APPRENTICESHIP CURRICULUM (OPTIONAL TRADE)

Rubber

Rubber_Injection Moulding Operator

Course Code:

☒NAPS ☐Non-NAPS

NSQF Level: 4

Contents

Course Details

<table>
<tr><td>1.</td><td>Course Name</td><td>Rubber_Injection Moulding Operator</td></tr>
<tr><td>2.</td><td>Course Code</td><td>CO072200142</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: 25/06/2020</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>Rubber Injection Moulding Operator</td><td>RSC/Q0207_V3</td><td>2020/RUB /RSDC/03781</td></tr>
</table>
</td></tr>
<tr><td>7.</td><td>Brief Job Role Description</td><td>The Rubber Injection Moulding Operator is responsible for setting up the injection moulding machine and for feeding the rubber compound strips into it.</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>NCO-2004/NIL</td></tr>
<tr><td>9.</td><td>Minimum Eligibility Criteria
(Educational and/ or Technical Qualification)</td><td>8th 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>
</table>

12.	**Is the Job Role amenable to Persons with Disability**	☐ **Yes** ☒ **No** **If yes, check the applicable type of Disability** ☐ **Locomotor Disability** ☐ **Leprosy Cured Person** ☐ **Cerebral Palsy** ☐ **Dwarfism** ☐ **Muscular Dystrophy** ☐ **Acid Attack Victims** ☐ **Blindness** ☐ **Low Vision** ☐ **Deaf** ☐ **Hard of Hearing** ☐ **Speech and Language Disability** ☐ **Intellectual Disability** ☐ **Specific Learning Disabilities** ☐ **Autism Spectrum Disorder** ☐ **Mental Illness** ☐ **Multiple Sclerosis** ☐ **Parkinson's Disease** ☐ **Haemophilia** ☐ **Thalassemia** ☐ **Sickle Cell Disease** ☐ **Multiple Disabilities**
		Remarks:
13.	**Submitting Body Details**	**Name:** Rubber, Chemical & Petrochemical Skill Development Council **E-mail ID:** ceo@rcpsdc.in **Contact Number:** 011-41009347- 48
14.	**Certifying Body**	Rubber, Chemical & Petrochemical Skill Development Council
15.	**Employment Avenues/Opportunities**	Rubber manufacturing units in India: The apprentice may be employed with the biggest player of the trades and be a part of their manufacturing set and deliver quality work. Rubber Injection Moulding Unit: The apprentice may be encouraged to set up their own rubber injection moulding unit and be able to sell injection moulded rubber parts. Education and Training: They may also take up the role of the instructor in this

		field where they can impart their manufacturing knowledge to the aspiring students.
16.	**Career Progression**	Rubber Injection Moulding Operator level role which lead supervisory level in moulding/curing process in rubber products manufacturing process
17.	**Trainer's Qualification & Experience:**	Trainer Prerequisites for Course: Injection Moulding Operator
18.	**Curriculum Creation Date**	25 July 2022
19.	**Curriculum Valid up to Date**	17 Oct 2024

Module Details

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
1.	Introduction	• Describe various stages of rubber developmental history. • Explain current industrial scenario of rubber and its prospects in future. • Identify different types of rubber. • Describe usage of rubber for making different products. • Recognise major industrial associations and their functions. • Identify equipment used for the rubber injection moulding operation. • Describe role and responsibilities of a rubber injection moulding operator.	0	0	0	0
2.	Prepare injection moulding machine RSC/N0701_V2	• Describe the details required for a production plan, such as: - Material to be produced - Quantity to be produced - Time required for production • Describe the rubber injection moulding production plan to be produced with product sequence details. • Describe the functions and use of tools and equipment required for rubber injection moulding such as: - Injection moulding machine - Mould/ dye - Mould release agent spraying gun - Compressor - Rubber compound feeding device • Identify the tools and equipment required for rubber injection moulding. • Carry out cleaning of tools and equipment used for rubber injection moulding operation. • Describe how the injection moulding machine works. • Carry out the checking of the functions of the rubber injection moulding machine. • Describe the material requirement for an injection moulding operation, such as: - Compound - Mould release agent - Material insert (as per product design) • List the quality check points for the raw material, such as: - Compound batch number - Compound identification details	40	60	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		- Compound Expiry date - Quality approval status • Describe importance of different process parameters of injection moulding machine, such as: - Temperature - Pressure - Duration of moulding • Perform the setting of the parameters on the injection moulding machine. • Identify the correct mould as per production plan with the help of product part number. • Describe the process of setting the mould on injection moulding machine as per the production plan				
3.	Perform injection moulding operation RSC/N0702_V2	• Explain the process of checking the injection moulding press parameters against specification sheet. • Describe the use and importance of mould release agent. • Describe the importance of applying the mould release agent appropriately as per the SOP. • Describe the implication of contamination during injection moulding process. • Describe the process of loading the compound in the mould as per SOP • Perform the compound loading in the mould as per the SOP to minimize material overflow/ wastage/excess flash. • Explain the significance and process of controlling the temperature and pressure during injection moulding process • Perform temperature and pressure control during the injection moulding process as per the specification. • Describe the steps involved in the process of rubber injection moulding, such as: - Compound loading in the mould cavity. - Injection moulding cycle running. - Unloading the finished parts from the mould. • Demonstrate rubber injection moulding process as per the standard operating procedures (SOP) of organisation. • List the safety norms, such as – wearing shoes, hand gloves, safety goggles.	60	40	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Explain the significance and process of storage of all balance unused left- over ingredients properly to avoid any contamination.				
4.	Undertake postinjection moulding activities RSC/N0703_V2	• Explain the significance of removal of cured product from the mould cavity after the moulding cycle completion. • Describe the implication of mould compound flash in product quality. • Explain the significance of removal of the compound flash from the mould and ensure clean mould for next cycle as per the SOP. • Demonstrate the trimming of the moulded piece to remove flash safely or the product as per SOP • Describe various surface treatment, such as: - Phosphating - Plating – Zinc, Nickel, etc. • Describe the process of surface treatment of the cured product as per the SOP. • Describe the FIFO (First In First Out) principle and its importance in rubber processing. • Apply identification and traceability tag as per the organisation's SOP. • Describe the sample selection process as per the organisation's SOP. • Demonstrate the process of cleaning tools and equipment at shift end. • Describe the process of handover of the equipment to the next shift operator with complete details, such as: - Production plan for the day and plan completed in the previous shift - Any problem observed in the machine or other equipment - Material under work in process	40	60	70%	70%
5.	Carry out housekeeping RSC/N5001	• Explain the importance and purpose of housekeeping. • Describe the meaning of '5S.' • Demonstrate the methodology of each 'S' in 5S philosophy of housekeeping. • Identify housekeeping equipment. • Demonstrate the housekeeping of machines, tools, equipment and work area with the specified equipment and material.	40	60	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Prepare the machines and work area for 5S audit as per the organisation's Standard Operating Procedure (SOP).				
6.	Carry out reporting and documentation RSC/N5002	• Explain the importance of documentation. • Explain the importance of reporting. • Create the reports for operations related issues. • Describe policies and guidelines of the organization. • Describe the purpose of procedures in an organization. • Explain organisation's work instructions related to finishing and packaging operations. • Describe the principles of effective communication while communicating at workplace. • Explain the ways of overcoming general problems encountered in communication at workplace. • Describe active listening skills and their components. • Describe the best practices to be followed for effective writing. • Describe the ways to resolve conflict within a team. • Determine priority of work from the pending work list as per the work management principles.	40	60	70%	70%
7.	Carry out quality checks RSC/N5003	• Describe the need of quality control in the rubber injection moulding operation. • Identify appropriate measuring and inspection instrument for the inspection of an injection moulded part. • Describe the process of regular calibration status check of the measuring equipment with the standard equipment. • Describe the injection moulding parts defects and their causes, such as: - Blistering - Short moulding - Chips - Contamination - Dull finish - Rough and uneven patches - Thick flashes • Identify defects generated during a rubber injection moulding operation. • Describe the implication of process parameter on product quality.	35	65	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Demonstrate in-process inspection during a rubber injection moulding operation. • Describe implications of the quality issues generated during a rubber injection moulding operation.				
8.	Carry out problem identification and escalation RSC/N5004	• Describe regular problems encountered during a rubber injection moulding operation, such as: - Machine maintenance issue - Raw material non-availability - Manpower non-availability - Quality issue in raw material - Quality issue in material produced • Explain how to deal with various problems during a rubber injection moulding operation. • Describe the purpose of hierarchy in a rubber manufacturing organisation. • Describe the process of escalating problem during a rubber injection moulding operation.	45	55	70%	70%
9.	Carry Out Health & Safety RSC/N5007	• Identify various hazards in a rubber industry. • Explain the health and safety requirements for a rubber industry. • Discuss requirement of Personal Protective Equipment (PPE) in rubber industry. • Identify different types of Personal Protective Equipment (PPE) used in the rubber industry. • Demonstrate the use of different Personal Protective Equipment (PPE). • Describe various emergency situations in the rubber industry. • List the common injuries in the rubber industry. • List the constituents of a first-aid box. • Demonstrate how to handle fire emergencies. • Select suitable fire extinguisher as per fire type and class. • Demonstrate how to use a multi-purpose fire extinguisher.	30	70	70%	70%
	Total Marks		**330**	**470**		

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	Specification (per batch of 30 trainees)
1	Asbestos gloves, brass screw drivers with flat head	10
2	Injection moulding machine, Molds	1

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.