

Tooling Specifications

We have the following mold specifications to insure that all of our tools run trouble free for a long time.

General Specifications:

1. The mold must fit between the tie bars when lowered vertically from above. Any core pulls or any part of the mold should not extend beyond the platen (when possible).
2. All Molds must have two opposing clamp slots extending the full length of the mold and on both sides of the mold. Cooling lines, etc., should not come out from the mold in these slots unless absolutely necessary. Pry bar slots on the P/L must be provided. If cooling lines come out of clamp slots, then clamp slots must be provided on all four sides.
3. Tie bar diameter and locations should be shown on the plan view to confirm the tool position relative to clearance.
4. Cooling and heating channels are to be looped as little as possible. Inlets and outlets cannot interfere with the tie bars and can be on any side. Cooling inlets and outlets should be DME Jiffy connects (or equivalent) recessed into the mold. Cooling lines should be no less than 1/4" diameter (larger preferred). Water fittings installed and tested. Lines 1/4", 3/8", 1/2". No 7/16 or odd sizes. Water lines to be same sizes as those used for heater rods- in case we have to convert.
5. Mold components and base to be DME or National standards, or equivalent. Eye bolt holes to be provided on both halves of the mold on all four sides. Locating rings to be 3.99". Bases to be DME #2 steel or equivalent unless otherwise noted. Sprue bushing to have 1/2" spherical radius. Adequate support pillars must be provided so that the tool will not flex or allow flash during molding. Support pillars are to be the same steel as support plate.
6. Ejection-spares of all pins, sleeves, blades, etc., which are not DME or National standards are to be provided. Guided ejection to be provided. All ejectors under .062" are to be made of vascomax 300 or 350 (precipitation hardening steel - similar to 15-5PH but hardenable). EJ. Sleeves to be nitrated inside & out. For medical parts & electronic parts tools run dry. Use lubricated EJ-pins, so no oils are needed. Specials or highly modified components to be identified on the BOM.
7. In bases larger than 8"x8", ejector housings must have at least three (prefer 5) knock out holes of 1-1/4" diameter. One hole must be in the center, and the other two must be on 3-1/2" vertical centers per the molding platen layouts. Ejection travel must be adequate to completely push out all plastic with each shot. All tools are to run automatically unless otherwise agreed upon. Tap for positive pull back -1/2-13 thread. On bigger molds- use 4 x 16 ej. bar pattern also.
8. Cavity pockets must have a 2" minimum of base steel around the outside. Spring compression is to be 30% maximum with 1/8" preload.
9. If many small inserts are used, the back-up plate must be of the same hardness as the inserts, or the inserts can be held in a case of the same hardness. All inserts, cavities, etc., must be marked with the type of material, when large enough.

Slide and hand load inserts:

9. Any hand loaded insert which comes out with each shot must be designed such that the insert can only be loaded on one location, in one direction, and only on the injection side of the mold. Three sets of these inserts (minimum) must be provided. The mold must be designed such that if the insert is left out and shot, the tool will not suffer any damage, nor will the cold have to be removed from the press to pull out any plastic which has stuck in the insert

pocket. Fixtures to assist in removing the insert, or to cool of the inserts must be provided.

10. All slides, whether mechanical or hydraulic, must be held in location by full length heel blocks which are internally anchored in the base. Stilson or Korloc wedge locks are an acceptable alternative. All slides must be removable without removing the tool from the press. If ejector pins are behind the appropriate safeties must be provided. Where feasible, mechanical safeties are preferred over electrical ones. All slides must have a positive return. Springs must be replaceable without removing the tool from the press. All slides and rising ejectors must have lubrication grooves. Similar metals of similar hardness cannot move against one another! Vliers (Ball Detents) are not acceptable for slide positive return. All hydraulic cylinders must have limit switches, or equal, at both extremes of travel. (SPI protocol on slides) All slides must be removable from the mold, without removing the mold from the press for cleaning.
11. Shims should never be used on new tools.
12. The operator side of the mold must have the following information stamped on it (metal stamps, not paint):
 - A. Customer Name
 - B. Part Name
 - C. Part Number
 - D. Number of Cavities
 - E. Mold Maker
 - F. Date Tool Completed
 - G. Special Instructions (ex.: limited knockout-1")
13. Cutting of steel cannot commence until a design has been approved. It is the responsibility of the molder to specify shrinkage, gate and runner size, and gate location.
14. Welding- Welding is never desired. If welding is done on a new tool, it is the responsibility of the toolmaker. Care must be taken to re-temper and reharden all welded pieces. If welding is done on a new tool (at the option of the toolmaker), it is agreed that the toolmaker will repair or replace any such parts which fail during the first year of operation of the tool at no charge to the molder.
15. Whenever tools or inserts are shipped, they must be sprayed with DME mold saver, not machine oil, or an equivalent - be careful not to spray down on EJ - Pin holes.
16. All spare inserts, blades, pins, etc., must be stamped with all identifying information.
17. Upon payment for the tool all hobs and patterns are to become the property of Control Plastics, Inc. Spare electrodes, patterns, etc., are to be shipped with the mold, for repair reasons.
18. All inserts must be stress relieved or normalized after "EDM-ing" EDM leaves a highly stresses surface which cracks easily.
19. Heat Treating Assumptions

H-13 Steels-	Hardened and triple drawn to 48-50 RC
S-7 Steels-	Hardened and triple drawn to 52-54 RC
420 or 440 Stainless Steels-	Hardened and double drawn to 52-55 RC

All stainless steels must go through a freeze treating cycle, and a certification to that effect must be sent. Uddeholm (in Taiwan) is the only approved Taiwanese Heat Treater of Stainless Steels.
20. Pre Hard Tool Steels - Hardness

P-20 -	32 RC minimum	-36 RC or 420F -	36 RC
Pre Hard H-13 (vicount 44, FDAC, etc.) -	44 RC		

Nak 80 (no Nak 55) - 40-44RC or RA - 40 (Finkel Steel)
15-5 PH (stainless) - 38-42 RC

21. Base Steels

DME #2 = 4140 or 4130 types = PDS3

DME #3 = P-20 = PDS5

Futaba (when allowed) - between DME #1 and #2

Tooling Schedule - To be filled out at the beginning of the job. Starting the third week of each job, the tool maker is to send a schedule showing completed work , digital photos documenting progress, and any revisions every Friday.

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