**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:** Mould Making Technicians - Machinist |
| **Nature and Purpose of the qualification:**  A CIPET trade certificate for Mould Making Technicians - Machinist and the he individual at work sets up and operates the Plastics Processing Injection 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:**  Mould Making Technicians- Machinist occupation in Plastics product manufacturing process. |
| **Proposed level of the qualification in the NSQF:** |
| **Anticipated volume of training/learning required to complete the qualification:**  720 Notional hours. |
| **Entry requirements / recommendations:**  Minimum qualification – Preferably Min -Class X/ITI, Minimum age - 18 years completed. |
| **Progression from the qualification:**  The Mould Making Technicians- Machinist 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:** 20.10.2017 |

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| **Format Structure of the Qualification:** | | | |
| **Title and Identification code of component** | **Mandatory/ Optional** | **Estimated Size (Notional Hours)** | **Level** |
| 1. To maintain a safe and  Healthy work environment at Workplace | M | 30 |  |
| 2. To understand basic  concepts of Engineering drawing & Can  able to study the Job Drawing/ Blue Print  & Dimensional Tolerances job | M | **90** |  |
| 3. Assist in performing the  Mould making Process by use of different  types of Hand tools | M | **60** |  |
| 4. Study of Types of Plastics  Mould | M | **120** |  |
| 5. Helping for mould polishing and mould assembly | M | **30** |  |
| 6. Work Effectively in a Team | M | **15** |  |
| 7. To operate different  conventional Machine Tools like Lathe,  Milling, Grinding, Shaper etc to making  Mould Parts and Cutting Tools. | M | **180** |  |
| 8. To operate different CNC  Machine Like CNC Lathe & CNC Milling  Machine etc for Making Mould Parts. | M | **180** |  |
| 9. Basic Reading & Writing for  Office/Shop floor Communication. Reading  the technical information’s | M | **15** |  |
|  |  | 720 |  |

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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.   1. 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:** Plastics Processing Operator Injection Moulding

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| **Assessable outcome** | | **Assessment criteria for the**  **outcome** | | |
| **LO** | **Assessable outcome Description** | **Theory** | **Practical** | **Total** |
| 1. To maintain a   safe and  Healthy work  environment at  Workplace | AO1.Identify activities which can cause  potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise etc.  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.Maintain a clean and safe working  environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc. | 09 | 21 | 30 |
|  | Sub total | 09 | 21 | 30 |
| 1. To understand basic concepts   of Engineering  drawing & Can  able to study  the Job  Drawing/ Blue  Print &  Dimensional  Tolerances job | AO1.To interact with the head mould maker & understand the mould drawing  AO2. To ensure availability of Tools and Raw materials for production in sufficient quantity as per production plan/operators instructions  AO3. Understand the Assembly Drawing &  Detail Drawing of Mould / Mould Parts  AO4.Understand the Tools Required for executing the required Mould Making Process and ensure that the same is available in shop floor  AO5.Understand the Tools Required for executing the required Mould Making Process and ensure that the same is available in shop floor | 27 | 63 | 90 |
|  | Sub total | 27 | 63 | 90 |
| 1. Assist in   performing the  Mould making  Process by use  of different  types of Hand  tools | AO1.Perform Handling & Using of Different Hand tools  AO2.Hands on Skill & Accruing Practices on measurement of Mould Parts  AO3.Select Different tools for particular job  AO4.Perform to handle the vernier Caliper, Micrometer etc.  AO5.Can able to set job on different types of vices | 18 | 42 | 60 |
|  | Sub total | 18 | 42 | 60 |
| 1. Study of Types   of Plastics  Mould | AO1.Study of Two Plate Injection Mould &  Three Plate Injection Mould  AO2.Study of Mould Feed System, Types of Gate  AO3.Study of Different types of cooling System  AO4.Study of Different ejection system of Mould. | 36 | 84 | 120 |
|  | Sub total | 36 | 84 | 120 |
| 1. Helping   for mould  polishing and  mould assembly | AO1.Polish the core and cavity  AO2.Polish the mating parts of mould AO3.Identify the mould parts  AO4.Assemble the mould independently | 09 | 21 | 30 |
|  | Sub total | 09 | 21 | 30 |
| 1. Work Effectively   in a Team | AO1.Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required  AO2.Accurately pass on information to  authorized persons who require it and within agreed timescale and confirm its receipt  AO3.Give information to others clearly, at a pace and in a manner that helps them to understand  AO4.Display appropriate communication  etiquette while working  AO5.Consult with and assist others to  maximize effectiveness and efficiency in carrying out tasks  AO6.Display helpful behaviour by assisting  others in performing tasks in a positive  manner, where required and possible | 4.5 | 10.5 | 15 |
|  | Sub total | 4.5 | 10.5 | 15 |
| 1. operate   different  conventional  Machine Tools  like Lathe,  Milling,  Grinding,  Shaper etc to  making Mould  Parts and  Cutting Tools | AO1.To Set the work piece & Set the cutting Tools  AO2.To Operate the Lathe Machine & to perform different operation  AO3.To Operate the Milling Machine & to perform different operation  AO4.To Operate the Cylindrical Grinding & to perform different operation  AO5.To grind the Mould Plates & Inserts using Surface Grinding machine | 54 | 126 | 180 |
|  | Sub total | 54 | 126 | 180 |
| 1. To   operate  different CNC  Machine Like  CNC Lathe &  CNC Milling  Machine etc for  Making Mould  Parts. | AO1.Setting of Work Piece on CNC Lathe & Milling  AO2.Setting of Tools & Tool Offset Calculation  AO3.Graphic Run of CNC Tool Path Programme  AO4.Dry Run of Machine Tool 3 7 10  AO5.Running the programme in Full sequence  AO6.To perform different operations on CNC Lathe & Milling | 54 | 126 | 180 |
|  | Sub total | 54 | 126 | 180 |
| 1. Basic Reading &   Writing for  Office/Shop  floor  Communication.  Reading the  technical  information’s. | AO1.Fill and process mandated forms for receiving, processing, or tracking data, enter data from source documents (such as trial report, process sheet etc.) in to Computer application having MS OFFICE software/Office Open source 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.Update database information to reflect most current source information AO6.Respond to requests for information and access relevant files | 4.5 | 10.5 | 15 |
|  | Sub total | 4.5 | 10.5 | 15 |
|  | Total | 216 | 504 | 720 |
| **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:** Mould Making Technicians- Machinist  **Level:** | | | |
| **NSQF Domain** | **Outcomes of the**  **Qualification/Component** | **How the job role**  **relates to the NSQF**  **Level descriptors** | **NSQF**  **Level** |
| **Process** | The user/ individual on the job  needs to know and understand  how to:  1. Can able to Read the Job  Drawing/ Blue Print &  Dimensional Tolerances  2. Can able to Handle different  types of Hand Tools , Job  setting devices, Can able to  measure the jobs  dimensions using Different  measuring instruments like  Venire Callipers,  Micrometer, Dial Gauge,  Surface Gauge etc  3. Assembly of various type of  mould with application  Ex: Hand injection mould, Two  plate Automatic mould - Direct  Sprue injection - Single  Impression - Multi Impression -  Side Gated – Three Plate  Moulds  4. Type of polishing, different  type of polish kit and their  application  5. Can Understand How to  Operate NC Lathe, How to  Programme NC Lathe  Machine Operation,  6. Can operate & Programme a  CNC Lathe Machine Tools.  Can perform Job on CNC  Lathe Machines. Can  programme & operate on  different types of CNC Lathe Controller like Fanuc, HASS  etc  7. Can operate & Programme a  CNC Milling Machine Tools.  Can perform Job on CNC  Milling Machines. Can  programme & operate on  different types of CNC  Milling Controller like  Heidenhain, Fanuc & HASS  etc | He should capable of  making the mould in all  respect like manufacturing  the mould parts using  conventional & CNC  Machines.  He should understanding of  the mould parts, polishing  kit, Assembly Techniques,  Operation of Conventional  & CNC Machine tools, Basic  reading, writing and  communication skills, Hand  tools and Safety |  |
| **Professional**  **knowledge** | The user/ individual on the job  needs to know and understand  how to:  1. Type of Hand Tools and its  uses  2. Reading of mould assembly  drawing and details drawing  3. Able to understand different  types of moulds and their  functions  4. Able to understand the  polishing techniques and  tools  5. Able to understand  operation of Conventional &  CNC Machines | Mould Making Technicians- Machinist should  understand the different  materials used in mould  manufacturing, tools for  machining, various  machining techniques for  mould manufacturing. He  should able to optimize the  best techniques for  manufacturing different  moulds, assembly &  polishing techniques for  different applications. |  |
| **Professional**  **skill** | The user/ individual on the job  needs to know and understand  how to:   Plan and organize the  activities/ work allocated by  mould maker and supervisor   Organize all the polishing  kits and assembly tools so  that sorting is easy on a day  to day basis   Use practical knowledge for  mould assemble   Matching of core and cavity | Mould Making Technicians- Machinist should recall  general principles,  machining procedure and  process knowledge which  may be repetitive type of  work in the area allotted,  different types of plastics  materials, mould materials  to be used for various  applications. Thus he  should demonstrate  practical skill, routine and  repetitive in mould  manufacturing process.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:   Write basic level notes and  observations   Draw basic level drawings  and charts   Read documents and notes   Interpret the information  given in the documents and  notes   Read and interpret symbols  given on equipment and  work area.   Discuss task lists and job  requirements with co-workers   Effectively communicate  information to team  members | Mould Making Technicians - Machinist should able  to communicate with their  team to clarify or schedule  the work plan/process to be  carried out with proper  clarity in all aspects and  should have arithmetic skill  to work out the required  materials, cost and time to  complete the assignment. |  |
| **Responsibility** | The responsible for making  moulds in all respect,  manufacturing the mould parts  using conventional & CNC  Machines, Organize all the  polishing kits and Assembly of  various type of mould | Mould Making Technicians- Machinist is responsible  for the entire work in the  mould manufacturing  process. |  |

**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 Mould Making Technicians- Machinist has a clear pathway  **Horizontal Pathway:**  The individual can migrate within the Plastics mould related industries. |