



Machine Operator Assistant – Plastics Extrusion

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Machine Operator Assistant – Plastics Extrusion”, in the “Petrochemical” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Machine Operator Assistant – Plastics Extrusion		
Qualification Name & Reference ID	Machine Operator Assistant – Plastics Extrusion CPC/Q 0303		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	Minimum qualification –VIII th Standard		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Work as Assistant Operator in HDPE/PVC Pipe Extrusion or Plastics Film Extrusion • Can operate Scrap Grinding & Agglomerator Machines Independently • Can operate High Speed Mixers & Blenders Independently • Can Prepare formulation Independently 		

This course encompasses 6 out of 6 Learning Outcomes(LO) of “Machine Operator Assistant – Plastics Extrusion” Qualification Document .

Sr. No.	Module	Theory Duration (hh:mm)	Practical Duration (hh:mm)	Key Learning Outcomes	Corresponding LO Code	Equipment Required
1	Basics Plastics Raw Materials, Additives, Master batches, pigments & Extrusion Concept A.	18:00	42:00	Introduction: <ul style="list-style-type: none"> • Polymers, Fundamentals, Terminology of polymers, Classification of polymers. Thermoplastics & Thermoset materials: <ul style="list-style-type: none"> • Brief introduction to raw materials, properties and applications, raw material manufacturers. Applications of Plastics <ul style="list-style-type: none"> • agriculture, building, electrical, electronics, industrial, packaging, medical, sports, transport, water management, telecommunication, toys, etc. 	CPC/N0311	Plastic Material Samples and Plastic Products

	B.			<p>Extrusion Process Techniques & Trouble shooting</p> <ul style="list-style-type: none"> • Basic principles of extrusion • Types of extruders, general features of extruders viz. barrel, screw, types of screws, drive mechanism, specifications, heating & cooling systems, flow mechanism, • Trouble shooting in extrusion processes viz. film, pipe, profile, wire coating/covering, extrusion coating 	<p>Single Screw Pipe Extrusion Plant Extruder</p> <p>Twin Screw Extruder PVC Pipe Extrusion Plant</p> <p>Blown Film Extruder Plant</p> <p>Three Layer Film Extrusion Plant</p> <p>Blender</p> <p>High Speed Mixer</p>
	C.			<p>Extrusion Plant & Maintenance.</p> <ul style="list-style-type: none"> • General constructional features of extruders – power supply and control system – drive mechanism – hydraulics, pneumatics and electrical circuits – gear box, clutches, pumps and safety features – identification of faults –trouble shooting – preventive maintenance – planning and safety. • Practical exposures to the preventive maintenance check-points for the extrusion plant/extrude. • Daily start-up and shut down maintenance checks • Checking hydraulics and electrical circuit for safety, routine faults and remedies. • Types of Maintenance, Repair and maintenance of various components used in Extrusion machines, and Dies. • Study of air compressor elements, drive mechanism, lubrication. • Study of chilling plant/cooling tower. • Study of Electrical safety Measures & Demonstration about use of protective devices. Study of single phase and three phase power 	<p>Single Screw Pipe Extrusion Plant Extruder</p> <p>Twin Screw Extruder PVC Pipe Extrusion Plant</p> <p>Blown Film Extruder Plant</p> <p>Three Layer Film Extrusion Plant</p> <p>Blender</p> <p>High Speed Mixer</p>

				<p>supply. Identification of phase, Neutral and earth pits.</p> <ul style="list-style-type: none"> • Study, Demonstration and Identification of common electrical materials such as wires, cables, switches, fuses, plugs, connectors, sockets, Different types of switches, MCCB etc. • Post operation techniques of plastics products: Joining, welding, sealing, decorative coating and printing on extruded products. 		
2	Health , Safety Practices & House Keeping	18:00	42:00	<ul style="list-style-type: none"> • Take an overlook of the Area under House Keeping. • Put appropriate Signage immediately if oily substance / Water spills on the floor to avoid accident • If certain housekeeping activities require to be performed by housekeeping staffs, the Inform them. • If it has to be carried out by self then, Identify the material / equipment required for cleaning the areas. • Plan the sequence for cleaning the area to avoid re-soiling the cleaned areas and surfaces. • Display the appropriate signage for the work being conducted. • Ensure that there is adequate ventilation for the work being carried out. • Wear the personal protective equipment required for the cleaning method and materials being used. 	CPC/N0312	Common safety equipment such as fire extinguishers, helmet, protective gloves, goggles etc. First Aid
3	Plastics Compounding / Mixing, Scrap Grinding, Agglomerating	45:00	105:00	<ul style="list-style-type: none"> • Additives Used in PVC Pipe Production • Master Batches & Pigments • High Speed Mixers and Its Parameters • Agglomerators & Its Parameters • Trouble Shooting & Maintenance • Parameters & Properties Control 	CPC/N0313	Blenders High Speed Mixer Agglomerator
4	HDPE /PVC Pipe Extruder & Film	27:00	63:00	<p>Extrusion process on extruders.</p> <ul style="list-style-type: none"> • Study of extruders in Idle Run 	CPC/N0314	Single Screw Pipe Extrusion

Extruder Machine Operation			<p>Operation (IRO), Free sketch of machines, their parts and parts-function.</p> <ul style="list-style-type: none"> • Study of the machine parts & functions from screw drive to the cater pillar. Practice of die setting on the machine, sizing techniques. Procedure for setting up of parameters & operation practice in running the machine to produce pipe & tube. • Types of HDPE / PVC Extruders. • Extruder Parts and Their Functions. • Pressure and Vacuum Sizing Units • Types of Dies Used for different Extruded Pipes. • Operations of Haul Off Units • Dismantling and assembling Extruder Parts. • Safety Precaution taken during assembling and disassembling. • Common Process Parameter like Temperature, Pressure and Speed and its controls. • Effect of process parameters on Product Properties • Trial Production and checking product stabilization. • Actual Production and Parameter / Process Control. • Quality Check and Continuous Production. • Post production and storing. • Common faults found and trouble shooting. • Segregation of faulty product and action taken. • Disposal of faulty products as per laid down procedure. • Understanding Safety Equipments and Its Use. • Do's and Don't in Area of Operation • Safety Precaution Majors before Operations. 		<p>Plant Extruder</p> <p>Twin Screw Extruder PVC Pipe Extrusion Plant</p> <p>Blender</p> <p>High Speed Mixer</p>
			<ul style="list-style-type: none"> • Extrusion processes and the downstream equipments viz dies, take off equipment for the production of sheets, films, blown film, cast film/slit 		<p>Blown Film Extruder Plant</p> <p>Three Layer Film Extrusion</p>

				<p>film, BO film, co extruded film & sheet. Twin screw extruder, parts and their functions and applications.</p> <ul style="list-style-type: none"> • Procedure for setting up of process-parameters eg. Temperature on different zones, screw-speed, nip-roller speed, winder speed, blow-ratio, control of cooling – air on bubble, methodology & practice by trainees to fix the blown film die on the machine , familiarization of die parts & their functions, technical specification of machines, defects, causes & remedies, practice of operating machine to produce different sizes of blown film. • Operation-practice by the trainee on setting up of process parameter to produce blown-film on film plant, observations on extruder output, size of film produced and technical specifications of machines to be recorded. • Types of Film Extruders. • Extruder Parts and Their Functions. • Sizing Units • Types of Dies Used for different Films. • Operations of Haul Off Units • Dismantling and assembling Extruder Parts. • Safety Precaution taken during assembling and disassembling. • Common Process Parameter like Temperature, Pressure and Speed and its controls. • Effect of process parameters on Product Properties • Trial Production and checking product stabilization. • Actual Production and Parameter / Process Control. • Quality Check and Continuous Production. • Post production and storing. • Common faults found and trouble shooting. 	<p>Plant</p> <p>Blender</p>
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				<ul style="list-style-type: none"> • Segregation of faulty product and action taken. • Disposal of faulty products as per laid down procedure. • Understanding Safety Equipments and Its Use. • Do's and Don't in Area of Operation • Safety Precaution Majors before Operations. 		
7	Reporting & Documentation	18:00	42:00	<ul style="list-style-type: none"> • Basic Computer Operation on MS Office like MS Word, Excel and Power Point • Page set up and Printing • Making of Posters and Banners • Writing Applications and Notes • Study about the forms and formats. • Filling forms and formats • National & International Standards and specifications as per BIS, ISO, ASTM, etc. for raw materials and finished products • Standard operating procedures (SOP), Knowledge about QMS (Quality management system) and related documents, • Reports required to be made • Filling up of technical forms, process charts, activity logs etc 	CPC/N0315	Computer, Printer, Report Formats, Forms etc
8	To Carry Out Quality Checks	18:00	42:00	<ul style="list-style-type: none"> • Ensure that total range of checks as per the prescribed national and International standards on regular intervals throughout the shifts. • Use appropriate measuring instruments, equipment, tools, accessories etc, as prescribed / required • Calibration of Measuring equipments and devices and its importance. • Identify non-conformities to quality assurance standards. • Identify potential causes of non-conformities to quality assurance standards • Identify impact on final product due to non-conformance to prescribed 	CPC/N0316	Measuring Instruments – Like Vernier, Micrometer Flat & Double Ball Ended, Measuring Tape, Pi Tape, Scale , Testing Equipments as per IS Standards

				<p>Standards.</p> <ul style="list-style-type: none"> • Evaluating the need for action to ensure that problems do not reoccur. • Suggest corrective action to address problem. • Review effectiveness of corrective action. 		
	Total Duration:	<u>144.00</u>	<u>336:00</u>	<p>Unique Equipment Required:</p> <ul style="list-style-type: none"> • Thermoplastic Materials – HDPE/LDPE/PP/PVC • Thermoset Materials – PF/UF/MF • Plastic Products – Sector wise • Single Screw Pipe Extrusion Plant Extruder • Twin Screw Extruder PVC Pipe Extrusion Plant • Blown Film Extruder Plant • Three Layer Film Extrusion Plant • Blender • High Speed Mixer • Agglomerator • Measuring Instruments – Like Vernier, Micrometer Flat & Double Ball Ended, Measuring Tape, Pi Tape, Scale , • Testing Equipments as per IS Standards • Maintenance Equipments • First Aid Box 		

Grand Total Course Duration: **480 Hours 00 Minutes**