

# MODEL CURRICULUM

## CASTING MACHINE OPERATOR

**SECTOR: GEMS & JEWELLERY**  
**SUB-SECTOR: CAST AND DIAMONDS-SET JEWELLERY**  
**OCCUPATION: Casting**  
**REF ID: G&J/Q2801, VERSION 1.0**  
**NSQF LEVEL: 4**



## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

**GEM & JEWELLERY SECTOR SKILL COUNCIL OF INDIA**

for the

### MODEL CURRICULUM

Complying to National Occupational Standards of  
Job Role/ Qualification Pack: **'Casting Machine Operator'** QP No. **'G&J/Q2801 NSQF Level 4'**

Date of Issuance: **October 15<sup>th</sup>, 2016**

Valid up to: **October 14<sup>th</sup>, 2018**

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

*Premkumar Kothari*

Mr. Premkumar Kothari  
Chairman  
(Gem & Jewellery Skill Council of India)

# Casting Machine Operator

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Casting Machine Operator”, in the “Gems & Jewellery” Sector and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Casting Machine Operator</b>		
<b>Qualification Pack Name &amp; Reference ID</b>	G&J/Q2801, Version 1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	Not Applicable
<b>Pre-requisites to Training</b>	Minimally qualified		
<b>Training Outcomes</b>	<p><b>After completing this programme, participants will be able to:</b></p> <ul style="list-style-type: none"> <li>• <b>Operate Casting Machine:</b> Converting wax models to jewellery pieces through investment casting process. Making investment flask, implementing burnout cycle, calculating and weighing the correct amount of alloy, precisely controlling machine parameters to manufacture jewellery with minimal rework, melting and casting the alloy into jewellery pieces.</li> <li>• <b>Respect and maintain IPR:</b> Respecting Intellectual Property Rights of company's products and designs to avoid infringement.</li> <li>• <b>Coordinate with others:</b> Encouraging artisan to work as a team and multitask and communicate with colleagues.</li> <li>• <b>Maintain occupational health and safety:</b> Familiarising artisan towards potential hazards to make work environment safe for everyone.</li> </ul>		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Casting Machine Operator” Qualification Pack issued by “Gem & Jewellery Skill Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p><b>Operate casting machine</b></p> <p><b>Theory Duration</b> (hh:mm) 10:00</p> <p><b>Practical Duration</b> (hh:mm) 230:00</p> <p><b>Corresponding NOS Code</b> G&amp;J/N2801</p>	<ul style="list-style-type: none"> <li>To accurately compute alloy required as per wax tree weight</li> <li>To proportionately use re-cycled and new gold in the alloy making</li> <li>To ensure minimal accidents while handling molten metal</li> <li>To prepare bubble-free investment of flask</li> <li>To constantly monitor furnace temperature for complete burnout cycle duration so that an incomplete process does not lead to casting defects</li> <li>To set machine parameters as per machine specifications prescribed for an alloy To pour metal at the right temperature in manual pouring mode To properly plan casting cycles for the optimum utilisation of machines</li> <li>To minimise rework and precious metal loss in the casting process and timely deliver casted jewellery pieces to next process</li> <li>To produce number of casted jewellery pieces or precious metal tree as per target deliverable and quality approved by the supervisor</li> <li>To produce defect-free casted jewellery pieces and ensure minimum damage to the set stones during casting process</li> <li>To produce Quality Control okayed cast jewellery piece</li> </ul>	<p><b>Mandatory</b> – Casting Machine, Furnace, Graphite Crucible, Flask, Investment Powder, Investment Jar, Jet Machine, Goggles, Gloves (Water Jet &amp; Furnace), Flask Holder, Big/ Small Weighing Machine, Graphite stopper rod, Water jet machine, Investment Machine, Air pressure cutting machine for Tree cutting, Mask, Gold cutting Tray, Gold rod cutter</p> <p><b>Optional</b> - Gold Melting Machine, Timer Machine</p>
2	<p><b>Respect and maintain IPR</b></p> <p><b>Theory Duration</b> (hh:mm) 01:00</p> <p><b>Practical Duration</b> (hh:mm) 02:00</p> <p><b>Corresponding NOS Code</b> G&amp;J/N9901</p>	<ul style="list-style-type: none"> <li>To have good understanding of what is Intellectual Property Rights</li> <li>To know the basics of IPR and patent laws</li> <li>To know prevention and protection of manufacturing techniques practised in the company</li> <li>To have sound knowledge of company policies related to IPR</li> <li>To understand what to do in case of violation of IPR rules</li> <li>To understand what all IPR is inclusive of</li> <li>To know direct relation of IPR violation and its effect on company's competitiveness in market</li> </ul>	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	<p><b>Coordinate with others</b></p> <p><b>Theory Duration</b> (hh:mm) 02:00</p> <p><b>Practical Duration</b> (hh:mm) 02:00</p> <p><b>Corresponding NOS Code</b> G&amp;J/N9902</p>	<ul style="list-style-type: none"> <li>To know reporting structure</li> <li>To know coordinating with supervisor and when to deal with a colleague individually</li> <li>To understand importance of team work</li> <li>To know sharing of workload</li> </ul>	
4	<p><b>Maintain occupational health and safety</b></p> <p><b>Theory Duration</b> (hh:mm) 01:00</p> <p><b>Practical Duration</b> (hh:mm) 02:00</p> <p><b>Corresponding NOS Code</b> G&amp;J/N9905</p>	<ul style="list-style-type: none"> <li>To maintain personal hygiene</li> <li>To maintain cleanliness of bench and tools</li> <li>To understand first aid and emergency procedures</li> <li>To report electrical</li> </ul>	Gloves, Mask, Goggles
	<p><b>Total Duration</b></p> <p><b>Theory Duration</b> 14:00</p> <p><b>Practical Duration</b> 236:00</p>	<p><b>Unique Equipment Required:</b> Casting Machine, Furnace, Graphite Crucible, Flask, Investment Powder, Investment Jar, Jet Machine, Gold Melting Machine, Goggles, Gloves (Water Jet &amp; Furnace), Flask Holder, Timer Machine, Big/ Small Weighing Machine, Graphite stopper rod, Water jet machine, Investment Machine, Air pressure cutting machine for Tree cutting, Mask, Gold cutting Tray, Gold rod cutter</p>	

Grand Total Course Duration: **250 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Gem and Jewellery Skill Council of India](#))

**Trainer Prerequisites for Job role: “Casting Machine Operator” mapped to Qualification Pack: “G&J/Q2801, Version 1.0.”**

Sr. No.	Area	Details
1	<b>Job Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “G&J/Q2801”, Version 1.0.
2	<b>Personal Attributes</b>	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	<b>Minimum Educational Qualifications</b>	10 <sup>th</sup> Standard Passed, preferably
4a	<b>Domain Certification</b>	Certified for Job Role: <u>Casting Machine Operator</u> mapped to QP: “ <u>G&amp;J/Q2801, Version 1.0</u> ”. Minimum accepted score as per SSC guidelines is 80% on the SSC prescribed online theory assessment test based on an industry validated question bank.
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402”. Minimum accepted score for the trainer is 80% as per SSC guidelines.
5	<b>Experience</b>	Minimum 3 years of experience in operating Casting Machine

### Annexure: Assessment Criteria

<b>Assessment Criteria</b>	
<b>Job Role</b>	<b>Casting Machine Operator</b>
<b>Qualification Pack</b>	<b>G&amp;J/Q2801, Version 1.0</b>
<b>Sector Skill Council</b>	<b>Gem &amp; Jewellery Skill Council of India</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 theory question papers for candidates at every examination/training centre. (as per assessment criteria below)
4	Individual assessment agencies will create practical tests for skill evaluation for candidates at every examination/training centre. (as per assessment criteria below)
5	To pass the Qualification Pack, every candidate should score a minimum 70% of aggregate marks to successfully clear the assessment
6	In case of successfully passing only certain number of NOSs, the candidate is eligible to take subsequent assessment on the balance NOSs to pass the Qualification Pack.

Assessment outcomes	Assessment Criteria for outcomes	Marks Allocation			
		Total Marks (80+20)	Out Of	Theory	Skills Practical
1. G&J/N2801 Operate the casting machine	PC1. Accurately compute alloy required as per wax tree weight	<b>80</b>	3	1	2
	PC2. Proportionately use re-cycled and new gold in the alloy making		6	1	5
	PC3. Ensure minimal accidents while handling molten metal		4	1	3
	PC4. Mix of all the required materials such as PoP, boric acid and DM water for investment process as per industry standards		12	2	10
	PC5. Prepare bubble-free investment of flask		7	2	5
	PC6. Constantly monitor furnace temperature for complete burnout cycle duration so that an incomplete process does not lead to casting defects		13	3	10
	PC7. Set machine parameters as per machine specifications prescribed for a particular alloy		12	2	10
	PC8. Pour metal at the right temperature in manual pouring mode		5	2	3
	PC9. Properly plan casting cycles for the optimum utilisation of machines		4	1	3
	PC10. Minimise rework and precious metal loss in the casting process		2	0	2
	PC11. Timely deliver casted jewellery pieces to next process		2	0	2
	PC12. Produce number of casted jewellery pieces or precious metal tree as per target deliverable and quality approved by the supervisor		2	0	2
	PC13. Produce defect-free casted jewellery pieces		2	0	2
	PC14. Ensure minimum damage to the set stones during casting process		2	0	2
	PC15. Produce Quality Control okayed cast jewellery piece		2	0	2
	PC16. Deliver casted jewellery pieces on time by reporting problems faced or anticipated well in advance		2	0	2
		<b>Total</b>	<b>80</b>	<b>15</b>	<b>65</b>
2. G&J/N9901 Respect and maintain IPR	PC1. Be able to spot plagiarism and report	<b>7</b>	2	1	1
	PC2. Be aware of patents and IPR		4	1	3



	PC3. Not be involved in IPR violations		1		1
		<b>Total</b>	<b>7</b>	<b>2</b>	<b>5</b>
3. G&J/N9902 Coordinate with others	PC1. Understand the work output requirements	<b>7</b>	1	0	1
	PC2. Comply with company policy and rule		2	1	1
	PC3. Deliver quality work on time as required by reporting any anticipated reasons for delays		1	0	1
	PC4. Put team over individual goals		0	0	0
	PC5. Be able to resolve conflicts		1	0	1
	PC6. Learn how to multi-task relevant activities		2	1	1
		<b>Total</b>	<b>7</b>	<b>2</b>	<b>5</b>
4. G&J/N9905 Maintain occupational health and safety	PC1. Spot and report potential hazards on time	<b>6</b>	1	0	1
	PC2. Follow company policy and rules regarding use of hazardous materials		2	0	2
	PC3. Attend and actively participate in the health and safety campaigns organised by the company		1	0	1
	PC4. Use or wear safety gear as per the rules of the company		2	1	1
	<b>Sub Total</b>		<b>6</b>	<b>1</b>	<b>5</b>
	<b>Grand Total</b>		<b>100</b>	<b>20</b>	<b>80</b>
	<b>Percentage Weightage:</b>			<b>20%</b>	<b>80%</b>
	<b>Minimum Pass % to qualify (aggregate):</b>				<b>70%</b>