



Model Curriculum

Fitter: Levelling, Alignment & Balancing

SECTOR: IRON & STEEL
**SUB-SECTOR: STEEL, SPONGE – IRON, FERRO ALLOYS,
RE ROLLERS, REFRACTORY**
OCCUPATION: MECHANICAL MAINTENANCE
REF ID: ISC/Q0905
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: 'Iron & Steel – Tungsten Inert Gas Welder (GTAW)' QP No. 'ISC/Q0911 NSQF Level 4'

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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Fitter: Levelling, Alignment & Balancing

CURRICULUM / SYLLABUS

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

Program Name	Fitter-Levelling Alignment & Balancing		
Qualification Pack Name & Reference ID.	Fitter-Levelling Alignment & Balancing ISC/Q0905		
Version No.	1.0	Version Update Date	30-12-2015
Pre-requisites to Training	Minimum qualification – 10 th standard / ITI Pass		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> Understand the assigned job of levelling, balancing & alignment Prepare for operation of levelling, balancing & alignment Carry out the assigned operation of levelling, balancing & alignment Use basic health and safety practices at the workplace Works effectively with others 		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Fitter-Levelling, Alignment & Balancing” 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 What is hazard Documentation for Health and safety Working at Heights, confined spaces 	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Practical Duration (hh:mm) 08:00</p> <p>Corresponding NOS Code ISC/N0008</p>	<ul style="list-style-type: none"> Solutions for fire at work place 	Material
3	<p>5S & House keeping</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 08:00</p> <p>Corresponding NOS Code ISC/N0911</p>	<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	<p>Understand the assigned job of levelling, balancing & alignment</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 24:00</p> <p>Corresponding NOS Code ISC/N0927</p>	<ul style="list-style-type: none"> Understand the assigned job of levelling, balancing and alignment in accordance with the instructions / checklist Understand the engineering drawings Seek clarifications with respect to the equipment, drawings, if any Identify the tools and tackles that are required to carry out the assigned job of levelling, balancing and alignment 	Machine drawings, work instructions, Hand tools for fitter, measuring instruments & precision measuring instruments
5	<p>Carry out the operation of levelling, balancing and alignment</p> <p>Duration (hh:mm) 60:00</p> <p>Practical Duration (hh:mm) 160:00</p> <p>Corresponding NOS Code ISC/N0928</p>	<ul style="list-style-type: none"> Prepare spares, material required for operation for fitter – levelling, balancing and alignment Conduct routine maintenance or rectify the problem, as appropriate Check levelling, alignment & balancing (static and dynamic) Monitor and record the temperature & vibration Conduct tests to ensure fitness Communicate to supervisor about completion of work 	Display charts, Motors Pumps, Compressors and Electrical Panels, general Spares for motors, pumps, generators
6	<p>Use basic health and safety practices at the</p>	<ul style="list-style-type: none"> Health and safety procedures 	PPE, Different Type of Safety



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>workplace others</p> <p>Theory Duration (hh:mm) 04:00</p> <p>Practical Duration (hh:mm) 22:00</p> <p>Corresponding NOS Code ISC/N0008</p>	<ul style="list-style-type: none"> • Fire safety procedures • Emergencies, rescue and first aid procedures 	<p>Sign, First Aid Box, Step Ladder, Sample Accident reports ,Fire Extinguishers, Items required for fire extinguisher and fire Safety</p>
	<p>Work effectively with others</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 08:00</p> <p>Corresponding NOS Code ISC/N0009</p>	<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 	<p>Communication skills PPTs, Posters Team management posters</p>
	<p>Total Duration</p> <p>Theory Duration 100:00</p> <p>Practical Duration 230:00</p>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> • Sample Mechanical & Electrical Drawing, Blueprints, • Basic hand tools such as spanner, pliers, pullers • Measuring & Precision measuring instruments such a micro-meter, Vernire callipers, • Tools and Equipment's for alignments such as level gauges, • Assembling tools Lubricant and coolant • Material and Equipment for cleaning • Sample Documents for reporting's • Sample quality Controlling formats • Personal protective Equipment's and clothes • 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 	

Grand Total Course Duration: **330Hours, 0 Minutes**

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



Trainer Prerequisites for Job role: “Fitter – Levelling, Alignment & Balancing” mapped to Qualification Pack: “ISC/Q0905”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q0905”.
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 Level, Alignment & Balancing” mapped to QP: “ISC/Q0905”. 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 relevant industry experience and minimum 3 years’ experience as Trained or un trained for same Job Role/ Trade



Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Fitter-Levelling, Alignment & Balancing
Qualification Pack	ISC/Q0905
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	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
ISC/N0926: Understand the assigned job of levelling, balancing & alignment	PC1. Interpret the checklist and understand the job requirements	150	5	0	5
	PC2. Understand the levelling / alignment / balancing of rotating equipment e.g. blower fan, motor, pump and gear box etc.		15	10	5
	PC3. Understand the use of levelling instruments (spirit level, water level, magnetic marking block, dial indicator, laser alignment equipment, strobe light etc.)		15	5	10
	PC4. Understand the standard code of practice for static and dynamic balancing		10	5	5
	PC5. Plan, as appropriate to carry out the job		10	5	5
	PC6. Understand sections, views, scale of measurement used in the drawing		10	5	5



Assessment outcome	Assessment criteria	Total marks	Marks allocation		
			Out of	Theory	Skills practical
	PC7. Understand the symbols used in the drawings		5	0	5
	PC8. Understand other specifications and identify the sequence of activities required to assemble the machine		15	5	10
	PC9. Identify any clarifications that he/she wants to seek with respect to the given drawing		10	0	10
	PC10. Identify and seek clarifications with respect to levelling, balancing and alignment of rotating equipment		5	0	5
	PC11. Recognize whom to contact for clarifications on the engineering drawing		5	0	5
	PC12. Escalate the concern to the supervisor or shift-in-charge, if needed		5	0	5
	PC13. Identify tools, tackles & equipment (spanners, steel scale, torque wrench etc.) required to perform the operation		10	5	5
	PC14. Identify measuring instruments, for e.g. Vernier, Micro meter, dial gauge, filler gauge, water level, Laser Alignment equipment etc.		5	0	5
	PC15. Ask helper to carry tools required to the desired work site		15	5	10
	PC16. Report to stores / supervisor in case of non-availability of tools & tackles or stock-out		10	0	10
	NOS Total Marks	Total	150	45	105
ISC/N0927: prepare for operation of levelling, balancing & alignment	PC1. Prepare the equipment, spares, tools and tackles (spanners, steel scale, torque wrench etc.)	150	20	5	15
	PC2. Plan for job duration and prepare the team to comply with		20	5	15
	PC3. Ensure that sequence of activities are followed correctly		20	5	15



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC4. Calibrate the instrument (Venire, Micro meter, dial gauge, filler gauge, water level, spirit level, laser alignment equipment etc.) before use		25	5	20
	PC5. Prepare the list of spares required for completion of job and ensure availability at work site		20	5	15
	PC6. Ensure that tools match the desired specifications		25	5	20
	PC7. Ensure tools and equipment required for assembly are free from physical damage and ready for operation		15	5	10
	PC8. Report damaged / defective components of equipment as per the escalation matrix		5	0	5
	NOS Total Marks	Total	150	35	115
ISC/N0928: Carry out the assigned operation of levelling, balancing & alignment	PC1. Dismantle the equipment, as needed	450			
			10	0	10
	PC2. Repair or replace the defective parts		15	0	15
	PC3. Assemble the parts according to the drawings, as required		20	5	15
	PC4. Assemble mechanical components, sub-assemblies together using screws, bolts & collars using hand/ power tools		20	5	15
	PC5. Check the levelling, balancing and alignment of rotating equipment for routine maintenance		20	5	15
	PC6. Re assemble the parts post correcting the defect		20	5	15
	PC7. Understand the process of levelling, alignment & balancing and the need for them		20	5	15
	PC8. Understand the basics of levelling, alignment & balancing		20	5	15
PC9. Understand the manual alignment process with dial gauge		20	5	15	



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC10. Understand machine based alignment process		15	5	10
	PC11. Carry out levelling, alignment & balancing through dial gauge, spirit level, water level, laser driven shaft alignment device		15	5	10
	PC12. Understand and able to execute static and dynamic balancing process		15	5	10
	Pc13. Understand static balance by identification of heavy point (rest at the bottom) upon slow rotation of the equipment with low friction bearings		15	5	10
	PC14. Understand the amount of measured weight to be added on the opposite side of the heavy point of equipment		15	5	10
	PC15. Understand and able to execute different types of balancing like vector method, stroboscope light method (dynamic balancing) etc.		15	5	10
	PC16. Rectify any defects in the rotating equipment's		15	5	10
	PC17. Test the rotating equipment and ensure fitness		15	5	10
	PC18. Report to the supervisor in case of any problem that has to be escalated		10	0	10
	PC19. Operate instruments to record temperature & vibrations (thermometer and vibration measuring instruments)		15	5	10
	PC20. Concentrate and record the observations at prescribed time intervals		15	5	10
	PC21. Identify any deviations from usual temperature &/or vibration		15	5	10
	PC22. Report any deviations to supervisor so as to take necessary actions to rectify them		15	5	10
	PC23. Ensure alignment of parts and with the engineering drawings		20	5	15
	PC24. Check vibrations to ensure they are within desired limits		15	5	10



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC25. Test the machine to ensure it is fit to use before handover		15	5	10
	PC26. Record the test results in the prescribed format of the organization		15	5	10
	PC27. Ensure all activities are complete according to checklist		15	5	10
	PC28. Communicate to supervisor on completion of given job and/or in case of any deviations from checklist		15	5	10
	NOS Total Marks	Total	450	125	325
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
	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		4	0	4



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



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



Assessment outcome	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	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	280	720
	Percentage Weightage:			50%	50%
	Minimum Pass% to qualify (aggregate):			60%	