GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

PLASTIC PROCESSING OPERATOR

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3.5

SECTOR –CHEMICALS AND PETROCHEMICALS

Directorate General of Training

PLASTIC PROCESSING OPERATOR

(Engineering Trade)

(Revised in March 2023)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL – 3.5

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the one-year duration of Plastic Processing Operator trade, a candidate is trained on Professional Skill, Professional Knowledge, and Employability Skill related to job role. In addition to this, a candidate is entrusted to undertake project work and extracurricular activities to build up confidence. The broad components covered under Professional Skill subject are as below: -

The trainee learns about safety and environment, use of fire extinguishers, artificial respiratory resuscitation to begin with. He gets the idea of trade tools & its standardization, Familiarize with basic fitting, basic of electricity, identification of plastics. Skilling practice of injection moulding and compression moulding. The process of FRP and also construction of hydraulic circuits. They will also skilled with different project works. The trainee learns about process of Blow moulding, extrusion and thermoforming. They will skilled with rotational moulding process. They will also perform of construction of Pneumatic circuits. They will also skilled in fabrication of plastic and predrying process. They will also skilled with different project works.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

The Plastic Processing Operator trade under CTS is one of the popular courses delivered nationwide through network of ITIs. The course is of one-year duration. It mainly consists of Domain area and Core area. In the Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Trainee broadly needs to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, plan and organize work processes, identify necessary materials and tools;
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional knowledge, core skills & employability skills while performing the job, and repair &maintenance work.
- Check the job with circuit diagrams/components as per drawing for functioning, diagnose and rectify faults in the components/module.
- Document the technical parameters in tabulation sheet related to the task undertaken.

2.2 PROGRESSION PATHWAYS:

- Can join industry as Plastic Processing Operator and will progress further as Senior Operator, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programs in different types of industries leading to a National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of one-year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	840
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	120
	Total	**1200**

150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

4	On the Job Training (OJT)/ Group Project	150
5	Optional Courses (10th/ 12th class certificate along with ITI certification or add on short term courses)	240

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification, or, add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by **Controller of examinations, DGT** as per the guide lines. The pattern and marking structure is being notified by DGT from time to time. **The learning**

outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence-based comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
(c) Marks in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% accuracy achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Plastic Moulding Technician or Operator; manages the specifications of the plastic and its granules, setting up and operating the moulding machinery and forming and finishing the output.

Moulder, Hand (Plastic); moulds plastics sheets into desired shapes in hand moulding press. Studies specifications for moulded product and assembles mould. Determines weight of charge, pressure, temperature and curing time for moulding; collects plastic sheets, cuts them to required size and heats them on electrically operated heater to soften for moulding; removes sheet when sufficiently heated and places it in female of wooden mould, fixes wooden slab of mould to keep sheet in position and inserts male block of mould; sets mould in hand press and manipulates controls to compress material and form material to shape of mould; removes moulded plastics object after specified time-interval by opening mould; examines and gauges product for conformity to plant or customer standards. May make minor adjustments in moulding procedure to eliminate defects, and remould product.

Plastic Products Making Operatives, Other; perform number of routine and low skilled tasks in manufacturing plastics products, such as arranging and loading plastics or plastics impregnated sheets, assisting Printing Machine Operator, cleaning and finishing moulded plastics products etc. and are designated as: Laminating Press Helper (Plastics) if assists Laminating Press Operator by counting sheets of resin impregnated wood, fabric, paper, or other materials, by wiping surface of metal plates with cloth and special solution to prevent sticking, and by stacking sheets between plain or engraved plates.

Reference NCO-2015:

(i) 8142.1301 – Plastic Moulding Technician or Operator
(ii) 8142.1400 – Moulder, Hand (Plastic)
(iii) 8142.9900 – Plastic Products Making Operatives, Other

Reference NOS:

(i) RSC/N4801
(ii) RSC/N4802
(iii) RSC/N4807
(iv) RSC/N4808
(v) CPC/N0113
(vi) CPC/N0114
(vii) CPC/N0109
(viii) CPC/N0115
(ix) CPC/N0116
(x) CSC/N9401
(xi) CSC/N9402

4. GENERAL INFORMATION

Name of the Trade	**Plastic Processing Operator**
NCO - 2015	8142.1301, 8142.1400, 8142.9900
NOS Covered	RSC/N4801, RSC/N4802, RSC/N4807, RSC/N4808, CPC/N0113, CPC/N0114, CPC/N0109, CPC/N0115, CPC/N0116, CSC/N9401, CSC/N9402
NSQF Level	Level- 3.5
Duration of Craftsmen Training	One Year (1200 hours + 150 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent.
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, CP, LC, DW, AA, LV, DEAF, HH, AUTISM, ID, SLD, MI
Unit Strength (No. Of Students)	20 (There is no separate provision of supernumerary seats)
Space Norms	300 Sq. m
Power Norms	13.6 KW
Instructors Qualification for:	
(i) Plastic Processing Operator Trade	B.Voc/Degree in Plastic Technology/ Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Plastic Technology/ Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/NAC passed in the Trade of "Plastic Processing Operator" With three years experience in the relevant field. **<u>Essential Qualification:</u>** Relevant regular/RPL National Craft Instructor Certificate (NCIC) under DGT. ***Note: Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.***
(ii) Workshop Calculation & Science	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field.

	OR 03 years Diploma in Engineering from AICTE / recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/ NAC in any one of the engineering trades with three years' experience. **Essential Qualification:** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** Regular / RPL variants NCIC in RoDA or any of its variants under DGT
(iii) Engineering Drawing	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Engineering from AICTE / recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/ NAC in any one of the engineering/ Draughtsman group of trades with three years' experience. **Essential Qualification:** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade OR Regular/RPL variants NCIC in RoDA or any of its variants under DGT
(iv) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skill. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) OR Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills.
(V) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES

1. Check and perform measuring, marking, Hack sawing, filling by using various measuring, marking, cutting and finishing tools following safety precautions. (NOS: RSC/N4801, CPC/N0113)
2. Check and perform drilling, tapping, dieing by using different related tools. RSC/N4801, CPC/N0113
3. Test and perform basic electrical earthings with the accessories fittings on board. (NOS: RSC/N4801, CPC/N0113)
4. Identify different plastic materials and test the properties of material by using various test apparatus. (NOS: RSC/N4801, RSC/N4802, CPC/N0114)
5. Identify, set and produce good quality of injection moulding items and check the defects. (NOS: RSC/N4801, CPC/N0109)
6. Identify, set, maintain and produce good quality of injection moulding items by using automatic injection moulding machine with the application of Microprocessor control and PLC. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)
7. Produce good quality of compression moulded items and check the defects by using compression mounding machine. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)
8. Identify and perform and different FRP processing techniques. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)
9. Identify and produce good quality of blow moulding items and inspect the finished product. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)
10. Perform simple pneumatic circuits. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)
11. Identify different parts, set and operate the blown film plant. (NOS: RSC/N4801, RSC/N4808, CPC/N0115)
12. Operate the pipe plant and produce good quality pipe. (NOS: RSC/N4801, RSC/N4808, CPC/N0115)
13. Operate the reprocessing plant and produce reprocessed granules. (NOS: RSC/N4801, RSC/N4808, CPC/N0115)
14. Install and Operate thermoforming machine and identify cycle of thermoforming. Produce good quality of thermoforming product and check the defects. (NOS: RSC/N4801, RSC/N4808, CPC/N0115)

15. Produce good quality of roto moulding product and check the defects. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)
16. Identify and perform pre-drying process using different materials. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)
17. Carry out different machining operations on plastic sheets/blocks. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)
18. Read and apply engineering drawing for different application in the field of work. (NOS: CSC/N9401)
19. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Check and perform measuring, marking, Hack sawing, filling by using various measuring, marking, cutting and finishing tools following safety precautions. (NOS: RSC/N4801, CPC/N0113)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Select raw material and visual inspect for defects.
	Mark as per specification applying desired mathematical calculation and observing standard procedure.
	Measure all dimensions in accordance with standard specifications and tolerances.
	Identify Hand Tools for different fitting operations and make these available for use in a timely manner.
	Prepare the job for Hack sawing, chiseling, filing, drilling, tapping, grinding.
	Perform basic fitting operations viz., Hack sawing, filing, drilling, tapping and grinding to close tolerance as per specification to make the job.
	Observe safety procedure during above operation as per standard norms and company guidelines.
	Check for dimensional accuracy as per standard procedure.
	Ascertain and select tools and materials for the job and make this available for use in a timely manner.
	Plan work in compliance with standard safety norms.
	Produce component by observing standard procedure.
	Check the dimensions of the produced components to ensure dimensions are within prescribed limit.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
2. Check and perform drilling, tapping, dieing by using different related tools. (NOS: RSC/N4801,CPC/N0113)	Ascertain and select tools and materials for the job and make this available for use in a timely manner.
	Plan work in compliance with standard safety norms.
	Produce component by observing standard procedure.
	Check the dimensions of the produced components to ensure dimensions are within prescribed limit.

	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
	Prepare the job for drilling, tapping, dieing,
3. Test and Perform basic electrical earthings with the accessories fittings on board. (NOS: RSC/N4801, CPC/N0113)	Select appropriate material and hand tools.
	Draw a circuit diagram and Prepare series circuit.
	Draw a circuit diagram and Prepare parallel circuit.
	Draw a circuit diagram and Prepare compound circuit.
	Prepare earthing and check.
	Fit the accessories on board.
	Check the performance with standard parameters.
4. Identify different plastic materials and test the properties of material by using various test apparatus. (NOS: RSC/N4801, RSC/N4802, CPC/N0114)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Perform different types of test viz., MFI Test, Tensile Testing, Compression Test, Shear test.
	Perform different types of test viz., Hardness Test, Melting point Test, Impact Test, Cup flow Testing, Water absorption Testing, Haze, gloss testing, Dart impact Testing
	Perform different types of test viz., Cutting test, Hot iron test, Water flotation test, Scratch test, Dropping test , Melting point test, Burning test, Melt flow index test, Impact test.
	Apply tensile, compressive, hardness test on universal testing machine.
	Maintain log books and records as required.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
5. Identify, set and produce good quality of injection moulding items and check the defects. (NOS: RSC/N4801, CPC/N0109)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Observe safety procedure during riveting as per standard norms and company guidelines.
	Set the temperature by energy regulator.
	Set the mould.

	Prepare raw material.
	Prepare good quality articles by using hand injection moulding machine as per standard norms.
	Check the product defects and rectify it
	Maintain log books and records as required.
	Shutdown the machine as per procedure.
	Keep the articles and moulds, hand tools at designated place.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
6. Identify, set, maintain and produce good quality of injection moulding items by using automatic injection moulding machine with the application of Microprocessor control and PLC. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Start water circulation pump and confirm the cooling as per required.
	Set the processing temperature as per material used.
	Prepare raw material and feed it in hopper.
	Select cycle operation mode (hand /semi auto/auto)
	Operate the machine.
	Set the parameters(shot weight, temp., pressure, speed, cooling time)
	Produce good quality product and check it.
	If any defect occurs, rectify it.
	Complete logs and records as required.
	Shut down the machine and clean the machine area.
	Load the mould.
	Select cycle operation mode(hand /semi auto/auto).
	Operate the machine.
	Set the parameters(as per PLC/microprocessor).
	Produce good quality product and check it.
	If any defect occurs, rectify it.
	PM of electrical accessories.
	PM of hydraulic components.
	PM of mechanical components.
	Trial of machine.
	Maintain log books and records as required.

	Unload the mould.
	Complete logs and records as required.
	Shut down the machine and clean the machine area.
7. Produce good quality of compression moulded items and check the defects by using compression mounding machine. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Set the temperature.
	Prepare the material (preheat if required)
	Select the operating mode(hand/semi auto)
	Produce good quality product as per specification.
	Check accuracy/ correctness of the product.
	If any defect occurs, rectify it.
	Finishing the product.
	Complete logs and records as required.
	Shutdown the machine.
8. Identify and perform and different FRP processing techniques. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Clean the given mould.
	Prepare the raw material.
	Prepare laminate.
	Keep for curing.
	Eject the laminate from mould.
	Check and finish the product.
	Maintain log books and records as required.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
9. Identify and produce good quality of blow moulding items and inspect the finished product. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Set the temperature.
	Prepare the raw material.
	Keep ready ancillary equipments.
	Set the parison.
	Select the mode of operation.

	Perform the product.
	Check the defect and rectify it.
	Complete logs and records as required.
	Shutdown the machine.
	Mould loading/unloading as per requirement.
	Plan the preventive maintenance as per standards.
10. Perform simple pneumatic circuits. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Prepare a simple pneumatic circuit as per drawing.
	Arrange the pneumatic components as required
	Set the components as per circuit
	Check all the connection as per drawing.
	Simulate the circuit.
	Check the performance of circuit
11. Identify different parts, set and operate the blown film plant. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Keep ready ancillary equipments.
	Set processing temperature.
	Prepare the raw material.
	Operate the plant.
	Unloading/loading of winding rolls.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
12. Operate the pipe plant and produce good quality pipe. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Keep ready ancillary equipments.
	Set processing temperature.
	Unload the die.
	Change the screw, if required.
	Load the die.
	Prepare the raw material.

	Operate the plant.
	Store the pipe in proper manner.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
13. Operate the reprocessing plant and produce reprocessed granules. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Check for operation of recycling apparatus like hopper, heaters etc. as per check list provided.
	Fix the desired Die to the recycling machine in order to achieve the desired operation as per work instructions.
	Perform preheating of grinded plastic waste (in case of engineering plastic).
	Ensure that the grinded plastic waste are mixed with additives before being fed in to the hopper.
	Ensure that the dimensions of the output product are measured as per the process given in the work.
	Feed the required operation code in the apparatus for heaters to melt the grinded plastic waste at the pre defined temperature.
	Check list procedure to ensure quality of final product.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
14. Install and Operate thermoforming machine and identify cycle of thermoforming Produce good	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Set the temperature.
	Set the mould.

quality of thermoforming product and check the defects. (NOS: RSC/N4801, RSC/N4807, CPC/N0115)	Set the parameters.
	Keep ready ancillary equipments.
	Prepare raw material.
	Operate the machine.
	Finishing and trimming the product.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
15. Produce good quality of rotomoulding product and check the defects. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Set the temperature.
	Set the mould.
	Set the parameters.
	Keep ready ancillary equipments.
	Prepare raw material.
	Operate the machine.
	Finishing and trimming the product.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
16. Identify and Perform predrying process using different materials. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)	Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	Set the temperature.
	Loading of material in tray.
	Set parameters.
	Complete logs and records as required.
	Shutdown the machine.
	Plan the preventive maintenance as per standards.

	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
17. Carry out different machining operations on plastic sheets/blocks. (NOS: RSC/N4801, RSC/N4808, CPC/N0116)	Perform various operations like Drilling, buffing, screwing, cutting, pasting.
	Observe and follow safety precautions
18. Read and apply engineering drawing for different application in the field of work. (NOS: CPC/N9410)	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
19. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. CP/N9411	Solve different mathematical problems
	Explain concept of basic science related to the field of study

SYLLABUS FOR PLASTIC PROCESSING OPERATOR TRADE			
DURATION: ONE YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 40Hrs.; Professional Knowledge 08 Hrs.	Check and perform measuring, marking, Hack sawing, filling by using various measuring, marking, cutting and finishing tools following safety precautions.	1. Familiarization with the training institute (workshop visit 2. Identification to safety equipment & their use etc. 3. General safety precautions while working in PPO section. 4. Methods of Housekeeping. 5. Use fire-fighting equipments. 6. Importance of trade training.	• Departmental training schemes (CTS/ATS). • Importance of trade. • Importance of safety & Rules. • Classes of fire extinguishers. • Introduction about occupational health hazards followed in plastic industries (04 hrs.)
		7. Perform marking practice straight lines. 8. Perform hack sawing. • Fit hacksaw blade to frame. • Use different types of hacksaws frames. 9. Perform filling practice - (straights, cross a draw). 10. Check flatness. 11. Check right angle. 12. Check overall dimensions with vernier calliper. 13. Check overall dimensions with vernier height gauge.	• Linear measuring Tools (steal rule) • Hand Tools • Marking Tools • Punching Tools • Sawing Tools • Files • Description Types grades &cut
Professional Skill 40 Hrs.; Professional	Check and perform drilling, tapping, dieing by using different related	**Drilling Practice** 14. Identify of different parts of drilling machine.	• Drilling machine and its types • Drilling machines its parts

Knowledge 08 Hrs.	tools.	15. Fit the tool on drilling machine. 16. Set the job on machine table with machine vice. 17. Perform drilled hole. 18. Perform blind hole. 19. Perform counter sunked hole. 20. Perform counter boring hole. 21. Perform spot facing with drilling machine. 22. Inspect hole diameters with the help of vernier caliper. **Tapping practice** 23. Illustrate tapping tools (Tap set and Tap wrench). 24. Perform tapping practice with Tap set. **Dieing practice** 25. Illustrate dieing Tools (Die & Diestock). 26. Perform dieing practice with Die. 27. Inspect outside diameters with the help of outside micrometer.	and functions • Types of drill • Operation Done of Drilling machine • Tool's used in internal threading Tap &Tap wrench • Tools used in external threading Die& Diestock • Introduction to precision measuring instruments • Vernier caliper • Micrometer • Height gauge • Bevel protector • Least count calculation and it's measurements • Locking devices.
Professional Skill 25Hrs.; Professional Knowledge 06Hrs.	Test and perform basic electrical earthings with the accessories fittings on board.	28. Perform circuits (close open short). 29. Verify Ohm's law. 30. Perform series circuits. 31. Perform parallel circuits. 32. Perform compound circuits. 33. Do earthing & test. 34. Fix the accessories one electric board. *Need to understand on basic electric safety	• Definition of Electrical Quantities and its Units • Ohm's law • Types of circuits and its connections • Types of Fuses • Types of Earthing • Wire & cable • Electric Symbol's

Professional Skill 40 Hrs.; Professional Knowledge 08 Hrs.	Identify different plastic materials and test the properties of material by using various test apparatus.	35. Identify plastic (Thermoplastic / Thermoset). 36. Perform MFI Test. 37. Perform Tensile Testing. 38. Perform Compression Test. 39. Perform Shear test. 40. Perform Hardness Test. 41. Perform Melting point Test. 42. Perform Impact Test. 43. Perform Cup flow Testing. 44. Perform Water absorption Testing. 45. Perform Haze, gloss testing. 46. Perform Dart impact Testing.	• Introduction of plastic • Group of plastic • Properties and used of • Thermoplastic materials * PE *PP * PVC * PMMA * SAN* PC* Nylon * PET. • Properties and Uses of Thermosetting materials *PF* UF* MF* EPOXY* Polyester resin (SMC/DMC) • Identification of plastic. • Commodity, Engineering, Speciality
Professional Skill 40Hrs.; Professional Knowledge 08 Hrs.	Identify, set and produce good quality of injection moulding items and check the defects.	**INJECTION MOULDING** 47. Identify different parts of Hand injection moulding machine. 48. Perform Mould setting. • Loading • Perform mould • Loading mould cooling connection • Purging of screw and bearing • Pre-drying requirement 49. Set Temperature. 50. Perform IRO. 51. Perform TRO - Single cavity mould. 52. Perform TRO- Double cavity mould. 53. Do preventive maintenance of Hand injection moulding machine.	• Different processing techniques • Classification of Injection moulding machine • Hand injection moulding machine parts and function • Injection moulding cycle • Moulds used in hand injection moulding machine and its terms • Faults, causes and its remedies in hand injection moulding process. Basic knowledge of mould • Core • Cavity • Cooling channel • Ejection system • Runner

			• Gate
		54. Identify of different parts of Automatic injection moulding machine (parts & function). 55. Perform Mould setting. 56. Read and set the pressure gauges. 57. Read and set temperature. 58. Perform IRO- (start-up, cycle and shutdown procedure). 59. Perform TRO- single cavity / double cavity mould. 60. Inspect quality (visuals). 61. Do preventive maintenance of auto injection moulding machine.	• Auto injection moulding machine its parts and functions • Screw type injection moulding machine • Plunger type injection moulding machine • Co-injection • Different type of clamping system • Auto injection moulding machine mould its parts and function • Two plate mould &three plate mould. Hot Runner mould • Processing defects causes and Remedies –(product) • Trouble shooting of injection molding machine.
Professional Skill 80Hrs.; Professional Knowledge 16 Hrs.	Identify, set, maintain and produce good quality of injection moulding items by using automatic injection moulding machine with the application of Microprocessor control and PLC.	**MICROPROCESSOR CONTROL & PLC INJECTION MOULDING MACHINE.** 62. Identify and list out of microprocessor control process parameters. 63. Read and study of process parameters. 64. Perform mould setting. • Mould loading • Cooling / MTC • Hot runner system • Ejection 65. Perform Injection unit setting.	• Introduction about microprocessor control and PLC. • Advantage of Microprocessor and PLC • Electrical injection mounding machines. • Basic principles and feature of thermo set injection mounding process • Comparison between conventional injection mounding machine and PLC & microprocessor

		66. Perform different pressure setting. 67. Set the temperature. 68. Perform IRO. 69. Set the shot weight. 70. Perform TRO. 71. Shoot out troubles of processing. 72. Perform mould unloading - 73. Perform mould loading. 74. Housekeeping of mould. 75. Trouble shooting of machine.	control injection moulding machine.
		Preventive maintenance of injection mounding machine 76. Do over all cleaning. 77. Do PM of electrical accessories. 78. Do PM of hydraulic accessories -	• Importance of preventive maintenance • Schedule wise preventive maintenance of injection mounding machine
		79. Identify hydraulic component. 80. Make hydraulic circuits using single acting cylinder, flow control valve, pressure control valve and pump. 81. Make hydraulic circuits using double acting cylinder, flow control, pressure control valve pump.	• Introduction about hydraulic system. • Pascal's law. • Different hydraulic component and it function. • Hydraulic symbol's of component.

Professional Skill 80Hrs.; Professional Knowledge 16 Hrs.	Produce good quality of compression moulded items and check the defects by using compression mounding machine.	82. Identify of different part of the hand compression mounding machine. 83. Set the temperature on hand compression moulding machine. 84. Perform mould setting. 85. Perform TRO - hand compression. 86. Do preventive maintenance of hand compression.	• Processing techniques used for thermo set materials • Introducing about compression mounding process • Machinery used for compression mounding process. • Hand compression mounding machine parts and function • Faults causes and remedies of product.
		87. Identify of different part of semi- auto compression mounding machine. 88. Illustrate hydraulic system of compression mounding machine. 89. Load the mould & set. 90. Set the temperature. 91. Perform IRO. 92. Perform TRO. 93. Do preventive maintenance of compression mounding machine.	• Introduction about semi-auto compression mounding machine. • Semi-auto compression mounding machine parts and function. • Heating system used for mould. • Different types of compression mould • Faults, causes, remedies of processing • Trouble shooting of compression mounding machine • Introduction about transfer mounding process • Comparison of compression mounding & transfer mounding
Professional Skill 40Hrs.; Professional	Identify and perform and different FRP processing techniques.	94. Distinguish mould and pattern. 95. Identify different glass	• Introduction of FRP • Advantage of FRP • Materials used in FRP

Knowledge 08 Hrs.		fibres. 96. List out of different raw materials (chemicals). 97. Perform TRO - FRP hand layup process. 98. Perform Trimming and cutting / finishing of product. 99. Decorate the product. 100. Housekeeping of mould.	• Process used for FRP • Details of hand lay up process • Spray up process • Vaccum bag. • Pressure bag. • Hot press / matched metal mounding • Faults, causes remedies • Health hazard associated with processing and fabrication.
Professional Skill 40Hrs.; Professional Knowledge 08 Hrs	Identify and produce good quality of blow moulding items and inspect the finished product.	101. Identify different parts of hand blow moulding machine. 102. Set the temperature. 103. Set the parison. 104. Operate the hand blow moulding machine (IRO). 105. Perform hand blow moulding machine (TRO). 106. Perform mould unloading. 107. Load the mould and set. 108. Do preventive maintenance of hand blow moulding machine.	• Introduction to blow moulding process. • List the blow moulding techniques. • Explain parts and functions of hand blow moulding machine. • Faults, causes & Remedies of hand blow moulding.
Professional Skill 25Hrs.; Professional Knowledge 06 Hrs.	Perform simple pneumatic circuits.	109. Identify pneumatic components. 110. Perform pneumatic circuit using pneumatic components (use single acting cylinder). 111. Perform pneumatic circuits using pneumatic components (use double acting cylinder.).	• Introduction about pneumatic system. • Different pneumatic component and its function. • Pneumatics symbols of component.
Professional	Identify different parts, set and operate the blown	112. Identify of different parts of the Auto blow molding	• Auto blow moulding

Skill 95Hrs.; Professional Knowledge 20 Hrs.	film plant.	machine. 113. Load the mould and set. 114. Set the temperature. 115. Perform IRO – auto blow. 116. Set the parison. 117. Set the parison wall thickness. 118. Perform TRO – auto blows. 119. Unload mould. 120. Do preventive maintenance of auto blow moulding. 121. Clean and inspect air compressor. **Blend required materials as per recipe.** **Understanding for material requirement and planning for material.**	machine parts and functions. • cycle of Auto blow moulding process. • Different types of blow moulds and its nomenclature. • Stretch blow moulding process. • Other blow moulding techniques. (Extrusion stretch blow (injection stretch blow extrusion blow, intermittent blow, injection blow). • Faults, causes remedies of blow moulding. • Preventive maintenance of low moulding machine. • Required PPE
		122. Recognize the extruder. 123. Identify of different parts of the control panels. 124. Set the processing temperature. 125. Change the screw PVC to PE. 126. Clean the breaker plate and change screen packs. 127. Load the Blown film Die. 128. Connect the heaters of Blown film Die. 129. Adjust the screw speed Nip rollers & winding rollers. 130. Perform TRO – (Blown film).	• Introduction to extrusion process. • Materials used for extrusion. • Latest extrusion techniques – (multilayer co-extruder, corrugated pipes.) • Extrusion machine its description use different parts & function. • Blown film extrusion. • Fault, causes Remedies of Blown film.
Professional Skill 40 Hrs.;	Operate the pipe plant and produce good quality pipe.	131. Unload blown film die. 132. Load pipe die. 133. Set the pipe plant.	• PVC compounding and its chemical ingredients • Pipe plant extrusion its

Professional Knowledge 08 Hrs.		134. Change the screw (PE to PVC). 135. Set the temperature for pipe processing. 136. Perform TRO – (pipe).	units and function • Fault, causes, Remedies of pipe.
Professional Skill 90 Hrs; Professional Knowledge 16 Hrs.	Operate the reprocessing plant and produce reprocessed granules.	137. Load the reprocessing die on extruder. 138. Prepare raw material for reprocessing. 139. Illustrate the scrap grinder. 140. Grind the scrap. 141. Set the processing temperature for reprocessing. 142. Perform TRO – (reprocessing of plastic).	• Reprocessing of plastic. • Scrap grinder parts & function & its specification. • Identification code Number for different plastics and its use. • Description about extrusion dies & its parts.
		143. Do the preventive maintenance of blown film plant. 144. Do the preventive maintenance of pipe plant. 145. Do the preventive maintenance of reprocessing plant. 146. Do the housekeeping of die.	• Trouble shooting of extruder. • Preventive maintenance of extruder. • Mono filament process. • Wire coating process. • Cast film process. • Calendaring process.
Professional Skill 90Hrs.; Professional Knowledge 16 Hrs.	Install and Operate thermoforming machine and identify cycle of thermoforming Produce good quality of thermoforming product and check the defects.	147. Demonstrate the thermoforming machine. 148. Set the mould. 149. Set the parameters of the thermoforming machine. (Heat timer temperature, cooling system etc). 150. Perform IRO – thermoforming machine.	• Introduction thermoforming process. • Thermoforming cycle. • Materials for thermoforming. • Mould materials. • Heating systems.

		151. Prepare the raw material as per mould. (Sheet cutting clamping). **<u>Straight vacuum forming.</u>** 152. Operate and prepare product. 153. Finish the thermoformed product.	• List of different forming process. • Straight vacuum forming. • Drape forming. • Match mould forming. • Pressure bubble plug assist forming.
		<u>Drape Forming</u> 154. Change the mould for drape forming. 155. Operate and prepare product. **<u>Matched mould forming</u>** 156. Change and set the mould for matched mould forming. 157. Operate and prepare product. 158. Do preventive maintenance of thermoforming machine.	• Inline thermoforming process • Comparison thermoforming and injection molding process. • Faults, causes & its remedies of thermoforming process. • Importance of preventive maintenance.
Professional Skill 25Hrs.; Professional Knowledge 06 Hrs.	Produce good quality of rotomoulding product and check the defects.	159. Identify different types of Rotomoulding machine. 160. Illustrate the mould. 161. Set the mould. 162. Prepare the raw material for rotomoulding. 163. Arrange heating system. 164. Perform TRO – Rotomoulding. 165. Finish and Decorate product. 166. Do preventive maintenance of machine.	• Introduction Rotational moulding process. • Advantage and Disadvantage & limitations of rotomodulding. • Cycle of Rotomoulding. • Rotational moulding equipments. • Faults causes Ramedies of Rotomoulding • Materials of Rotational moulding.
Professional Skill 25Hrs.; Professional	Identify and Perform predrying process using different materials.	167. Illustrate pre-drying equipments. 168. Set the temperature.	• Importance of pre-drying. • Various pre-drying equipments.

Knowledge 06 Hrs.		169. Load the material in tray. 170. Set the parameters and pre-dry the material. 171. Perform over all maintenance of pre-drying equipment.	• Pre-drying temperature and time for various materials. • Safety observed while operating pre-drying equipment
Professional Skill 25Hrs.; Professional Knowledge 06 Hrs.	Carry out different machining operations on plastic sheets/blocks.	172. Illustrate the fabricating methods. 173. Cut the acrylic sheet using acrylic cutter. 174. Drill the acrylic sheet HDPE Block using hand drill machine. 175. Perform screwing the acrylic sheet.	• Methods of joining & assembly • Buffing & sanding. • Methods of machining of plastics. • Decoration of plastics.
Engineering Drawing(40 Hrs.)			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the field of work.	**<u>Engineering Drawing:</u>** Introduction to Engineering Drawing and Drawing Instruments – Conventions Sizes and layout of drawing sheets Title Block, its position and content Drawing Instrument Lines- Types and applications in drawing Free hand drawing of – Geometrical figures and blocks with dimension Transferring measurement from the given object to the sketches. Free hand drawing of hand tools and measuring tools. Drawing of Geometrical figures: Angle, Triangle, Circle, Rectangle, Square, Parallelogram. Lettering & Numbering – Single Stroke. Dimensioning Types of arrowhead Leader line with text Position of dimensioning (Unidirectional, Aligned) Symbolic representation – Different symbols used in the Plastic Processing Operator trade. Concept and reading of Drawing in Concept of axes plane and quadrant Concept of Orthographic and Isometric projections Method of first angle and third angle projections (definition and difference)	

		Reading of Job drawing related to Plastic Processing Operator trade.
WORKSHOP CALCULATION & SCIENCE (30 Hours)		
Professional Knowledge WCS - 30 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**WORKSHOP CALCULATION & SCIENCE:** **Unit, Fractions** Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion Factors, HCF, LCM and problems Fractions - Addition, substraction, multiplication & division Decimal fractions - Addition, subtraction, multiplication& division Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** Square and square root Simple problems using calculator Applications of Pythagoras theorem and related problems Ratio and proportion Ratio and proportion - Direct and indirect proportions Percentage Percentage - Changing percentage to decimal and fraction **Material Science** Properties and uses Polymer, thermoplastic and thermoset material **Mass, Weight, Volume and Density** Mass, volume, density, weight and specific gravity. Related problems for mass, volume, density, weight and specific gravity **Heat & Temperature and Pressure** Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals Problem of heat loss and heat gain with assignments Thermal conductivity and insulators Concept of pressure - Units of pressure, gauge pressure and gauges used for measuring pressure **Basic Electricity** Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units Conductor, insulator, types of connections - series and parallel **Mensuration** Area and perimeter of square, rectangle and parallelogram Area and perimeter of Triangles Area and perimeter of circle, semi-circle, circular ring, sector of

		circle, hexagon and ellipse Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder **Trigonometry** Measurement of angles Trigonometrical ratios
Implant training/project **Broad areas:** (i) Prepare a flower pot by using acrylic sheet. (ii) Prepare geometrical solids by using acrylic sheet. (iii) Prepare any one type of mould used in plastic processing (iv) Prepare any model of extrusion plant. (v) Prepare a disply chart of pre-drying materials and its temperature.		

SYLLABUS FOR CORE SKILLS
1. Employability Skills(Common for all CTS trades) (120Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in./dgt.gov.in

ANNEXURE-I

LIST OF TOOLS AND EQUIPMENT			
PLASTIC PROCESSING OPERATOR (For batch of 20 candidates)			
S No.	**Name of the Tools & Equipment**	**Specification**	**Qty**
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit sl. 1-15 is required additionally)			
1.	Calliper	Inside Spring - 150 mm	5 Nos.
2.	Calliper	Outside - Spring - 150 mm	5 Nos.
3.	Divider	spring type – 150 mm	5 Nos.
4.	Odd leg calliper	firm joint 0- 150 mm	5 Nos.
5.	Screw Driver	10 X 200 mm	6 Nos.
6.	File card		2 Nos.
7.	Hammer	Ball Peen - 500 grams	6 Nos.
8.	Steel Rule	300 mm, Graduated both in Metric and English Unit	5 Nos.
9.	Engineer's Square	150 mm Blade	10 Nos.
10.	Hacksaw Frame - Adjustable	300 mm	10 Nos.
11.	Centre Punch	Diameter - 10 mm and Length - 100 mm	10 Nos.
12.	File - Flat - Bastard	300 mm	10 Nos.
13.	File - Flat - Second Cut	250 mm	10 Nos.
14.	File - Flat - Safe Edge	200 mm	10 Nos.
15.	File - Triangular	Smooth - 200 mm	10 Nos.
B. INSTRUMENTS AND GENERAL SHOP OUTFIT - For 2 (1+1) units no additional items are required			
16.	Bench Vice	150 mm	10 Nos.
17.	Micrometer - Outside	Digital- 0 - 25 mm	2 Nos.
18.	Micrometer - Outside	25 - 50 mm	2 Nos.
19.	VernierCalliper	Digital - 0 - 200 mm	2 Nos.
20.	Surface Plate - Granite	300 x 300 mm with Stand and Cover	1 No.
21.	Drill Twist Set	1.5 mm to 15 mm by 0.5 mm	1 No.
22.	Taps set	3mm to 10mm, Set of 9 Pieces	1 No.
23.	Dies Set	3 mm to 10 mm	1 No.
24.	Cooling tower	10TR	1 No.
25.	Mono block pump	2HP	2 Nos.

26.	Vernier Bevel Protractor	300 mm Blade with Acute Angle Attachment	2 Nos.
27.	Vernier Height Gauge	0 - 300 mm with least count = 0.02 mm	1 No.
C. GENERAL MACHINERY			
28.	Drilling Machine	13 mm Electric with Hammer Action	2 Nos.
29.	Pillar Drill Machine	Motorized up to 13 mm Capacity	1 No.
30.	Pedestal Grinder	Double Ended - 200 mm	1 No.
31.	Test Equipment for plastic -MFI		1 No.
32.	Universal Testing machine for Plastic		1 No.
33.	Impact tester.		1 No.
34.	Plastic scrap grinder		1 No.
35.	Pre heater	12 trays of 25 kgs. Of 20 minutes capacity.	1 No.
36.	Hand operated Injection Moulding machine	15 grams capacity	5 Nos.
37.	Hand operated Injection Moulding machine	30 grams capacity	5 Nos.
38.	Automatic screw type Injection Moulding Machine	with moulds and accessories as required 80 to 85 T capacity (with Microprocessor/PLC Controller)	1 No.
39.	Hand operated Compression Moulding Machine	with moulds – 30 to 60 T. capacity	5 Nos.
40.	Automatic compression moulding machine	with moulds and accessories as required – 100 T capacity (with Microprocessor/PLC controller)	1 No.
41.	Hand operated Blow Moulding Machine	with moulds and accessories of 250 ml capacity with clamping system.	5 Nos.
42.	Automatic Extrusion Blow Moulding Machine	with set of moulds and accessories - 1 to 2 liter capacity (with Microprocessor/PLC controller)	1 No.

43.	Extruder of 40 kg/hr. Plasticizing capacity	with re-processing die including granulator/cutterfor PE& PP.	1 No.
44.	Pipe extruder of 40 kg/hr. Plasticizing capacity	with pipe die (1/2 inch & 1 inch diameter) to process PE & PP.	1 No.
45.	Extruderof40 kg/hr. Plasticizing capacity	For single layer Blown film plant including die (18 inch LFW) & accessories.	1 No.
46.	Thermo/Vacuum forming Machine with Mould		1 No.
47.	Rotational moulding Machine with Mould		1 No.
48.	Hydraulic trainer kit	Hydraulic Trainer with Equipment trays - 2nos., Pressure gauge – 2 nos., Hydraulic Motor -1 no., 4/2-way hand lever valve - 3no.s, 4/3-way hand lever valve with relieving mid-position - 3nos., 4/3-way hand lever valve with closed mid-position - 3nos., 4/3-way hand lever valve with recirculating mid-position - 3 nos., Pressure sequence valve, pressure relief valve – 3 nos., 3-way pressure reducing valve – 2 nos., 2-way flow control valve – 2 nos., One-way flow control valve - 4nos., Non-return valves – 4 nos., Shut-off valve- 4 nos., Diaphragm accumulator with shut-off block – 1 no., Weight up to 10 kg- 1 no., 2/2 way plunger / stem actuated – 2 nos., Standard hoses with quick connectors, Flow dividing valve – 1 no., 5-way distributor with pressure gauge - 1no.s, All these accessories are mounted on	1 No.

		M.S.fabricated frame.	
49.	Pneumatic trainer kit	Pneumatic trainer consists with Pressure Gauge,Pneumatic Motor, Single Acting Cylinder, Double Acting Cylinder, Air Filter Regulator Lubricatorwith Pressure Gauge Hand Lever Operated Valves : 2 Nos, 5/2 way&3/2-way, Solenoid Valve: 2 Nos, 5/2 way& 3/2 way, Pilot Operated Valve: 5/3Spring Centered, 5/2Spring Returned, 3/2 Pilot Operated. Palm Operated Valve: 3/2-way Valve, Roller Lever Valve : 5/2 way, 3/2-way Valve, Shuttle Valve: OR Valve, AND Valve: Dual Pressure Valve, Flow Control Valve, Non-Return Valve, Block Manifold: 6 ways, Plastic Tubing as per require, Quick Push-Pull connectors, Air Compressor,all these are pneumatic components are mounting on a aluminum profile plate.	1 No.
50.	Programmable logic control	At least digital 4 input & 4 Output,4 analog input & output) At least digital 8 input & 8 Output, 4 analog input & output with simulation software and hardware for understanding PLC programming and functioning ,	1 No.

		operation for plastic machineries.	
51.	Strech Blow Moulding Machine- 1 liter with mould		1 No.
52.	Air compressor with air treatment accessories 5 HP		1 No.
D. FURNITURE			
53.	Black/ White Board with Stand	4 x 3 Feet	1 No.
54.	Discussion Table/ Working Table = L:W:H = 8:4:3 Feet - Heavy Wooden Top		1 No.
55.	Instructor/ Office Chair		2 Nos.
56.	Instructor/ Office Table		1 No.
57.	Notice Board	2 x 3 Feet	1 No.
58.	Steel Almirah	Large	2 Nos.
59.	Steel Locker	12 Pigeon Hole	2 Nos.
60.	Steel Rack		1 No.
61.	Stool	Height 450 mm	20 Nos.

Note: -

1. Internet facility is desired to be provided in the class room.

ANNEXURE – II

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum. Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of Expert members participated for finalizing the course curricula of Plastic Processing Operator trade held at Govt. ITI, Ambernath and ITC Vadodara.			
S No.	**Name & Designation Sh./Mr./Ms**	**Organization**	**Remarks**
Industry Expert			
1.	Laxmidas Hinduja, Chairman	Transpek Industries Ltd.	Chairman
2.	S. A. Pandav, RDD, Vadodara	DET, Gujarat	Coordinator
3.	L. K. Mukherjee, DDT	CSTARI, Kolkata	Coordinator
4.	Akash Vergurlekar, Mechanical Maintenance Executive	VVF India Ltd. Taloja, Raigad	Member
5.	Jayesh Karnik, Instrumentation Maintenance Executive- Engg. Service	-do-	Member
6.	Pradeep Kumar Pandey, Asst. Deputy Manager	Century Rayon, Mumbai	Member
7.	Deepak M Kanitkar, Executive	Huhtamaki PPL Ltd, Bansri, Thopoli, Rigad	Member
8.	Atul D. Taksande, Sr. Executive P&A	Bombay Dyeing & Manufacturing Co., Patulganga	Member
9.	K. M. Unni Krishnan, Sr. Manager HR & Admin.	ASB International Pvt. Ltd., Ambernath	Member
10.	Ajit D. Bagwe, Manager- Molding	-do-	Member
11.	Rohan Kadlay, General Manager	Siemens Ltd. Mumbai	Member
12.	VidyadharTakle, Asst. Manager- Engg. Service	Godrej Industries Ltd., Ambernath	Member
13.	Roshan Vagade, QC- Engineer	Indore Composite Pvt. Ltd. Mumbai	Member
14.	Sandip D. Pisal, Asso. Chief Manager- Painter	Godrej & Boyce Manufacturing Co. Ltd, Mumbai	Member
15.	Rajendra Agashe, Manager- HR	Asian Paints India ltd. Taloja	Member
16.	Mahesh Bandekar, Coating Officer	Indore Composite Pvt. Ltd., Mumbai	Member

17.	Prashant A Bhosale, Sr. Manager-Production	Jubilant Life Science Ltd., Ambernath	Member
18.	Udayraj Ransing, Dy. Manager Engg.	-Do-	Member
19.	Hardik Patel, Manager	Paragon Plastic, Makarpura	Member
20.	Uday Chowkshi, MD	Abhi Plastic, Makarpura	Member
21.	Maganbhai Sureliya	Sabic Innovative Plastic India Ltd. Gujarat	Member
22.	Ravi Mishra	Shefield Technoplast Pvt. Ltd. Gujarat	Member
23.	Vijay Mariar	-Do-	Member
24.	Ghanshyambhai Patel	Agni Fibre Board Pvt. Ltd. Vadodara, Gujarat	Member
25.	Deepakbhai Tedse	-Do-	Member
26.	Samir Mehta	Shree Ram Plastic, Vadodara, Gujarat	Member
27.	Chandrasekher Jaiswal	Chemical Process Equipment, Vadodara	Member
DGT & other institute			
28.	K.C. Kachhadiya Principal	ITI Karjan. Gujarat	Member
29.	M.V. Hingoo, SI	ITI Tarsali, Gujarat	Member
30.	R. V. Mandake, Craft Instructor	ITI Aundh, Pune-07	Member
31.	P. G. Chavan, Craft Instructor	ITI Ambernath, Thane	Member
32.	N. G. Mhatre, Craft Instructor	-do-	Member
33.	H. N. Bargal, Training Officer	DVET, Mumbai	Member
34.	N. V. Kumbhar, Craft Instructor	ITI Satara, Maharashtra	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्