

*Syllabus for the trade
of*

PLASTIC PROCESSING OPERATOR
(SEMESTER PATTERN)

UNDER

CRAFTSMEN TRAINING SCHEME

Revised in: 2015

By

Government of India

Central Staff Training and Research Institute

Directorate General of Training

Ministry of Skill Development and Entrepreneurship

EN -81, Sector-V, Salt Lake City,

Kolkata-700091

**List of the Trade Committee Members for the trade of
PLASTIC PROCESSING OPERATOR held on 06.4.2015 and 27.04.2015 held at DVE&T, Mumbai and
Industrial Training Institute, Aurangabad, Maharashtra**

SR.NO.	NAME & DESIGNATION	REPRESENTING ORGANIZATION WITH FULL ADDRESS	REMARKS
1.	Mr. M. K. Mandal. Manager (Project)	CIPET, Aurangabad	Member
2.	Mr. MiliindkumarBharne Manager (P/T)	CIPET, Aurangabad	Member
3.	Mr. Pravin B Bachhav Sr. Technical Officer (P/T)	CIPET, Aurangabad	Member
4.	Mr. S. K. Apte Training Officer A.V.T.S. Plastic Processing.	A.V.T.S. Pune-07	Member
5.	Mr. R. V. Mandake Instructor (PPO)	I.T.I. Aundh, Pune-07	Member
6.	Mr. N. V. Kumbhar Instructor (PPO)	I.T.I. Aundh, Pune-07	Member
7.	Mr. S. M. Shirsat Instructor (PPO)	I.T.I. Kolhapur	Member
8.	Mr. D. M. Maharnvar Instructor (PPO)	I.T.I. Satara	Member
9.	Mr. P. Y. Bagade Instructor (PPO)	I.T.I. Satara	Member
10.	Mr. S. T. Thube Instructor (PPO)	I.T.I.JalgaonDist-Nashik	Member
11.	Mr. G. C. Randive Instructor (PPO)	I.T.I.JalgaonDist-Nashik	Member
12.	Mr. V. S. Nalavade Instructor (PPO)	I.T.I. Nashik	Member
13.	Mr. B. G. Jadhav Instructor (PPO)	I.T.I. Parbhani	Member

**List of the Members of Trade Committee Meeting for the trade of
PLASTIC PROCESSING OPERATOR
held on 02nd July, 2015 at Industrial Training Institute, Maninagar, Ahmedabad, Gujarat**

SR.NO.	NAME & DESIGNATION	REPRESENTING ORGANIZATION WITH FULL ADDRESS	REMARKS
1.	Shri Sanjay Kumar Joint Director of Trg	CSTARI, Kolkatta	Chairman
2.	Shri L. K. Mukherjee Dy. Director of Trg	CSTARI, Kolkatta	Member
3.	Shri A. C. Muliya Dy. Director	Directorate of Employment & Training, Gandhinagar	Member
4.	Shri G. N. Parekh Dy. Director	Directorate of Employment & Training, Gandhinagar	Member
5.	Shri Vikas K Deo Sr. Manager Business Development	Windsor, Ahmedabad	Member
6.	Shri B. J. Prajapati Director	Precision Rotogravure Pvt. Ltd., Ahmedabad	Member
7.	Shri Paritosh P Diwasali Sr. Tech. Officer	CIPET, Ahmedabad	Member
8.	Shri N. R. Parikh Principal	ITI Kheda	Member
9.	Shri Patel Pragnesh B GI – PPO	ITI Sarkhej, Ahmedabad	Member
10.	Shri B. J. Patel GI – PPO	ITI Kubernagar, Ahmedabad	Member
11.	Shri A. V. Modi GI – PPO	ITI Kubernagar, Ahmedabad	Member
12.	Shri K. V. Vyas GI – PPO	ITI Kubernagar, Ahmedabad	Member

GENERAL INFORMATION

1. Name of the Trade : **PLASTIC PROCESSING OPERATOR**
2. NCO Code No. :
3. Duration : 1 Year Course with 2 Semesters of 6 months each
4. Power Norms : 13.6 Kw
5. Space Norms : 300 Square Meter
6. Entry qualification : Passed 10th Class Examination under 10+2 system with Science and Mathematics
7. Unit Size (No. of Trainees) : 16
8. Instructor Qualification :
a. Degree in Plastic Technology/ Engineering from recognized University with one year experience
OR
b. Diploma in Plastic Technology/ Engineering from recognized board of Technical Education with 2 years post qualification experience in relevant field
OR
c. 10th Class Passed and NTC / NAC in Trade with 3 years post qualification experience in the relevant field
9. Desirable : CIC in the trade.

Note: - At least one instructor must have Degree/ Diploma in the relevant field.

SYLLABUS OF THE TRADE OF		
PLASTIC PROCESSING TECHNICIAN UNDER CTS		
SEMESTER - I		
Week No.	TRADE PRACTICAL	TRADE THEORY
1	Familiarization with the institute, importance of trade training , machinery used in the trade, types of jobs made by the trainees in the trade : introduction to safety and firefighting equipment and their use related to plastic processing	SAFETY: Introduction about safety, firefighting equipment its precautions observed in the section. Introduction about occupational health hazards followed in plastic industries
2	Marking, Hacksawing, Filing on mild steel flat as per required dimensions using steel rule, calipers, punches etc.	Linear measuring tools. Introduction to hand tools used for marking,punching, sawing, filing etc. marking table.
3	Practice of drilling (through & blind holes) on flat surfaces. Forming internal threads with taps to standard size and preparing studs and bolts	Bench vice-its types and parts. Files – its description types, grades & cut. Hacksaw - its type use and care.
4	Do	Introduction to dies and taps its use and care. Introduction to precision measuring instruments - Vernier caliper, micrometer, height gauge, bevel protector. Least count calculation and its measurements.
5 & 6	Safety precaution and first aid about electricity while working on machines. Basic knowledge about fixing and connecting of electrical accessories like switches, holders, fuse, plug sockets on electrical board. Identification & applications of electronic components used in plastic processing machines.	Safety precaution and first aid while working on machine. Drilling machines-its type – (portable, bench type, and pillar type), parts & working procedure.
7 & 8	Making hydraulic and pneumatic circuits by using flow control valves, pressure control valves. Logic valves, pumps and compressor.	Operating and maintenance of hydraulic and pneumatic components- flow control valves, pressure control valves. Logic valves, pumps and compressor.
9 & 10	TESTING OF VARIOUS PLASTICS MATERIAL: Tensile test, Compressive test, Shear test, Hardness test, MFI test, Melting point test. Demo on Impact test, Cup flow test, Water absorption test, Haze, Gloss etc.	IDENTIFICATION OF VARIOUS PLASTICS MATERIAL THERMO PLASTIC: PE,PP,ABS,POM,SAN,PMMA,PS,PC,NYLON,PVC,PET,CN,CA,CAP,PBT & THERMOSETTING PLASTIC: PF,MF,UF,EPOXY,SILICON,POLYESTER RESIN,SMC,DMC) its properties and applications. Processed data sheet of deferent plastic manufacturing.
11,12 & 13	INJECTION MOULDING: Familiarization with the basic idea of mechanical electrical and hydraulic system of injection moulding machines in IRO and its different parts and their respective functions. Operating and controlling of injection moulding machine in IRO & TRO (fitting of mould ejector, locking and cooling of mould, adjusting feed of screw or ram, temperature controlling, fitting and adjusting nozzle, controlling of injection pressure and speed). Parameters setting.	INJECTION MOULDING: Introduction to Injection Moulding Process. Introduction about injection moulding machine – its types (plunger type, screw type electric, co-injection moulding machine). Description about different types of injection Moulds and its parts. Processing defects, causes, remedies. Trouble shooting of injection moulding machine.
14 & 15	Microprocessor Controlled & PLC Injection Moulding Machine Machine setting procedure, setting for process-parameters. Types of moulds Types of runners and gates.	Microprocessor Controlled & PLC Injection Moulding machine. Introduction to basic concepts of Micro-processor control, comparison of Micro-processor controlled machine with conventional machine. Introduction to basic principles & features of Thermoset Injection Moulding Process, All electrical Injection Moulding Machines, Multi injection Moulding Machines Types of moulds Types of runners and gates.
16	Oiling, lubrication and preventive maintenance of injection moulding machine	Introduction about Oiling, lubrication and preventive maintenance of injection moulding machine
17	COMPRESSION MOULDING: Familiarization with basic idea of mechanical electrical and hydraulic system of compression moulding machine and its different parts and theirrespective functions.	COMPRESSION MOULDING: Introduction to Compression Moulding Process. Compression moulding machine – (Hand operated & Semiautomatic) its description, different parts and their respective functions.

SYLLABUS OF THE TRADE OF		
PLASTIC PROCESSING TECHNICIAN UNDER CTS		
SEMESTER - I		
Week No.	TRADE PRACTICAL	TRADE THEORY
18 & 19	Operating and controlling of compression moulding machine in IRO & TRO, movement of platen top or bottom adjustment and its control. adjusting pressure in terms of per square area and total tonnage, fitting and heating of molds, controlling temperature, checking of bulk factor/density etc.	Description about different types of compression Moulds and its parts. Processing Defects, Causes, and Remedies etc. Trouble shooting of Compression Molding Machine.
20	Oiling, lubrication and preventive maintenance of compression molding machine	Transfer Molding Process. Introduction about Oiling, lubrication and preventive maintenance of compression molding machine
21 & 22	Fiber Reinforce Plastic (FRP) process (hand lay-up process).	Introduction of fiber reinforced plastic processing method.
23	PROJECT WORK / INDUSTRIAL VISIT	
24	REVISION	
25	FIRST SEMESTER EXAMINATION (TRADE THEORY & PRACTICAL)	

SYLLABUS OF THE TRADE OF		
PLASTIC PROCESSING TECHNICIAN UNDER CTS		
SEMESTER – II		
Week No.	TRADE PRACTICAL	TRADE THEORY
1,2 &3	BLOW MOULDING PROCESS: Familiarization with basic idea of mechanical, electrical, hydraulic and pneumatic system of blow moulding machine and its different parts and their respective functions.	BLOW MOULDING PROCESS: Introduction to Blow Moulding Process and its latest processing techniques.(Stretch blow, extrusion stretch blow, injection stretch blow multilayer blow) Blow moulding machine (Hand operated & Automatic) –its description, different parts and their respective functions. Sequence of operation.
4, 5 &6	Operating and controlling of blow moulding machine in IRO & TRO (setting of die, adjusting mandrel, controlling Parisian, adjusting thickness uniformity).	Description about Blow Moulds and its parts. Processing defects, causes, remedies etc. Trouble shooting of Blow moulding machine.
7	Oiling, lubrication and preventive maintenance of Blow moulding machine	Introduction about Oiling, lubrication and preventive maintenance of Blow moulding machine
8, 9 &10	EXTRUSION PROCESS: Familiarization with basic idea of mechanical, electrical and hydraulic system of extrusion machine and its different parts and their respective functions.	EXTRUSION PROCESS: Introduction to different extrusion process and its latest processing techniques.(multi-layer film, co-extruded sheets, corrugated pipes) Extrusion machine – its description, use of different parts and their functions. PVC compounding and its chemical ingredients.
11, 12 &13	Operating and controlling of extrusion machine in IRO & TRO. (Changing and cleaning of screws in extruder, adjusting and controlling temperature, adjusting screen pack arrangement, adjusting variable speed, setting and adjusting die head for pipe, profile, reprocessing and blown film etc.).	Description about extrusion dies and its parts. Processing defects, causes, remedies etc. Trouble shooting of extruder machine.
14	Oiling, lubricating and preventive maintenance of extruder machine.	Introduction about Oiling, lubrication and preventive maintenance of extruder machine.
15, 16 &17	Operating and controlling of thermoforming & vacuum forming machine in IRO & TRO.	Thermoforming & vacuum forming – its brief description and use. Processing technique of different plastic material.
18-19	Demo about rotational moulding machine.	Introduction about Rotational Moulding process.
20	Practice for Annealing, Stress Relieving, Warpage Control, De-flashing and Printing of finish products.	Post Moulding Operations: Annealing, Stress Relieving, Warpage Control, De-flashing and Printing.
21	Practice of Pre-drying of Plastics Materials	Importance of Pre-drying of Plastics Materials Various pre drying equipments and ancillaries
22-23	Fabricating acrylic sheet ABS- sheet, HIPS sheet, HMHDPE blocks etc. involving, drilling screwing buffing sanding. Types of plastic casting	Brief description of machinery used for buffing, sanding, welding and their application. Types of plastic casting
24	Demo on Preservation/storage methods i.e. (scaling, corrosion, blocking, sliding, revolving parts)	Preservation methods of moulds and dies from environment and its types. (Hot runner moulds, cold runner moulds, blow moulds, Stretch mould& dies.)
25	PROJECT WORK / INDUSTRIAL VISIT	
26	REVISION	
27	SECOND SEMESTER EXAMINATION (TRADE THEORY & PRACTICAL)	

A: Trade Details					
S.N.	Particulars	As per DGT			
1	Name of the Trade	Plastic Processing Operator			
2	Duration (In Semester):	2			
3	Intake:	16			
4	Space Required (in Sq. Meter):	300			
5	Power Required (in KW):	13.6			
B: Workshop/ Lab Furniture					
S.N.	Name of Item	Category	Qty	Unit	Remark
1	Drum - 100 Liters	Equipment	1	Number	Per 1 Unit in a Shift
2	Drum - 200 Liters (optional)	Equipment	1	Number	Per 1 Unit in a Shift
3	Drum - 50 Liters (optional)	Equipment	1	Number	Per 1 Unit in a Shift
4	Dust Bin - 50 Liters	Equipment	1	Number	One per trade
5	Black/ White Board with Stand - 4 X 3 Feet	Furniture	1	Number	Per 1 Unit in a Shift
6	Book Shelf/ Glass Shelf (optional)	Furniture	1	Number	Per 1 Unit in a Shift
7	Discussion Table/ Working Table = L:W:H = 8:4:3 Feet - Heavy Wooden Top	Furniture	1	Number	Per 1 Unit in a Shift
8	Instructor/ Office Chair	Furniture	2	Number	Per 1 Unit in a Shift
9	Instructor/ Office Table	Furniture	1	Number	Per 1 Unit in a Shift
10	Notice Board - 2 X 3 Feet	Furniture	1	Number	Per 1 Unit in a Shift
11	Steel Almira - Large	Furniture	2	Number	Per 1 Unit in a Shift
12	Steel Locker - 12 Pigeon Hole	Furniture	2	Number	Per 1 Unit in a Shift
13	Steel Rack (optional)	Furniture	1	Number	Per 1 Unit in a Shift
14	Stool - Height 450 mm	Furniture	10	Number	Per 1 Unit in a Shift
C: Workshop/ Lab Infrastructure (Tools, Equipment's, Machines, etc.)					
S.N.	Name of Item	Category	Qty	Unit	Remark
1	Calliper - Inside Spring - 150 mm	Tool	4	Number	Per 1 Unit in a Shift
2	Calliper - Outside - Spring - 150 mm	Tool	4	Number	Per 1 Unit in a Shift
3	Divider spring type – 150 mm	Tool	4	Number	Per 1 Unit in a Shift
4	Odd leg calliper firm joint 0- 150 mm	Tool	4	Number	Per 1 Unit in a Shift
5	Screw Driver - 10 X 200 mm	Tool	6	Number	Per 1 Unit in a Shift
6	File card	Tool	2	Number	Per 1 Unit in a Shift
7	Hammer - Ball Peen - 500 grams	Tool	6	Number	Per 1 Unit in a Shift
8	Bench Vice - 150 mm	Tool	8	Number	Per 1 Unit in a Shift
9	Micrometer - Outside - Digital- 0 - 25 mm	Tool	2	Number	Per 1 Unit in a Shift
10	Micrometer - Outside - 25 - 50 mm	Tool	2	Number	Per 1 Unit in a Shift
11	VernierCalliper - Digital - 0 - 200 mm	Tool	2	Number	Per 1 Unit in a Shift
12	Vernier Bevel Protractor - 300 mm Blade with Acute Angle Attachment	Tool	2	Number	Per 1 Unit in a Shift
13	Vernier Height Gauge - 0 - 300 mm with least count = 0.02 mm	Tool	1	Number	Per 1 Unit in a Shift
14	Surface Plate - Granite - 300 x 300 mm with Stand and Cover	Tool	1	Number	Per 1 Unit in a Shift
15	Drill Twist Set - 1.5 mm to 15 mm by 0.5 mm	Tool	1	Set	Per 1 Unit in a Shift

16	Drilling Machine - 13 mm Electric with Hammer Action	Tool	2	Number	Per 1 Unit in a Shift
17	Taps set - 3mm to 10mm, Set of 9 Pieces	Tool	1	Number	Per 1 Unit in a Shift
18	Dies Set - 3 mm to 10 mm	Tool	1	Number	Per 1 Unit in a Shift
19	Steel Rule - 300 mm, Graduated both in Metric and English Unit	Tool	4	Number	Per 1 Unit in a Shift
20	Engineer's Square - 150 mm Blade	Tool	8	Number	Per 1 Unit in a Shift
21	Hacksaw Frame - Adjustable - 300 mm	Tool	8	Number	Per 1 Unit in a Shift
22	Centre Punch - Diameter - 10 mm and Length - 100 mm	Tool	8	Number	Per 1 Unit in a Shift
23	File - Flat - Bastard - 300 mm	Tool	8	Number	Per 1 Unit in a Shift
24	File - Flat - Second Cut - 250 mm	Tool	8	Number	Per 1 Unit in a Shift
25	File - Flat - Safe Edge - 200 mm	Tool	8	Number	Per 1 Unit in a Shift
26	File - Triangular - Smooth - 200 mm	Tool	8	Number	Per 1 Unit in a Shift
27	Pillar Drill Machine - Motorized up to 13 mm Capacity	Machine	1	Number	Per Trade irresepect to number of Units
28	Pedestal Grinder - Double Ended - 200 mm	Machine	1	Number	Per Trade irresepect to number of Units
29	Test Equipment for plastic -MFI	Machine	1	Number	Per Trade irresepect to number of Units
30	Universal Testing machine for Plastic	Machine	1	Number	Per Trade irresepect to number of Units
31	Melting point tester.	Machine	1	Number	Per Trade irresepect to number of Units
32	Impact tester.	Machine	1	Number	Per Trade irresepect to number of Units
33	Plastic scrap grinder	Machine	1	Number	Per Trade irresepect to number of Units
34	Pre heater 12 trays of 25 kgs. Of 20 minutes capacity.	Machine	1	Number	Per Trade irresepect to number of Units
35	Hand operated Injection Moulding machine - 15 grams capacity	Machine	4	Number	Per Trade irresepect to number of Units
36	Hand operated Injection Moulding machine - 30 grams capacity	Machine	4	Number	Per Trade irresepect to number of Units
37	Automatic screw type Injection Moulding Machine with moulds and accessories as required 80 to 85 T capacity (with Microprocessor/PLC Controller)	Machine	1	Number	Per Trade irresepect to number of Units
38	Hand operated Compression Moulding Machine with moulds – 30 to 60 T. capacity	Machine	4	Number	Per Trade irresepect to number of Units
39	Automatic compression moulding machine with moulds and accessories as required – 100 T capacity (with Microprocessor/PLC controller)	Machine	1	Number	Per Trade irresepect to number of Units

40	Hand operated Blow Moulding Machine with moulds and accessories of 250 ml capacity with clamping system.	Machine	4	Number	Per Trade irresepect to number of Units
41	Automatic Extrusion Blow Moulding Machine with set of moulds and accessories - 1 to 2 liter capacity (with Microprocessor/PLC controller)	Machine	1	Number	Per Trade irresepect to number of Units
42	Extruder of 40 kg/hr. Plasticizing capacity with re-processing die including granulator/cutterfor PE& PP.	Machine	1	Number	Per Trade irresepect to number of Units
43	Pipe extruder of 40 kg/hr. Plasticizing capacity with pipe die (1/2 inch & 1 inch diameter) to process PE & PP.	Machine	1	Number	Per Trade irresepect to number of Units
44	Extruderof40 kg/hr. Plasticizing capacity for single layer Blown film plant including die (18 inch LFW) & accessories.	Machine	1	Number	Per Trade irresepect to number of Units
45	Pad Printing Machine with soft silicon rubber pad with Pre-Treatment machine for plastic like PE & PP before printing.	Machine	1	Number	Per Trade irresepect to number of Units
46	Thermo/Vaccum forming Machine with Mould	Machine	1	Number	Per Trade irresepect to number of Units
47	Rotational moulding Machine with Mould	Machine	1	Number	Per Trade irresepect to number of Units
48	Hydraulic trainer kit	Machine	1	Number	Per Trade irresepect to number of Units
49	Pneumatic trainer kit	Machine	1	Number	Per Trade irresepect to number of Units
50	Strech Blow Moulding Machine- 1 liter with mould	Machine	1	Number	Per Trade irresepect to number of Units
51	High Frequency welding Machine	Machine	1	Number	Per Trade irresepect to number of Units
52	Air compressor with air treatment accessories 5 HP	Machine	1	Number	
53	Cooling tower 10TR	Machine	1	Number	
54	Mono block pump 2HP	Machine	2	Number	

D: Allied Trade Details (Per 1 Unit in a Shift)

S.N.	Name of Allied Trade	No. of Weeks during Course	Remark
1	Not Required	Nil	Not Applicable

**E: Machines/ Equipment of the Allied Trade to be Utilized
(These Machines/Equipment's and corresponding Tools have to be provided in case the Allied Trade in not available in the ITI)**

S.N.	Name of Item	Category	Qty	Unit	Remark
1	Not Required				Not Applicable

F. Computer Lab Infrastructure

S.N.	Name of Item	Category	Qty	Unit	Remark
1	Not Required				Not Applicable

**G: Common Facility Utilization (Per 1 Unit in a Shift)
(This section specifies utilization of Common Facilities provided in the ITI)**

S.N.	Particulars	Hours per Week	Remark
1	Computer Lab Utilization (Hours Per Week)	2	Per 1 Unit in a Shift
2	Drawing Hall Utilization (Hours Per Week)	2	Per 1 Unit in a Shift
3	Library Hall Utilization (Hours Per Week)	2	Per 1 Unit in a Shift
4	Class Room Utilization (Hours Per Week)	12	Per 1 Unit in a Shift
5	CNC Lab Utilization (Hours per Week)	0	

H. Safety

S.N.	Name of Item	Category	Qty	Unit	Remark
1	Apron - Blue	Equipment	12	Number	Per 1 Unit in a Shift
2	First Aid Kit	Equipment	1	Number	One per trade
I: Special Instructions (This section specifies instruction related to Infrastructure Management)					
S.N.	Particulars				
1	Nil				
J: Instructor Facility (Optional) (This section specifies the items to be provided to the Instructor during Training)					
S.N.	Name of Item	Category	Qty	Unit	Remark
1	Blank CD (rewritable)	Stationary	10	Number	Per 1 Unit in a Shift
2	Box File	Stationary	5	Number	Per 1 Unit in a Shift
3	Calculator - Scientific	Equipment	1	Number	Per 1 Unit in a Shift
4	Eraser	Stationary	1	Number	Per 1 Unit in a Shift
5	Gum Bottle	Stationary	1	Number	Per 1 Unit in a Shift
6	Highlighter pen	Stationary	5	Number	Per 1 Unit in a Shift
7	Office File	Stationary	10	Number	Per 1 Unit in a Shift
8	Paper Rim - A4 Size Xerox Paper	Stationary	1	Number	Per 1 Unit in a Shift
9	Paper Rim - Legal Size Xerox Paper	Stationary	1	Number	Per 1 Unit in a Shift
10	Pen Drive - 8 GB	Stationary	1	Number	Per 1 Unit in a Shift
11	Pencil Box	Stationary	1	Number	Per 1 Unit in a Shift
12	Permanent Marker Pen	Stationary	5	Number	Per 1 Unit in a Shift
13	Punch Machine	Stationary	1	Number	Per 1 Unit in a Shift
14	Register - 200 Pages	Stationary	2	Number	Per 1 Unit in a Shift
15	Sharpener	Stationary	1	Number	Per 1 Unit in a Shift
16	Sketch pen box	Stationary	1	Number	Per 1 Unit in a Shift
17	Stapler Big	Stationary	1	Number	Per 1 Unit in a Shift
18	Stapler Big Pins - Box	Stationary	1	Number	Per 1 Unit in a Shift
19	Stapler Small	Stationary	1	Number	Per 1 Unit in a Shift
20	Stapler Small Pins - Box	Stationary	1	Number	Per 1 Unit in a Shift
21	White Board Marker/Ink Bottle/ Chalk	Stationary	10	Number	Per 1 Unit in a Shift
22	White/ Black Board Duster	Stationary	2	Number	Per 1 Unit in a Shift
23	Torch	Tool	1	Number	Per 1 Unit in a Shift