







Model Curriculum

QP Name: Machine Operator – Injection Moulding (MO-IM)

NQR Code: QG-3.5-CP-04117-2025-V2-CIPET

QP Version: 2

NSQF Level: 3.5

Model Curriculum Version: 1

Sector: Chemicals & Petrochemicals (CPC)

Central Institute of Petrochemicals Engineering & Technology (CIPET)

Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India CIPET Head office, T.V.K Industrial Estate, Guindy, Chennai – 600 032.







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Training Parameters

Sector	Cher	micals & Petrochemicals (CPC)					
Sub-Sector	Petr	Petrochemicals					
Occupation	Mac	Machine Operator - Injection Moulding					
Country	India	India					
NSQF Level	3.5						
Aligned to NCO/ISCO/ISIC Code	NCO	-2015/8142.0501					
Minimum Educational Qualification and Experience	S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)				
Experience	1	Grade 11 th	No Experience required				
	2	Grade 10 th or equivalent	1.5 years relevant experience				
	3	8 th grade	4.5 years relevant experience				
		Previous relevant Qualification of NSQF Level 3	1.5 years relevant experience				
Pre-Requisite License or Training	Not	applicable					
Minimum Job Entry Age	18 Y	ears					
Last Reviewed On							
Next Review Date							
NSQC Approval Date							
QP Version	1						
Model Curriculum Creation Date							
Model Curriculum Valid Up to Date							
Model Curriculum Version	1						
Minimum Duration of the Course	600	Hrs.					
Maximum Duration of the Course	600	Hrs.					







Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

After the successful completion of session, the trainee will be able to

- Understand the Basic concepts, job requirements related to Injection Moulding process
- Understand and operate Injection moulding related process parameters, troubleshoot the process/product
- Conduct quality checks and inspection
- Maintain basic Health, Safety Practices at workplace, 5S.
- Understand concept of Entrepreneurship in injection moulding
- Study and operate Computer and do Data entry in MS OFFICE/ open source suite







Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Module 1: CPC/N0214 - Understand basic concepts, job requirements & basics knowhow related to process	30:00	60:00	00:00	00:00	90:00
Module 2: CPC/N0215 - Perform the Injection moulding related operations, monitor process parameters and troubleshoot the process/ product if any	60:00	180:00	00:00	00:00	240:00
Module 3: CPC/N 0222- To conduct quality check and inspection of the Finished products with reference to approved product	30:00	60:00	00:00	00:00	90:00
Module 4: CPC/N0411: Maintain basic Healthy & safety practices at Workplace,5S	30:00	30:00	00:00	00:00	60:00
Module 5: CPC/N 0223: Entrepreneurship in Injection Moulding	15:00	15:00	00:00	00:00	30:00
Module 6: CPC/N0219 Basics of MS Office / Open Source office suite software	15:00	15:00	00:00	00:00	30:00
Module 7: DGT/VSQ/N0101: Employability Skills	30:00	00:00	00:00	00:00	30:00
Module 8: On-the-Job Training	00:00	00:00	30:00	00:00	30:00
Total Duration	210:00	360:00	30:00	00:00	600:00







Module Details

Module 1: CPC/N0214 -Understand basic concepts, job requirements & basics knowhow related to process

Mapped to:

Terminal Outcomes:

- Understanding the work order and the process requirement from the supervisor
- Arranging the required raw material and Moulds for the process
- Cleaning the equipment and the Moulds

Duration: 30:00 Hours	Duration : 60:00 Hours			
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes			
 Interact with the supervisor in order to understand the production schedule Help in planning the day's production activities based on the supervisor's instructions Follow the molding procedure and process to be adopted for completing the work order from the supervisor by referring to the Work Instruction document/ SOP manual. Mould required for executing the required operation and ensure that the same is available for operation. Collect the mould from the tool room If mould is not available . Understand the raw material like plastics granules, fillers, bonding additives etc. required for executing the activity 	 Availability of consumables and plastics materials for production in sufficient quantity as per production plan/supervisor instructions. Understanding the does and don'ts of the manufacturing process as defined in SOPs/Work Instructions or defined by supervisors. Understand the Mould required for executing the required operation and ensure that the same is available for operation. Cleaning of the other auxiliaries tools, (if any) before the initiation of the moulding and trimming process Cleaning of the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident Availability of the coolant and working of valves to circulate the coolant to cool and solidify plastic Understand the raw material like plastics granules, fillers, bonding additives etc. required for executing the activity 			

Classroom Aids:

LCD Projector/Screen, Computer, charts, Black / White board & Duster.

Tools, Equipment and Other Requirements

Steel rule 15 cm with metric Graduations, Measure Tape, Outside, inside spring caliper, Screwdriver 15 cm, Screwdriver set, D/E spanner set inch & mm, Allen key set inch & mm, Hand Hacksaw frame adjustable, Flat file second cut & smooth, Half round file second cut & smooth, Needle file rough & smooth, Micrometer 0-25 mm, Vernier caliper, Thickness gauge, Safety PPE's like apron, gloves etc.







$\frac{\text{Module 2: CPC/N0221 - Perform the Injection moulding related operations,}}{\text{monitor process parameters and troubleshoot the process/product if any}}$

Mapped to:

Terminal Outcomes:

- Checking the operations of the equipment
- Feeding the granules as per requirement
- Set up and operate the Injection moulding machine
- Perform visual inspection of the output products
- Achieve productivity, quality and safety standards as per company's norms

Duration : 60:00 Hours	Duration : 180:00 Hours
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
 Check for operation of molding apparatus like hopper, heaters etc. as per the checklist provided Make modifications in the process parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards Ensure that the plastic granules are mixed with additives (if any) before being fed into the hopper Conduct a test process and produce a sample output as per the required Ensure that the dimensions of the output product are measured as per the process given in the Work Instructions/ SOP Feed the required operation code in the apparatus for heaters to melt the plastic granules at the predefined temperature Enter moulding temperature, volume of plastic and weight settings in the machine as per data sheet Enter machine and process parameters such as moulding pressure and time as per the data sheet 	 Operation of molding apparatus like hopper, heaters etc. as per the checklist provided Fixing the desired Mould to the injection moulding machine in order to achieve the desired operation as per the Work Instructions/ SOPs Modifications in the process parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards To Ensure that the plastic granules are mixed with additives (if any) before being fed into the hopper To ensure that the dimensions of the output product are measured as per the process given in the Work Instructions/ SOP under guidance of the operator. Production process as instructed by operator. Feed the required operation code in the apparatus for heaters to melt the plastic granules at the predefined temperature Run the machine in Semi-Auto or Automatic mode of operation as guided by the operator. Check-list procedure to ensure quality of final product

Classroom Aids:

Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Duster

Tools, Equipment and Other Requirements

Hand operated Injection Moulding Machine, Semi Auto Vertical Injection Moulding Machine, Semi Auto Horizontal Injection Moulding machine, Fully Auto Injection Moulding Machine, Microprocessor based Injection Moulding Machine, Automatic Hopper Loader, Oven / Drier, Dehumidifier, Colour Blender, Mould Temperature Controller, Scrap Grinder, Hydraulic Trainer, Pneumatic Trainer, Hot air gun, Blow lamp, Weighing balance, Moulds – two plate, three plate, split mould etc. for automatic injection moulding & hand, moulds, Mould polishing kit, Cooling tower, Hydraulic Trolley, Crane, Chilling Unit, Utility equipment (Cooling Circuit), Steel rule 15 cm with metric Graduations, Measure Tape, Outside, inside spring calliper, Screwdriver 15 cm, Screwdriver set, D/E spanner set inch & mm, Allen key set inch & mm, Hand Hacksaw frame adjustable, Flat file second cut & smooth, Half round file second cut & smooth, Needle file rough & smooth, Micrometre 0-25 mm, Vernier caliper, Thickness gauge, Safety PPE's like apron, gloves etc







Module 3: CPC/N0222- To conduct basic quality check and Inspection of finished products with reference to approved product

Mapped to:

Terminal Outcomes:

- Inspecting the finished components
- keeping records of production and defects
- conducting minor repair/deflashing if any on output parts which can be reworked
- The role holder will interact with the maintenance team and material management team.

Duration : 30:00 Hours	Duration: 60:00 Hours		
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes		
 Compare texture, colour, surface properties, hardness and strength etc. with the given approved product Note down the observations of the basic inspection process and Identify pieces which are OK and also not meeting the specified standards Maintain records of each category of work outputs as per the batch etc. so that correction can be organized. Rectify minor defects like dimension variation, thickness variation etc. by control process parameters etc. 	 Compare texture, colour, surface properties, hardness and strength etc. with the given approved product. Rectify minor defects like dimension variation, thickness variation etc. by controlling process parameters etc and informing operators. Provide first and last output from each batch to the lab for quality check on its composition, properties etc. Obtain clearance for the entire batch from the lab and submit the operator. 		
Classroom Aids:			

-Classroom Aids:

Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Duster

Tools, Equipment and Other Requirements

Semi Auto Vertical Injection Moulding Machine, Semi Auto Horizontal Injection Moulding machine, Fully Auto Injection Moulding Machine, Microprocessor controlled Injection Moulding Machine, Automatic Hopper Loader, Oven / Drier, Weighing balance, Moulds - two plate, three plate, split mould etc. for automatic injection moulding & hand, moulds, Mould polishing kit, Cooling tower, Hydraulic Trolley, Crane, Chilling Unit, Utility equipment (Cooling Circuit), Steel rule 15 cm with metric Graduations, Measure Tape, Outside, inside spring calliper, Screwdriver 15 cm, Screwdriver set, D/E spanner set inch & mm, Allen key set inch & mm, Hand Hacksaw frame adjustable, Flat file second cut & smooth, Half round file second cut & smooth, Needle file rough & smooth, Micrometre 0-25 mm, Vernier calliper, Thickness gauge, Safety PPEs like apron, gloves etc.







Module 4: CPC/N0411- Maintain basic health and safety practices at the workplace, 5S. *Mapped to:*

Terminal Outcomes:

- Health and safety procedure.
- Fire safety procedure.
- Emergencies, rescue and first aid procedures.
- Ensure sorting, stream lining, storage and documentation, cleaning, standardization and sustenance across the plant premises of the organization.

Duration: 30:00 Hours	Duration : 30:00 Hours
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
 Wear protective clothing/equipment for specific tasks and work conditions Carry out safe working practices while dealing with hazards to ensure the safety of self and others. Apply good housekeeping practices at all times Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, demonstrate the correct use of a fire extinguisher Carry out safe working practices while dealing with hazards to ensure the safety of self and others Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, 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, and 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. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un-necessary items are not cluttering the workbenches or work surfaces. 	 Carry out safe working practices while dealing with hazards to ensure the safety of self and others. Apply good housekeeping practices at all times Use the various appropriate fire extinguishers on different types of fires correctly Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, 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, and 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. Create awareness amongst other by sharing information on the identified risks. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions Follow the technique of waste disposal and waste storage in the proper bins as per SOP Segregate the items which are labeled as red tag items for the process area and keep them in the correct places Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards. Check that the items in the respective areas have been identified as broken or damaged Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions.

Classroom Aids:

Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster

Tools, Equipment and Other Requirements

Safety PPE's like apron, gloves etc.







Module 5: CPC/N0223 Entrepreneurship in Injection Moulding Mapped to:

Terminal Outcomes:

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Duration: 15:00 Hours	Duration: 15:00 Hours
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
 Planning and Budgeting with reference to various components of Injection Moulding Basics of bookkeeping in accounts and various transactions Various schemes available in setup for Injection Moulding Prices of various inputs and products from the market unique selling proposition Best ways of attracting market price for one's produce Quality concepts before & during the sale activity. Storage of security and backup data files 	 Planning and Budgeting with reference to various components of Injection Moulding. Keep books of accounts and various transactions. Arrange for financial assistance from various quarters in the light of various schemes available in setup for Injection Moulding. Ascertain the prices of various inputs and products from the market. Assess the influence of various quality parameters of products on the product pricing. Cordial relations with various clients for the benefit of industry. Assess the needs and requirements of the clients and assess one's own unique selling proposition. Extract critical market information that is otherwise not in the public domain. Choose appropriate buyer in a given situatio 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.
Classroom Aids:	Decad Count Decad Medica Decades
Charts, Models, Video presentation, Flip Chart, White-	Board/Smart Board, Marker, Duster
Tools, Equipment and Other Requirements Computer with MS-Office, Open Source software, UPS	

Module 6: CPC/N0219 Basics of MS Office / Open Source office suite software *Mapped to:*

Terminal Outcomes:

Enter, update and maintain data in MS Office / Open Source Office Suite Software.

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Duration: 15:00 Hours	Duration: 15:00 Hours
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes







- Fill and process mandated forms for receiving, processing, or tracking data, enter data from source documents (such as trial report, process sheet etc.) into Computer applications having MS Office / Open Source office suite software.
- Scan source documents in accordance with specific instructions.
- Maintain files of source documents or other information related to data entered.
- Update database information to reflect most current source information

- Filling and processing mandated forms for receiving, processing, or tracking data enter data from source documents (such as trial report, process sheet etc.) into Computer applications having MS Office / Open Source office suite software.
- Scanning source documents in accordance with specific instructions.
- verify data entered with source documents, checks for compliance and corrects all typographical errors and missing or repeated data.
- Maintain files of source documents or other information related to data entered.
- update database information to reflect most current source information
- Assist in the filing and storage of security and back up data files

Classroom Aids:

Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster

Tools, Equipment and Other Requirements

Computer with MS-Office / Open Source Office Suite Software, UPS, Table Chair etc.







Module 7: Employability Skills Mapped to: DGT/VSQ/N0101: Employability Skills

Man	datory Duration: 30:00	Hours	
Loca	tion: Training Centre		
S. No.	Module Name	Key Learning Outcomes	Duration (hours)
1.	Introduction to Employability Skills	 Discuss the importance of Employability Skills in meeting the job requirements. 	1
2.	Constitutional values - Citizenship	 Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. Show how to practice different environmentally sustainable practices. 	1
3.	Becoming a Professional in the 21st Century	 Discuss 21st century skills. Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations. 	1
4.	Basic English Skills	Use appropriate basic English sentences/phrases while speaking.	2
5.	Communication Skills	 Demonstrate how to communicate in a well -mannered way with others. Demonstrate working with others in a team. 	4
6.	Diversity & Inclusion	 Show how to conduct oneself appropriately with all genders and PwD. Discuss the significance of reporting sexual harassment issues in time. 	1
7.	Financial and Legal Literacy	 Discuss the significance of using financial products and services safely and securely. Explain the importance of managing expenses, income, and savings. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws. 	4
8.	Essential Digital Skills	 Show how to operate digital devices and use the associated applications and features, safely and securely. Discuss the significance of using the internet for browsing, accessing social media platforms, safely and securely. 	3
9.	Entrepreneurship	Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges.	7
10.	Customer Service	 Differentiate between types of customers. Explain the significance of identifying customer needs and addressing them. Discuss the significance of maintaining hygiene and dressing appropriately. 	4
11	Getting ready for apprenticeship & Jobs	 Create biodata. Use various sources to search and apply for jobs. Discuss the significance of dressing up neatly and maintaining hygiene for an interview. Discuss how to search and register for apprenticeship opportunities. 	2







	LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS				
S.No.	Name of the Equipment	Quantity			
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required			
2.	UPS	As required			
3.	Scanner cum Printer	As required			
4.	Computer Tables	As required			
5.	Computer Chairs	As required			
6.	LCD Projector	As required			
7.	Whiteboard	As required			
Note: Ab	ove Tools & Equipment not required, if Computer LAB is available in th	ne institute.			







Module 8: On-the-Job Training

Mandatory Duration: *30:00 Hours*

Module Name: On-the-Job Training

Location: On Site

Terminal Outcomes

- On-the-Job Training (OJT) is a hands-on learning method where participants acquire skills and knowledge while performing their job tasks.
- Participants learn specific job-related skills that are directly applicable to their roles.
- Industrial training often leads to participants becoming more effective and efficient in their learning.
- Industrial training experience builds the confidence level of participants.
- Training occurs in the actual work environment, reducing the need for induction training programs while joining in industry.
- Interaction with industry captains or mentors during training strengthens learning teamwork and workplace relationships.
- Trainees become familiar with the industrial tools, systems, and workflows quickly.
- Participants encounter and address challenges in industry, developing critical thinking and adaptability.







Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational	Specialization	Relevant Industry Experience		Training Experience		Remarks
Qualification		Years	Specialization	Years	Specialization	
Diploma	Plastics / Polymer Engineering / Technology	2	Plastics Processing Industry	-	-	-
B.E. / B.Tech. / M.Sc.	Plastics / Polymer Engineering / Science	-	-	-	-	-

Trainer Certification				
Domain Certification	Platform Certification			
Minimum Educational Qualification as above, additionally he/ she should have done job role relevant skill training course from CIPET.	Recommended that the Trainer Should have done job role relevant upskilling course from CIPET.			







Assessor Requirements

Assessor Prerequisites						
Minimum Educational	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
Qualification		Years	Specialization	Years	Specialization	
Diploma	Plastics / Polymer Engineering / Technology	2	Plastics Processing Industry	3	Plastics / Polymer Engineering / Technology	-
B.E. / B.Tech.	Plastics / Polymer Engineering	1	Plastics Processing Industry	1	Plastics / Polymer Engineering	-

Assessor Certification				
Domain Certification	Platform Certification			
Minimum Educational Qualification as above, additionally he/ she should have done a job role relevant skill training course from CIPET.	Recommended that the Trainer Should have done a job role relevant upskilling course from CIPET.			







Assessment Strategy

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

Mention the detailed assessment strategy in the provided template.

- 1. Assessment System Overview:
 - Batches are assigned to Training Assessment Wing (TAW), CIPET HO for planning of assessment
 - Training Centers request TAW for Assessment and Certification of Trainees
 - TAW identifies suitable assessor and nominates the assessor to the respective Training Centre
 - TAW monitors the assessment process
 - Training Centers maintain necessary records
- 2. Testing Environment:
 - Check the Assessment location, date and time
 - If the batch size is more than 30, then there should be 02 Assessors in a day (or) 01 assessor in 2 days
 - Check that the allotted time to the candidates to complete the Theory & Practical Assessment
- 3. Assessment Quality Assurance levels/Framework:
 - Question bank / Question Paper is prepared by the Subject Matter Experts (SME) / Assessor
 - Questions are mapped to the specified assessment criteria
 - Certified Assessor & Trainer will be engaged in the process
- 4. Types of evidence or evidence-gathering protocol:
 - Date / Time recorded for the reporting of the assessor from assessment location
 - Assessment batch Group Photo of Trainees along with Assessor
- 5. Method of verification or validation:
 - Surprise visit to the assessment location
 - Virtual meet with the Assessor / Trainees
- 6. Method for assessment documentation, archiving, and access
 - Hard copies of the documents are stored, soft copies of assessment evidences are stored in Email for future correspondence







References

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
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 a similar/ related set of functions in an industry.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualification pack code.







Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
OJT	On-the-job Training
PwD	People with Disability PPE Personal Protective Equipment ES Employability Skills
PPE	Personal Protective Equipment
ES	Employability Skills