

Model Curriculum

Operator-Shot Blasting and Grit Blasting

SECTOR:	CAPITAL GOODS
SUB-SECTOR:	1. Machine Tools 2. Plastic Manufacturing Machinery 3. Textile Manufacturing Machinery 4. Process Plant Machinery 5. Electrical and Power Machinery 6. Light Engineering Goods
OCCUPATION:	Machining
REF ID:	CSC/Q0111, v1.0
NSQF LEVEL:	2



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: '**Operator-Shot Blasting and Grit Blasting**'
QP No. '**CSC/Q0111 NSQF Level 2**'

Date of Issuance: Nov 24th, 2017

Valid up to : Nov 24th, 2021

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



Authorised Signatory
(Capital Goods Skill Council)

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Operator-Shot Blasting and Grit Blasting

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Operator-Shot Blasting and Grit Blasting”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Operator-Shot Blasting and Grit Blasting		
Qualification Pack Name & Reference ID. ID	CSC/Q0111, v1.0		
Version No.	1.0	Version Update Date	24/11/2017
Pre-requisites to Training	8th Standard passed, preferably		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Prepare surface by shot blasting and/or grit blasting • Apply basic health and safety practices at the workplace • Work effectively with others 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Operator-Shot Blasting and Grit Blasting” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Prepare surface by shot blasting and/or grit blasting</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 110:00</p> <p>Corresponding NOS Code CSC/N0111</p>	<ul style="list-style-type: none"> Distinguish between metals and non metals Distinguish between metals and non metals Explain the purpose of alloying State physical and mechanical properties of some of the most common metals Describe the necessity for blasting Explain various blasting techniques Identify equipment used in blasting Explain parameter settings of various equipment used in the blasting operation Describe different types and grades of surface preparation Analyse various types of grit, abrasive Explain characteristics and applications of different types of abrasives or grit Describe the method to identify grid size, mesh size and surface roughness Explain the importance of surface preparation and effect of surface preparation on the final product List hazards associated with blasting process for surface preparation Identify Personal Protective Equipment used in shot blasting and grit blasting Wear Personal Protective Equipment correctly Check tools and equipment for any damage Analyse safety precautions to be followed while carrying out shot blasting or grit blasting List various sources to obtain job specifications Interpret job specifications from various sources Establish job requirements Prepare the work are for the shot blasting or grit blasting operation Gather work piece, raw material or consumable required for shot blasting or grit blasting Choose the lost appropriate equipment for the blasting operation Setup the equipment as per the standard operating procedure Choose appropriate work holding or 	<p>Training Kit (PowerPoint, Trainer Guide)</p> <p>Salt testing kit, surface profile gauge, press tape, swab, surface profile compactors, consumables, portable grit/sand blaster, grit/sandblasting cabinet, dust-free/dustless grit/sandblast machine, automatic grit/sandblast equipment, pressure/suction feed grit/sandblaster, wet/liquid grit/sandblaster, high pressure abrasive grit/sandblaster, cylindrical shot blaster, hook type shot blaster, Personal Protective Equipment (PPE)</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>positioning devices</p> <ul style="list-style-type: none"> Fix the work piece using standard work holding devices Prepare the surface as per the standard procedure Identify common surface imperfections State various methods to identify common surface imperfections Check the finish as per the job specification Carry out documentation as per the company policy Seek assistance from the supervisor in case of unresolved problems Undertake numerical computations Identify basic, compound and solid shapes Convey and share technical information Communicate with people in a respectful manner Plan, prioritize and sequence work operations as per job requirements Manage own time for achieving better results Work in a team in order to achieve better results Demonstrate problem-solving abilities <p>Identify problems with work planning, procedures, output and behaviour and their implications</p>	
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) Identify job site hazards and take corrective actions to avoid such hazards 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>	<ul style="list-style-type: none"> Explain types of fires Recognise required fire extinguisher based on the type of fire Apply 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>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Corresponding NOS Code CSC/N1335</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 Code CSC/N1335</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. Demonstrate CPR process Provide first aid for minor injuries Explain stages of crisis and crisis management Prepare an Incident report as per the guidelines 	<p>Training kit (Trainer guide, PowerPoint) First aid kit with all contents</p>
5	<p>Work effectively with others</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 60:00</p> <p>Corresponding NOS Code CSC/N1336</p>	<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 	<p>Training kit (Trainer guide, PowerPoint)</p>
	<p>Total Duration</p> <p>Theory Duration 74:00</p> <p>Practical Duration 226:00</p>	<p>Unique Equipment Required: Salt testing kit, surface profile gauge, press tape, swab, surface profile compactors, consumables, portable grit/sand blaster, grit/sandblasting cabinet, dust-free/ dustless grit/sandblast machine, automatic grit/sandblast equipment, pressure/suction feed grit/sandblaster, wet/liquid grit/sandblaster, high pressure abrasive grit/ sandblaster, cylindrical shot blaster, hook type shot blaster, Personal Protective Equipment (PPE), Class A, B, C, D and K fire extinguishers, First aid kit with all contents</p>	

Grand Total Course Duration: **300 Hours, 0 Minutes**

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

Trainer Prerequisites for Job role: “ Operator –Shot blasting and Grit Blasting” mapped to Qualification Pack: “CSC/Q0111 v1.0”

Sr. No.	Area	Details
1	Description	It involves cleaning, preparing the surface using shot blasting and grit blasting machines and abrasives so that further coating can be done on the components for final finish. It also involves checking the prepared components for smoothness accuracy.
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	Diploma /Degree in Mechanical Engineering
4a	Domain Certification	Certified for Job Role: “ <u>Operator- Shot Blasting and Grit Blasting</u> ” mapped to QP: “ <u>CSC/Q0111, 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: “MEP/Q0102”. Minimum accepted as per respective SSC guidelines is 80%.
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

Criteria For Assessment Of Trainees

Job Role: Operator -Shot Blasting and Grit Blasting

Qualification Pack: CSC/Q0111

Sector Skill Council: Capital Goods Skill Council

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. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack.

Total Marks: 300		Compulsory	NOS	Marks Allocation	
Assessment outcomes	Assessment Criteria for outcomes	Total Marks	Out of	Theory	Skills Practical
CSC/N0111 Prepare surface by shot blasting and/or grit blasting	PC1.comply with health and safety, environmental and other relevant regulations and guidelines at work and ensure process compliance	100	3	1	2
	PC2.adhere to procedures or systems in place for risk assessment, occupational standards, personal protective equipment (PPE) and other relevant occupational safety regulations		4	1	3
	PC3.work following laid down procedures and instructions		3	1	2
	PC4.ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition and are kept at secured location		2	0	2
	PC5.ensure that all measuring equipment are within calibration date and are approved for usage		2	0	2
	PC6.ensure work area is clean and safe from hazards before and after the job is completed		2	0	2

PC7.obtain job specification from a valid and approved source	2	0	2
PC8.read and establish job requirements from the job specification document accurately	3	1	2
PC9.report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	4	1	3
PC10.prepare the work area for the shot blasting and/or grit blasting operations as per procedure	4	1	3
PC11.remove paint and corrosion products from ferrous and non-ferrous surfaces using shot blasting and grit blasting	5	1	4
PC12.obtain correct work-pieces/raw materials and abrasives/consumables as per job requirements	5	1	4
PC13.identify the metals, metal alloys and non-metals and surface finish specifications accurately	3	1	2
PC14.ensure selection of surface preparation method/technique as per the work requirements	4	1	3
PC15.ensure availability appropriate tools and equipment per job requirements	2	0	2
PC16.set up machines for carrying out blasting	4	0	4
PC17.set work pieces as per job requirements using appropriate positioning and/or holding devices	5	1	4
PC18.carry out the surface preparation process in accordance with standard operating procedures	6	2	4
PC19.check the finish as per job specification	5	1	4
PC20.check the surface to ensure completeness of work	4	1	3
PC21.identify common surface imperfections and correct errors	4	1	3
PC22.complete documentation post completion of work, as per procedure	2	1	1
PC23.keep finished components as well as raw material as per organizational procedure established	3	1	2
PC24.produce components as per standards applicable to the process and in line with production targets	5	1	4
PC25.report conditions and seek appropriate assistance in a timely manner to address risk of failure to comply with necessary targets and specifications	3	0	3
PC26.deal with finished components as per organizational guidelines	4	1	3
PC27.complete documentation during and post operations as per organizational procedures	3	1	2
PC28.return all tools and equipment to the correct location on completion of the fitting activities	2	0	2

	PC29.leave the work area in a safe and tidy condition on completion of job activities		2	0	2
		Total	100	21	79
CSC/N1335 Use basic health and safety practices at the workplace	PC1.use protective clothing/equipment for specific tasks and work conditions	100	4	1	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		4	2	2
	PC6.state methods of accident prevention in the work environment of the job role		3	2	1
	PC7.state location of general health and safety equipment in the workplace		5	2	3
	PC8.inspect for faults, set up and safely use steps and ladders in general use		5	2	3
	PC9.work safely in and around trenches, elevated places and confined areas		5	2	3
	PC10.lift heavy objects safely using correct procedures		4	2	2
	PC11.apply good housekeeping practices at all times		5	2	3
	PC12.identify common hazard signs displayed in various areas		3	1	2
	PC13.retrieve and/or point out documents that refer to health and safety in the workplace		4	1	3
	PC14.use the various appropriate fire extinguishers on different types of fires correctly		3	1	2
	PC15.demonstrate rescue techniques applied during fire hazard		3	1	2
	PC16.demonstrate good housekeeping in order to prevent fire hazards		4	1	3
	PC17.demonstrate the correct use of a fire extinguisher		4	1	3
	PC18.demonstrate how to free a person from electrocution		4	1	3
	PC19.administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.		3	1	2
	PC20.demonstrate basic techniques of bandaging		3	1	2
	PC21.respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		3	1	2
	PC22.perform and organize loss minimization or rescue activity during an accident in real or simulated environments		3	1	2

	PC23.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
	PC24.demonstrate the artificial respiration and the CPR Process		3	1	2
	PC25.participate in emergency procedures		4	1	3
	PC26.complete a written accident/incident report or dictate a report to another person, and send report to person responsible		3	1	2
	PC27.demonstrate correct method to move injured people and others during an emergency		4	2	2
		Total	100	36	64
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 effectiveness and efficiency in carrying out tasks		10	3	7
	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