

Model Curriculum

17. Lab Technician-Metal Testing

SECTOR: CAPITAL GOODS

SUB-SECTOR: MACHINE TOOLS, DIES, MOULDS AND PRESS TOOLS, PLASTICS MANUFACTURING MACHINERY, TEXTILE MANUFACTURING MACHINERY, PROCESS PLANT MACHINERY, ELECTRICAL AND POWER MACHINERY, LIGHT ENGINEERING GOODS

OCCUPATION: Quality

REF ID: CSC/Qo6o2, V1.0

NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CAPITAL GOODS SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Lab Technician - Metal Testing.' QP No. 'CSC/ Qo6o2, NSQF Level 4'

Date of Issuance: April 10th, 2014

Valid up to : August 30th, 2016

**Valid up to the next review date of the Qualification Pack or the
Valid up to date mentioned above (whichever is earlier)



Authorised Signatory
Tourism & Hospitality Skill Council

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Senior Manual Metal Arc Welding/Shielded Metal Arc Welding

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Lab Technician-Metal Testing”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Lab Technician-Metal Testing		
Qualification Pack Name & Reference ID. ID	CSC/Q0602, v1.0		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	Diploma(Mechanical, Metallurgy)		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Carryout testing on metals: Perform of metal testing operations as per approved procedures. It involves identifying and using relevant methods and skills to complete the testing and address problems. It involves initiating and completing testing and procedures using a range of different metal testing methods and equipment used within the workplace. • Basic health and safety practices at the workplace: identify risks and hazards at workplace, use of PPE, and apply good housekeeping practices, etc., • Work effectively with others: effectively communicate with others and demonstrate good ethical practices and discipline. 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Lab Technician-Metal Testing” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Carryout Testing on Metal</p> <p>Theory Duration (hh:mm) 40:00</p> <p>Practical Duration (hh:mm) 100:00</p> <p>Corresponding NOS Code CSC/No602</p>	<ul style="list-style-type: none"> Identify common types of metals and metal alloys Explain properties of ferrous and non ferrous metals Define common terms used metal testing Explain principles of metal testing List various methods and techniques used in testing various kinds of metals List chemicals and equipment used for testing various kinds of metals List parameters for metal testing – equipment omission, leaks, contamination, metallurgy properties pre metal processing, metallurgy properties post metal processing, etc. Adhere to safe working properties Identify hazards associated with metal testing and take corrective action to avoid such hazards Identify Personal Protective Equipment required for metal testing Choose right kind of equipment and methods for metal testing Interpret metal testing instructions, inspection & testing procedure –job instruction sheet, job card, work drawings and instructions, quality control documents, process specifications, quality control documents, standard operating procedure Define quality control specifications Prepare the work area for metal testing Prepare any tools and equipment required for testing operation Prepare test samples in accordance with the standard procedure Carryout metal testing as per instructions Record the results of tests carried out in standard formats- written or typed report, computer based record or any other specific requirement Carryout documentation as per the standard procedure Seek advice from the immediate supervisor in case of unresolved problems Fill up appropriate technical forms ,activity logs as per the requirement Follow proper communication protocol 	<p>Training Kit (PowerPoint, Trainer Guide)</p> <p>Metal samples, Universal Testing Machine, Carbon and sulphur determination apparatus, melt flow index apparatus, Impact hardness tester, measuring microscope, ferrite meter, spectrometer and hand tools, Personal Protective Equipment (PPE)</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Communicate with people in respectful manner in line with organizational policy Perform numerical operations, geometry and calculations Maintain current knowledge of application standards, legislation etc. Demonstrate problem solving abilities Plan, organize and sequence work operations as per the job requirement Work in a team to achieve better results 	
2	<p>Health and safety</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 08:00</p> <p>Corresponding NOS Code CSC/N1335</p>	<ul style="list-style-type: none"> Explain the importance of personal protective equipment (PPE) required for gas cutting operation State the causes for accidents Identify job site hazardous work and state possible causes of risk or accident at the workplace Explain the importance of '5S' at the workplace 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Leather gloves, leather apron, welding screen – helmet types, hand screen welding and safety shoes</p>
3	<p>Fire Safety</p> <p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code CSC/N1335</p>	<ul style="list-style-type: none"> Explain types of fires - Class A, B, C and D Select appropriate fire extinguisher to control fire Use PASS method to operate a fire extinguisher Follow fire safety signs and safe evacuation method in case of a fire Identify the location of assembly point, fire exit, fire alarm Follow reporting procedure in case of a fire 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Class A, B, C, D and K fire extinguishers</p>
4	<p>Emergencies, rescue and first aid procedure</p> <p>Theory Duration (hh:mm) 09:00</p> <p>Practical Duration (hh:mm) 18:00</p> <p>Corresponding NOS</p>	<ul style="list-style-type: none"> Follow electrical safety procedures Use approved method to rescue a person from electrocution State the importance of first aid Identify the contents of a first aid kit and their application Administer first aid in case of bleeding, burns, choking, electrical shock, poisoning, etc. Use of CPR process Bandage wounds Explain stages of crisis and crisis 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>First aid kit with all contents</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Code CSC/N1335	management <ul style="list-style-type: none"> Prepare an incident report 	
5	Work effectively with others Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 60:00 Corresponding NOS Code CSC/N1336	<ul style="list-style-type: none"> Explain the importance of team work and team dynamics State 4Cs of working in a team Explain types of communication Apply effective communication technique Overcome barriers to effective communication Demonstrate active listening skills Demonstrate good customer service skills Explain the importance of ethical behaviour in your day-to-day work State the importance of discipline in life and apply the same at workplace 	Training kit (Trainer guide, PowerPoint)
6	Final Assessment Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 06:00 Corresponding NOS Code	<ul style="list-style-type: none"> To test skills and knowledge 	
	Total Duration Theory Duration 88:00 Practical Duration 222:00	Unique Equipment Required: Metal samples, Universal Testing Machine, Carbon and sulphur determination apparatus, melt flow index apparatus, Impact hardness tester, measuring microscope, ferrite meter, spectrometer and hand tools, PPE, Class A, B, C, D and K fire extinguishers, First aid kit with all contents.	

Grand Total Course Duration: **310 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Capital Goods Skill Council](#))

Trainer Prerequisites for Job role: “Lab Technician-Metal Testing” mapped to Qualification Pack: “CSC/Qo6o2 v1.0”

Sr. No.	Area	Details
1	Description	Identifying and using relevant methods and skills to complete the testing and address problems. It involves initiating and completing testing and procedures using a range of different metal testing methods and equipments used within the workplace.
2	Personal Attributes	Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness.
3	Minimum Educational Qualifications	Degree in Mechanical Engineering/Metallurgy
4a	Domain Certification	Certified for Job Role: “ <u>Lab Technician-Metal Testing</u> ” mapped to QP: “ <u>CSC/Qo6o2, v1.0</u> ”. 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/Q14o2”. Minimum accepted 70 % as per respective SSC guidelines is 70%.
5	Experience	<ul style="list-style-type: none"> 3-4 years of industry experience in the relevant field 3-4 years of teaching experience

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Lab Technician-Metal Testing
Qualification Pack	CSC/Qo6o2, v1.0
Sector Skill Council	Capital Goods 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 center based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 60% in aggregate and 40% in each NOS
6	The marks are allocated PC wise; however, every NOS will carry a weight age in the total marks allocated to the specific QP

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
1. CSC/No602 Carry out testing on metals	PC1.work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	4	1	3
	PC2.adhere to procedures or systems in place for health and safety, personal protective equipment (PPE) and other relevant safety regulations for laboratory operations		5	1	4
	PC3.work following laid down procedures and instructions		4	1	3
	PC4.ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition and are kept at secured location		3	0	3
	PC5.ensure that all measuring equipment are within calibration date and are approved for usage		3	0	3
	PC6.ensure work area is clean and safe from hazards before and after the job is completed		3	0	3
	PC7.obtain job specification from a valid and approved source		3	0	3
	PC8.read and establish job requirements from the job specification document accurately		3	0	3
	PC9.report and rectify incorrect and inconsistent information in job specification documents as per organization procedures		5	1	4
	PC10.prepare the work area for the testing operations as per procedure		6	2	4
	PC11.obtain correct work-pieces/raw materials to be tested		3	0	3
	PC12.identify the metals, metal alloys and non-metals and job specifications accurately		5	0	5
	PC13.ensure availability appropriate testing tools and equipment as per job requirements		4	1	3
	PC14.set up tools and equipment for testing		5	0	5
	PC15.identify conditions required for tests to be undertaken		3	0	3
	PC16.select the appropriate testing methods to be undertaken		3	0	3
	PC17.prepare any tools and equipment required for the testing operations		4	0	4
	PC18.prepare the test samples in accordance with the procedures and check their integrity		6	2	4
	PC19.carry out the required tests in accordance with the procedures		7	2	5
	PC20.record the results of the tests undertaken in the appropriate format as per organisational procedures		7	2	5
	PC21.complete documentation post completion of		4	1	3

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	work, as per organisational procedure				
	PC22.secure tools and equipment in a safe condition on completion of the testing activities		3	0	3
	PC23.refer unresolved job related problems to appropriate personnel for support		3	0	3
	PC24.monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem		4	0	4
	Total		100	14	86
2.CSC/N1335 Use basic health and safety practices at the workplace	PC1.use protective clothing/equipment for specific tasks and work conditions	100	5	2	3
	PC2.state the name and location of people responsible for health and safety in the workplace		3	1	2
	PC3.state the names and location of documents that refer to health and safety in the workplace		3	1	2
	PC4.identify job-site hazardous work and state possible causes of risk or accident in the workplace		5	2	3
	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		4	2	2
	PC6.state location of general health and safety equipment in the workplace		3	2	1
	PC7.inspect for faults, set up and safely use steps and ladders in general use		5	2	3
	PC8.work safely in and around trenches, elevated places and confined areas		5	2	3
	PC9.lift heavy objects safely using correct procedures		5	2	3
	PC10.apply good housekeeping practices at all times		4	2	2
	PC11.identify common hazard signs displayed in various areas		5	2	3
	PC12.retrieve and/or point out documents that refer to health and safety in the workplace		3	1	2
	PC13.use the various appropriate fire extinguishers on different types of fires correctly		4	1	3
	PC14.demonstrate rescue techniques applied during fire hazard		4	1	3
	PC15.demonstrate good housekeeping		3	1	2

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	in order to prevent fire hazards				
	PC16.demonstrate the correct use of a fire extinguisher		4	1	3
	PC17.demonstrate how to free a person from electrocution		4	1	3
	PC18.administer appropriate first aid to victims was required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.		4	1	3
	PC19.demonstrate basic techniques of bandaging		3	1	2
	PC20.respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		4	1	3
	PC21.perform and organize loss minimization or rescue activity during an accident in real or simulated environments		3	1	2
	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		3	1	2
	PC23.demonstrate the artificial respiration and the CPR Process		3	1	2
	PC24.participate in emergency procedures		3	2	1
	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		4	1	3
	Total		100	36	64
3.CSC/N1336 Work effectively with others	PC1.accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	3	7
	PC2.accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	3	7
	PC3.give information to others clearly, at a pace and in a manner that helps them to understand		10	3	7
	PC4.display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	3	7
	PC5.consult with and assist others to maximize		10	3	7

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	effectiveness and efficiency in carrying out tasks				
	PC6.display appropriate communication etiquette while working		10	3	7
	PC7.display active listening skills while interacting with others at work		10	3	7
	PC8.use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	3	7
	PC9.demonstrate responsible and disciplined behaviors at the workplace		10	3	7
	PC10.escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict		10	3	7
	Total		100	30	70
	Grand Total	300	300	80	220
	Percentage Weightage:			27	73
	Minimum Pass% to qualify (aggregate):			60	