theory Duration (hh:mm)	<ul style="list-style-type: none"> • Conduct routine maintenance or rectify the problem, as appropriate • Conduct periodic and scheduled tests to ensure fitness 	Subassemblies, furnace transformer, Hand tools and lifting machines,

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	30:00 Practical Duration (hh:mm) 80:00 Corresponding NOS Code ISC/N5603	<ul style="list-style-type: none"> Communicate to supervisor about completion of work 	various measuring instruments
7	Activities specific to furnace transformer maintenance Duration (hh:mm) 17:00 Practical Duration (hh:mm) 40:00 Corresponding NOS Code ISC/N5604	<ul style="list-style-type: none"> Isolate the unit, ensuring safe working condition with shutdown Carry out maintenance activity Give clearance for reactivation of line after due maintenance 	Subassemblies, furnace transformer, Hand tools and lifting machines, various measuring instruments
8	Use basic health and safety practices at the workplace Duration (hh:mm) 08:00 Practical Duration (hh:mm) 12:00 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
9	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	Unique Equipment Required: <ul style="list-style-type: none"> Mechanical Drawings, Blueprints, 	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Theory Duration 136:00 Practical Duration 294:00	<ul style="list-style-type: none">• Basic Tools and Equipment's,• measuring tools& precision measurement tools,• Assembling tools• Material and Equipment for cleaning, lifting machines• PPE, Safety Sign, First Aid Box, Fire Extinguishers	

Grand Total Course Duration: **430Hours, 0 Minutes**

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



Trainer Prerequisites for Job role: “Technician Furnace Transformer: Ferro Alloys” mapped to Qualification Pack: “ISC/Q5601”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q5601”.
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: “Technician Furnace Transformer: Ferro Alloys” mapped to QP: “ISC/Q5601”. 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	Technician Furnace Transformer: Ferro Alloys
Qualification Pack	ISC/Q5601
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/N5601: Understand the job requirement of technician furnace transformer	PC1. Interpret the checklist and understand the job requirements	150	20	10	10
	PC2. Make a work plan to carry out the job		20	10	10
	PC3. Have working knowledge on circuit diagrams		15	10	5
	PC4. Understand the symbols used in the diagrams		15	10	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC5. Understand assembly blueprints, engineering drawings and other specifications to identify the sequence of activities required to assemble the machine		15	10	5
	PC6. Read and interpret engineering drawings to ensure correct limits, tolerance and fits of equipment components		15	5	10
	PC7. Identify the areas he/she is not comfortable with before starting the job		10	5	5
	PC8. Recognize whom to contact for clarifications on the engineering design		10	5	5
	PC9. Escalate the concern to the supervisor or shift-in-charge, if needed		10	5	5
	PC10. Identify tools, tackles & equipment required to perform the operation		10	5	5
	PC11. Asks helper to carry tools required to the desired work site		5	0	5
	PC12. Report to stores in case of non-availability of tools & tackles or stock-out		5	0	5
	NOS Total Marks	Total	150	75	75
ISC/N5602: Prepares for furnace transformer operation	PC1. Reach the site with desired tools, tackles and equipment	100	5	0	5
	PC2. By root cause analysis, identifies the part of the equipment/machine providing trouble, as required		30	20	10



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC3. By visual inspection, ensures that the parts to be assembled are not defective or rusted, in case of new assembly		10	5	5
	PC4. Ensure that tools match the desired specifications		15	5	10
	PC5. Ensure tools and equipment required for assembly are free from physical damage and ready for operation		5	0	5
	PC6. Report damaged / defective components of equipment as per the escalation matrix		10	0	10
	PC7. Ensure the calibration status of all measuring equipment and instruments		15	5	10
	PC8. Ensure spares before attending on the equipment		15	5	10
	NOS Total Marks	Total	100	35	65
ISC/N5603: Carries out the furnace transformer operation	PC1. Isolate Power source and obtain written clearance from the owner	300	35	15	20
	PC2. Identify and Correct the defect in the part or replace the defective part		30	10	20
	PC3. Assemble the parts according to the drawings, as required		20	5	15
	PC4. Fasten mechanical components/ subassemblies together using screws, bolts, and collars using hand/ power tools		15	5	10



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC5. Set and adjust leakages, tensions and clearances of assembled components to specifications using fixed gauges and hand tools		25	5	20
	PC6. Re assemble the parts post correcting the defect		20	5	15
	PC7. Ensure alignment of parts and with the engineering drawings		25	5	20
	PC8. Check vibrations to ensure fitness		15	5	10
	PC9. Test the transformer to ensure it is fit to use before handover		35	10	25
	P10. Record the test results in the prescribed format of the organization		30	10	20
	PC11. Ensure all activities are complete according to checklist		10	5	5
	PC12. Communicate to supervisor on completion of given job in case of any deviations from checklist		20	5	15
	PC13. Handover the system to the owner and obtain written completion document		20	5	15
	NOS Total Marks	Total	300	90	210
ISC/N5604: Activities specific to furnace transformer maintenance	PC1. Carry out the detailed procedure for isolating and clearing the unit and obtain written job card	200	20	5	15
	PC2. Ensure proper shutdown process and		15	5	10



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	obtain job card				
	PC3. Report to the supervisor in case of any problem that has to be escalated		15	5	10
	PC4. Understand the activity to be carried out sequentially as per the check list		25	10	15
	PC5. Attend on the equipment and carry out maintenance activity		20	5	15
	PC6. Rectify any defects if any found and record		15	5	10
	PC7. Carry out cold trials before the equipment can be used again		20	5	15
	PC8. Report to the supervisor in case of any problem that has to be escalated		15	5	10
	PC9. Charge the line after completing the maintenance and obtain written certificate		15	10	5
	PC10. Give clearance for charging the power line		15	5	10
	PC11. Carry out damage control in case of any emergencies		25	20	5
	NOS Total Marks	Total	200	80	120
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		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Marks allocation		
			Out of	Theory	Skills practical
	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		9	5	4
	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
	PC9. Lift heavy objects safely using correct procedures		5	0	5
	PC10. Apply good housekeeping practices at all times		1	0	1
	PC11. Identify common hazard signs displayed in various areas		6	5	1
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		4	0	4



Assessment outcome (nos)	Assessment criteria	Total marks	Marks allocation		
			Out of	Theory	Skills practical
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		9	5	4
	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
	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		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Marks allocation		
			Out of	Theory	Skills practical
	shock, before the arrival of emergency services in real or simulated cases				
	PC23. Demonstrate the artificial respiration and the CPR Process		5	0	5
	PC24. Participate in emergency procedures		5	0	5
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible		9	5	4
	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
	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		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	possible				
	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		5	0	5
	NOS Total Marks	Total	100	30	70
	Grand Total	1000	1000	325	575
	Percentage Weightage:			50%	50%
	Minimum Pass% to qualify (aggregate):			60%	