

# Model Curriculum

## 20. Quality Inspector- Forged, Casted and Machined Components

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

OCCUPATION: Quality Inspection

REF ID: CSC/Qo6o1, 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: 'Quality Inspector – Forged, Casted or Machined Components'

QP No. 'CSC/Qo6o1, NSQF Level 4'

Date of Issuance: April 10<sup>th</sup>, 2014

Valid up to : August 30<sup>th</sup>, 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

## TABLE OF CONTENTS

1. Curriculum.....	01
2. Trainer Prerequisites.....	07
3. Annexure: Assessment Criteria.....	08

# Quality Inspector-Forged, Casted and Machined Components

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Quality Inspector-Casted, Forged and Machined Components”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Quality Inspector-Forged, Casted and Machined Components</b>		
<b>Qualification Pack Name &amp; Reference ID. ID</b>	CSC/Qo6o1, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	
<b>Pre-requisites to Training</b>	10 <sup>th</sup> standard pass, preferably Minimum 1 year apprenticeship in production or quality		
<b>Training Outcomes</b>	<b>After completing this programme, participants will be able to:</b> <ul style="list-style-type: none"> <li>• <b>Inspect forged, casted or machine components for visual quality and dimensional accuracy:</b> inspection of forged, casted and machined components to ensure visual quality and dimensional accuracy as per specifications.</li> <li>• <b>Basic health and safety practices at the workplace:</b> identify risks and hazards at workplace, use of PPE, and apply good housekeeping practices, etc.,</li> <li>• <b>Work effectively with others:</b> effectively communicate with others and demonstrate good ethical practices and discipline.</li> </ul>		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Quality Inspector-Forged, Casted and Machined Components” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p><b>Inspect Forged, Casted and Machine Components for Visual Quality and Dimensional Accuracy</b></p> <p><b>Theory Duration</b> (hh:mm) 40:00</p> <p><b>Practical Duration</b> (hh:mm) 100:00</p> <p><b>Corresponding NOS Code</b> CSC/No6o1</p>	<ul style="list-style-type: none"> <li>• Explain manufacturing techniques including forging, casting and other machining processes</li> <li>• Identify various types of ferrous and non ferrous metals and state mechanical properties</li> <li>• Explain material behaviour during forging, casting, fabrication and other machining processes</li> <li>• Explain various types of measurement systems</li> <li>• Undertake numerical operations and calculations</li> <li>• Interpret commonly used geometrical entities</li> <li>• Interpret of symbols, scope, content and application of forging, casting and machining procedure and specification</li> <li>• Explain symbols and conventions used in production drawings</li> <li>• State general principles of quality control principles and procedures</li> <li>• Explain various QC tools including root cause analysis</li> <li>• List various measuring instruments used in inspection –rules, tapes, dividers/trammel, scribes, punches, scribing blocks, squares, protractor, depth gauge, micrometer, vernier calliper, vernier height gauge, feeler gauges, bore/hole gauge, slip gauge, snap gauge, radius/profile gauge, thread gauge, plug gauge, ring gauge, air gauge, surface finish equipment, stick micrometer, dial stand and compactor, temperature indicator, CMM etc.</li> <li>• List various parts of welded fabricated structure for which inspection is required – Fabricated frames, pipe sections, transition pieces, structures, cylindrical components, segmented bends, square/rectangular tanks, conical components, modular components, curved/profile structures, tubular structures etc.</li> <li>• Explain methods of inspection-Visual inspection, physical measurements, chemical tests, checks against patterns, templates and guides, condition of</li> </ul>	<p>Training Kit (PowerPoint, Trainer Guide)</p> <p>rules, tapes, dividers/trammel, scribes, punches, scribing blocks, squares, protractor, depth gauge, micrometer, vernier calliper, vernier height gauge, feeler gauges, bore/hole gauge, slip gauge, snap gauge, radius/profile gauge, thread gauge, plug gauge, ring gauge, air gauge, surface finish equipment, stick micrometer, dial stand and compactor, temperature indicator, CMM, die penetrant tester, hardness tester, coat meter, ultrasonic thickness gauge</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>consumable, leakage testing etc.</p> <ul style="list-style-type: none"> <li>• List various inspection equipment-depth gauge, magnifying glass, adjustable square/protractor, mirror, surface plate/table, vee block, die penetrant tester, hardness tester, coat meter, ultrasonic thickness gauge</li> <li>• Identify joint features for quality inspection –linearity/profile, weld root run, inter –runs, dimensional tolerance, distortion, shrinkage, visual appearance, excess weld metal, undercut, penetration and profile</li> <li>• Calculate allowances for gaps and shrinkages as per the standard procedure</li> <li>• List tools for inspection documents-inspection report, route card, customer specifications document, deviation report, check sheet, control chart, flow chart, run chart etc.</li> <li>• List Personal Protective Equipment required for quality inspection</li> <li>• Identify hazards associated with quality inspection – working at height, enclosed/confined spaces, handling components/structures, slips, trips and falls, sharp tools etc.</li> <li>• Explain the importance of safe working practices</li> <li>• Plan, organize and prioritize sequence of operations as per standard operating procedure</li> <li>• Prepare/collect different product/production related data for inspection</li> <li>• Identify features to be inspected for forged, casted or machined components</li> <li>• Identify the right equipment required for inspection depending on the component feature</li> <li>• Carryout quality inspection and check the conformance to the product specification</li> <li>• Record the results of inspection in appropriate formats</li> <li>• Inform supervisor or competent authority if there are any deviations</li> <li>• Liaise with appropriate authority using correct protocol</li> <li>• Communicate with colleagues and superiors</li> <li>• Use ERP or any other software for quality</li> </ul>	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>control function</p> <ul style="list-style-type: none"> <li>Adapt problem solving techniques</li> <li>Demonstrate team management skills</li> <li>Fill up appropriate technical forms ,activity logs as per the requirement</li> <li>Follow proper communication protocol</li> <li>Communicate with people in respectful manner in line with organizational policy</li> <li>Perform numerical operations, geometry and calculations</li> <li>Maintain current knowledge of application standards, legislation etc.</li> <li>Demonstrate problem solving abilities</li> <li>Plan, organize and sequence work operations as per the job requirement</li> <li>Work in a team to achieve better results</li> </ul>	
2	<p><b>Health and safety</b></p> <p><b>Theory Duration</b> (hh:mm) 10:00</p> <p><b>Practical Duration</b> (hh:mm) 08:00</p> <p><b>Corresponding NOS Code</b> CSC/N1335</p>	<ul style="list-style-type: none"> <li>Explain the importance of personal protective equipment (PPE) required for gas cutting operation</li> <li>State the causes for accidents</li> <li>Identify job site hazardous work and state possible causes of risk or accident at the workplace</li> <li>Explain the importance of '5S' at the workplace</li> </ul>	<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><b>Fire Safety</b></p> <p><b>Theory Duration</b> (hh:mm) 05:00</p> <p><b>Practical Duration</b> (hh:mm) 30:00</p> <p><b>Corresponding NOS Code</b> CSC/N1335</p>	<ul style="list-style-type: none"> <li>Explain types of fires - Class A, B, C and D</li> <li>Select appropriate fire extinguisher to control fire</li> <li>Use PASS method to operate a fire extinguisher</li> <li>Follow fire safety signs and safe evacuation method in case of a fire</li> <li>Identify the location of assembly point, fire exit, fire alarm</li> <li>Follow reporting procedure in case of a fire</li> </ul>	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Class A, B, C, D and K fire extinguishers</p>
4	<p><b>Emergencies, rescue and first aid procedure</b></p> <p><b>Theory Duration</b></p>	<ul style="list-style-type: none"> <li>Follow electrical safety procedures</li> <li>Use approved method to rescue a person from electrocution</li> <li>State the importance of first aid</li> </ul>	<p>Training kit (Trainer guide, PowerPoint)</p> <p>First aid kit with all</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 09:00  <b>Practical Duration</b> (hh:mm) 18:00  <b>Corresponding NOS Code</b> CSC/N1335	<ul style="list-style-type: none"> <li>Identify the contents of a first aid kit and their application</li> <li>Administer first aid in case of bleeding, burns, choking, electrical shock, poisoning, etc.</li> <li>Use of CPR process</li> <li>Bandage wounds</li> <li>Explain stages of crisis and crisis management</li> <li>Prepare an incident report</li> </ul>	contents
5	<b>Work effectively with others</b>  <b>Theory Duration</b> (hh:mm) 20:00  <b>Practical Duration</b> (hh:mm) 60:00  <b>Corresponding NOS Code</b> CSC/N1336	<ul style="list-style-type: none"> <li>Explain the importance of team work and team dynamics</li> <li>State 4Cs of working in a team</li> <li>Explain types of communication</li> <li>Apply effective communication technique</li> <li>Overcome barriers to effective communication</li> <li>Demonstrate active listening skills</li> <li>Demonstrate good customer service skills</li> <li>Explain the importance of ethical behaviour in your day-to-day work</li> <li>State the importance of discipline in life and apply the same at workplace</li> </ul>	Training kit (Trainer guide, PowerPoint)
6	<b>Final Assessment</b>  <b>Theory Duration</b> (hh:mm) 04:00  <b>Practical Duration</b> (hh:mm) 06:00  <b>Corresponding NOS Code</b>	<ul style="list-style-type: none"> <li>To test skills and knowledge</li> </ul>	
	<b>Total Duration</b>  <b>Theory Duration</b> <b>88:00</b>  <b>Practical Duration</b> <b>222:00</b>	<b>Unique Equipment Required:</b> Personal Protective Equipment, rules, tapes, dividers/trammel, scribes, punches, scribing blocks, squares, protractor, depth gauge, micrometer, vernier calliper, vernier height gauge, feeler gauges, bore/hole gauge, slip gauge, snap gauge, radius/profile gauge, thread gauge, plug gauge, ring gauge, air gauge, surface finish equipment, stick micrometer, dial stand and compactor, temperature indicator, CMM, die penetrant tester, hardness tester, coat meter, ultrasonic thickness gauge, 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: "Quality Inspector-Forges, casted and machined components" mapped to Qualification Pack: "CSC/Qo6o1 v1.0"

Sr. No.	Area	Details
1	<b>Description</b>	Inspection of forged, casted and machined components to ensure visual quality and dimensional accuracy as per specifications.
2	<b>Personal Attributes</b>	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	<b>Minimum Educational Qualifications</b>	Degree in Mechanical Engineering
4a	<b>Domain Certification</b>	Certified for Job Role: " <u>Quality inspector-Forged, casted and machined components</u> " mapped to QP: " <u>CSC/Qo6o1, v1.0</u> ". Minimum accepted score is 80%
4b	<b>Platform Certification</b>	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	<b>Experience</b>	<ul style="list-style-type: none"> <li>3-4 years of industry experience in the relevant field</li> <li>3-4 years of teaching experience</li> </ul>

### Annexure: Assessment Criteria

<b>Assessment Criteria</b>	
<b>Job Role</b>	<b>Quality Inspector-Forged, casted and machined components</b>
<b>Qualification Pack</b>	<b>CSC/Qo6o1, v1.0</b>
<b>Sector Skill Council</b>	<b>Capital Goods Skill Council</b>

<b>Sr. No.</b>	<b>Guidelines for Assessment</b>
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
<b>1.CSC/No6o1 Inspect forged, casted and machined components for visual quality and dimensional accuracy</b>	PC1.comply with health and safety, environmental and other relevant regulations and guidelines at work and ensure process compliance	<b>100</b>	4	1	3
	PC2.adhere to procedures or systems in place for risk assessment, occupational standards, personal protective equipment (PPE) and other relevant occupational safety regulations		6	2	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 work area is clean and safe from hazards before and after the job is completed		3	0	3
	PC6. ensure availability of job specification is from a valid source		3	0	3
	PC7.read and establish job requirements from the job specification document		4	0	4
	PC8.prepare and maintain the work area as per procedure or operation specification		6	1	5
	PC9.ensure that all measuring equipment are within calibration date and are approved for usage		3	0	3
	PC10.prepare/collect different production/product related data required for inspection		5	0	5
	PC11.obtain tools and measuring instruments required inspecting the components as per specifications		4	1	3
	PC12.identify and confirm the inspection checks to be made and acceptance criteria to be used		7	2	5
	PC13.identify the correct specification for the product or equipment being inspected		7	2	5
	PC14.identify the features to be inspected for forged, casted or machined components		5	0	5
	PC15.use the correct equipment to carry out the inspection as specified		7	2	5
	PC16.identify any defects or variations from the specification		7	2	5
	PC17.record the results of the inspection in the appropriate format		4	0	4
	PC18.process the records as per organization policy and procedures (validation, reporting and processing, etc.)		6	2	4
	PC19.deal promptly and effectively with problems within one's control and report those that cannot be solved		4	0	4

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC20.refer unresolved job related problems to appropriate personnel for support		4	0	4
	PC21.monitor the problem and keep the supervisor informed about progress or any delays in resolving the problem		4	0	4
	<b>Total</b>		<b>100</b>	<b>16</b>	<b>84</b>
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 in order to prevent fire hazards		3	1	2
	PC16.demonstrate the correct use of a fire extinguisher		4	1	3

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC17.demonstrate how to free a person from electrocution		4	1	3
	PC18.administer appropriate first aid to victims where 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
	<b>Total</b>		<b>100</b>	<b>36</b>	<b>64</b>
<b>3.CSC/N1336 Work effectively with others</b>	PC1.accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	<b>100</b>	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

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	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
	<b>Total</b>		<b>100</b>	<b>30</b>	<b>70</b>
	<b>Grand Total</b>	<b>300</b>	<b>300</b>	<b>82</b>	<b>218</b>
	<b>Percentage Weightage:</b>			<b>27</b>	<b>73</b>
	<b>Minimum Pass% to qualify (aggregate):</b>			<b>60</b>	