



Model Curriculum

Shift In Charge Furnace: Ferro Alloys

SECTOR: IRON & STEEL
SUB-SECTOR: FERRO ALLOYS

OCCUPATION: FURNACE OPERATIONS
REF ID: ISC/Q5301
NSQF LEVEL: 5



  

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: 'Shift In Charge: Furnace QP No. 'ISC/Q5301 NSQF Level 5'
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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Shift In Charge Furnace: Ferro Alloys

CURRICULUM / SYLLABUS

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

Program Name	Shift In Charge Furnace: Ferro Alloys		
Qualification Pack Name & Reference ID.	Shift In Charge Furnace: Ferro Alloys ISC/Q5301		
Version No.	1.0	Version Update Date	01-04-2017
Pre-requisites to Training	Minimum qualification – Diploma (Metallurgical / Mechanical / Electrical) Pass		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Carry out shift operation • Carry out reporting and documentation • Carry out quality checks • Carry out problem identification and escalation • Use basic health and safety practices at the work place • Works effectively with others and manage team members 		

This course encompasses 6 out of 6 National Occupational Standards (NOS) of “Shift In Charge Furnace: 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) 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) 06:00 Practical Duration (hh:mm) 06:00 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	Carry out shift operation Theory Duration (hh:mm) 235:00 Practical Duration (hh:mm) 85:00 Corresponding NOS Code ISC/N5301	<ul style="list-style-type: none"> • Knowledge on various reactions & activities taking place in the process • Operating the furnace on optimum levels • Raw material feed to the furnace & burden preparation • Quality Assurance and control • Co-ordination with shift maintenance & service departments • Handling of hot metal and transfer of Finished goods 	PPTs for various types of drawings, tools, measuring instruments, scales, PLC, gas cleaning system etc.
5	Carry out reporting and documentation Theory Duration (hh:mm) 35:00 Practical Duration (hh:mm) 85:00 Corresponding NOS Code ISC/N5302	<ul style="list-style-type: none"> • Reporting of data/problem/incidents etc. • Completing Recording and Documentation • Information Security 	tools, measuring instruments, scales, PLC, gas cleaning system etc., fire alarms
6	Carry out quality checks Theory Duration (hh:mm) 25:00 Practical Duration	<ul style="list-style-type: none"> • Carry out quality checks to identify problems • Take corrective actions • Document / Report the results 	tools, measuring instruments, scales, PLC, gas cleaning system etc.



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 60:00 Corresponding NOS Code ISC/N5303		
7	Carry out problem identification and escalation Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 48:00 Corresponding NOS Code ISC/N5304	<ul style="list-style-type: none"> Identify problems across materials, products, equipment etc. Take corrective action Escalation of unresolved identified problems 	tools, measuring instruments, scales, PLC, gas cleaning system etc.
8	Use basic health and safety practices at the workplace Duration (hh:mm) 04:00 Practical Duration (hh:mm) 08:00 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 and manage team members Duration (hh:mm) 08:00 Practical Duration (hh:mm) 089:00 Corresponding NOS Code ISC/N0096	<ul style="list-style-type: none"> Communicate effectively with team members, co-workers and supervisors <ul style="list-style-type: none"> Encourage friendly working environment Use appropriate titles and terms of respect Follow code of conduct and ethics as applicable Follow organisation specific policies Demonstrate effective behaviours for team work Ensure engagement of team members through on-the job handholding & support 	Communication skills PPTs, Posters Team management posters
	Total Duration Theory Duration	Unique Equipment Required: <ul style="list-style-type: none"> Mechanical Drawings, Blueprints, Basic Tools and Equipment's, 	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	133:00 Practical Duration 277:00	<ul style="list-style-type: none">measuring tools & precision measurement tools,Material and Equipment for cleaning, lifting machinesPPE, Safety Sign, First Aid Box, Fire Extinguishers	

Grand Total Course Duration: **410Hours, 0 Minutes**

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

Trainer Prerequisites for Job role: “Shift In Charge Furnace: Ferro Alloys” mapped to Qualification Pack: “ISC/Q5301”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q5301”.
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 pass and preferably CTI/ATI cleared/ Diploma Mechanical
4a	Domain Certification	Certified for Job Role: “Shift In Charge Furnace: Ferro Alloys” mapped to QP: “ISC/Q5301”. 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	Shift In Charge Furnace: Ferro Alloys
Qualification Pack	ISC/Q5301
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/N5301: Carry out shift operation	PC1. Understand various chemical reactions that are taking place in the furnace	400	45	15	30
	PC2. Understand the importance of gases that are evolved during operation		10	5	5
	PC3. Understand activities that are involved in Gas Cleaning system		10	5	5
	PC4. Understand the Metal & Slag chemistry		10	5	5
	PC5. Ensure periodical checks for Quality Assurance		10	5	5
	PC6. Operate at rated capacity		40	15	25
	PC7. Understand Electrode Management and balancing uniform currents		40	15	25



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC8. Ensure timely feed to the furnace		40	15	25
	PC9. Ensure timely evacuation of the hot metal		20	5	10
	PC10. Check Raw material day bins and the quality reports available on daily basis		15	5	10
	PC11. Ensure periodical calibration of scales involved (PLC / Micro processors)		15	5	10
	PC12. Prepare material balance and verify the burden preparation.		25	10	15
	PC13. Communicate with immediate supervisor for any deviation on quality		7	2	5
	PC14. Carry out corrections for moisture variations		7	2	5
	PC15. Ensure to collect raw material analysis reports for preparation of burden		7	2	5
	PC16. Interpret Metal & Slag tapping analysis		10	5	5
	PC17. Carry out intermediate corrections if required and inform to supervisor		10	5	5
	PC18. Customer requirements and segregation of non conformities		7	2	5
	PC19. Ensure equipment availability post discussion with Mechanical / Electrical shift In Charges.		10	5	5
	PC20. To spare equipment timely for preventive maintenance and avoid break-downs		7	2	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC21. Ensure evacuation of Finished goods with Logistic & product handling departments		7	2	5
	PC22. Ensure availability of reports from Quality assurance team		5	3	2
	PC23. Ensure availability of man power and check absenteeism / additional requirements with HR		7	2	5
	PC 24. Ensure Safety & Environmental precautions in coordination with respective departments		7	2	5
	PC 25. Ensure Tap to Tap product handling		7	2	5
	PC 26. Ensure safety precautions while hot metal is handled		7	2	5
	PC 27. Transfer of slag and metal to respective areas		5	2	3
	PC 28. Identify non conformities and take precautionary steps		10	5	5
	NOS Total Marks	Total	400	150	250
ISC/N5302 Carry out reporting and documentation	PC1. Report data/problems/incidents as applicable in a timely manner	100	15	5	10
	PC2. Report to the appropriate authority as laid down by the company		15	5	10
	PC3. Follow reporting procedures as prescribed by the company		20	5	15



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC4. Identify documentation to be completed relating to one's role		5	2	3
	PC5. Record details accurately an appropriate format		5	2	3
	PC6. Complete all documentation within stipulated time according to company procedure		5	2	3
	PC7. Ensure that the final document meets with the requirements of the persons who requested it or make any amendments accordingly		15	5	10
	PC8. Make sure documents are available to all appropriate authorities to inspect		5	2	3
	PC9. Take back up and preserve them in CD wherever applicable		5	2	3
	PC10. Respond to requests for information in an appropriate manner whilst organizational procedures		5	2	3
	PC11. Inform the appropriate authority of requests for information received		5	2	3
	NOS Total Marks	Total	100	35	65
ISC/N5303: Carry out quality checks	PC1. Ensure that total range of checks are periodically regularly and consistently performed	150	25	10	15
	PC2. Use appropriate measuring instruments, equipment, tools, accessories etc. as required		25	10	15
	PC3. Identify non-conformities to quality assurance standards		1	0	1
	PC4. Identify potential causes of non-conformities to quality		14	5	9



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	assurance standards				
	PC5. Identify impact on final product due to non-conformance to company Standards		15	5	10
	PC6. Evaluating the need for action to ensure that problems do not recur		15	5	10
	PC7. Take corrective action to address problem		15	5	10
	PC8. Review effectiveness of corrective action		15	10	5
	PC9. Interpret the results of quality check		1	0	1
	PC10. Inform any non-conformity to the appropriate authority within the stipulated time		4	2	2
	PC11. Record of results of action taken		5	2	3
	PC12. Record adjustments not covered by established procedures for future reference		5	2	3
	PC13. Review effectiveness of action taken		5	2	3
	PC14. Follow reporting procedures where the cause of defect cannot be identified		5	2	3
	NOS Total Marks	Total	150	60	90
ISC/N5304: Carry out problem identification and escalation	PC1. Identify defects/indicators of problems	100	5	2	3
	PC2. Identify any wrong practices that may lead to problems		5	2	3
	PC3. Identify practices that may impact the final product quality		5	2	3



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC4. Identify if the problem has occurred before		5	2	3
	PC5. Identify other operations that might be impacted by the problem		5	2	3
	PC6. Ensure that no delays are caused as a result of failure to escalate problems		3	0	3
	PC7. Take appropriate materials and sample to conduct tests		5	2	3
	PC8. Evaluate results to confirm suspected reasons for non-conformance (where required)		5	2	3
	PC9. Consider possible reasons for identification of problems		5	2	3
	PC10. Consider applicable corrections and formulate corrective action		5	2	3
	PC11. Formulate action in a timely manner		5	2	3
	PC12. Communicate problem/remedial action to appropriate parties		3	0	3
	PC13. Take corrective action in a timely manner		3	0	3
	PC14. Report/document problem and corrective action in an appropriate manner		5	2	3
	PC15. Monitor corrective action		3	0	3
	PC16. Evaluate implementation of corrective action taken to determine if the problem has been resolved		5	2	3
	PC17. Ensure that corrective action selected is viable and		3	0	3



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	practical				
	PC18. Ensure that correct solution is identified to an identified problem		5	2	3
	PC19. Take corrective action for problems identified according to the company procedures		5	2	3
	PC20. Ensure that no delays are caused as a result of failure to take necessary action		3	0	3
	PC21. Escalate problem as per laid down escalation matrix		3	0	3
	PC22. Escalate the problem within stipulate		3	0	3
	PC23. Escalate the problem in an appropriate manner		3	0	3
	PC24. Ensure that no delays are caused as a result of failure to escalate problems		3	0	3
	NOS Total Marks	Total	100	28	72
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
	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



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	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
	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



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	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 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		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	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/N0096: Work effectively with others and manage team members	PC1. Accurately receive, absorb and share information and instructions from the supervisor and fellow workers, getting clarification where required	100	5	0	5
	PC2. Display appropriate communication etiquette while working		10	0	10
	PC3. Display active listening skills while interacting with others at work		10	0	10
	PC4. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		5	0	5
	PC5. Display helpful behaviour by assisting others in performing tasks in effective manner		10	0	10
	PC6. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	0	10
	PC7. Demonstrate responsible and disciplined behaviours at the workplace		5	0	5



Assessment outcome (nos)	Assessment criteria	Marks allocation			
		Total marks	Out of	Theory	Skills practical
	PC8. Escalate grievances and problems to superiors		5	0	5
	PC9. Communicate day-to-day objectives, instructions etc. to team members		15	5	10
	PC10. Guide the team members to manage day-to-day issues at work		5	0	5
	PC11. Gather concerns, feedback from team members and convey them to appropriate authorities		15	5	10
	PC12. Escalate grievances and problems to superiors		5	0	5
	NOS Total Marks	Total	100	10	90
	Grand Total	1000	1000	325	672
	Percentage Weightage:			50%	50%
	Minimum Pass% to qualify (aggregate):			60%	