Model Curriculum

1. Plasma Cutter

SECTOR: Construction
SUB-SECTOR: Real Estate and Infrastructure Construction
OCCUPATION: Fabrication
REF ID: CON/Q1207, V1.0
NSQF LEVEL: 4

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CONSTRUCTION SECTOR SKILLS COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Plasma Cutter**' QP No. '**CON/Q 1207 NSQF Level 4**'

Date of Issuance: **January 31st, 2017**

Valid up to: **August 14th, 2017**

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

Authorised Signatory
(Construction Skill Development Council)

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Plasma Cutter

CURRICULUM / SYLLABUS

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

Program Name	**Plasma Cutter**		
Qualification Pack Name & Reference ID	CON/Q1207, v1.0		
Version No.	1.0	**Version Update Date**	14-08-2017
Pre-requisites to Training	Preferably 10th standard and 9 years site experience in same occupation for Non trained worker/ 3 years site experience as a certified Gas Cutter – Construction for Trained worker		
Training Outcomes	**After completing this programme, participants will be able to:** • **Carry out cutting operations on structural steel elements using plasma cutting:** performing plasma cutting operation on various steel sections by following standard procedures and adhering to quality and safety norms • **Work effectively in a team to deliver desired results at the workplace**: Organised working procedure within a team at site • **Work according to personal health, safety and environment protocol at construction site:** Importance of Health & Safety aspects & measures to be followed while working.		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of "Plasma Cutter" Qualification Pack issued by "Construction Skill Development Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 00:00	• Introduction to role and responsibilities of the job role • Introduction to various types of welding • Introduction to different processes involved in fabrication & their purpose • need and importance of tack welding • Brands of welding equipments & their power ratings • Various hazards in fabrication Yards • Occupational Disease related to welding works and their symptoms • Importance of following safety precautions while welding • Introduction to Shop drawings (symbols and details etc.) • Basic math • units of measurement and conversion • career growth paths	• class room • White board • Computer • Projector • Charts and displays regarding oxy fuel and plasma cutting
2	**Carry out cutting operations on structural steel elements using plasma cutting** **Theory Duration** (hh:mm) 154:00 **Practical Duration** (hh:mm) 358:00 **Corresponding NOS Code** CON/N1212	**Theory:** • ***Plasma:*** 1. Definition and detailed concept regarding Plasma 2. Properties of Plasma 3. Applications of plasma cutting 4. Materials which can be cut by plasma • ***Equipment and consumables:*** 1. Details of the equipment used for plasma cutting including its various components, their purpose 2. do's and don'ts while operating cutting equipment 3. knowledge about the range of equipment, 4. knowledge of the manufactures guidelines for the use of equipment, 5. Knowledge of the optimum and ideal settings of the equipment for the given task. 6. areas of application of equipment 7. knowledge of reading and interpreting the various gauges and displays in the equipment 8. knowledge of various tools and tackles used in cutting operations and how to safely handle and use the same during the cutting operations 9. knowledge of different consumables used in the process and their purpose, properties 10. how to optimize the use of consumables • ***Cutting operations and quality of cut:*** 1. standard procedure for performing cutting operations on various sections using	Tools: • Hand Gloves. • Apron leather • Gas welding Goggles with Colour glass • Chipping hammer • Chisel • Clamps • Gas Pressure measuring guage • Trolley for cylinder • Plasma cutting torch, nozzle with consumables (tip and cap) • Cutting cart • Head protector • Electrodes • Cutting guides • Power source and compression unit with internal cooling system • Exhaust fan • Light source

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		plasma cutting including measuring, marking, cleaning, cutting, stacking etc. 2. concepts of shop drawing and cutting drawing, its interpretation 3. estimation of quantities of materials required for a give task of cutting 4. Knowledge of relationship between heat transfer, gas flow rate, amperage settings etc. with material properties and the effects of changing these parameters on cutting process 5. Knowledge of the process involved in cleaning of materials before and after cutting 6. Importance of test runs 7. Effects of thickness of material in cutting, 8. Effective cutting of heavy sections 9. Defects in cutting 10. Effects of holding the cutting torch too close and too far from the base metal • ***Safety while performing cutting operations:*** 1. Various hazards in construction site and fabrication yards 2. Occupational diseases related to plasma cutting 3. Hazards related to plasma cutting 4. Knowledge of safety procedures related to electric hazard, fire hazard, hazard due to heat and toxic gases, confined spaces, working at heights etc. • **Practical:** • ***Carry out preparatory works prior to cutting including the following*** activities: 1. *Preparation of surface:* ensuring the surface is free from any foreign matter, the dimensions for cutting are clearly marked and are as per the shop/cutting drawing. 2. *Preparation of equipment*: ▪ ensure that all components of the equipment are in proper order, functioning and are at optimum setting as required for the job ▪ check and ensure that the gas used is compatible with the process, check the gas pressure and flow. • ***Perform cutting operations:*** 1. Perform the cutting operations of sections of varying depths by following the standard procedure and performing the following: ▪ Appropriate initiation of the cut	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		▪ Carryout adjustment of current, gas flow rate as per requirement ▪ Adjust travel speed in relation to the heat settings and thickness of the material ▪ Reduce wastage of material and consumables ▪ Terminate the cut as per standard practice ▪ Clean the cut, dismantle the equipment and store the equipment as per manufactures guidelines	
3	**Work effectively in a team to deliver desired results at the workplace** **Theory Duration** (hh:mm) 07:00 **Practical Duration** (hh:mm) 17:00 **Corresponding NOS Code** CON/N8001	**Theory: -** • Method of oral and written communication skills with co-workers, trade seniors while handling and carrying out visual checks on materials, tools and equipments • How to interpret scope of cutting activities, material/ tools handling by adhering to instructions or consulting with seniors • Method of reporting to seniors clearly and promptly • Seek necessary support and complete assigned tasks within stipulated time duration • Keep good relation and maintain well behavior with co-workers **Demonstration/ Practical (D/P) :-** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition 1. Selection of materials, tools or devices for defined purpose under 2. Reading and interpretation of drawings and estimation of quantities 3. carrying out preparatory activities for cutting works 4. Carrying out cutting works	
4	**Work according to personal health, safety and environment protocol at construction site** **Theory Duration** (hh:mm) 17:00 **Practical Duration** (hh:mm) 39:00 **Corresponding NOS Code** CON/N9001	**Theory:-** • Types of hazards involved in construction sites • Types of hazards involved in of cutting works • Emergency safety control measures and actions to be taken under emergency situation • Concept of :- 1. First Aid process 2. Use of fire extinguisher 3. Classification of fires and fire extinguisher 4. Safety drills 5. Types and use of PPEs as per general safety norms • Reporting procedure to the concerned authority in emergency situations	• Leather Hand Gloves • Jump suit • Wire brush • Hand & Leg guards leather • Safety goggles • Nose mask • Ear protection • Fire extinguishers • Sand buckets Flashback arrestors • Welding helmet

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Standard procedure of handling, storing and stacking material, fabrication accessories • What is safe disposal of waste, type of waste and their disposal • basic ergonomic principles as per applicability **Demonstration/ Practical (D/P) :-** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition. • Selection of PPEs and use them appropriately as per working need of scaffolding activities like: 1. Selection of materials, tools or devices for defined purpose under 2. carrying out preparatory activities for cutting works 3. Carrying out cutting works • Selection of fire extinguisher based on classification of fire, standard practice of storing & stacking firefighting equipments/ materials at work locations • Disposal of waste materials as per their nature and effects on weather	• Welding glass
	Total Duration **Theory Duration 186:00** **Practical Duration 414:00**	**Unique Equipment Required:** Hand Gloves, Apron leather , Gas welding Goggles with , Colour glass , Chipping hammer, Chisel, Clamps, Gas Pressure measuring guage, Trolley for cylinder, Plasma cutting torch, nozzle with consumables (tip and cap), Cutting cart, Head protector, Electrodes, Cutting guides, Power source and compression unit with internal cooling system, Exhaust fan Light source, Leather Hand Gloves, Jump suit, Wire brush, Hand & Leg guards leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets, Flashback arrestors, Welding helmet, Welding glass	

Grand Total Course Duration: **600 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by ***Construction Skill Development Council of India)***

Trainer Prerequisites for Job role: "Plasma Cutter" mapped to Qualification Pack: "CON/Q1207", v1.0"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "CON/Q1207".
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**	ITI/12th
4a	**Domain Certification**	Trainer/Assessor-50% in each NOS & 80% overall, Lead trainer/ Lead Assessors- 50% in each NOS and overall 90%
4b	**Platform Certification**	Trainer/Assessor-80% in each NOS and Lead trainer/Lead Assessors-90% in each NOS
5	**Experience**	i. Technical Degree holder with minimum three years of Field experience and preferably two years of teaching experience or, ii. In case of a Diploma Holder five years of field experience and preferably two years of teaching experience or, iii. In case of ITI/12th pass minimum eight years of field experience and preferably two years of teaching Experience.

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role	Plasma Cutter
Qualification Pack	CON/Q1207
Sector Skill Council	Construction

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 knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC
3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.
5. The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% individually in each NOS.
6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.
7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
9. 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 within the specified timeframe set by SSC.
10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

				Marks Allocation	
Assessment outcomes	Assessment Criteria for outcomes	**Total Mark**	**Out Of**	**Theory**	**Skills Practical**
CON/N1212: Carry out cutting operations on structural steel elements using plasma cutting	PC1. ensure that the surface is clean and free from any oxides, paints, oils dust etc.	**100**	2	1	1
	PC2. confirm the compliance of markings on the elements with dimensions as shown in drawings		2	1	1
	PC3. ensure that the gas used is compatible with the process		2	1	1
	PC4. check gas pressure gauges prior to beginning the process		2	1	1
	PC5. confirm that all auxiliary units are working as required		2	1	1
	PC6. confirm that the plasma tip used is clean, and undamaged		2	1	1
	PC7. test the gas flow before beginning cutting procedures		2	1	1
	PC8. check the settings on the equipment and set them as per requirement		2	1	1
	PC9. read and interpret the fabrication shop drawings to identify cut sections		4	1	3
	PC10. estimate the quantity of consumable required for cutting		5	2	4
	PC11. identify any hazardous conditions in the work place relevant to work		2	1	1
	PC12. avoid wearing loose clothing and wear welding jumpsuits or any other uniform issued on site		2	1	1
	PC13. ensure that there is no leakage in gas pipelines		2	1	1
	PC14. avoid presence of moisture in vicinity of the working area and work piece		5	2	4
	PC15. strike the flame with prescribed lighters and not using open flames		5	2	4
	PC16. avoid any unsafe act by self particularly while working in workplace		2	1	1
	PC17. identify and use the fire protection tools and equipment based upon the type of fire		2	1	1
	PC18. participate in safety drills organized in workplace		2	1	1
	PC19. participate in tool box talks as organized in workplace		2	1	1
	PC20. set the machine at required current setting depending upon the thickness of section and type of element		2	1	1
	PC21. start the flow of ionized gas or plasma		2	1	1

	PC22. avoid starting the cut at 90' to the base metal		2	1	1
	PC23. cut the metal at an angle (e.g. 60 degrees from horizontal, 30 degrees from vertical) and then rotate the torch to the vertical position		5	2	4
	PC24. confirm the gas flow rate by consulting the gauges in the equipment		5	2	4
	PC25. confirm the current settings by consulting the display on the equipment and make the necessary changes		5	2	4
	PC26. avoid touching the tip of the nozzle to the base metal to increase the life of the tip		2	1	1
	PC27. employ drag cups were ever possible		2	1	1
	PC28. adjust the travel speed in relation to the heat settings and thickness of the materials		5	2	4
	PC29. maintain appropriate distance of the torch from the base material to ensure cutting in correct profile and minimizing wastage		5	2	4
	PC30. ensure that cut is terminated properly and cleanly by employing push angle particularly in the higher thickness sections		5	2	4
	PC31. employ correct tools and tackles as required during the cutting operations		5	2	4
	PC32. clean any dross formed on the top and bottom surface and clean the cut		2	1	1
	PC33. avoid formations of ripples in the cut		2	1	1
	PC34. disconnect the equipment, clean the tip of torch, and store the equipment as per manufactures guidelines		2	1	1
		Total	**100**	**30**	**70**
CON/N8001: Work effectively in a team to deliver desired results at the workplace	PC1. pass on work related information/ requirement clearly to the team members	**100**	7	2	5
	PC2. inform co-workers and superiors about any kind of deviations from work		7	2	5
	PC3. address the problems effectively and report if required to immediate supervisor appropriately		10	3	7
	PC4. receive instructions clearly from superiors and respond effectively on same		7	2	5
	PC5. communicate to team members/subordinates for appropriate work technique and method		10	3	7
	PC6. seek clarification and advice as per requirement and applicability		7	2	5
	PC7. hand over the required material, tools tackles, equipment and work fronts timely to interfacing teams		27	8	19
	PC8. work together with co-workers in a synchronized manner		27	8	19

		Total	**100**	**30**	**70**
CON/N9001: Work according to personal health, safety and environment protocol at construction site	PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authority	**100**	7	2	5
	PC2. follow emergency and evacuation procedures in case of accidents, fires, natural calamities		7	2	5
	PC3. follow recommended safe practices in handling construction materials, including chemical and hazardous material whenever applicable		10	3	7
	PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations, mock drills, conducted at site		7	2	5
	PC5. identify near miss , unsafe condition and unsafe act		7	2	5
	PC6. use appropriate Personal Protective Equipment (PPE) as per work requirements including: • Head Protection (Helmets) • Ear protection • Fall Protection • Foot Protection • Face and Eye Protection • Hand and Body Protection • Respiratory Protection (if required)		10	3	7
	PC7. handle all required tools, tackles , materials & equipment safely		7	2	5
	PC8. follow safe disposal of waste, harmful and hazardous materials as per EHS guidelines		7	2	5
	PC9. install and apply properly all safety equipment as instructed		13	4	9
	PC10. follow safety protocol and practices as laid down by site EHS department		13	4	9
	PC11. collect and deposit construction waste into identified containers before disposal, separate containers that may be needed for disposal of toxic or hazardous wastes		7	2	5
	PC12. apply ergonomic principles wherever required		7	2	5
		Total	**100**	**30**	**70**