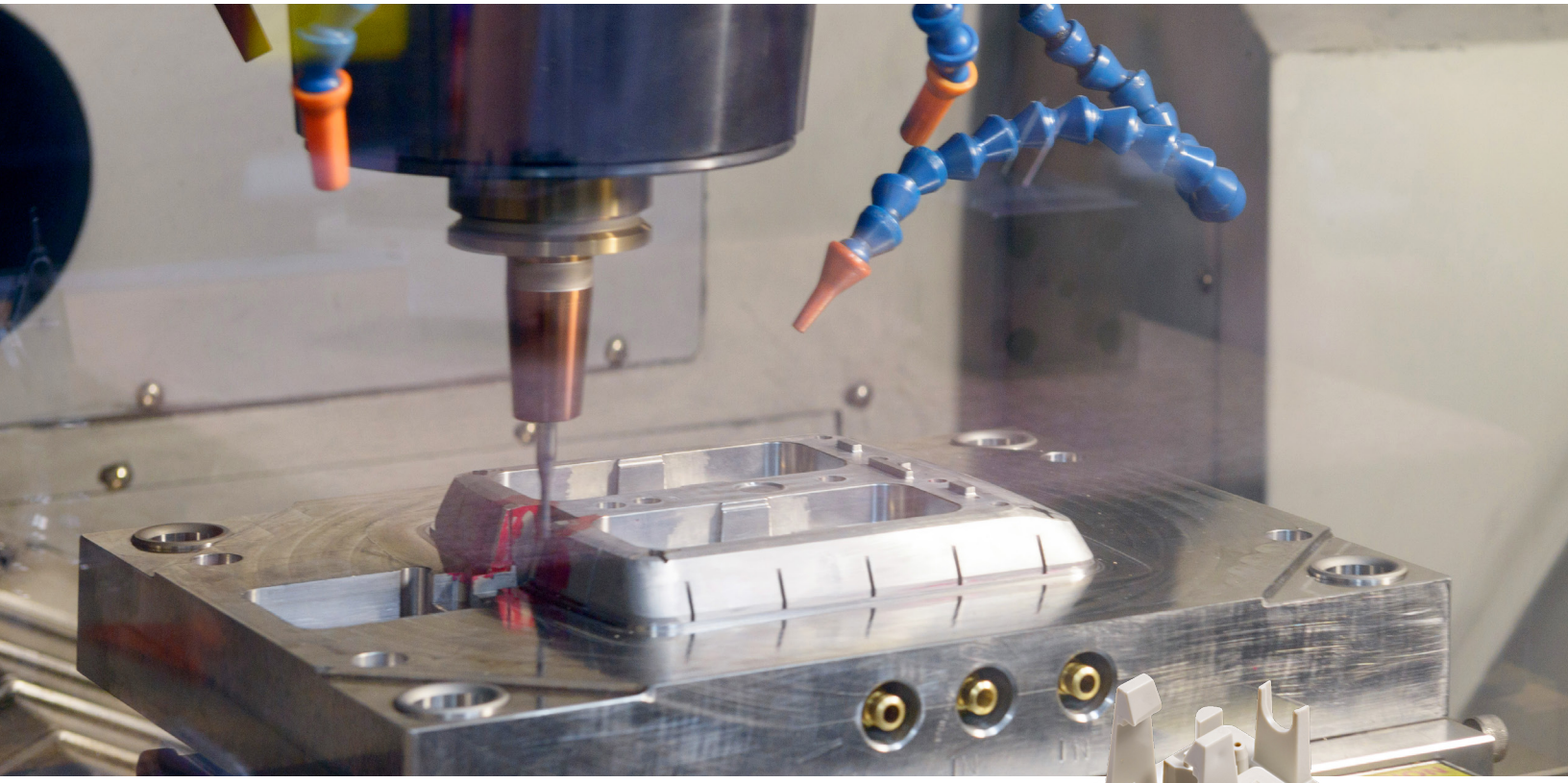

Classifications of Injection Molds

The following classifications are guidelines to be used in obtaining quotations and placing orders for uniform types of molds. It is our desire, through these classifications, to help eliminate confusion in the mold-quote process and increase customer satisfaction.

It is strongly recommended that mold drawings be obtained before construction is started on any injection mold. Even though parts may seem simple enough not to warrant a mold design, a drawing showing sizes and steel types will pay for itself in the event of mold damage.

As the applications of plastics become more sophisticated, so must mold designs. When designing a mold for a difficult part there are resources available to the moldmaker and molder to confirm the best mold design. For these designs it is recommended that a computer aided flow and/or cooling analysis be performed. These programs may help determine the best mold design, saving time and cost of design rework.

These classifications are for mold specifications only and in no way guarantee workmanship. It is very important that purchasers deal with vendors whose workmanship standards and reliability are well proven.

Mold life, because of variations in part design and molding conditions, cannot be guaranteed. This guide will attempt to give approximate cycles for each type of mold (excluding wear caused by material abrasion, poor mold maintenance and improper technique).

Maintenance is not the responsibility of the moldmaker. Normal maintenance, such as replacement of broken springs, broken ejector pins, worn rings or the rework of nicks and scratches should be borne by the molder. Mold rework costs should be closely considered when deciding which classification of mold is required.

This document does not constitute a warranty or guarantee by the Society of the Plastics Industry, Inc., or its members for the classifications or specifications set forth herein.

Guide for Purchasers | Classifications of Injection Molds

The following contains a brief synopsis of the various mold classifications and the detailed descriptions of each mold class.

Class 101 Mold ***Cycles:** One million or more	Built for extremely high production. This is the highest-priced mold and is made with only the highest quality materials.
Class 102 Mold **Cycles:** Not exceeding one million	Medium to high production mold, good for abrasive materials and/or parts requiring close tolerances. This is a high quality, fairly high-priced mold.
Class 103 Mold **Cycles:** Under 500,000	Medium production mold. This is a very popular mold for low to medium production needs. Most common price range.
Class 104 Mold **Cycles:** Under 100,000	Low production mold. Used only for limited production preferably with nonabrasive materials. Low to moderate price range.
Class 105 Mold **Cycles:** Not exceeding 500	Prototype only. This mold will be constructed in the least expensive manner possible to produce a very limited quantity of prototype parts. *(Important: refer to the general specifications to complete the details of this section, except for prototype molds).*
Class I Unit Insert** **Cycles:** Approximately 500,000	Top quality materials for medium to high production requirements.
Class II Unit Insert** **Cycles:** Under 100,000	Similar to Class 104 Mold. Most commonly used insert. Low to medium production.
Class III Unit Insert** **Cycles:** Less than 500	Similar to Class 105 Mold. Least expensive insert for very limited quantities. Insert built with the least expensive materials.

* *Cycles are approximate and for comparison only.*

** *When buying inserts, the customer pays only for the insert. The unit mold base is owned by the molder. Because of the large variation in insert sizes, it should be kept in mind that it will be impossible to have product produced by another vendor without having to purchase a mold base.*

(Important: refer to the general specifications to complete the details of this section, except for prototype molds.)

Guide for Manufacturers | Classifications of Injection Molds

Here we will attempt to detail the materials and the processes to be used in producing the various classifications of molds.

General Specifications

1. Customer to approve mold design prior to start of construction.
2. All molds to have adequate channels for temperature control.
3. Wherever feasible, all details should be marked with steel type and rockwell hardness.
4. Customer name, part number, and mold number should be stamped on all molds.
5. All molds and large components should have adequate provision for handling, i.e., eyebolt holes.

Class 101 Mold

1. Detailed mold design required.
2. Mold base to be minimum hardness of 280 BHN.
3. Molding surfaces (cavities and cores) must be hardened to a minimum of 48 R/C range. All other details, such as slides, heel blocks, gibs, wedge blocks, etc. should also be of hardened tool steels.
4. Ejection should be guided.
5. Slides must have wear plates.
6. Temperature control provisions to be in cavities, cores and slides wherever possible.
7. Over the life of a mold, corrosion in the cooling channels decreases cooling efficiency thus degrading part quality and increasing cycle time. It is therefore recommended that plates or inserts containing cooling channels be of a corrosive resistant material or treated to prevent corrosion.
8. Parting line locks are required on all molds.

Class 102 Mold

1. Detailed mold design required.
2. Mold base to be minimum hardness of 280 BHN.
3. Molding surfaces should be hardened to a 48 R/C range. All other functional details should be made and heat treated.
4. Temperature control provisions to be directly in the cavities, cores, and slides wherever possible.
5. Parting line locks are recommended for all molds.
6. The following items may or may not be required depending on the ultimate production quantities anticipated. It is recommended that those items desired to be made a firm requirement for quoting purposes:
   a. Guided Ejection
   b. Slide Wear Plates
   c. Corrosive Resistant Temperature Control Channels
   d. Plated Cavities

Class 103 Mold

1. Detailed mold design recommended.
2. Mold base must be minimum hardness of 165 BHN.
3. Cavity and cores must be 280 BHN or higher.
4. All other extras are optional.

Class 104 Mold

1. Mold design recommended.
2. Mold base can be of mild steel or aluminum.
3. Cavities can be of aluminum, mild steel or any other agreed upon metal.
4. All other extras are optional.

Class 105 Mold

May be constructed from cast material or epoxy or any other material offering sufficient strength to produce minimum prototype pieces.

Class I Unit Insert

1. Detailed mold design required.
2. Insert retainer to be uniform hardness of at least 280 BHN.
3. All molding and/or functional details are to be made of tool steel hardened to at least 48 R/C.
4. Slides must have wear plates.
5. Temperature control provisions to be in cavities, cores and slides wherever possible.
6. Over the life of a mold, corrosion in the cooling channels decreases cooling efficiency thus degrading part quality and increasing cycle time. It is therefore recommended that plates or inserts containing cooling channels be of a corrosive resistant material or treated to prevent corrosion.
7. Parting line locks are required to be on all molds.
8. Insert retainers must have leader pins and bushings or some similar guidance system.

Class II Unit Insert

1. Detailed mold design recommended.
2. Insert retainer to be uniform hardness of at least 165 BHN.
3. Cavities and cores must be 280 BHN or higher.
4. Water channels to be included.
5. All other extras are optional.

Class III Unit Insert

Can be constructed from aluminum, cast metal, cast epoxy or any material with sufficient strength to produce minimum prototype parts.

(Important: Refer to the general specifications to complete the details of this section, except for prototype molds.)