OJT Syllabus for Injection & PET Moulding Operator

Course Name	Injection & PET Moulding Operator
Sector	Infrastructure Equipment
Course Code	INF/2024/IPMO/404
Level	3
Occupation	Injection & PET Moulding Operator
Job Description	The Injection & PET Moulding Operator is responsible for the efficient operation of injection molding machines and PET molding equipment. This role involves a deep understanding of moulding principles, process parameters, and quality assurance procedures. The Operator plays a critical role in ensuring the production of high-quality molded products while adhering to safety standards and troubleshooting any process issues.
Course Duration	Total Duration 390 Hrs (OJT-330 and ES-60)
Trainees' Entry Qualification	Grade 10 OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR Previous relevant Qualification of NSQF Level 2 with one yr experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
Trainers Qualification	12th standard/ITI with 3 years in the relevant field

Structure of Course(In OJT Module):

Module No.	Module name	Outcome	Compulsory/ Elective	Total (Hrs) (OJT)
1	**Introduction**	Identify roles & responsibilities of a Injection and PET Moulding Operator	Compulsory	30
2	**Concepts related to job requirements**	Elaborate the concepts, job requirements of the process.	Compulsory	30
3	**Foundational Moulding Principles**	Evaluate basic knowledge related to the process	Compulsory	30
4	**Injection & PET Moulding Operation**	Perform the injection and PET moulding related operations	Compulsory	60
5	**Process Monitoring & Troubleshooting**	Monitor process parameters and troubleshoot the process/product	Compulsory	60
6	**Molding Parameters & Material Mixing**	Setup various prerequisites and perform mixing operations	Compulsory	60

Module No.	Module name	Outcome	Compulsory/ Elective	Total (Hrs) (OJT)
7	**Product Quality Assurance**	Perform quality check and inspection of the finished products	Compulsory	30
8	**Entrepreneurship in injection moulding**	Develop essential concepts in entrepreneurship and business development with the knowledge of injection moulding	Compulsory	30
9	**Employability Skill**	As per guided curriculum	Compulsory	60
		TOTAL		**390**

Syllabus:

Module no. 1: Introduction
Outcome: Identify roles & responsibilities of a Injection and PET Moulding Operator

Content:

- 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.

Tools & Equipment Required:
Class Room equipment: LCD Projector/Screen, Computer, charts, Black / White board and Duster.

Module no. 2: Concepts related to job requirements
Outcome: Elaborate the concepts, job requirements of the process.

Content:

- 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
- 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.
- 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
- 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

Tools & Equipment Required:
Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gage, Steel measuring tape, Weighing Balance (1 No.) ,

Hammer, screw driver set with Multiple heads, Allen key hexagonal, File triangular, Hacksaw, adjustable, Spanner set double side, Adjustable spanner, PP, HDPE, Injection grade, Hand mould, Two plate mould, Three Plate mould, Automatic Hopper Loader, Hot air oven and Dryer, Dehumidifier, Mould Temperature Controller, Scrap Grinder, Crane, Air Compressor, Hot air blow Gun, Water cooling Tower, Hand operated Injection Moulding Machine, Semi-Automatic Vertical / Horizontal Injection Moulding Machine, Fully Automatic Injection Moulding Machine, Microprocessor Based Injection Moulding Machine.

Module no. 3: Foundational Moulding Principles
Outcome: Evaluate basic knowledge related to the process

Content:

- Demonstrate how to install and bolt the mould in place and slide the safety door shut
- 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

Tools & Equipment Required:

Measuring equipment: Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gage, Steel measuring tape, Weighing Balance (1 No.) Plastics raw material: PP, HDPE, Injection grade. Mould: Hand mould, Two plate mould, Three Plate mould Auxiliaries equipment: Automatic Hopper Loader, Hot air oven and Dryer, Dehumidifier, Mould Temperature Controller, Scrap Grinder, Crane, Air Compressor, Hot air blow Gun, Water cooling Tower Hand operated Injection Moulding Machine Semi-Automatic Vertical / Horizontal Injection Moulding Machine Fully Automatic Injection Moulding Machine Microprocessor Based Injection Moulding Machine

Module no. 4: Injection & PET Moulding Operation
Outcome: Perform the injection and PET moulding related operations
Content:

- 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

Tools & Equipment Required

Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gage, Steel measuring tape, Weighing Balance (1 No.) Hand Tools: Hammer, screw driver set with Multiple heads, Allen key hexagonal, File triangular, Hacksaw, adjustable, Spanner set double side, Adjustable spanner. Auxiliaries equipment: Automatic Hopper Loader, Hot air oven and Dryer, Dehumidifier, Mould Temperature Controller, Scrap Grinder, Crane, Air Compressor, Hot air blow Gun, Water cooling Tower Hand operated Injection Moulding Machine Semi-Automatic Vertical / Horizontal Injection Moulding Machine Fully Automatic Injection Moulding Machine Microprocessor Based Injection Moulding Machine

Module no. 5: Process Monitoring & Troubleshooting
Outcome: Monitor process parameters and troubleshoot the process/product
Content:

- Demonstrate a test process
- 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
- Ensure that the product matches the dimensions
- Ensure the quality of the final output
- Perform the production process
- Perform troubleshooting of the process

Tools & Equipment Required
Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gage, Steel measuring tape, Weighing Balance (1 No.), Hammer, screw driver set with Multiple heads, Allen key hexagonal, File triangular, Hacksaw, adjustable, Spanner set double side, Adjustable spanner, PP, HDPE, Injection grade, Hand mould, Two plate mould, Three Plate mould

Module no. 6: Molding Parameters & Material Mixing
Outcome: Setup various prerequisites and perform mixing operations

Content:

- 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

Tools & Equipment Required
Steel Ruler, Micrometer, Venire Caliper, Radius, gauge, Feeler gage, Steel measuring tape, Weighing Balance (1 No.), Hammer, screw driver set with Multiple heads, Allen key hexagonal, File triangular, Hacksaw, adjustable, Spanner set double side, Adjustable spanner, Automatic Hopper Loader, Hot air oven and Dryer, Dehumidifier, Mould Temperature Controller, Scrap Grinder, Crane, Air Compressor, Hot air blow Gun, Water cooling Tower Hand operated Injection Moulding Machine Semi-Automatic Vertical / Horizontal Injection Moulding Machine Fully Automatic Injection Moulding Machine Microprocessor Based Injection Moulding Machine

Module no. 7: Product Quality Assurance
Outcome: Perform quality check and inspection of the finished products

Content:

- Compare texture, colour, surface properties, hardness and strength etc. with the given approved product
- Practise recording the observations of the basic inspection process
- Identify pieces which are OK and also not meeting the specified standards
- Practise rejecting the batch which are beyond repair and repair the ones which need minor modifications

Tools & Equipment Required

Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines , Mild Steel, Stainless Steel, Aluminium, Brass, Wood CNC Lathe Machine Lathe Machine CNC Simulator 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types CAM software, CNC controller, CNC simulator, milling machine, CNC Milling machine CAM software, CNC controller, different type CNC Controller Like HASS, FANUC, Heidenhain, CNC HASS Simulators

Module no. 8: Entrepreneurship in injection moulding

Outcome: Develop essential concepts in entrepreneurship and business development with the knowledge of injection moulding

Content:

- 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

Tools & Equipment Required

LCD Projector/Screen, Computer, charts, Black / White board and Duster, Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines

Module 9 : Employability Skills (60 Hrs.)

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this program, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively

35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Unique Equipment Required:

1. Class Room equipment: LCD Projector/Screen, Computer, charts, Black / White board and Duster.
2. Measuring equipment: Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Height gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.)
3. Hand Tools: Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives
4. Personal Protective equipment: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines
5. Plastics raw material: PP, HDPE, Injection grade
6. Mould: Hand mould, Two plate mould, Three Plate mould
7. Auxiliaries equipment: Automatic Hopper Loader, Hot air oven and Dryer, Dehumidifier, Mould Temperature Controller, Scrap Grinder, Crane, Air Compressor, Hot Air Blow Gun, Water Cooling Tower, Hand operated Injection Moulding Machine, Semi-Automatic Vertical / Horizontal Injection Moulding Machine, Fully Automatic Injection Moulding Machine, Micro- processor Based Injection Moulding Machine.

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks
Identify roles & responsibilities of a Injection and PET Moulding Operator	INF/1802/OC1	20	50
Elaborate the concepts, job requirements of the process.	INF/1802/OC2	20	50
Evaluate basic knowledge related to the process	INF/1802/OC3	20	50
Perform the injection and PET moulding related operations	INF/1802/OC4	20	80
Monitor process parameters and troubleshoot the process/product	INF/1802/OC5	20	80
Monitor process parameters and troubleshoot the process/product	INF/1802/OC6	20	80
Perform quality check and inspection of the finished products	INF/1802/OC7	20	50
Develop essential concepts in entrepreneurship and business development with the knowledge of injection moulding	INF/1802/OC8	20	50
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0