

General Mold Specifications and Classifications of Injection Molds and Inserts used by C&H Plastics, Inc.

The following mold specifications and classifications are guidelines used by C&H Plastics, Inc. to be used in obtaining mold and insert quotations and placing orders for uniform types of molds. It is our desire through these classifications to help eliminate confusion in the mold quoting system and to increase our customers' satisfaction.

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

These classifications are for mold specifications only and in no way guarantee workmanship. 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 molding 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 are the responsibility of the Molder. Mold rework costs should be closely considered when deciding which classification of mold is required.

General Mold Specifications Required on all Molds and Inserts

1. Customer to approve mold design prior to start of construction.
2. Mold drawings are to be supplied on all molds and inserts.
3. All molds and inserts, with the exception of prototype, to have adequate channels for temperature control.
4. Wherever feasible, all details should be marked with steel type and Rockwell hardness approximately .005 deep.
5. Customer name, part number and mold number should be steel stamped on all molds and/or inserts.
6. All molds should have eyebolt holes on the topside. There should be one above and one below the parting line to facilitate mold removal, if required, in halves.
7. Vents at parting lines are required.
8. All ejector boxes to be covered.
9. All auxiliary cylinders to be tapped for N.P.T. pipe threads.
10. Quick disconnect water fittings should be counter-bored into base if possible.
11. 4" diameter locating rings required.
12. In multi-cavity molds and/or inserts, all identical cavities are to be individually identified.
13. Molds quoted to run PVC materials are to have 420 Stainless Steel (or equivalent) cores, cavities, and sprue bushing.

Classification of Injection Molds up to 400 Tons

Class 101 Molds

Cycles: One million or more

Description: Built for extremely high production. This is the highest quality mold and is made with only the highest quality materials.

Mold Requirements:

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, gibbs, wedge blocks, etc. should also be hardened tool steels.
4. Ejection should be guided.
5. Slides must have wear plates.
6. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
7. Over the life of a mold, corrosion in the cooling channels decreases cooling efficiency thus degrading part quality and increasing cycle times. It is therefore recommended those plates or inserts containing cooling channels are of a corrosive resistant material or treated to prevent corrosion.
8. Parting line locks are required on all molds.

Classification of Injection Molds up to 400 Tons (Continued)

Class 102 Molds

Cycles: Not to exceed One million

Description: Medium to high production mold, good for abrasive materials and/or parts requiring close tolerances. This is a high quality mold.

Mold Requirements:

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, gibbs, wedge blocks, etc. should also be hardened tool steels.
4. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
5. Parting line locks are required on all molds.
6. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - a. Guided ejection
 - b. Slide wear Plates
 - c. Corrosive Resistant Temperature Control Channels
 - d. Plated Cavities

Classification of Injection Molds up to 400 Tons (Continued)

Class 103 Molds

Cycles: Under 500,000

Description: Medium Production Mold. This is a very popular mold for low to medium production needs. This is the most common mold type.

Mold Requirements:

1. Detailed mold design required.
2. Mold base to be minimum hardness of 165 BHN.
3. Molding surfaces (cavities and cores) must have a minimum hardness of 280 BHN.
4. Temperature control provisions to be in cavities and cores, wherever possible.
5. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - a. Parting line locks
 - b. Guided ejection
 - c. Slide wear Plates
 - d. Corrosive Resistant Temperature Control Channels
 - e. Plated Cavities

Classification of Injection Molds up to 400 Tons (Continued)

Class 104 Molds

Cycles: Under 100,000

Description: Low Production Mold. Used for limited production preferably with non-abrasive materials.

Mold Requirements:

1. Detailed mold design required.
2. Mold base can be made of mild steel or aluminum.
3. Molding surfaces (cavities and cores) can be made of mild steel, aluminum or any other agreed upon material.
4. Temperature control provisions to be in cavities and cores, wherever possible.
5. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - a. Parting line locks
 - b. Guided ejection
 - c. Slide wear Plates
 - d. Corrosive Resistant Temperature Control Channels

Class 105 Molds

Cycles: Not to exceed 500

Description: Prototype only. This mold will be constructed in the least expensive manner possible to produce a very limited quantity of prototype parts.

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

Classification of Injection Mold Inserts

Class I Inserts

Cycles: Approximately 500,000

Description: Top quality materials for medium to high production requirements.

Insert Requirements:

1. Detailed design required.
2. 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 hardened tool steels.
3. Slides must have wear plates.
4. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
5. Over the life of a mold, corrosion in the cooling channels decreases cooling efficiency thus degrading part quality and increasing cycle times. It is therefore recommended those plates or inserts containing cooling channels are of a corrosive resistant material or treated to prevent corrosion.
6. Molding details should be plated for protection unless stainless steel is used.
7. Parting line locks are required on all inserts.

Classification of Injection Mold Inserts (continued)

Class II Inserts

Cycles: Under 100,000

Description: Similar to the Class 103 and Class 104 Molds. Most commonly used insert with low to medium production requirements.

Insert Requirements:

1. Detailed design required.
2. Molding surfaces (cavities and cores) must have a minimum hardness of 280 BHN, unless otherwise specified at the time of quotation.
3. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
4. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - a. Plated cavities
 - b. Parting line locks
 - c. Slide wear Plates
 - d. Corrosive Resistant Temperature Control Channels

Class III Inserts

Cycles: Less than 500

Description: Similar to a Class 105 Mold. This is the least expensive insert used for very limited prototype quantities. Insert built with the least expensive materials.

Insert Requirements:

1. Detailed design required.
2. Can be constructed from Aluminum, Cast Metal, Cast Epoxy or any material with sufficient strength to produce at least 500 injection molded pieces.

Classification of Injection Molds 400 Tons or More

Class 401 Molds

Cycles: 500,000 or more

Description: Built for extremely high production. This is the highest quality mold and is made with only the highest quality materials.

Mold Requirements:

1. Detailed mold design required.
3. Mold base to be minimum hardness of 280 BHN.
4. Molding surfaces (cavities and cores) must be hardened to a minimum of 50 R/C range. All other details, such as slides, heel blocks, gibbs, wedge blocks, etc. should also be hardened tool steels.
5. Ejection should be guided.
6. Slides must have wear plates.
7. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
8. Over the life of a mold, corrosion in the cooling channels decreases cooling efficiency thus degrading part quality and increasing cycle times. It is therefore recommended those plates or inserts containing cooling channels are of a corrosive resistant material or treated to prevent corrosion.
9. Parting line locks are required on all molds.
10. All molds and large components must have adequate provisions for handling, i.e., eyebolt holes.

Classification of Injection Molds 400 Tons or more (continued)

Class 402 Molds

Cycles: Not to exceed 500,000

Description: Medium to high production mold, good for abrasive materials and/or parts requiring close tolerances. This is a high quality mold.

Mold Requirements:

1. Detailed mold design required.
2. Mold base to be minimum hardness of 165 BHN.
3. Molding surfaces (cavities and cores) must be hardened to 280 – 310 BHN or 320 – 350 BHN depending on the complexity of the part and the performance expected.
4. All other details, such as slides, heel blocks, gibs, wedge blocks, etc. should also be made and heat treated to at least 48 R/C.
5. Temperature control provisions to be in cavities, cores, and slide cores wherever possible.
6. Parting line locks are required on all molds.
7. All molds and large components must have adequate provisions for handling, i.e., eyebolt holes.
8. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - e. Guided ejection
 - f. Slide wear Plates
 - g. Corrosive Resistant Temperature Control Channels
 - h. Plated Cavities

Classification of Injection Molds 400 Tons or more (continued)

Class 403 Molds

Cycles: Under 100,000

Description: Medium Production Mold. This is a very popular mold for low to medium production needs. This is the most common mold type.

Mold Requirements:

1. Detailed mold design required.
2. Mold base can be made of mild steel or aluminum.
3. Molding surfaces (cavities and cores) can be made of aluminum, mild steel or any other agreed upon metal.
4. Temperature control provisions to be in cavities and cores, wherever possible.
5. All molds and large components must have adequate provisions for handling, i.e., eyebolt holes.
6. The following items may or may not be required depending on the ultimate production quantities anticipated. Those items desired will be specified on the quotation request form as needed.
 - a. Parting line locks
 - b. Guided ejection
 - c. Slide wear Plates
 - d. Corrosive Resistant Temperature Control Channels

Class 404 Molds

Cycles: Not to exceed 500

Description: Prototype only. This mold will be constructed in the least expensive manner possible to produce a very limited quantity of prototype parts.

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