Model Curriculum

Iron & Steel-Plasma Cutter: Manual

SECTOR: IRON & STEEL
SUB-SECTOR: STEEL, SPONGE – IRON, FERRO ALLOYS, RE ROLLERS, REFRACTORY
OCCUPATION: MECHANICAL MAINTENANCE
REF ID: ISC/Q0910
NSQF LEVEL: 4

Skill India

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

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 – Plasma Cutter - Manual'** QP No. **'ISC/Q0910 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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Plasma Cutter - Manual

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Plasma Cutter - Manual", in the "Iron & Steel" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Iron & Steel-Plasma Cutter : Manual**		
Qualification Pack Name & Reference ID.	Iron & Steel-Plasma Cutter : Manual ISC/Q0910		
Version No.	1.0	**Version Update Date**	30-12-2015
Pre-requisites to Training	Minimum qualification – 12th standard (Science) / ITI Pass		
Training Outcomes	**After completing this programme, participants will be able to:** • Manually cut metal materials using plasma arc • Manually cut metal and metal alloys using oxy-fuel gases • Use basic health and safety practices at the workplace • Work effectively with others		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of "Iron & Steel-Plasma Cutter: Manual" 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**	• 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 **Practical Duration** (hh:mm) 16:00 **Corresponding NOS**	• Understanding the Occupational health & Safety • Understanding of work related hazards. • Documentation for Health and safety • Working at Heights, confined spaces • Solutions 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
	Code ISC/N0008		
3	**Manually cut metal materials using plasma arc** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 100:00 **Corresponding NOS Code** ISC/N0909	• Work safely all the time • Prepare for cutting operations • Carry out cutting operations • Carry out test for quality • Dealing with contingencies	PPTs of Plasma cutting, attachments such as Electrode Gases, Tips Cups, Air plasma, Oxygen injected, Duel gas, various hand tools and display of same calibration tools & precession measuring instruments
4	**Manually cut metal and metal alloys using oxy-fuel gas** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 80:00 **Corresponding NOS Code** ISC/N0910	• Work safely all the time • Prepare for cutting operations • Carry out cutting operations • Carry out test for quality • Dealing with contingencies	PPTs of Oxy-Gas cutting, attachments such as Electrode Gases, Tips Cups, Air plasma, Oxygen injected, Duel gas, various hand tools and display of same calibration tools & precession measuring instruments
5	**Work effectively with others** **Theory Duration** (hh:mm) 04:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** ISC/N0009	• 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
6	**Use basic health and safety practices at the workplace** **Theory Duration** (hh:mm) 04:00 **Practical Duration** (hh:mm) 08:00	• Understand Health and safety procedures • Understand Fire safety procedures • Understand Emergencies, rescue and first aid procedures and enrichment. • Gain knowledge about basics of animal housing and farm structure.	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

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code ISC/N0008		and fire Safety
	Total Duration **Theory Duration** **68:00** **Practical Duration** **212:00**	**Unique Equipment Required:** Laptop, white board, marker, projector, first aid kit	

Grand Total Course Duration: **280Hours, 0 Minutes**

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

Trainer Prerequisites for Job role: "Plasma Cutter - Manual" mapped to Qualification Pack: "ISC/Q0910"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "ISC/Q0910".
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- Welder and preferably passed from Craftsman Training Institute/Advanced Training Institute.
4a	**Domain Certification**	Certified for Job Role: "Iron & Steel-Plasma Cutter: Manual" mapped to QP: "ISC/Q0910". 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 untrained for same Job Role/ Trade.

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	**Iron & steel-Plasma Cutter :Manual**
Qualification Pack	**ISC/Q0910**
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.

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
ISC/N0909: Manually cut metal materials Using plasma arc	PC1. Work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	450	10	5	5
	PC2. Take necessary safety precautions for plasma cutting operations including equipment, processes and checks		10	5	5
	PC3. Interpret cutting procedure data sheets specifications		15	5	10
	PC4. Check regulators, hoses and check that valves are securely connected and free from leaks and damage		15	5	10
	PC5. Check equipment is calibrated and approved for use		10	0	10
	PC6. Check/fit the correct nozzle to the torch		15	5	10

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC7. Match correct tips and cups to the torch as per requirement and manufacturer's equipment instructions		15	5	10
	PC8. Set the amperage and gas pressure as per metal thickness, metal type, and type of gas		20	5	15
	PC9. Use the correct procedure for lighting, adjusting and extinguishing the arc		20	5	15
	PC10. Use appropriate and safe procedures for handling and storing of gas cylinders		15	5	10
	PC11. Prepare the work area for the cutting activities		5	0	5
	PC12. Obtain the appropriate tools and equipment for the plasma arc cutting operations, and check that they are in a safe and usable condition		20	5	15
	PC13. Check that the plasma arc cutting equipment is correctly set up for the operations to be performed		20	5	15
	PC14. Carry out correct measurements required using appropriate equipment and methods for planning the cut		15	5	10
	PC15. Where appropriate, mark out the components for the required operations, using appropriate tools and techniques		15	5	10
	PC16. Perform trial cut to check for cut defects		15	5	10
	PC17. Operate the plasma cutting equipment to produce items/cut shapes to the dimensions and profiles as specified		15	5	10
	PC18. Use the correct angles to cut and the right speed		15	5	10

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC19. Use various types of plasma arc cutting methods/techniques		15	5	10
	PC20. Perform various cutting operations correctly		5	0	5
	PC21. Produce thermal cuts in various forms of material		15	5	10
	PC22. Produce cut profiles for various type of materials		15	5	10
	PC23. Produce thermally-cut components which meet specified quality criteria		15	5	10
	PC24. Detect and correct defects in cut		10	0	10
	PC25. Leave the work area in a safe and tidy condition on completion of the cutting activities		10	0	10
	PC26. Check that the finished components meet the required standard		15	5	10
	PC27. Use appropriate methods and equipment to check the quality, and that all dimensional and geometrical aspects of the cut material are to the specification		15	5	10
	PC28. Identify various cutting defects		15	5	10
	PC29. Report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions		10	5	5
	PC30. Detect equipment malfunctions and deal with them appropriately		10	5	5
	PC31. Deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve		10	5	5

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC32. Shut down and make safe the cutting equipment on completion of the cutting activities or during an emergency		10	5	5
	PC33. In case of emergencies follow standard emergency procedures		10	5	5
	NOS Total Marks	Total	450	140	310
ISC/N0910: Manually cut metal and metal alloys using oxy-fuel gases	PC1. Work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	300	10	5	5
	PC2. Take necessary safety precautions for gas cutting operations including equipment, processes and checks		10	5	5
	PC3. Interpret cutting procedure data sheets specifications		10	5	5
	PC4. Check regulators, hoses and check that valves are securely connected and free from leaks and damage		5	0	5
	PC5. Check equipment is calibrated and approved for use		5	0	5
	PC6. Check/fit the correct gas nozzle to the torch		5	0	5
	PC7. Ensure preheat and oxygen holes on the tips are clean		10	5	5
	PC8. Check that a flashback arrestor is fitted		15	5	10
	PC9. Set appropriate gas pressures		5	0	5
	PC10. Use the correct procedure for lighting, adjusting and extinguishing the flame		5	0	5
	PC11. Adjust torch valve for type of flame such as neutral, carburizing and oxidizing		5	0	5
	PC12. Follow sequence of operations such as pre-heating material and initiating cut		10	5	5

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC13. Mark out the locations for cutting accurately and as per requirement		5	0	5
	PC14. Use appropriate and safe procedures for handling and storing of gas cylinders.		5	0	5
	PC15. Prepare the work area for the cutting activities		5	0	5
	PC16. Obtain the appropriate tools and equipment for the oxy-fuel gas cutting operations, and check that they are in a safe and usable condition		10	5	5
	PC17. Check that the oxy-fuel gas cutting equipment is set up for the operations to be performed		5	0	5
	PC18. Adjust cylinder valves and adjust regulator for operating pressure to achieve specifications for required operations		10	0	10
	PC19. Where appropriate, mark out the components for the required operations, using appropriate tools and techniques		10	0	10
	PC20. Perform trial cut to check for cut defects		5	0	5
	PC21. Operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles specified into various forms		10	5	5
	PC22. Use various types of oxy-fuel gas cutting methods		10	5	5
	PC23. Perform various cutting operations correctly		5	0	5
	PC24. Produce thermal cuts in various forms of material (metal of 3mm and above)		5	0	5
	PC25. Produce cut profiles for various type of materials		15	5	10
	PC26. Produce thermally cut components which meet specified quality criteria leave the work area in a safe and		5	0	5

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	tidy condition on completion of the cutting activities				
	PC27. Recognize and correct burn-back and flashback		10	5	5
	PC28. Detect and correct defects in cut		5	0	5
	PC29. Check that the finished components meet the standard required		15	5	10
	PC30. Use appropriate methods and equipment to check the quality, and that all dimensional and geometrical aspects of the cut material are to the specification		10	0	10
	PC31. Identify various cutting defects		15	5	10
	PC32. Report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions		10	5	5
	PC33. Detect equipment malfunctions and deal with them appropriately		5	0	5
	PC34. Deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve		10	5	5
	PC35. Shut down and make safe the cutting equipment on completion of the cutting activities		10	5	5
	PC36. In case of emergencies follow standard emergency procedures		10	5	5
	NOS Total Marks	Total	300	85	215
ISC/N0008: Use basic health and safety practices at the workplace	PC1. Use protective clothing/equipment for specific tasks and work conditions	150	9	4	5
	PC2. State the name and location of people responsible for health and safety in the workplace		6	1	5

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC3. State the names and location of documents that refer to health and safety in the workplace		2	1	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace		8	4	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		6	1	5
	PC6. State location of general health and safety equipment in the workplace		6	1	5
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		6	1	5
	PC8. Work safely in and around trenches, elevated places and confined areas		6	1	5
	PC9. Lift heavy objects safely using correct procedures		6	1	5
	PC10. Apply good housekeeping practices at all times		2	1	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		5	1	4
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		9	4	5
	PC14. Demonstrate rescue techniques applied during fire hazard		8	4	4
	PC15. Demonstrate good housekeeping in order to prevent fire hazards		2	1	1
	PC16. Demonstrate the correct use of a fire extinguisher		6	1	5
	PC17. Demonstrate how to free a person from electrocution		6	1	5

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		8	3	5
	PC19. Demonstrate basic techniques of bandaging		6	1	5
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		7	2	5
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		6	1	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		6	1	5
	PC23. Demonstrate the artificial respiration and the CPR Process		6	1	5
	PC24. Participate in emergency procedures		6	1	5
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible		4	1	3
	PC26. Demonstrate correct method to move injured people and others during an emergency		2	1	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

				Marks allocation	
Assessment outcome	**Assessment criteria**	**Total marks (1000)**	**Out of**	**Theory**	**Skills practial**
	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		5	0	5
	NOS Total Marks		**100**	**30**	**70**
	Grand Total	**1000**	**1000**	**300**	**700**
	Percentage Weightage:			**50%**	**50%**
	Minimum Pass% to qualify (aggregate):			**60%**	