



DEVELOPING THE STANDARDS FOR MOLD BASE LIBRARY

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ABSTRACT

Injection molding process is a technique of forcing molten plastic into a mould cavity, once the plastic is cooled the part is ejected. This process is not a mysterious process it involves polymer, mould, machine, material handling, part handling, etc the main tool of the injection-molding machine is mold base. The mold base is the assembly of many other components like mold plates, support pillars, cooling system, ejection system, etc. The design of the mold base plays a significant role in manufacturing the defect free components. There are many standards like Hasco, DME standards used widely all over the world. Their specification and cost are too high when compared with the developed In-house mold base. A new standard is created to satisfy the Indian condition. The parameters considered to design the mold base are the clamping force, injection pressure, material selection, and wall thickness of the plate and location of different plates. The Cimatron Software is used for designing the mold base plate. A knowledge base is created for different thickness and dimensions. Non-standard

dimensions can also be incorporated at a special situation. For the different component specification the standard can be obtained from the knowledge base.

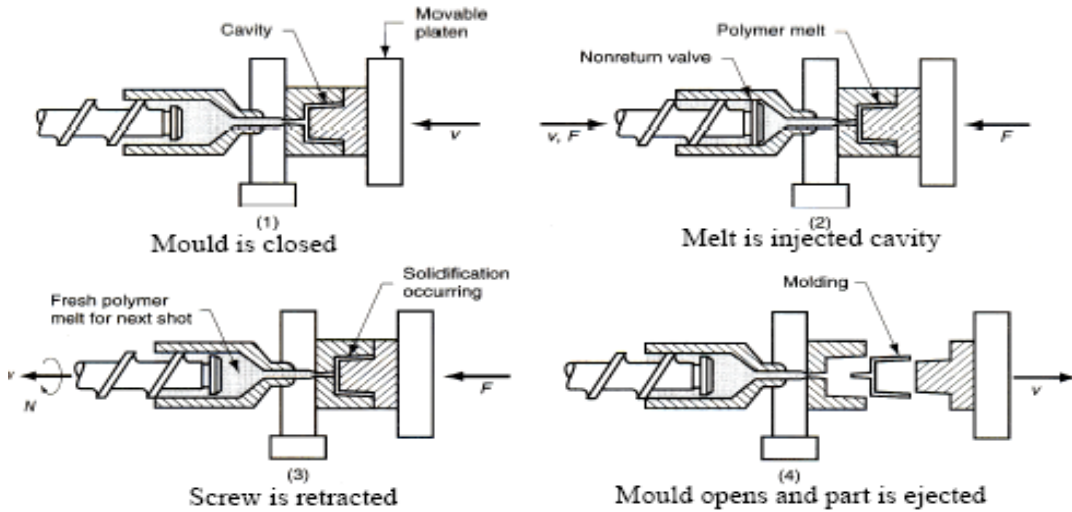
INTRODUCTION

Injection molding of thermoplastics is possible because of the characteristics of thermoplastic materials. This process consists of melting a thermoplastic material to a predetermined shot size and then injecting the plastic into a cooled mold where it is formed. Once formed, the part is then ejected from the mold. The injection molding machines used in industries are rated by clamp size (tons) and injection pressure (N/mm² of general purpose polystyrene) and are classified as hydraulic, toggle or electric machines. These machines are typically divided into four sections, as shown in (Figure1.1).

- Injection unit
- Clamping unit

Steps involved in Injection Molding

- Melting of plastic material
- Injection of molten material
- Cooling process
- Ejection process



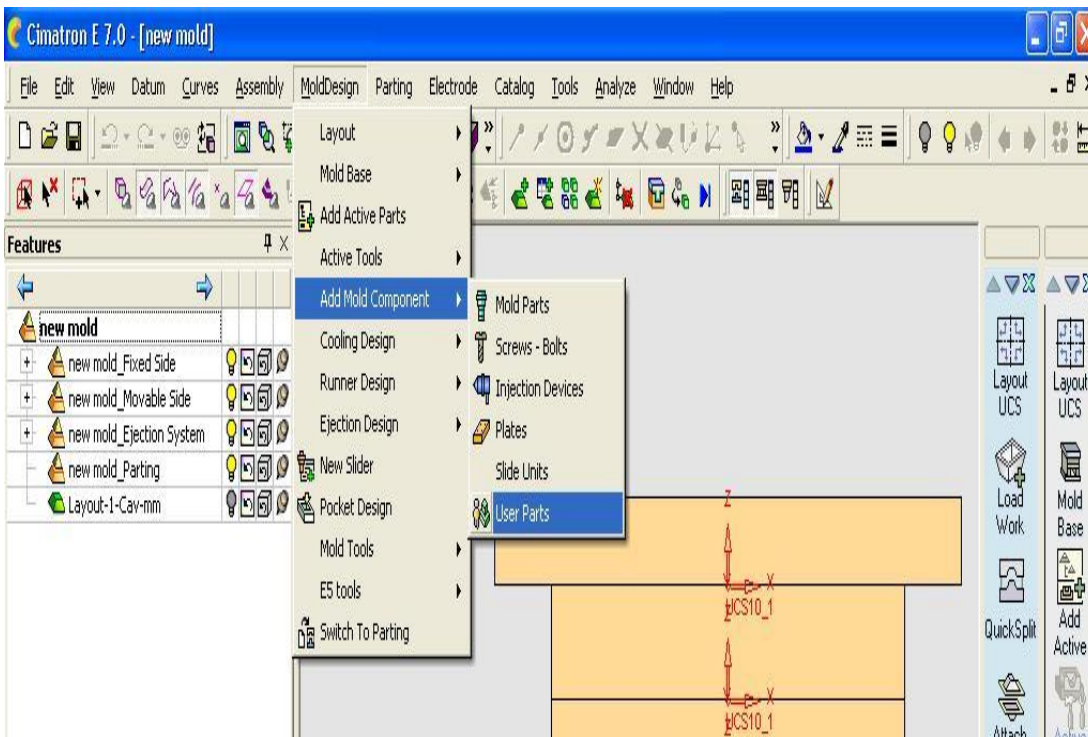
DESIGN OF MOLD BASE PLATES

The mold base is the assembly of components. They consist of the stationary and movable half, the stationary half is the cavity set and the movable part is the core set. The plates are top clamping plate, cavity plate, core plate, support plate, spacer block, ejector plate, ejector retainer plate and rear clamping plate. In designing a mold base many parameter are considered some of them are,

- Material selection for mold plates.
- Injection pressure
- Clamping force

- Thickness of the mold plate

CAD is primarily concerned with design of products and assemblies, manufacturing modeling is primarily concerned with preparing a model for manufacturing and designing the tool required for manufacturing. CIM data estimate that production of molds is the largest segment of CAM, as more than 30 percent of the total cam software of market is associated with this type of production. Mold design, a component of manufacturing modeling, has become a commonly employed and critical technology in mold making.



COMPARISON OF IN-HOUSE STANDARDS WITH OTHER STANDARDS

Overall cost of the mold base

The clamping force increases the cost of the mold base. The clamping force of different standards are tabulated,

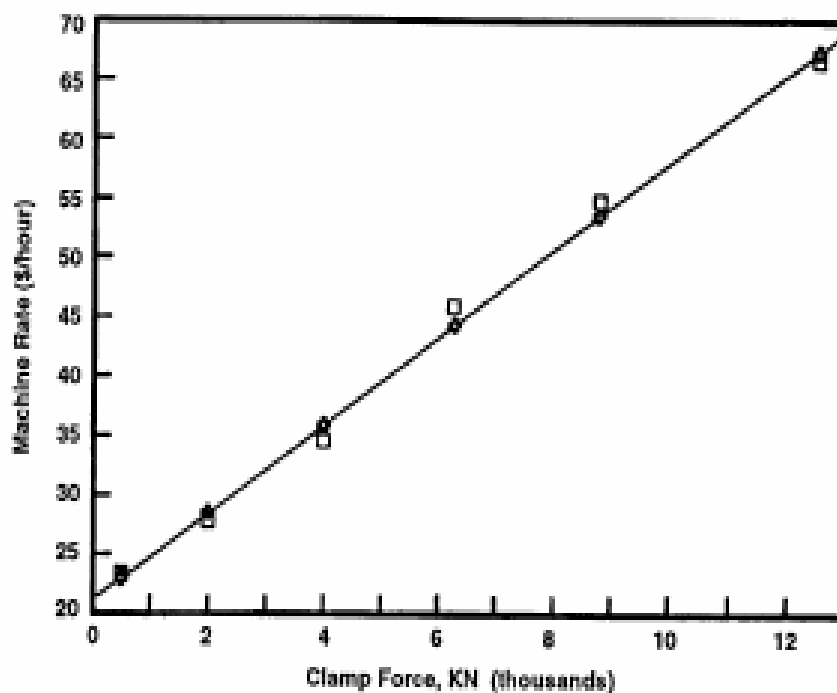
CLAMPING FORCE (kN)	PROJECTED AREA (Sq.mm)	INJECTION PRESSURE (N / sq.mm)
250	2500	100
270	2704	100
302	3025	100
336	3364	100
360	3600	100
384	3844	100
409	4096	100
462	4624	100
490	4900	100

Clamping force for the developed In-house mold base

CLAMPING FORCE (kN)	PROJECTED AREA (Sq.mm)	INJECTION PRESSURE (N / sq.mm)
20	400	100
25	500	100
30	600	100
35	700	100
40	800	100
45	900	100

Design for Injection Molding

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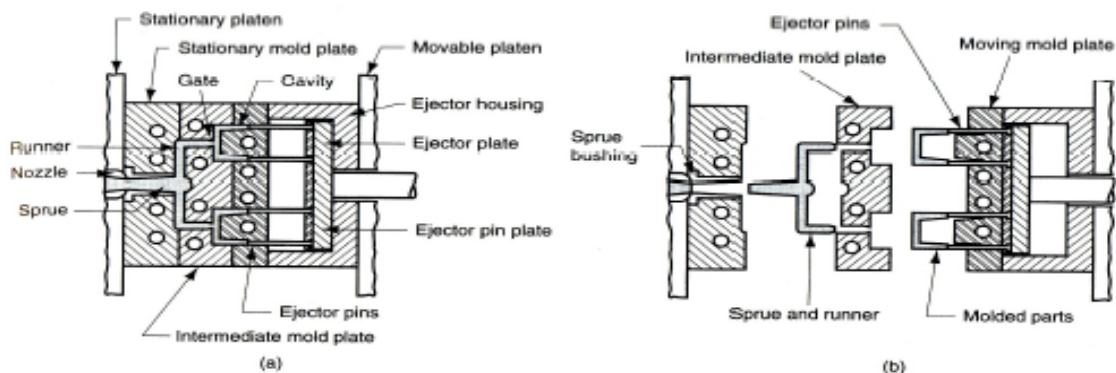
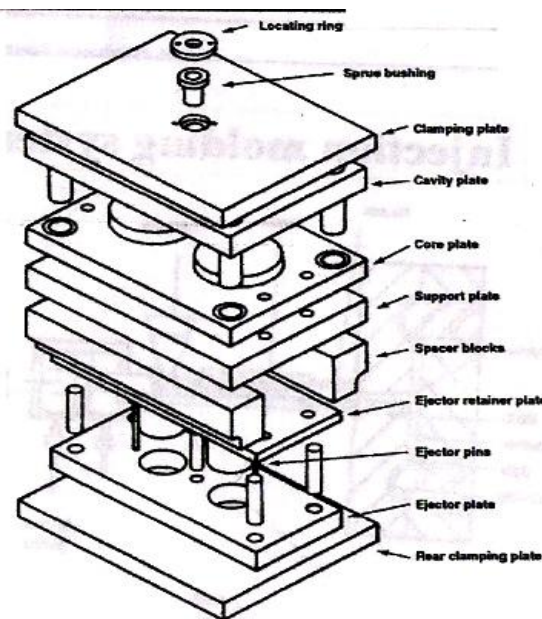
LIST OF TABLES

Shrinkage value of different materials

MATERIALS	% SHRINKAGE
ABC	0.4 to 0.6
POLYSTYRENE	0.5 to 0.6
ACRYLIC	0.4 to 0.8
POLYCARBONATE	0.6 to 0.8

9Injection pressure

THERMOPLASTIC	INJECTION PRESSURE IN (N / mm ²)
POLYETHYLENE	965
ABS	1000
ACETAL	1172
POLYCARBONATE	1172
POLYPHENYLENE OXIDE	1034
POLYPROPYLENE	965



CONCLUSION

Mold is a living organism that belongs to the kingdom fungi. Mycelium Molds are the vast group of thread-like structures called hyphae commonly observed on food surfaces and other affected damp surfaces. Depending on its health hazard, mold is categorized as Allergenic, Pathogenic, and Toxigenic. Injection molding has a great many applications for manufacturing, particularly for production high volume parts. While the tooling and molding can be expensive, the cost of production once this is completed is low.

REFERENCES

1. Asia.J, Javierre.C, De la Serna.J.A, (Article in Press), 'An example of stimulation tools use for large injection moulds design: The CONTENUR TM 24001 solid waste container', Journal of Material Processing.
2. Technology, Cracknell.P.S and Dyson. R.W, (2000) 'Handbook of Thermoplastics Injection Mould Design', Blackie Academic & Professional.
3. Jeffrey M. Lawrence, Kuang – ting Hsiao, Roderic C. Don, PaulSimacek, Gonzalo E. Strado, E. Murat Sozer, (April 2002), 'An approach to couple mold design and on – line control to manufacture complex composite parts by resin transfer molding', Journal Composites part A: Applied science and manufacturing, Vol. 33, pp. 981-990.
4. John Bown, 'Injection Moulding of Plastic Components,(1997) – A Guide to Efficiency, Fault Diagnosis and Cure', McGRAW – HILL Book Company (UK) limited.
5. Lou.Z, Joan. H, Ruan .X, (Nov.1999), 'Development of an Intergraded knowledge – based system for mold – base design', Journal of Material Processing Technology, Vol. 150, pp. 194-199.