**CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION**

**Name and address of awarding body:** Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Hajipur, Industrial Area, Vaishali, Bihar. 844102.

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

Dr. P.C. Padhi, Director& Head, CIPET Hajipur, Industrial Area, Vaishali, Bihar. 844102. Ph: +91-6224-277424,270085,273515.

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**SUMMARY**

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| **Qualification Title:** Machine Operator Assistant Injection Moulding |
| **Nature and Purpose of the qualification:**  A CIPET trade certificate for Machine Operator Assistant Injection Moulding and the individual at work sets up and operates the Plastics Processing moulding machine to produce good quality products from Plastics materials. He is responsible for produce bottles, containers or others hollow objects from plastics resin by operating semi & fully automatic and advance Plastics Processing Moulding machines, troubleshooting process problems and performing minor maintenance to ensure continued operation of the production line. They are also responsible for completing the output learn Good Manufacturing Practices. |
| **Body/bodies which will award the qualification:**  Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Hajipur, Industrial Area, Vaishali, Bihar. 844102. |
| **Body which will accredit providers to offer courses leading to the qualification:**  Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Hajipur, Industrial Area, Vaishali, Bihar. 844102. |
| **Body/bodies which will be responsible for assessment:**  The assessment is being carried out at of Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Hajipur, Industrial Area, Vaishali, Bihar. 844102. |
| **Occupation(s) to which the qualification gives access:**  Machine Operator Assistant Injection Moulding occupation in Plastics product manufacturing process. |
| **Proposed level of the qualification in the NSQF: 3 (CPC/Q 0204)** |
| **Anticipated volume of training/learning required to complete the qualification:**  480 Notional hours. |
| **Entry requirements / recommendations:**  Minimum qualification – Preferably Min -Class 8th Standard, Minimum age - 18 years completed. |
| **Progression from the qualification:**  The Machine Operator Assistant Injection Moulding has a clear pathway. |
| **Planned arrangements for the Recognition of Prior learning (RPL):**  RPL arrangements are being developed and will be informed in due course of time. |
| **International comparability where known:** It will be carried out in next phase as comparability is being verified. |
| **Date of planned review of Qualification:** 20.10.2018 |

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| Format Structure of the Qualification: Machine Operator Assistant Injection Moulding | | | |
| Title and Identification code of component | Mandatory/ Optional | Estimated Size (Notional Hours) | Level |
| 1. Industrial Safety Practices in Injection Moulding | M | 40 |  |
| 1. Fitter Tools &Fitting Equipments | M | 40 |  |
| 1. Introduction to Polymers, Plastics Material selection for particular application and Plastics Raw Material- Thermoplastics, Thermosets, Engineering Plastics etc | M | 120 |  |
| 1. Injection Moulding process for Plastics-Machine Types, Process, Moulds etc. | M | 160 |  |
| 1. Faults and Remedies in Injection Moulding | M | 20 |  |
| 1. Post Moulding Operations | M | 16 |  |
| 1. Communication skills | M | 40 |  |
| 1. Basic Computer concepts | M | 20 |  |
| 1. 5S and TQM Concepts,   Industrial Visits | M | 24 |  |
|  |  | 480 |  |

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| **Body/Bodies which will carry out assessment:**  A Separate department/ body -Training Assessment Wing of Central Institute of Plastics  Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. Of India, Hajipur, Vaishali, Bihar 844102.  **Will the assessment body be responsible for RPL assessment?**  RPL arrangements are being developed and will be informed in due course of time.  **Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:**  With uniformity and setting of learning outcomes for different Jobs Roles the assessment of candidates will be at learning outcome level. Assessment criterion has been defined for each learning outcome and it includes both theoretical and practical skills on which the candidate will be assessed. The question suite which will be used to check the skills of the trainee would include  **Theoretical test suite –** Will include multiple choice questions, audio-video question etc.  which will test the trainee on his knowledge of the subject  **Practical Knowledge suite –** Practical knowledge can be tested through Assessor driven evaluation/test, Situational Judgment Tests etc to test practical core competence. A mix of these would be able to evaluate the trainee on his practical knowledge of the  Qualification Document.  **Assessment strategy:**   1. Assessment criteria for Qualification Document have been developed. Each Learning Outcome have separate marks for Theory and Practical Skills. 2. The Training Assessment Wing will have assessors who will not be associated with training activities and will be provided training on the said work. Thus it will ensure that the assessment carried out is fair and consistent. 3. Set of question bank developed to assess the theoretical and practical knowledge. To ensure the quality, each trainees get the unique set of question 4. Student has to score minimum marks separately for theoretical and practical skill and overall percentage should also be 50% for theory and 70% for practical. 5. Empanelment of subject matter expert as assessor to assess trainee specifically on practical skills 6. Assessments are preferably conducted by written examination papers in English/ regional languages according to the requirement. 7. It has been ensure that TP/trainer should not be present during assessment |

**Assessment Process Flow:**

**Request for evaluation of batch by**

**Training Partner**



**Allocation of batch to Training Assessment wing**



**Evaluation of batch by Training Assessment wing as per schedule and as per Assessment Process**



**Assessment observation data input sheet from Training Assessment wing including viva, practical and theory marks**



**Result finalization**



**Uploading of result on IT database platform**

**Summative Assessment**:

Based on the Total Marks allotted for the specific subject, formal evaluation shall be conducted. Based on secured marks, candidates shall be declared pass or fail.

Steps undertaken for summative assessment:

1. Based on Completion of Batch, Evaluation Schedule shall be prepared
2. Identified Assessor is nominated for Evaluation
3. Setting up of separate Question Paper for Theory & Practical Examination
4. Conduct of examination as per the schedule
5. Evaluation & Certification

**Evidence Collected during Assessment:** Theoretical Answer Sheets, Practical Exam Sheets,Evaluation Sheets, Jobs produced during practical Exams.

**Protocol for Selection of Assessors:**

* The Assessors should have the minimum qualification: Degree in Engineering.
* The Assessors should have minimum 5 years of Experience in the relevant field.

**ASSESSMENT EVIDENCE**

**Assessment Guidelines:**

1. Criteria for assessment for each Qualification Document will be created by CIPET.
2. Each Assessable outcome (AO) will be assigned marks proportional to its importance in Learning Outcome and few performance criteria may be allotted marks in combine.
3. Each Learning Outcome will be assessed both for theoretical knowledge and practical which is being proportionately demonstrated in the table below.
4. The assessment for the theory part will be based on knowledge bank of questions created by CIPET which will contain multiple choice theory questions and Practical question database with mark allotment criteria.
5. To pass the Qualification Document, every trainee should score a minimum of 50 % in Functional and all Generic Learning Outcome’s.
6. In case of successfully passing only certain number of Learning Outcome’s, the trainee is eligible to take Subsequent assessment on the balance Learning Outcome’s to pass the Qualification Document.

**Title of the Component:** Machine Operator Assistant Injection Moulding

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| --- | --- | --- | --- | --- |
| **Assessable outcomes** | | **Assessment criteria for the outcome** | | |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| **1.       CPC/N02Understand basic concept, job requirements and basics knowhow related to the process** | AO1.        To interact with the operator in order to understand the production schedule | 13 | 12 | 25 |
| AO2.        To help in planning the day’s production activities based on the operator’s instructions |
| AO3.        To ensure availability of consumables and plastics materials for production in sufficient quantity as per production plan/operators instructions. |
| AO4.        Clearly understanding the does and don’ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by operator. |
| AO5.        Check availability of the personal protective equipments (PPE) like Gloves, Goggles etc. |
| AO6.        Understand the molding procedure and process to be adopted for completing the work order from the operator by referring the Work Instruction document/ SOP manual. |
| AO7.         Ensure that the required material is procured from the store before starting the process |
| AO8.         Understand the Mould required for executing the required operation and ensure that the same is available for operation. |
| AO9.         If mould is not available collect the mould from tool room. |
| AO10.     Install and bolt the mould in place and slide the safety door shut. |  |  |  |
| AO11.    Add the raw material in the machine using material loader or by manual feeding. |
| AO12.     Ensure moulds are clean if not clean with soft cotton cloth. |
| AO13.     Ensure cleaning of the other auxiliaries tools, (if any) before the initiation of the moulding and trimming process |
| AO14.     Ensure cleaning of the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident |
| AO15.    Ensure availability of the coolant and working of valves to circulate the coolant to cool and solidify plastic |
| AO16. Understand the raw material like plastics granules, fillers, bonding additives etc. required for executing the activity |
| AO17. Refer the queries to supervisor if they cannot be resolved by the operator |
| AO 18. Confirm self - understanding to the operator once the query is resolved so that all doubts & queries can be resolved before the actual process execution |
| **Sub total** | **13** | **12** | **25** |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| **2.       CPC/N02Assist in performing the Injection molding related operations, monitor process parameters and troubleshoot the process/product** | AO1.       Check for operation of molding apparatus like hopper, heaters etc. as per the checklist provided | 100 | 130 | 230 |
| AO2.       Fix the desired Mould to the injection moulding machine in order to achieve the desired operation as per the Work Instructions/ SOPs |
| AO3.       Make modifications in the process parameters (by selecting the right program from the machine control system) if required and ensure alignment with the prescribed standards as guided by Operator. |
| AO4.       Perform preheating of plastic granules ( In case of Engineering plastics) |
| AO5.       Ensure that the plastic granules are mixed with additives (if any) before being fed into the hopper |
| AO6.       Conduct a test process and produce a sample output as per the required |
| AO7.       Ensure that the dimensions of the output product are measured as per the process given in the Work Instructions/ SOP under guidance of operator. |
| AO8.       Start the production process as instructed by Operator. |
| AO9.       Feed the required operation code in the apparatus for heaters to melt the plastic granules at the predefined temperature |
| AO10.   Run the machine in Semi-Auto or Automatic mode of operation as guided by the operator. |
| AO11.   Check-list procedure to ensure quality of final product |
|  | **Sub total** | **100** | **130** | **230** |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| 3.       **CPC/N02Conduct basic quality checks of the finished products with reference to the approved product** | AO1. Compare texture, colour, surface properties, hardness and strength etc. with the given approved product. | 12 | 24 | 36 |
| AO2. Rectify minor defects like dimension variation, thickness variation etc. by control process parameters etc and informing operator. |
| AO3. Provide first and last output from each batch to the lab for quality check on its composition, properties etc. |
| AO4. Obtain clearance for the entire batch from the lab and submit the operator. |
|  | **Sub total** | **12** | **24** | **36** |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| 4.       **CPC/N02Maintain a safe and healthy working environment at the work place** | AO1. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise etc | 17 | 18 | 35 |
| AO2. Identify areas in the plant which are potentially hazardous/ unhygienic in nature |
| AO3. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine |
| AO4. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc |
| AO5. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations |
| AO6. Create awareness amongst other by sharing information on the identified risks |
| AO7. Support the Safety team and the supervisor in creating the risk mitigation plan |
| AO8. Follow the instructions given on the equipment manual describing the operating process of the equipment |
| AO9. Follow the Safety, Health and Environment related practices developed by the organization |
| AO10. Ensure relevant safety boards/ signs are placed on the shop floor AO11. Operate the machine using the recommended Personal Protective Equipment (PPE) and ensure team members also use the related PPEs at the workplace |
| AO12. Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc. |
| AO13. Attend all safety and fire drills to be self-aware of safety hazards and preventive techniques |
| AO14. Maintain high standards of personal hygiene at the work place |
| **Sub total** | **17** | **18** | **35** |
|
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| 5.       **CPC/N02Maintaining 5S in the work premises** | AO1. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un- necessary items are not cluttering the workbenches or work surfaces. | 28 | 24 | 52 |
| AO2. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions |
| AO3. Follow the technique of waste disposal and waste storage in the proper bins as per SOP |
| AO4. Segregate the items which are labelled as red tag items for the process area and keep them in the correct places |
| AO5. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions |
| AO6. Ensure that areas of material storage areas are not overflowing AO7. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required |
| AO8. Return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area |
| AO9. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards |
| AO10. Follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists |
| AO11. Check that the items in the respective areas have been identified as broken or damaged |
| AO12. Follow the given instructions and check for labeling of fluids, oils. Lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc. |
| AO13. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions |
| AO14. Check whether safety glasses are clean and in good condition |
| AO15. Keep all outside surfaces of recycling containers are clean AO16. Ensure that the area has floors swept, machinery clean and generally clean. In case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards. |
| AO17. Check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up |
| AO18. Ensure workbenches and work surfaces are clean and in good condition |
| AO19. Follow the cleaning schedule for the lighting system to ensure proper illumination |
| AO20. Store the cleaning material and equipment in the correct location and in good condition |
| AO21. Ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene |
| AO22. Follow the daily cleaning standards and schedules to create a clean working environment |
| AO23. Attend all training programs for employees on 5 S |
| AO24. Support the team during the audit of 5 S |
| AO25. Participate actively in employee work groups on 5S and encourage team members for active participation |
| AO26. Follow the guidelines for What to do and What not to do to build sustainability in 5S as mentioned in the 5S check lists/ work instructions |
| **Sub total** | **28** | **24** | **52** |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| **6.       CPC/N02Basics of computer and data entry in MS OFFICE/office Open source suite Software** | To be competent, the user/individual on the job must be able to: | 14 | 8 | **22** |
| AO1. Fill and process mandated forms for receiving, processing, or tracking data enter data from source documents (such as trial report, process sheet etc.) into Computer application having MS OFFICE software. |
| AO2. Scan source documents in accordance with specific instructions. |
| AO3. verify data entered with source documents, checks for compliance and corrects all typographical errors and missing or repeated data. |
| AO4. Maintain files of source documents or other information related to data entered. |
| AO5. Investigate and confirm data that is unclear before entering, generate reports of data entry, store completed work in designated locations and perform backup operations. |
| AO6. update database information to reflect most current source information |
| AO7. assist in the filing and storage of security and back up data files |
| AO8. respond to requests for information and access relevant files |
|  | **Sub total** | **14** | **8** | **22** |
|  | **Total** | **184** | **216** | **400** |
| **Means of assessment 1:** | | | | |
| The assessment comprise of - | | | | |
|          Theory Assessment           Viva voce           Practical assessment | | | | |
| **Means of assessment 2:**  **Pass/Fail-**  **The Pass mark of theory written assessment is 50% and for viva and practical assessment is 70%. The candidate has to pass separately in Theory and Practical.** | | | | |

**EVIDENCE OF LEVEL**

**Level of qualification**

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| **Title /Name of Qualification/Component:** Machine Operator Assistant Injection Moulding  **Level: 3** | | | |
| **NSQF Domain** | **Outcomes of the**  **Qualification/Component** | **How the job role**  **relates to the NSQF**  **Level descriptors** | **NSQF**  **Level** |
| **Process** | Machine Operator Assistant Injection Moulding is expected to ensure housekeeping and safety in the production area and select  the correct die, etc he/she has to-   Understanding the work order and  the process requirement from the  supervisor   Arranging the required raw material and Dies for the process   To interact with the supervisor in  order to understand the production  schedule   To plan the day’s production  activities based on the supervisor’s  instructions   To collect material data sheet,  machine instructions and work  manuals   To ensure availability of consumables and plastics materials for production in sufficient quantity as per production plan/supervisor  instructions.   Clearly understanding the does and don’ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors.   Check availability of the personal  protective equipment’s (PPE) like  Gloves, Goggles etc.   Ensure that the required material is procured from the store before  starting the process   Understand the dies/Moulds required for executing the required  operation and ensure that the same  is available for operation.   If die is not available collect the same from die storage area   Add the raw material in the machine using material loader or by manual  feeding.   Ensure dies are clean if not clean  with soft cotton cloth.   Ensure cleaning of the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident   Ensure availability of the coolant and working of valves to circulate the  coolant to cool and solidify plastic   Understand the raw material like  plastics granules, fillers, bonding  additives etc. required for executing  the activity   Refer the queries to supervisor if  they cannot be resolved by the  operator   Confirm self - understanding to the  supervisor once the query is resolved so that all doubts & queries can be resolved before the actual process execution   He is responsible for checking the  operations of the equipment   Feeding the granules as per  requirement   Perform visual inspection of the  output products   Achieve productivity, quality and  safety standards as per company’s  norms   Report problems to supervisor   He will be responsible for Inspecting  the finished components   conducting minor repair/de-flashing  if any on output parts which can be reworked   The role holder will interact with  maintenance team and material  management team   The individual needs to ensure  sorting, streamlining & organizing,  storage and documentation,  cleaning, standardization and  sustenance across the plant and  office premises of the organization   He needs to understand Market  Information Management   Client Relation Management   Marketing knowhow and strategy   He also needs to understand and  practice Entering, update and  maintain data in MS Office system/  Office open source system. | Machine Operator Assistant Injection Moulding job  requires limited  range of activities  which are familiar  and predictable  like availability of  consumables,  safety PPE, raw  material used,  basic machine  parts and its  functions etc.  He should  understand the  raw material like  plastics granules,  fillers, bonding  additives etc.  required for  executing the  activity, Dies  /Mould required,  their types etc. |  |
| **Professional**  **knowledge** | The user/individual on the job needs to know and understand:   General Principle of moulding  procedure, process knowledge,  machine startup & shutdown  procedures, moulds loading and  unloading procedure.   Types of different thermoplastics  materials, additives and grades for  different plastics products.   Identification & Troubleshooting of  various defects in products  produced in the various plastics  processing machineries like  Injection, Extrusion, and Blow. |  |  |
| **Professional**  **skill** | The user/individual on the job needs to know and understand:   General principles of plastics  processing, Knowledge about die  loading and unloading procedure,  parameter settings etc.   Types of plastics like thermoplastics  and the additives & grades to be  used tonnage and capacity of the  machine being operated.   Different types of tools and  machinery to process the plastic and trim the output   Various types of cooling systems  and their properties.   How to perform extrusion machine  safety check   Hazards and safety aspects involved in tape production and usage of relevant PPEs   Safety procedures to be adopted to complete die removal process   Detect problems in day to day tasks.  Support operator in using specific  problem solving techniques and  detailing out the problems   Discuss possible solution with the  supervisor for problem solving.  The user/individual on the job needs to know and understand how to:   Plan and organize the work order  and jobs received from the internal  customers/ operator.   Organize all process/ equipment  manuals so that sorting out  The user/individual on the job needs to know and understand how to:   Follow instructions and work on  areas of improvement identified   Complete the assigned tasks with  minimum supervision   Complete the job defined by the  operator within the timelines and  quality.   The user/individual on the job  needs to know and understand how  to:   Use common sense and make  judgments during day to day basis   Use basic reasoning skills to identify  and resolve basic problems   Use intuition to detect any potential problems which could arise during  operations.   He needs to know about  entrepreneurship associated with  plastics extrusion, its concepts etc.   He needs to know about marketing strategy involved for the products manufactured, market availability  etc. | Machine Operator Assistant Injection Moulding should recall  general principles  of Plastics  Extrusion  procedure and  process knowledge  which may be  repetitive type of  work in the area allotted, Types of  plastics like  thermoplastics and  the additives &  grades to be used,  Dies/Moulds, Its  types, application  etc. Thus he  should  demonstrate  practical skill,  routine and  repetitive in  Plastics processing,  he should also  understand quality  concepts and use  in the area of work  allotted. |  |
| **Core skill** | The user/ individual on the job needs to know and understand how to:   How to be able to read warnings,  instructions and other text material  on product labels, components etc   How to enter into the history card  details of the fault identified in the  plastic product manufactured read  equipment manuals and process  documents to understand the  equipment and processes better.   Read instructions especially safety  instructions especially symbols  while using the equipment in the  plant area logs.  The user/individual on the job needs to know and understand how to:   Discuss task lists, schedules, and  work-loads with coworkers/  assistants and supervisors   Question internal customers/ Shop  floor operator appropriately in  order to understand the nature of  the problem and make a diagnosis   Avoid using jargon, slang or  acronyms when communicating  with a operator /fellow  sub ordinates etc. Unless it is  required. | Machine Operator Assistant Injection Moulding should  be able to read  /write warnings,  instructions and  other text  material on  product labels,  components etc  with minimum  required clarity,  should have skill of basic  arithmetic, like  raw material  weights additions  etc. |  |
| **Responsibility** | Machine Operator Assistant Injection Moulding is responsible for his own job and self learning.  He/she Set up basic as well as all  critical machine controls and operate  Plastics Injection, Extrusion and Blow Machine in order to produce good quality products as per approved specifications  by supervisor, Identify and Troubleshoot the defects occur during production of plastics product. He may need to control/ check multiple machines at a time. | Machine Operator Assistant Injection Moulding is  responsible for  his own job and  learning in  Injection  Extrusion & Blow  process which  justifies the  pegging of the QP. |  |

**EVIDENCE OF RECOGNITION AND PROGRESSION**

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| **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?**  Relevant information was collected from Industries and allied sector working in this area.  The Plastics industries are recruiting people based on the qualification acquired. Maximum  of the industries accept this as qualification for selection/short listing of the individual.  approved by members.  **Vertical Pathway:**  The Occupational Map has been created & attached.  The Plastics Processing Operator has a clear pathway  **Horizontal Pathway:**  The individual can migrate within the Plastics Processing related industries. |