APPRENTICESHIP CURRICULUM (OPTIONAL TRADE)

Rubber

Machine Operator_Plastic Injection Moulding

Course Code: CO072200043

☒NAPS ☐Non-NAPS

NSQF Level: 4

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Course Details

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<tr><td>1.</td><td>Course Name</td><td>Machine Operator_Plastic Injection Moulding</td></tr>
<tr><td>2.</td><td>Course Code</td><td>CO072200043</td></tr>
<tr><td rowspan="2">3.</td><td>Apprenticeship Training Duration:
(2 to 4 weeks of BT is embedded in this duration as per the requirement of the establishment)</td><td>Months: 12 Months</td></tr>
<tr><td>Remarks</td><td></td></tr>
<tr><td>4.</td><td>Credit</td><td>TBD</td></tr>
<tr><td>5.</td><td>NSQF Level (Mandatory for NAPS)</td><td>4 NSQC Approval Date: 20/07/2016</td></tr>
<tr><td>6.</td><td>Related NSQF aligned qualification details</td><td>
<table>
<tr><th>S. No.</th><th>QP/ Qualification/ NOS Name (As applicable)</th><th>QP/ NOS Code & Version</th><th>NQR Code</th></tr>
<tr><td>1.</td><td>Machine Operator Plastic Injection Moulding</td><td>RSC/Q4502_V1.0</td><td>2021/CP/CIPET/04623</td></tr>
</table>
</td></tr>
<tr><td>7.</td><td>Brief Job Role Description</td><td>The individual at work sets up and operates the Injection moulding machine to produce good quality products from Plastics materials.</td></tr>
<tr><td>8.</td><td>NCO-2015 Code & Occupation (Access the NCO 2015 volumes from: https://labour.gov.in/organizationsofmole/directorate-general-employment-training-dget)</td><td>Injection Moulding</td></tr>
<tr><td>9.</td><td>Minimum Eligibility Criteria
(Educational and/ or Technical Qualification)</td><td>Class VIII Passed</td></tr>
<tr><td>10.</td><td>Entry Age for Apprenticeship</td><td>18 Years</td></tr>
<tr><td>11.</td><td>Any Licensing Requirements (wherever applicable)</td><td>NA</td></tr>
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<table>
<tr><td>12.</td><td>Is the Job Role amenable to Persons with Disability</td><td>☐ Yes ☒ No
If yes, check the applicable type of Disability

<table>
<tr><td>☐ Locomotor Disability</td><td>☐ Leprosy Cured Person</td><td>☐ Cerebral Palsy</td><td>☐ Dwarfism</td><td>☐ Muscular Dystrophy</td></tr>
<tr><td>☐ Acid Attack Victims</td><td>☐ Blindness</td><td>☐ Low Vision</td><td>☐ Deaf</td><td>☐ Hard of Hearing</td></tr>
<tr><td>☐ Speech and Language Disability</td><td>☐ Intellectual Disability</td><td>☐ Specific Learning Disabilities</td><td>☐ Autism Spectrum Disorder</td><td>☐ Mental Illness</td></tr>
<tr><td>☐ Multiple Sclerosis</td><td>☐ Parkinson's Disease</td><td>☐ Haemophilia</td><td>☐ Thalassemia</td><td>☐ Sickle Cell Disease</td></tr>
<tr><td>☐ Multiple Disabilities</td><td></td><td></td><td></td><td></td></tr>
</table>
Remarks:</td></tr>
<tr><td>13.</td><td>Submitting Body Details</td><td>Name: Rubber, Chemical & Petrochemical Skill Development Council
E-mail ID: ceo@rcpsdc.in
Contact Number: 011-41009347- 48</td></tr>
<tr><td>14.</td><td>Certifying Body</td><td>Rubber, Chemical & Petrochemical Skill Development Council</td></tr>
<tr><td>15.</td><td>Employment Avenues/Opportunities</td><td>Plastic product manufacturing company, Plastic furniture, construction, sports and leisure industry.</td></tr>
<tr><td>16.</td><td>Career Progression</td><td>Warehouse Supervisor and Academic progressionto Level 5 program</td></tr>
<tr><td>17.</td><td>Trainer’s Qualification & Experience:</td><td>Any Graduate preferably in rubber or polymer and 5+ year Experience</td></tr>
</table>

18.	**Curriculum Creation Date**	12/07/2022
19.	**Curriculum Valid up to Date**	31/Dec/2024

Module Details

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
1.	**Introduction**	• Evaluate the history of development of plastic products • Describe current industrial scenario of plastics and prospects • Identify types of plastic • List major industrial associations related to injection moulding • Describe roles and responsibilities for a machine operator – plastic injection moulding.	0	0	0	0
2.	**Understand basic concept, job requirements and basics know how related to the Injection moulding process RSC/N4501_V1**	• Interact with the operator to assess the production schedule • Plan the day's production activities based on the operator's instructions • Ensure availability of consumables and plastics materials for production in sufficient quantity as per production plan/operators instructions • Comply with the moulding procedure and process to be adopted for completing the work order from the operator • Ensure that the required material is procured from the store before starting the process • Assess the does and don'ts of the manufacturing process as defined in SOPs • Demonstrate the use of the personal protective equipment (PPE) like gloves, goggles etc. • Manage the mould required to execute the moulding operation • Ensure that the same is available for operation • Organize the mould from tool room If mould is not available • Demonstrate how to install and bolt the mould in place and slide the safety door shut	50	25	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Practise adding the raw material in the machine using material loader or by manual feeding Ensure moulds are clean and if not, clean with soft cotton cloth • Ensure that cleaning of other auxiliary's tools, (if any) before the initiation of the moulding and trimming process • Practise cleaning of the area around the apparatus for any oil, grease, combustible substances etc. • Ensure that coolant in the valves is working properly • Identify the raw material like plastics granules, fillers, bonding additives etc. required for executing the activity • Discuss with your supervisor to resolve an issue that cannot be done by the operator • Clarify all doubts and queries before the actual execution process starts				
3.	**Perform the Injection molding related operations, monitor process parameters and troubleshoot the process/product if any RSC/N4505_V1**	• Assess the operation of moulding apparatus like hopper, heaters etc. as per the checklist provided • Demonstrate how to repair the mould to the injection moulding machine in order to achieve the desired operation • Adjust the process parameters (by selecting the right program from the machine control system) if required • Ensure alignment with the prescribed standards • Perform preheating of plastic granules (In case of Engineering plastics) • Ensure that the plastic granules are mixed with additives (if any) before being fed into the hopper • Practise how to feed the required operation code in the apparatus for heaters to melt the plastic granules at the predefined temperature • Demonstrate a test process	100	155	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Design a sample output as per the required guidelines • Ensure that the dimensions of the output product are measured as per the process given in the Work Instructions/ SOP • Ensure that the product matches the dimensions • Ensure the quality of the final output • Perform the production process • Perform troubleshooting of the process as per SOP • Setup moulding temperature, volume of plastic and weight settings in the machine as per data sheet • Setup machine and process parameters such as moulding pressure and time as per the data sheet • Construct master batch and regrind raw material as per standard composition • Perform mixing operations • Ensure the procedure to ensure quality of final product				
4.	**Conduct quality checks and inspection of the finished products with reference to the approved product RSC/N4506_V1**	• Compare texture, colour, surface properties, hardness and strength etc. with the given approved product • Practice recording the observations of the basic inspection process • Identify pieces which are OK and also not meeting the specified standards • Practice rejecting the batch which are beyond repair and repair the ones which need minor modifications • Maintain records of each category of work outputs as per the batch etc., so that correction can be organized • Organize linkage between rejection of output and the pertinent causes for the same (process/ material etc.)	30	100	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Practice repairing minor defects like dimension variation, thickness variation etc. by control process parameters etc. • Escalate all issues related to change in surface properties, tensile strength etc. so that the manufacturing equipment can be reset • Manage first and last output from each batch to the lab for quality check on its composition, properties etc. • Organize clearance for the entire batch from the lab requirement of the clients and assess one's own unique selling proposition • Assess critical market information that is otherwise not in the public domain • Choose appropriate buyer in a given situation of market parameters • Identify best ways of attracting market price for one's produce • Ensure quality before and during the sale activity to ensure good returns				
5.	**Basics of computer and data entry in MS OFFICE/office Open source suite Software RSC/N4504_V1**	• Perform data handling process such as entering data, tracking data, documenting, reporting, etc. using various MS office tools • Perform scan operations on source documents in accordance with specific instructions. • Validate data entered with source documents, checks for compliance and correct all typographical errors • Manage files of source documents or other information • Update database to reflect most current source information • Assist in the filing and storage of security and back up files • Practice ways to access relevant files based on requests	25	15	70%	70%
6.	**Maintain basic health and safety practices at the workplace, 5S**	Discuss the job role of an Injection Moulding Operator • Comply with environmental and safety policies of organisation • Identify personal safety, job safety and machine safety procedures	10	30	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
	RSC/N4101_V1	• Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all • Identify and correct any hazards like illness, accidents, fires or any other natural calamity safely. • Demonstrate safe working practices while dealing with hazards • Practice good housekeeping practices at all times • Demonstrate rescue techniques applied during fire hazard • Demonstrate the correct use of a fire extinguisher. • Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise • Identify areas in the plant which are potentially hazardous / unhygienic in nature. • Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine. • Practice how to create awareness amongst others by sharing information on the identified risks. • Demonstrate the sorting process and check that the tools, fixtures and jigs that are lying on workstations are the ones in use and un- necessary items are not cluttering the workbenches or work surfaces. • Categorize the types of wastes • Demonstrate the technique of waste disposal and waste storage in proper bins as per SOP • Segregate the items which are labelled as red tag items for the process area and keep them in the correct places • Categorize the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers				

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Practice proper stacking of various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required • Identify the floor markings/ area markings used for demarcating the various sections in the plant • Practice proper labelling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents • Validate the items in the respective areas • Comply with the given instructions and check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same. • Organize all material and tools in the designated places as indicated in the 5S instructions				
7.	**Entrepreneurship in Injection moulding RSC/N4507_V1.0**	• Plan with reference to various components of injection moulding • Maintain books of accounts and various transactions • Organize financial assistance from various quarters in the light of various schemes available • Justify the prices of various inputs and products from the market • Assess the influence of various quality parameters of products on the product pricing • Maintain cordial relations with various clients for the benefit of industry • Assess the needs and requirement of the clients and assess one's own unique selling proposition • Assess critical market information that is otherwise not in the public domain • Choose appropriate buyer in a given situation of market parameters • Identify best ways of attracting market price for one's produce • Ensure quality before and during the sale activity to ensure good returns	20	40	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		Class Room equipment: LCD Projector/Screen, Computer, charts, Black / White board and Duster. **Personal Protective equipment:** Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines				
	Total Marks		**235**	**365**		

Glossary

Term	Description
Sector	Sector is a conglomeration of different business operations
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.

Acronyms

Acronym	Description
NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Annexure 1: Tools and Equipment

List of Tools and Equipment

The tools and equipment required are:

Sno	Tool / Equipment Name	Quantity for specified Batch size (as per batch of 30 trainees)
1	Helmet	30
2	Air Compressor	1
3	Hot air blow Gun	1
4	Cooling Tower	1
5	Crane	1
6	Injection Moulding Machine	1
7	PP	5
8	Mould Temperature Controller	1
9	Two plate mould	2
10	Scrap Grinder	1
11	Dryer	1
12	Micrometer	4
13	Steel measuring tape	4
14	Weighing Balance	1
15	Hammer	2
16	screw driver set with Multiple heads,	4
17	Allen key hexagonal	4

18	Projector/Screen	1
19	Steel Ruler	4
20	Black / White board	1
21	Vernier Caliper	4
22	Hacksaw	4
23	Adjustable spanner single side	4
24	Spanner set double side,	4
25	Fire Extinguisher	1
26	Apron,	10
27	Feeler gauge	4
28	Radius gauge	1
29	File Sets,	4
30	First Aid Box with Medicines	1
31	Injection grade.	5
32	HDPE	2
33	Three Plate mould	1
34	Hand mould	2
35	Hot air oven	1
36	Safety Goggles	4
37	Gloves	4

Classroom Aids

The aids required to conduct sessions in the classroom are:

1 Projector
2 Computer/laptops
3 Internet connectivity
4 Whiteboard

Annexure 2: Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records
- If the batch size is more than 30, then there should be 2 Assessors.

Testing Environment: Assessor must:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME should be verified by the other subject Matter Experts along with the approval required from SSC
- Questions are mapped with NOS and PC
- Question papers are prepared considering that level 1 to 3 is for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management Apprenticeship Curriculum: NAPS Jr. Machine Operator – CNC Milling of Plastic Page 20 of 14

- Assessor must be ToA certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

Method of verification or validation:

- Surprise visit to the assessment location
- Random audit of the batch
- Random audit of any candidate

Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage and are stored in the Hard Drive

On the Job:

1. Assessment for on the job training to be conducted by the industry partner on the practical competency output defined in the NOS/QP and the assessment criteria.
2. The candidate must score 70% in each module to complete the OJT.
3. Tools of Assessment that can be used are:
   a. Videos of Trainees during OJT should be shared by employer to RCPSDC.
4. Assessment will ensure that the apprentice will be able to:
   a. Work effectively and efficiently as per schedules and timelines while complying with the health and hygiene norms.
   b. Implement safety practices.
   c. Optimize the use of resources to ensure less wastage and maximum conservation.
   d. Communicate effectively and develop interpersonal skills.