**INTRODUCTION**

**1. The name of the skill is Plastic Die Engineering.**

Plastic Die Engineers involve the design and manufacture of injection moulds for producing plastic components. They should read and understand mould drawings and be able to manufacture them.

Plastic Injection moulded components are used in the field of Telecommunication, Automobile, Home appliances, Office automation and Entertainment electronics etc. There are many advanced technologies available for Die making but the basic skills required in planning, designing, machining, measuring, polishing, and fitting only tested in this competition.

The Competition is a demonstration and assessment of the competencies associated with these basic skills. The Test Project consists of practical work only.

**1.1 Competency specification**

Knowledge and understanding of plastic die making with:

* + - * CAD/CAM software like Inventor, Mastercam etc
* Machine tools like CNC Milling machine, Bench drilling machine, Pedestal grinder etc.
* Hand tools like Files, Hammers, Hacksaw, Taps, Reamers, Screw drivers, Spanners, Allen keys etc.
* Metal cutting tools like Drills, face mill cutters and end mills, Machine reamers and taps, Counter boring tools with parallel and taper shanks, reamers etc.
* Cutting tool materials like High speed steels and carbides
* Steel grades and their properties like strength, hardness, machinability, polishability, etc.,
* Marking tools like scribers and punches (centre punch, letter punch, Number punch, etc.).
* Measuring tools like vernier calipers, micrometers, Height gauge ,etc
* Gauges like pin gauges, plug gauges, slip gauges, etc.
* Bench fitting techniques (measuring and marking out).
* Methods and sequence of mould polishing

**The competitor shall be able to :**

* Efficiently use different machine tools like CNC milling , drilling machine, pedestal grinde etc.
* Create design and machine mould parts
* Work from drawings or model, mark, machine, measure and produce components by hand and CNC Milling machining technique
* Polish the moulding surface to mirror finish
* Follow safe machining practices
* select right cutting parameters in order to finish machining with required dimensions ,surface finish within the allotted time

**1.2 Theoretical knowledge**

Theoretical knowledge is required but not tested explicitly**.** The theoretical knowledge is limited to that necessary to carry out the design work, machiningprocedures, polishing procedures, assembly and adjustment of molding dies.

**1.3 Test Projects**

The test project shall be completed within 12 h :

Mould Design :3h

Programming :1h

Machining :6h

Bench working :2h

Total:12h

**2.Assessment method**

There are Two assessment methods: Measurement and Judgment

**Measurement** is used to assess accuracy, precision, and other performance which can and should be measured in a robust way. It is used where there should be no ambiguity.

**Judgement** is used to assess the quality of performance, about which there may be small differences of view when applying the external benchmarks.

**2.1 Assessment criteria**

The main heading of the marking scheme are the assessment criteria. There will be normally four to six main criteria

**2.2 Sub criteria:** The Main criteria will be broken down into one or more sub criteria’s . Marking forms are organized under sub criteria.

**2.3 Aspects:** Each sub criterion is broken down into one or more aspects. Aspects categorized either as measurement or judgement and marks are awarded to each aspect. No aspect shall be given more than 5 marks

**3:Summary of marking:**

|  |  |  |  |
| --- | --- | --- | --- |
| Main criteria | Judgment | Measurement | Total |
| Mould Design | 4 | 26 | 30 |
| Machining | 8 | 62 | 70 |
| Grand Total | 12 | 88 | 100 |

**4:Materials, Equipment and Tools carried by Competitors in their Toolbox**

The Competitor should bring their own tools and equipment to ensure manufacturing of the Test Project.

These include:

* End mills Ø2－Ø16 (mm)
* Ball end mills R2 – R3 mm
* Radius end mills R0.5 – R1 mm
* Face mills and inserts
* Machine reamers (Ø3-Ø8H7).
* Drill bits Ø2.8－Ø7.8 (mm) ( only reamer size drills)
* centre drills
* countersinks
* Tap wrenches
* Hand reamers (Ø3-Ø8H7)
* Set of metric Allen wrenches (2 －12 mm)
* Parallel blocks
* Files of any kind
* Variety of honing (grinding) stones
* Various polishing equipment
* Air grinder or electric grinder
* Caliper 160 mm
* Outside micrometer 0-25
* Outside Micrometer 25-50mm
* Outside Micrometer 50-75mm
* Outside micrometer 75-100mm
* Disk micrometer 0-25mm
* Disk micrometer 25-50mm
* Depth micrometer set 0-25 mm
* Universal Dial indicator with stand
* Plunger dial indicator
* Edge finder