

**NATIONAL SKILL QUALIFICATION FRAME WORK  
(NSQF)  
QUALIFICATION FILE**

**SYLLABUS & CURRICULUM**

**POST GRADUATE DIPLOMA IN PLASTICS  
PROCESSING AND TESTING**

**(PGD-PPT)**

**Implemented from Academic Year: 2018-19**



**Academic Cell  
Central Institute of Plastics Engineering & Technology  
(Department of Chemicals & Petrochemicals,  
Ministry of Chemicals & Fertilizers, Govt. of India)  
Head Office, Guindy, Chennai – 600 032**

Tel. No.: 91-44-22254780  
Email: hocipet2018@gmail.com

Fax: 91-44-22254787  
Web: [www.cipet.gov.in](http://www.cipet.gov.in)

# NATIONAL SKILL QUALIFICATION FRAMEWORK QUALIFICATION FILE

## CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

### Name and address of submitting body:

Central Institute of Plastics Engineering & Technology (CIPET)  
Department of Chemicals & Petrochemicals (DCPC)  
Ministry of Chemicals & Fertilizers, Govt. of India  
T.V.K.Industrial Estate, Guindy, Chennai-32

### Name and contact details of individual dealing with the submission:

#### Name and contact details of individual dealing with the submission

Name : Prof. (Dr.) S. K Nayak  
Position in the organization : Director General  
Address : CIPET, CIPET Head office, Guindy, Chennai  
E-mail address : [cipethq@vsnl.com](mailto:cipethq@vsnl.com), [drsknayak@cipet.gov.in](mailto:drsknayak@cipet.gov.in)  
Tel number(s) : +91-44-22253040, +91-44-22254780  
E-mail address : [cipethq@vsnl.com](mailto:cipethq@vsnl.com), [drsknayak@cipet.gov.in](mailto:drsknayak@cipet.gov.in)

### List of documents submitted in support of the Qualifications File:

1. Curriculum Document
2. Evaluation (Marking) Scheme

## 1. SUMMARY

<b>Qualification Title</b>	<b>Post Graduate Diploma in Plastics Processing &amp; Testing</b>
<b>Qualification Code</b>	<b>CIPET/PGD-PPT/01</b>
<b>Nature and purpose of the qualification</b>	<p><b>Nature:</b> Post Graduate Diploma Course</p> <p><b>Purpose:</b> Learners who attain this qualification are competent in Plastics processing techniques like Injection Molding, Extrusion, Blow molding, compression molding, etc. and in testing of Plastic products and raw materials. The graduates can get a job in plastics processing industries in production as well as in quality control or they can become entrepreneurs.</p>
<b>Body/bodies which will award the qualification</b>	<b>Central Institute of Plastics Engineering &amp; Technology (CIPET), Guindy, Chennai</b>
<b>Body which will accredit providers to offer courses leading to the</b>	<b>AICTE</b>
<b>Body/bodies which will carry out assessment of learners</b>	<b>Central Institute of Plastics Engineering &amp; Technology (CIPET), Guindy, Chennai</b>
<b>Occupation(s) to which the qualification gives</b>	<b>Production In-charge / Quality Control Engineer</b>
<b>Licensing requirements</b>	<b>Not Applicable</b>
<b>Level of the qualification in the NSQF</b>	<b>Level 8</b>
<b>Anticipated volume of training/learning required to complete the qualification</b>	<b>1620</b>
<b>Entry requirements and /or recommendations</b>	<b>B. Sc. Graduates (B.Sc. Chemistry / B.Sc. degree with chemistry as one of the subjects)</b>
<b>Progression from the qualification</b>	<p><b>Job Progression:</b></p> <p>After completion of two semesters of theory and practical students have to undergo six months industrial training cum project work with stipend and after the completion of training the graduates can work as a production in-charge or Quality control supervisor. After 5 years of experience they can become Production manager/Quality manager in the downstream polymer industries.</p>
<b>Planned arrangements for the Recognition of Prior learning (RPL)</b>	<b>Yes</b>
<b>International comparability where known</b>	<b>Not Known</b>
<b>Date of planned review of the qualification.</b>	<b>January 2018</b>

SEMESTER-I

Theory							
S. No.	Subject	CH	TH	EH	Marks		
					INT	EXT	TOTAL
PPT 101	Plastics Materials and its Applications-I	43	11	03	40	60	100
PPT 102	Plastics Processing Technology – I	43	11	03	40	60	100
PPT 103	Plastics Testing – I	43	11	03	40	60	100
PPT 104	Plastics Product and Mould Design	43	11	03	40	60	100
PPT 105	Polymer Science & Technology	43	11	03	40	60	100
<b>(18 weeks- 15hrs a week)</b>		<b>215</b>	<b>55</b>	<b>15</b>	<b>200</b>	<b>300</b>	<b>500</b>
		<b>270</b>					
Practical Work							
PPTL 101	Practical – I - Plastics Processing Lab –I (18 weeks- 8hrs a week)	144		08	100	200	300
PPTL 102	Practical – II – Plastics Testing Lab – I (18 weeks- 6 hrs a week)	108		04	100	100	200
	Library – (20 weeks 4 hrs a week) (18 weeks- 1hr a week)	18		--	-	-	-
<b>Total Hours (18 weeks- 15hrs a week)</b>		<b>270</b>		<b>12</b>	<b>200</b>	<b>300</b>	<b>500</b>

SEMSETER -II

Theory							
S. No.	Subject	CH	TH	EH	Marks		
					INT	EXT	TOTAL
PPT 201	Plastics Materials and its Applications- II	43	11	03	40	60	100
PPT 202	Plastics Processing Technology-II	43	11	03	40	60	100
PPT 203	Plastics Testing-II	43	11	03	40	60	100
PPT 204	Machine Maintenance	43	11	03	40	60	100
PPT 205	Industrial Management & Entrepreneurship	43	11	03	40	60	100
<b>Total Theory Hours (18 weeks- 15hrs a week)</b>		<b>215</b>	<b>55</b>	<b>15</b>	<b>200</b>	<b>300</b>	<b>500</b>
		<b>270</b>					
Practical Work							
PPTL 201	Practical –III - Plastics Processing Lab – II(18 weeks- 7 hrs a week)	126		08	100	100	200
PPTL 202	Practical – IV - Plastics Testing Lab –II (18 weeks- 4 hrs a week)	72		04	100	100	200
PPTS 203	Seminar – (18 weeks- 3 hrs a week)	54		-	100		100
	Library – (18 weeks- 1hr a week)	18		-	-	-	-
<b>Total (18 weeks- 15hrs a week)</b>		<b>270</b>		<b>12</b>	<b>200</b>	<b>200</b>	<b>500</b>

SEMSETER –III

S. No.	Subject	CH	TH	EH	Marks		
					INT	EXT	TOTAL
PPTP	Project Work/In plant training in industry **	540	-	-	-	-	-
<b>Total Hours (18 weeks 30 hours per week)</b>		<b>540</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
PPTP 301	Project Evaluation & Viva voce	-	-	8	400	400	800
PPTP 302	Industrial Training Report	-	-	-	200		200
<b>Total</b>		<b>540</b>	<b>-</b>	<b>8</b>	<b>1000</b>		<b>1000</b>

\*\* Minimum of 6 weeks

CH-Contact Hours

TH- Tutorial Hours

EH-Examination Hours

<b>Formal structure of the qualification</b>				
<b>Sl. No</b>	<b>Title and Identification Code of Component</b>	<b>Mandatory Optional</b>	<b>Estimated Size Learning Hours</b>	<b>Level</b>
I Semester				
01	Plastics Materials and its Applications –I	Mandatory	54	
02	Plastics Processing Technology –I	Mandatory	54	
03	Plastics Testing –I	Mandatory	54	
04	Plastics Product and Mould Design	Mandatory	54	
05	Polymer Science & Technology	Mandatory	54	
06	Plastics Processing Lab –I	Mandatory	144	
07	Plastics Testing Lab –I	Mandatory	108	
II Semester				
01	Plastics Materials and its Applications – II	Mandatory	54	
02	Plastics Processing Technology – II	Mandatory	54	
03	Plastics Testing – II	Mandatory	54	
04	Machine Maintenance	Mandatory	54	
05	Industrial Management and Entrepreneurship	Mandatory	54	
06	Plastics Processing Lab-II	Mandatory	126	
07	Plastics Testing Lab – II	Mandatory	72	
08	Seminar	Mandatory	54	
III Semester				
01	Project Work/ In plant training in industry	Mandatory	540	

## SECTION 1

**ASSESSMENT****Body/Bodies which will carry out assessment:**

Examination cell - Central Institute of Plastics Engineering & Technology, Head Office, Chennai - 32

**How will RPL assessment be managed and who will carry it out?**

*Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the relevant Education body. The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards.*

**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.**

**1. ASSESSMENTGUIDELINE:**

- Criteria for assessment based on each learning outcomes, will be assigned marks proportional to its importance.
- The assessment for the theory & practical part is based on two midterm exam and a centralized semester exam wherein the questions are set by faculties and approved by Examination cell, CIPET Head Office, Chennai.
- For each Individual batch, Examination cell creates unique question papers for theory part as well as practical for each candidate at each examination.
- To pass the Qualification, every trainee should score a minimum of 40% in each Theory and 50% Practical subject.

**Assessment comprises the following components:**

- Job carried out in labs/workshop
- Record book
- Answer sheet of assessment
- Viva –voce
- Mid Term Exam
- Attendance and punctuality

**2. ASSESSORS:**

CIPET centres faculty teaching the Post Graduate Diploma in Plastics Processing & Testing, also assesses the students as per guidelines set by Examination cell of CIPET Head office. Faculties are been trained from time to time to upgrade their skills on various aspects such as conduction of assessments, teaching methodology etc.

**3. ELIGIBILITY TO APPEAR IN THE EXAM:**

Minimum 80% attendance is compulsory for the students to appear for the assessments.

**4. MARKINGScheme:**

Please refer Annexure - I for marking / evaluation scheme.

**5.PASSINGMARKS:**

Passing criteria is based on marks obtain in attendance record, assignments, practical's performance, viva or oral exam, mid – semester exam , practical exam and final semester exam.

Minimum Marks to pass practical exam – 50%

Minimum Marks to pass final Exam – 40%

Minimum Marks to pass in class test – 40%

Minimum Marks to pass Project report and viva-voce exam – 50%

**6. RESULTS ANDCERTIFICATION:**

The assessment results are backed by evidences collected by assessors. Successful trainees are awarded the Post Graduate Diploma certificate by CIPET Head Office.

**ASSESSMENT EVIDENCE****ASSESSMENT EVIDENCE**

Assessment evidence comprises the following components document in the form of records:

1. *Record book*
2. *Answer sheet of periodical and midterm test assessment*
3. *Viva –voce*
4. *Attendance and punctuality*
5. *General Behavior*

<b>TITLE OF COMPONENT</b>		<b>POST GRADUATE DIPLOMA IN PLASTICS PROCESSING &amp; TESTING</b>		
<b>Sr.No</b>	<b>OUTCOMES TO BE ASSESSED</b>	<b>ASSESSMENT CRITERIA FOR THE OUTCOME</b>		<b>No. of Hours</b>
<b>1</b>	<b>PLASTICS MATERIAL AND ITS APPLICATION -I</b> <i>(Understands characteristics and properties of different plastics, additives and compounding)</i>	1.1	Understanding of basic chemistry of polymers, their nomenclature - Sources of Raw Materials - Methods of Manufacture - General Characteristics & Properties.	
		1.2	Knowledge of Commodity Plastics, Engineering Plastics, Engineering Plastics & Specialty Plastics - Sources of Raw Materials- Method of Manufacture - General Characteristics, Structure & Properties-Processing Behavior and applications in key sectors.	
		1.3	Knowledge about polymer blends & alloys- Definitions and nomenclature - advantages of blends and alloys, miscible and immiscible blends, morphology of blends, compatibility of polymers.	
		1.4	Understanding of Polymer Additives and Reinforcements like Antioxidants, Stabilizers (Heat & UV), Processing aids, Blowing agents, Flame Retardants, Nucleating agents, Colourants and Additives for Recycling, Coupling Agents, Curing Agents	
		1.5	Knowledge of properties and applications of Fillers, Fibres, Natural Fibres and Synthetic Fibres.	
<b>2</b>	<b>PLASTICS PROCESSING TECHNOLOGY-I</b>	2.1	Understanding of Basic Principles of Melt Processing of Thermoplastics, Effect of Polymer Properties on Processing,	
		2.2	Basic Knowledge on Thermal Behaviour of Polymer Melt, flow behaviour of polymer melts, Rheology of Ideal Fluids and Polymers – Newtonian & Non-Newtonian fluids	
		2.3	Understanding of Different Types of Processes and Limitations - Process Flow Charts, Selection of Process – Degradation – molecular orientation and different grades of plastics.	
		2.4	Knowledge of Compression moulding & Transfer moulding - Principle – Process – Machine Specification, Material Recommendation and flow properties - Preheating Techniques, Process Variables - Flow Characteristics, cycle time, heating and cooling system, faults and Trouble Shooting, process advantages and limitations	
		2.5	Understanding of Injection Moulding Process - Basic Process Principles, Machine rating and Specifications - Types of Machines –	



		<p>Construction - Parts and its functions,</p> <p>2.6 Practical understanding of Start up and shut down procedure - Operation procedure, projected area calculation, Press capacity, clamping system, Type of Screws and their function- Process variables - Heating System - Ejection system – Back Pressure - Suck back - Drooling - Nozzle Types - Moulding cycle - Shot weight -Purging - Material recommendation - grades</p> <p>2.7 Knowledge of Microprocessor controlled Injection Moulding- Interaction of process variables- machine operation- theoretical concepts and their relationship to processing- Shrinkage – Annealing - Dimensional Control - Moulding Records - Trouble Shooting</p> <p>2.8 Knowledge of Advance Injection Moulding- structural foam moulding, gas assisted injection moulding, thin wall product moulding, multi material and multi-colour moulding, thermo set injection moulding, All Electric Injection Moulding,</p> <p>2.9 Understanding of Statistical quality control and process control</p> <p>2.10 Knowledge of Thermoset Injection Moulding – Processing behaviour of thermosets, process principles, variables, Automation - Troubleshooting</p> <p>2.11 Can explain Injection Moulds: Types of Injection Moulds -Cavity &amp; Core finishing – Gate Types, Runners, Hot Runner Moulds –Insulated Runner Mould system.</p> <p>2.12 Understanding of Rotational Moulding Process - Basic Process Principles, Machine rating and Specifications - Types of Machines – Construction - Parts and its functions, Process variables - Charge size - wall thickness control - Heating and Cooling system, faults – causes and remedies, Merits and Demerits of the process</p> <p>2.13 Understanding of FRP processing methods - contact moulding - hand layup, spray up method - vacuum bag and pressure bag moulding, filament winding, centrifugal casting, pultrusion, matched die moulding and advanced techniques.</p> <p>2.14 Understanding of Secondary Processing Techniques - Powder Coating, Casting, Machining &amp; Joining of plastics-Decoration of Plastics-Metalizing-Printing &amp; Painting etc-Post moulding operations techniques, In-mould labeling</p>	
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		2.15 Should be able touse Robots in part handling, Robotics used in high production moulding process, Automated Conveyor system, Automatic material handling systems,	
3	<b>PLASTICS TESTING– I</b>	<p>3.1 Knowledge of basics of testing- Specification, Standards, test specimen, Pre-conditioning and test atmosphere</p> <p>3.2 Familiarity with measuring instruments - Vernier Caliper, Micrometer, Thickness Gauge, Pie Tape, Go No Go Gauges etc.</p> <p>3.3 Understanding of Identification of plastics by simple tests, Visual examination, Density,Melting point, Solubility test, Flame test and burning characteristics .and chemical analysis test.</p> <p>3.4 Understanding of tests for determining Specific gravity-Density by density- gradient columnBulk density - Particle size by sieve analysis,Moisture analysis</p> <p>3.5 Understanding of tests for determining Short-term Mechanical Properties - Tensile, Flexural, Compressive, Shear, Impact, Tear resistance, Hardness tests, Abrasion resistance, Friction properties along with long-term mechanical properties like creep and stress relaxation.</p> <p>3.6 Understanding of tests for determining thermal Properties - Heat Distortion Temperature (HDT), Vicat Softening Temperature (VST),Long Term Heat Resistant Tests, Thermal Conductivity, Thermal Expansion, Brittleness Temperature, DSC, TGA, DMA.</p> <p>3.7 Understanding of tests for determining various material characterization properties like Melt Flow index, Viscosity, Dilute Solution Viscosity, Molecular weight calculation, Material Characterization, Apparent Density, Bulk Factor, Cup &amp; Spiral flow rest, dynamic viscosity (Brookfield viscometer).</p>	
4	<b>PLASTICS PRODUCT AND MOULD DESIGN</b>	<p>4.1 Understanding of Engineering Drawing Concepts - Orthographic views, conversion of pictorial view into orthographic view, Dimensioning techniques, Sectional views and assembly drawing. Blue print reading</p> <p>4.2 Knowledge of Product Design - Plastics product design - Concepts - Essential factors – process variables vs product design.</p> <p>4.3 Knowledge of Uniform and symmetrical wall thickness - part geometries - draft angle Ribs - internal sharp corners and notches, Bosses - Holes -Threads - undercuts - Hinges metal inserts - Tolerances</p>	

		<p>4.4 Exposure to Recent trends in product development: Introduction to Prototype &amp; Rapid prototype (RPT) - 3D Printing - applications and benefits.</p> <p>4.5 Knowledge of Injection Mould Design - Selection of Injection moulding machines Shot capacity, Plasticizing capacity, Clamping force and Daylight, mould elements , Bolsters - mould alignment, Feed system, Ejection types, Mould cooling, Venting, parting line and parting surface Requirement of Core &amp; Cavities for Single &amp; Multi impression mould, Cavity &amp; Core finishing, Gate Types, Runners, mould material, Bill of materials</p> <p>4.6 Knowledge of Advanced injection mould design - Study of External undercut- split cavities, Side cores Split and side core actuation, internal undercut-form pin-collapsible core - loose cores, threaded inserts - internal and external threads.</p> <p>4.7 Understanding of Blow Mould design - Types of blow moulds and Requirement of pinch off, neck designs, parting line, venting, cooling</p> <p>4.8 Knowledge of Compression Mould Design - Types of compression moulds</p>	
<p><b>5</b></p>	<p><b>POLYMER SCIENCE &amp; TECHNOLOGY</b></p>	<p>5.1 Basic knowledge of Polymer Structure, Processing and Applications - Molecular Force and Chemical Bonding in Polymers, Geometric Isomerism, Molecular Weight and Molecular Weight Distribution and its effect on Properties and Processing of Polymers.</p> <p>5.2 Understanding of thermal transition Tg and Tm.</p> <p>5.3 Understanding of Polymer physics concerning polymerization Techniques like Bulk, Solution, Suspension, Emulsion.</p> <p>5.4 Knowledge of Reaction Mechanism- Chain growth Polymerization – Addition Polymerization</p> <p>5.5 Knowledge of Structure – Property Relationship – Molecular Weight and Poly Dispersity Index (PDI) Effect of Polymerization on PDI – Polymer solutions and solubility</p> <p>5.6 Knowledge of General Rules for Polymer solubility, Crystallinity and orientation in polymers,</p> <p>5.7 Familiarity with Polymer characterization techniques concerning analysis of chemical structure and morphology and the determination of physical properties in relation to compositional and structural parameters.</p> <p>5.8 Knowledge of Identification and Characterization</p>	

		<p>of Polymers, Molecular Force and Chemical Bonding in Polymers.</p> <p>5.9 Understanding of Molecular Weight Distribution and its effect on Properties and Processing of Polymers.</p> <p>5.10 Knowledge about Glass Transition temperature and Melt Temperature.</p> <p>5.11 Understanding of Polymer structure and how it affects the properties</p> <p>5.12 Knowledge of Molecular Weight Determination by Dilute Solution Viscosity, Gas Chromatography, Gel Permeation Chromatography,</p> <p>5.13 Understanding of Melt Flow and Thermal characteristics through DSC, TGA, DMA</p> <p>5.14 Understanding of preliminary concepts of Rheology and Viscoelasticity</p>	
6	<b>PLASTIC PROCESSING LAB- I</b>	<p>6.1 Knowledge about Shop-floor Machinery, Safety aspects, mold, tools handling and safety measures on the shop-floor.</p> <p>6.2 Study of Machine in Idle-Run Observation (IRO), Parts &amp; functions, Operating principle, free sketch of Machine-parts eg. Nozzle, Torpedo, Hopper, Rack &amp; Pinion Barrel etc., shot capacity definition.</p> <p>6.3 Operation practice to produce moulding on different hand injection moulds. Recording the observation and results in practical record books.</p> <p>6.4 Study of Semi-Automatic Injection Moulding M/cs of all types in IRO. Comparative study of Pneumatic type &amp; Hydraulic type of M/cs, operation to produce components in different moulds. Cycle-time analysis, observations of Process- Parameters &amp; Procedure to be recorded.</p> <p>6.5 Knowledge of Automatic Injection Molding machines-Study of M/c Parts &amp; function, Study of clamping systems on M/cs, Technical specification of Machine, sequence on Machine, Definitions of all Processing Parameters &amp; study of controls in M/cs.</p> <p>6.6 Hands on practical -IRO &amp; study of Injection Unit, Clamping Unit, Process- Control knobs, Safety precautions, start-up Procedure, Shut- down Procedure</p> <p>6.7 M/c Operation-Practice, Process parameter setting for a particular mould on the Machine, Observations of all parameters, cycle-time analysis, use of different plastics material for</p>	<p>12 Hours</p> <p>12 Hours</p> <p>12 Hours</p> <p>16 Hours</p> <p>16 Hours</p> <p>12 Hours</p> <p>12 Hours</p>

		<p>moulding &amp; comparison, Moulding faults analysis for causes and remedies.</p> <p>6.8 Study of Extruders in IRO, Free sketch of machines, their parts and parts-function, List of products manufactured by Extrusion-Process. Study of different types of extrusion process. Operation-Practice 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.</p> <p>6.9 Study of Hand Blow Moulding M/cs, Free-sketch of M/c with parts &amp; study of part-function, Specification of M/c, Study of Parison-die with sketch. Die-centering practice and operation of Hand Blow Machines, to produce components observations, cycle-time analysis Procedure of operation and observations. To know Technical specification of M/c, Mould clamping on M/c, operation Practice with different mould.</p> <p>6.10 Auxiliary equipment, Introduction to Maintenance basic knowledge of Hydraulic &amp; Pneumatic systems, Electrical system and Introduction to Moulds, Tool Room Machines &amp; Drawing Practice.</p>	<p>16 hours</p> <p>16 Hours</p> <p>20 Hours</p>
7	<b>PLASTIC TESTING LAB-I</b>	<p>7.1 Familiarization with measuring instruments Identification of plastics by simple method</p> <p>7.2 Capable of determine Viscosity and Molecular weight, K-value for PVC resin, Melt flow index of plastics materials</p> <p>7.3 Knows how to determine Ash Content, Moisture Content, Filler Content</p> <p>7.4 Understanding of Mechanical properties of plastics &amp; test methods</p> <p>7.5 Understanding of weathering properties and related tests.</p> <p>7.6 Knows how to determine Density, Bulk density for powder material</p> <p>7.7 Is able to determine Burst strength &amp; tear strength of films</p> <p>7.8 Familiar with determination of Hardness (Rockwell, shore A&amp;D, Barcol )</p> <p>7.9 Can prepare Specimen by Injection moulding, contour cutting, compression moulding, contour punching, etc.</p> <p>7.10 Understanding of Testing methods for Electrical and Optical properties of Plastics materials</p>	<p>12 Hours</p> <p>12 Hours</p> <p>12 hours</p> <p>18 Hours</p> <p>06 Hours</p> <p>12 Hours</p> <p>06 Hours</p> <p>06 hours</p> <p>12 Hours</p> <p>12 Hours</p>

<p><b>8</b></p>	<p><b>PLASTICS MATERIALS AND ITS APPLICATIONS -II</b></p>	<p>8.1 Knowledge of Thermoset plastic Sources of Raw Materials Method of Manufacture – General Characteristics Structure &amp; Properties – Processing Behavior and applications.</p> <p>8.2 Knowledge of for Specialty Plastics Sources of Raw Materials Method of Manufacture – General Characteristics Structure &amp; Properties – Processing Behavior and applications</p> <p>8.3 Knowledge of Thermoplastic elastomer for Sources of Raw Materials Method of Manufacture – General Characteristics Structure &amp; Properties – Processing Behavior and applications.</p> <p>8.4 Knowledge of composites for definition advantage, matrix reinforcement Sources of Raw Materials Method of Manufacture – General Characteristics Structure &amp; Properties – Processing Behavior and applications.</p> <p>8.5 Knowledge of biodegradable plastic Bio Plastic for Principle and Mechanism of Plastics degradation Natural Bio-degradable Polymers – Synthetic, Bio-degradable Polymers - Water soluble Polymers Bio plastics types, properties and applications.</p>	
<p><b>9</b></p>	<p><b>PLASTICS PROCESSING TECHNOLOGY-II</b></p>	<p>9.1 Knowledge of Extrusion principles and construction, screw, compression ratio-back pressure, Types of extruder</p> <p>9.2 Knowledge of Extruder heating &amp; cooling systems - breaker plate - screen pack &amp; its functions - screw &amp; hopper cooling, Hopper, loading devices - Drying equipments - Process</p> <p>9.3 Awareness of downstream equipments and extrusion plants for Pipe/ Corrugated Pipe/Tube, Wire &amp; Cable covering, Blown Film- single layer, multilayer, laminates plant, Sheet/Tape plant and Mono filament / Box Strapping plant.</p> <p>9.4 Understanding of Thermoforming principles – Advantages - Material Selection, machines and their types, mold material, types of thermoforming processes, process variables, defects- causes and troubleshooting</p> <p>9.5 Knowledge of Calendaring principles, Process variables, Types of Calendar Rolls - Heating &amp; Cooling System - Roll Bending - Complete Description of Calendaring line with their function – Winding Types and Method - Finishing – Trouble Shooting and applications</p> <p>9.6 Knowledge of Blow moulding - Advantages - Material Selection, machines and their types,</p>	

		<p>mold material, types of processes, die construction, process variables, programming, defects- causes and troubleshooting</p> <p>9.7 Knowledge of Mixing machinery and devices - Mixing and mixing equipments. Principles - Operating characteristics - Machine construction - Specifications</p> <p>9.8 Knowledge of Process control systems and working details of Batch mixers and continuous mixers - High speed mixer</p> <p>9.9 Idea about Two roll mill and different types of mixers and kneaders - Single Screw extruder - Twin Screw extruder</p> <p>9.10 Knowledge of Plastics waste management Basic principles-mechanical recycling-chemical recycling-incineration, Pyrolysis -mixed waste recycling-value addition, application and development for recycled materials.</p>	
<p><b>10</b></p>	<p><b>PLASTICS TESTING– II</b></p>	<p>10.1 Understanding of electrical properties of plastics like Dielectric strength, Dielectric constant and Dissipation factor, Insulation resistance, Volume and Surface resistivity, Arc resistance, Antistatic and ability to perform tests to determine the same.</p> <p>10.2 Understanding of optical properties of plastics such as Refractive index, luminous transmittance, Clarity and Haze, Photo-elastic properties, Colour measurements and Gloss, transparency and Opacity and ability to perform tests to determine the same.</p> <p>10.3 Knowledge and hands-on experience of testing to determine Chemical &amp; Permanence Properties of Plastics namely-Resistance to chemicals, Immersion test, Stain Resistance of Plastics, Environmental Stress Cracking Resistance (ESCR), Water absorption, gas permeability-water vapor permeability.</p> <p>10.4 Acquire knowledge and Hands on experience in Flammability, Flammability (UL -94), Test Ignition Properties, Limited Oxygen Index Test Smoke Density Test, Flammability of Cellular Plastics.</p> <p>10.5 Trainee can individually operate the machine and carry out the tests as per standard procedures.</p> <p>10.6 Hands on experience on testing of weathering properties, environmental factors affecting plastics, Accelerated weathering tests, outdoor weathering of plastics, Resistance of plastics to biological systems.</p>	



		<p>10.7 Knows how Failure Analysis is conducted and understands different Types of failures, and their analysis using Non Destructive Testing (NDT), Ultrasonic methods &amp; its application in plastics, Gamma &amp; Beta Transmission, Laser, X-ray Fluorescence.</p> <p>10.8 Trainee has practical experience on Test methods and standards for bio- degradable plastics, Criteria used in evaluation of bio- degradable plastics and Description of current test methods.</p> <p>10.9 Trainee has knowledge and complete testing experience for Product Testing Plastics Pipes Films Woven sacks, Water Tanks, Containers &amp; Plastic Foams and other products.</p>	
<p>11</p>	<p><b>MACHINE MAINTENANCE</b></p>	<p>11.1 Trainee shall be able to perform the following skills with proper sequence.</p> <p>11.2 Understanding of Maintenance and its objectives, types of maintenance-Preventive Maintenance, Breakdown Maintenance, Predictive Maintenance, Schedule Maintenance and Maintenance Planning.</p> <p>11.3 Knowledge of Factors to be considered for Installation, Erection and Commissioning of Plastics Processing &amp; Testing Machinery – methods of Alignments and Leveling.</p> <p>11.4 Knowledge of Mechanical Parts like Screw, Barrel, Parts of Screw , clearance between screw and barrel, Non return valve, Thrust Bearing Unit, Gear Boxes, Calendar roll, Mill roll – platens flatness measurements, Platen parallelism measurement,</p> <p>11.5 Understanding of maintenance and lubrication of moving parts– Transmission system i.e. Gears, V-belts, Chains.</p> <p>11.6 Knowledge of Hydraulics Equipments like Valves, Valve sequences, Pressure control valves, metering and flow control valves, directional control valves</p> <p>11.7 Knowledge of Gear motors- Hydraulic actuators- servo motors</p> <p>11.8 Knowledge of Hydraulic symbols, industrial hydraulic circuits-Hydraulic Circuits for injection moulding machine</p> <p>11.9 Knowledge of strainers-heat exchanger- hydraulic air venting valve-Heat exchangers,</p> <p>11.10 Knowledge of filters, Compressors, Oil seals, O - Rings - Central Lubrication System , Oil quality monitoring, filtration</p> <p>11.11 Knowledge of Principles of displacement pumps-</p>	



		<p>Positive and variable displacement pumps</p> <p>11.12 Knowledge of Fundamentals of pneumatic pumps, Characteristics of air, Air generation and distribution, Pneumatic Valves, Actuators and output devices, pneumatic elements , power components &amp; Pneumatic Systems,</p> <p>11.13 Knowledge of Symbols and descriptions of components, Safety requirements for pneumatic systems, Trouble shooting of pneumatic systems malfunctions and Maintenance</p> <p>11.14 Knowledge of repair and maintenance of the electrical equipments – Electrical induction motors, Variable Speed Motors, their characteristics and speed control, motor starters-DOL and star delta, Drives-safety rules.</p> <p>11.15 Knowledge of PLC based systems,</p> <p>11.16 Knowledge of Distributed I/O based systems for machine control Maintenance of Starter</p> <p>11.17 Knowledge of Circuit Breakers (Air Circuit Breakers and Miniature Circuit Breakers), and circuits, PLC system used in plastics processing &amp; Testing Machineries</p> <p>11.18 Knowledge of Limit Switches &amp; Timers, Relays, Heaters-types,</p> <p>11.19 Knowledge of Measurement of temperature, Temperature Controllers, on-off, PID type and Thermocouples, Heaters (mica and ceramic type)</p> <p>11.20 Knowledge of study of safety rules and regulations hot runner systems, hot sprue, Manifold etc.</p> <p>11.21 Knowledge of Electrical controls devices - Protective devices-Relays (EMR and SSR), merits and demerit and switches</p>	
<p>12</p>	<p><b>INDUSTRIAL MANAGEMENT AND ENTREPRE-NEURSHIP</b></p>	<p>12.1 Knowledge of Principles of Management - Development of management theory: - Taylor's Scientific Management.</p> <p>12.2 Knowledge of Functions of Management - Planning, Organizing, Staffing, Directing, Controlling, Decision making.</p> <p>12.3 Knowledge of Organizational Structure - Knowledge of Line &amp; Staff Organization, Leadership, Motivation and Communication.</p> <p>12.4 Knowledge of Operation Management - Plant - location.</p> <p>12.5 Knowledge of Quality Management, types of quality – quality of design, conformance and performance, phases of quality management, Juran's and Deming's view of quality</p>	

		<p>12.6 Understanding of Quality Management Assistance Tools - Ishikawa diagram – Pareto Analysis – Pokka Yoke (Mistake Proofing).</p> <p>12.7 Knowledge of basics of quality circles, DMAIC, 8D, PDCA cycle, TQM, Kaizen, Lean Manufacturing, Five S (5S), Six sigma Quality Management Standards Knowledge of the ISO 9001:2000 Quality Management System Standard</p> <p>12.8 Knowledge of the ISO 14001:2004, ISO 27001:2005</p> <p>12.9 Knowledge of Industry – Entrepreneurship and entrepreneurial qualities, Steps required for starting a small scale industry, procedure for registration Knowledge of sources of financial assistance, govt., assistance for development of SSI.</p> <p>12.10 Knowledge of preparation of project report, Taxes &amp; GST, license requirements.</p> <p>12.11 Knowledge of Introduction to Behavioral Science &amp; Personality development, Attitudes, organization commitments, values &amp; business ethics.</p> <p>12.12 Knowledge of meaning of Motivation, Group behaviour, group dynamics, Communication, Leadership</p> <p>12.13 Knowledge of Basic Principle of Costing and Costing Methods, Break – Even Point Control Functions – Cost Reduction – Value Analysis – Cost Audit – Costing as related to mould and mouldings.</p> <p>12.14 Knowledge of Profoma for Cost Estimation – Product Cost – Mould Cost – Processing Cost – Project Costing – Direct Cost – Indirect Cost – Break Even Point.</p>	
<p>13.</p>	<p><b>PLASTIC PROCESSING LAB- II</b></p>	<p>13.1 Study of Basic concepts of Microprocessor control, Comparison of Micro Processor-Controlled M/cs with Conventional M/Cs, Machine Setting Procedure. Operation of M/c with Mould fixing &amp; setting on the M/c with different plastics materials, cycle-time analysis, Analysis of Product defects, causes &amp; remedies during M/c operation, listing of important operating procedure points, safety precautions through M/C Instruction/Manual operating.</p> <p>13.2 Observe and practice the extrusion process Procedure for setting up of Process-Parameters eg. Temperature on different zones, Screw-Speed, Nip- roller speed, Winder Speed, Blow-</p>	<p>16 Hours</p> <p>12 Hours</p>

	ratio, control of cooling-Air on bubble, Methodology & practice by trainees to fix the Blown Film die on M/C familiarization of Die-parts & Their function, Technical specification Of M/cs, defects, causes & remedies, Practice of operating M/c to produce different sizes of Blown Film.	
13.3	Observe and practice the automatic blow moulding machine-setting Procedure, Parameter-setting Procedure, Method of Mould fixing & parison- die setting on the M/c, Practice by trainees to remove & fix the parison die to produce on appropriate Parison for blowing, type of blowing systems, operation-practice on different moulds, cycle-time analysis, process-faults & remedies	16 Hours
13.4	Hand on practical of Hand compression M/c in IRO, Free sketch of parts & study of part-function, comparison of compression Moulding M/c with Injection Moulding M/c. Compression moulding processes.	10 Hours
13.5	Hands on practical - Operating Principle of Hand Compression Press, Mould setting-procedure & parameter setting, operation practice , M/c specification observations and recording, Cycle-time analysis, observation & Procedure of start-up & shut down of M/c, Hand on practical of Setting up, operation of M/c, safety precautions, Analysis of Cycle-time, Product defects & remedies	12 Hours
13.6	Practice on operation of compression & Transfer moulds with thermoset materials. Study of Process Principle, type of moulds & material used in thermoforming.	16 Hours
13.7	Roto moulding - Machine-study in IRO, Process Principle & sequence of operation, Raw materials used, Mould-clamping practice on the M/c Operation practice to produce Roto moulded components, Cycle-time analysis, Comparison of process with other processing processes.	12 Hours
13.8	FRP - Study of types of Resin, fibres used in the process, sequence of Process operation in Hand-layup process. Operation Practice for Hand-layup Process for producing FRP-products, Precautions during the process, Process-defects & analysis for the remedies.	12 Hours
13.9	Knowledge of Principles of coating equipment, Process-method, type of material used, sequence of Operation in Coating.	10 Hours
13.10	Knowledge of Principles and Operation of Heat-Sealing equipment, High frequency Welding & Hot stamping operation. Familiarization of screen	10 Hours

		printing process, methodology for screen preparation, type of inks used.	
<b>14.</b>	<b>PLASTIC TESTING LAB-II</b>	14.1 Study the Introduction of product testing 14.2 Know how to Testing of HDPE/ RPVC Pipes, Water Storage Tanks/Containers, Films/Sheets, HDPE/PP Woven Sacks/Tapes. 14.3 Know how Testing of Bottles/Vanaspati, Ghee, Milk Packing 14.4 Know how Testing of Plastics Products for Determination of Mechanical, Thermal, Electrical & Chemical Properties 14.5 Capable of Determine the Carbon Black Content and Dispersion in Olefinic Plastics 14.6 Capable of Determine the environmental stress cracking resistance for Polyethylene 14.7 Capable of Determine the Melt Flow Index of different Plastics Materials and Grades 14.8 Can prepare Compounding, Blending using Two Roll Mill 14.9 Know how the Specimen preparation 14.10 Follow Maintenance of test records in industries as per BIS	08 Hours 10 Hours 10 Hours 15 Hours 08 Hours 05 Hours 05 Hours 04 Hours 03 Hours 04 Hours

15.	<b>Seminar</b>	<p>15.1 Individual or group of students as a team should select a seminar topic in recent developments and advancements relevant to their subject</p> <p>15.2 The seminar contents should be presented in power point presentation and the same topic has to be submitted as hardcopy for assessment and allotment of marks.</p>	<p>27 Hours</p> <p>27 Hours</p>
16.	<b>Project Work / In-plant Training and viva voce</b>	<p>16.1 Undertake a project. Project work shall be identified in collaboration with industry preferably.</p> <p>16.2 Project Topic should cover any of the following: Projects related to : increasing productivity/ quality assurance/ estimation and economics of production/ repair and maintenance of plant and equipment/ identification of raw material thereby reducing the wastage/ suggesting substitutes of the polymer being used/ Any other related problems of interest for host industry.</p> <p>- Industry project/Viva voce</p>	

## PGD-PPT

## I Semester

## List of text books/Reference books

**1. Plastics Materials and its Applications - I**

- a. Plastics Materials – J.A. Brydson.
- b. Plastic Materials Hand Book – A.S. Athalye

**2. Plastics Processing Technology - I**

- a. Injection Moulding Theory & Practice – Rubin, Irvin.
- b. Plastics Engineering Hand Book – Society of Plastic Industry Inc.
- c. Plastics Processing Data Hand Book – D.V. Rosato.
- d. Plastics Materials & Processing – Brent Strong.
- e. Industrial Robot Handbook - Richard K. Miller, CMfg.E, Springer Science+Business Media, LLC
- f. Total Quality Process Control for Injection Molding, 2nd Edition, M. Joseph Gordon, Jr.

**3. Plastics Testing - I**

- a. Text Book on Fundamentals of Plastics Testing - Prof. (Dr.) S.K..Nayak
- b. Plastics Testing Technology Hand Book – Vishu Shah
- c. Simple Methods for Identification of Plastics – Brawn R. B.

**4. Plastics Product and Mould Design**

- a. Plastics Product Design Beck, R
- b. Injection Mould Design – Pye R.G.W
- c. Injection Moulds 130 Proven Design Gashtrow

**5. Polymer Science & Technology**

- a. Polymer Science – Gowariker V.R. & others.
- b. Text book of Polymer Science – Billmeyer F.W.

## PGD-PPT

## II SEMESTER

## List of text books/Reference books

**1. Plastics Materials and its Applications - II**

- a. Plastics Materials – J.A. Brydson.
- b. Plastic Materials Hand Book – A.S. Athalye.

**2. Plastics Processing Technology - II**

- a. Compression Moulding – Iyesaw, A.I.
- b. Technical Manual on Plastics Processing –
- c. Plastics Engineering Hand Book – Society of Plastics Industry Inc.
- d. Plastics Materials & Processing – Strong A Brent.

**3. Plastics Testing – II**

- a. Text Book on Fundamentals of Plastics Testing - Prof. (Dr.) S.K. Nayak
- b. Plastics Testing Technology Hand Book – Shah Vishu

**4. Machine Maintenance**

- a. Manuals on Hydraulics & Pneumatics – Vickers.

**5. Industrial Management & Entrepreneurship**

- a. Industrial Engineering Management – Khanna O. P.
- b. Personal Management & Industrial Relations – Davar R. S.

**SECTION 2**

**EVIDENCE OF LEVEL**

**Awarding bodies will enter a proposed NSQF level for the qualification in the qualification File Summary. This section asks for the evidence on which that proposal is based. The evidence must refer to the level descriptors of the NSQF.**

NSDA recommends an approach to working out the level of qualifications which starts with the level descriptor domains (Process, Professional knowledge, Professional skill, Core skill and Responsibility: see annex A). Two variants for providing the evidence of level are offered here: Option A and Option B in the following pages. Awarding bodies should choose the option which best suits the qualification.

<b>TITLE/NAME OF QUALIFICATION/COMPONENT: POST GRADUATE DIPLOMA IN PLASTICS PROCESSING &amp; TESTING</b>			
<b>NSQF DOMAIN</b>	<b>OUTCOMES OF THE QUALIFICATION/COMPONENT</b>	<b>HOW THE JOB ROLE RELATES TO THE NSQF LEVEL DESCRIPTORS</b>	<b>NSQF LEVEL</b>
<b>Process</b>	<ul style="list-style-type: none"> <li>• Selection of Plastics Processing Machines</li> <li>• Selecting right grade of material.</li> <li>• Setting machine parameters - Operating Machine as per cycle time for getting finished Product</li> <li>• Carrying out tests and quality evaluation of the Raw Materials and finished Products as per various National and International standards</li> </ul>	<ul style="list-style-type: none"> <li>• The trainee having Post Graduate Diploma in Plastics Processing and Testing is best suited to work in downstream Petrochemical industries. Plastics Industries offer myriad opportunities for these trainees.</li> <li>• The trainees are assigned jobs in various departments of Plastics Industries namely Design, Plastics Processing Department and Plastics Testing. In this qualification the trainees have to work in the field of Plastics processing and testing. The trainee’s responsibility is to consider the various properties and characteristics of plastics materials and execute the order which includes receiving inquiry from customer, preparing quotation, gathering of information from valid sources e.g. Purchase Order, Product Drawing, Contract Terms of customer etc.</li> <li>• They have to identify plastics for a particular application with respect to its properties. The Trainees has knowledge about Natural Polymers, Commodity Plastics, Engineering Plastics and specialty Plastics as well as thermosets and also about different grades of plastics that are commercially available.</li> <li>• The trainees can work on either microprocessor Injection moulding unit, Extrusion Pipe plant, Monofilament plant, wire coating plants, Injection &amp; Extrusion Blow</li> </ul>	<b>Level 7</b>



		<p>Moulding, Blow Moulding, Thermoforming, Rotational Moulding, Fiber Reinforced plastics, Gas assisted Injection Moulding machine, Compression Moulding, Printing techniques, Coating and electroplating process and calendaring. They can set the mould and die and the machine parameters as per requirement. They will supervise Production and plan shift schedule and execute the production planning. They can maintain 5S on the production Floor. Maintain the production and quality control as per ISO &amp; BIS. Manage Inventory needed for smooth production. Prepare MIS documents related to production floor. Manage wastage of raw material on shop floor. Man management in the shift.</p> <ul style="list-style-type: none"> <li>• The Trainees can perform Testing &amp; Quality control as per standard procedure both national and international level. The Trainees can work in Mechanical, Chemical, and Thermal, and characterization, optical, electrical and rheological labs for testing of different plastics products.</li> </ul>	
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<b>TITLE/NAME OF QUALIFICATION/COMPONENT: POST GRADUATE DIPLOMA IN PLASTICS PROCESSING &amp; TESTING</b>			
<b>NSQF DOMAIN</b>	<b>OUTCOMES OF THE QUALIFICATION/COMPONENT</b>	<b>HOW THE JOB ROLE RELATES TO THE NSQF LEVEL DESCRIPTORS</b>	<b>NSQF LEVEL</b>
<b>Professional Knowledge</b>	<ul style="list-style-type: none"> <li>• The Trainee is well versed with the grade of material used for processing of particular plastics products.</li> <li>• Trainees can select the processing technique and set-up process parameters to run production</li> <li>• Trainees can identify defects and do troubleshooting</li> <li>• Trainee understands the standard and work as per standard procedure.</li> <li>• Trainees can devise ways to cut short the cycle time and hence increase production.</li> <li>• Trainee can evaluate quality of the product</li> </ul>	<ul style="list-style-type: none"> <li>• The Trainee should be technically skilled in the area of design, tool room, processing &amp; testing. He/She should be able to understand the trouble or defect and should be able to resolve the issue.</li> <li>• The Trainee should be able to compound the polymer along with other necessary additives and should know the proper machine in which the compounding has to be done.</li> <li>• They should be able to identify the specification of the machine.</li> <li>• Trainee should be aware of giving high output in the form of production at the given time using manpower in most economical way.</li> <li>• Trainee should be aware of system and procedures and accordingly work on it.</li> <li>• Trainee should be able to do quality analysis as per various national and international standards. They should be able to understand what the standard says. The trainee has to work into different Plastics Processing process so they have to have sound knowledge in various processing techniques. They have to be prone to new technologies or newer versions of the software.</li> <li>• They should be aware of maintenance of mould and machineries.</li> <li>• They should be capable of running the machine independently.</li> </ul>	Level 7

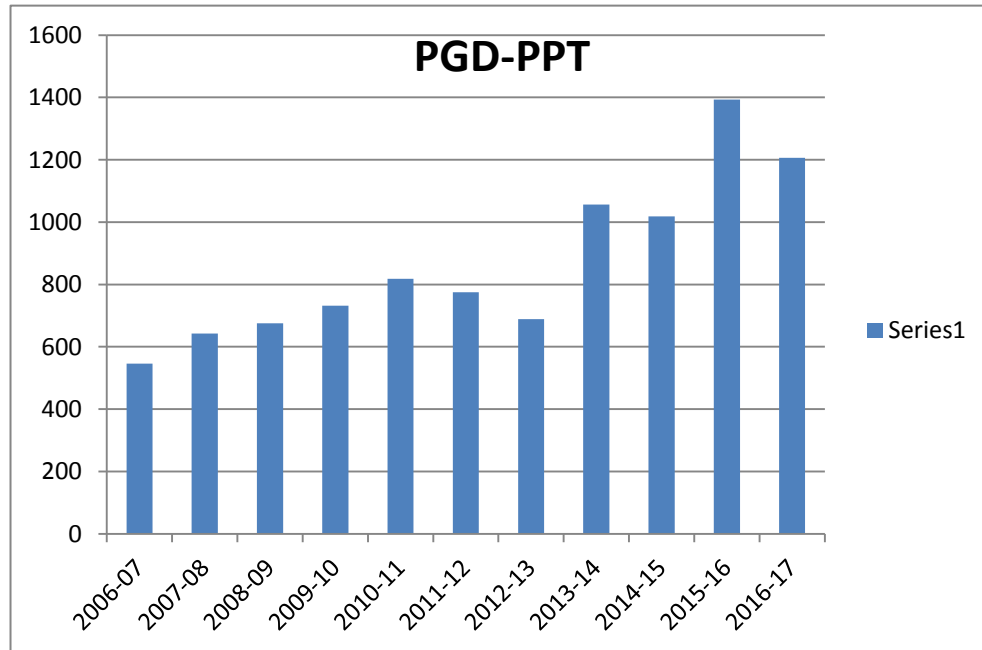
TITLE/NAME OF QUALIFICATION/COMPONENT: POST GRADUATE DIPLOMA IN PLASTICS PROCESSING & TESTING			
NSQF DOMAIN	OUTCOMES OF THE QUALIFICATION/COMPONENT	HOW THE JOB ROLE RELATES TO THE NSQF LEVEL DESCRIPTORS	NSQF LEVEL
Professional Skills	<ul style="list-style-type: none"> <li>• Identify processing requirement</li> <li>• Develop plan for processing</li> <li>• Troubleshoot the problems on the shop floor</li> <li>• Assess process efficiency</li> <li>• Assess product quality using different testing methods</li> <li>• Develop quality consciousness concept</li> </ul>	<ul style="list-style-type: none"> <li>• Job Holder shall supervise the production process</li> <li>• Job Holder shall diagnose common problems in the material, machines and equipments based on visual inspection and quality checks</li> <li>• Job Holder shall look for improvements wherever possible</li> <li>• Job Holder shall motivate the team, handle the coordination among team members and report team members issues to HR department that is beyond his control</li> </ul>	Level 7

NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
<b>Core Skills</b>	<ul style="list-style-type: none"> <li>• Use basic health and safety practices at the work place</li> <li>• Can supervise the shop-floor and can assess process parameters and troubleshoot</li> <li>• Develop entrepreneurship skills</li> <li>• Communicate effectively</li> </ul>	<ul style="list-style-type: none"> <li>• The Trainee should be technically skilled in the processing &amp; testing. He/She should be able to understand the trouble or defect and should be able to resolve the issue.</li> <li>• The Trainee should be able to compound the polymer along with other necessary additives and should know the machines on which the compounding has to be done.</li> <li>• He should be able to identify the specification of the processing machine.</li> <li>• Trainee should be aware of system and procedures and accordingly work on it.</li> <li>• The trainee has to supervise the shop-floor so they must know Plastics Processing techniques so they have to have sound knowledge on various processing techniques.</li> <li>• He should be aware of maintenance of mould and machineries.</li> <li>• He should be able to implement safety procedures as per standards</li> <li>• He should be capable of analyzing production records using statistical tools</li> <li>• He should be able to communicate effectively with team members and with management</li> <li>• He should resolve any difficulties in relationships with colleagues, or get help from an appropriate person, in a way that preserves goodwill and trust.</li> <li>• He needs to know and understand how to practice honesty with respect to company property and time.</li> </ul>	Level 7

<b>NSQF Domain</b>	<b>Outcomes of the Qualification/Component</b>	<b>How the job role relates to the NSQF level descriptors</b>	<b>NSQF Level</b>
<b>Responsibility</b>	Work independently and guide team members with full responsibility of output of group and development of organization.	<ul style="list-style-type: none"> <li>• Should be responsible for implementing KAIZEN.</li> <li>• He should be responsible for arranging raw material for production in a shift.</li> <li>• He should be responsible for arranging the manpower for smooth running of shift activity.</li> <li>• He should be responsible for executing production planning receive by PPC (Production Planning &amp; Control) department.</li> <li>• He should be responsible to get optimum output of plant capacity and reduce the wastage.</li> <li>• He should be responsible for controlling input costs for production.</li> <li>• He should be responsible to control online quality control and quality assurance of the finished products.</li> <li>• Job holder shall follow work standard, specific norms and procedures laid down by the organization. Job holder shall develop moral, values and ethical practices in business operation.</li> </ul>	Level 7

SECTION 3  
EVIDENCE OF NEED

**What evidence is there that the qualification is needed?**



The qualification, **Post graduate Diploma in Plastics Processing and Testing (PGD-PPT)** is in existence since 1979 and CIPET has trained more than 9,500 trainees in the last 10 years. All trainees are placed in Industries through campus placement.

**What is the estimated uptake of this qualification and what is the basis of this estimate?**

Skills Gap analysis Reports for industry demand and secondary research data, though these do not lend to accurate demand projection. The link to NSDC Human Resource & Skills Requirement in Capital Goods Sector is

[http://cgsc.in/Humanresource\\_skill\\_requirement.pdf](http://cgsc.in/Humanresource_skill_requirement.pdf)

**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF?**

- The qualification is originally designed by curriculum committee comprising the traininghead, industrial experts, academicians and professional experts.
- The work group under the guidance of curriculum development committee already conducted desk search as well as referred to the qualification packs as a supporting document for mapping of the curriculum.
- As per the search it is found that, the Post graduate Diploma in Plastics Processing and Testing (PGD-PPT) course is not available for the skill development of the candidates in Capital Goods Sector Skill Council.

**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?**

- The curriculum committee meeting for review will be in the month of Jan 2018 which comprises industrial expert, university professors with subject specialization.
- The data used for revision or update will be impact analysis (student and industries) and new subject area in the field of plastics processing and testing & quality control.
- The curriculum review and updates, in consultation with polymer industries and expert of respective domain, NOS approved by NSDA will also be referred to from time to time.

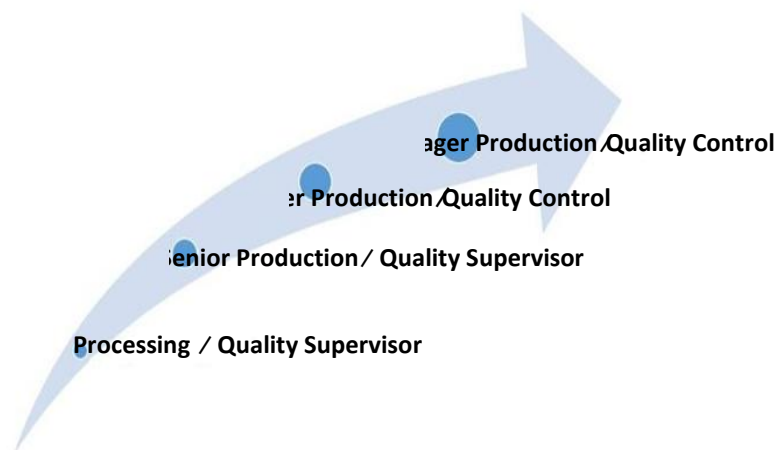
## SECTION 4

### EVIDENCE OF PROGRESSION

**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?**

Qualifying trainee will obtain CIPET Certificate in 'Post graduate Diploma in Plastics Processing and Testing (PGD-PPT)'. After completion of course and after 3 years of field experience the trainee can work as a Senior production/quality control supervisor and after that 5 years of experience, the person can work as a Manager production or Manager Quality control. Also he/she can become an entrepreneur in the downstream polymer industries sector.

The diagram shown below represents the vertical mobility for the job holder as a job progression in capital goods Sector.



**Fig. 1. Career Progression of PGD-PPT Graduates**