

Mold Design & Moldmaking Series

Sample Mold Specification Guide



Table of Contents

	PAGE #
Definition	3
Payment Terms	4
General Guidelines	6
Preliminary Tool Drawing Requirements	8
Mold Drawings	9
Design and Mold Inspection Report	11
Tooling Inspection Checklist	13
Platen Dimensions for Presses #1-5	16
Platen Dimensions for Presses #6-10	17
Sprue Puller Bushings	18
Standard Sprue Puller for Unfilled Materials	19
Standard Sprue Puller for Glass Filled Materials	20
Trapezoidal Runner	21
Snap-Tite Connectors	22
Mold Safety Strap	23
Rule of Thumb Formula for Deep Draw Parts	24
3-Plate Drop Design	25

Definition

Mold specification guides are used to provide the tool maker with mold design guidelines that the company purchasing the tool uses. Before quoting or designing a mold, the tool maker will thoroughly review all requirements set by the customer. The following is a list of items, along with a brief description, that are typically found in mold specification guides.

Payment Terms: This section of the Mold Specification Guide informs the mold maker of the company's mold purchasing policy. These terms layout when payments will be made, and what should be included in the quote. To help eliminate confusion, payments terms should be agreed upon before any steel or mold components are purchased

General Guidelines provide recommended design guidelines for aspects of tool design including; mold base, ejection, actions, runners, gates, cooling and venting. These should be carefully reviewed by the tool maker before designing the injection mold.

Preliminary Tool Drawing Requirements list what items need be included, and states that these drawings must be approved and signed before the mold base or any components are purchased. These initial design concepts are provided by the tool maker.

Mold Drawings: Outline the information that should be included on the final tool drawing, as well as the formats in which the drawings are to be provided to the customer.

Design and Mold Inspection Report: This document is created and filled out by the customer to inform the tool maker of which practices and mold features and required.

Tooling Inspection Checklist: This checklist serves as a reviewing guide for the tool maker to use during the mold sampling process. This helps prevent small details from being overlooked.

Additional Information: Along with the items listed above, many companies will include the platen dimensions for presses, runner and gate dimensions, sample mold drawings, preferred mold components, mold strap design, hot runner design, part removal methods, etc.. Any critical information that may affect manufacturing should be given to the tool maker.

Payment Terms

The initial payment, equalling one-third of complete quote, will be paid within 30 days from date of purchase order.

The second payment, equalling one-third of complete quote, will be paid within 30 days from receiving the tool(s).

The final payment, equalling one-third of complete quote, will be paid within 30 days from final approval of completed tool(s).

Note: All shipping and sampling costs must be included in quote.

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275 Donohue Rd., Suite 14 ▼ Dracut, MA 01826
Phone: 978-957-0700 ▼ Fax: 978-957-1860
www.traininteractive.com ▼ Email: info@traininteractive.com

**SAMPLE MOLD
SPECIFICATION GUIDE**

Page 4

General Guidelines

MOLD BASE

Locating rings are 3.990 diameter, spherical radius = .75 Radius.

Eye bolt holes required for all four sides on both halves.

Use 3/4"-10 x 1-1/4 DP for mold weight less than 1 ton.

Use 1" - 8 x 1-1/2 DP for mold weight greater than 1 ton.

All molds to be stamped with mold number

Pry bar slots at main parting line.

All molds to have safety strap across parting lines

EJECTION

Ejector blades for deep walls and ribs.

Positive ejection return for all production molds.

Air poppet valves for deep draw parts.

Contoured ejector pins must be keyed.

All cold runner molds must have a sprue puller.

Ejector plate stops are required where mold mechanisms prevent full ejector stroke.

Angled lifters must be heat treated or case hardened and be guided on both sides by hardened wear plates.

Guided ejection is required for all production molds.

ACTIONS

Wear plates required on slides.

Guide blocks must be hardened, ground and dowed.

Design slide system for removal without requiring disassembly.

Slides require slide retainers (either spring loaded ball or clamp type).

RUNNERS AND GATES

Runner and gates polished with 600 stone.

Radii at intersection of sprue and runner.

Radii at intersection of runners.

Use round of trapezoidal runners.

Main runners are to extend beyond, the extreme auxiliary runners to serve as cold well slugs to a 3/8" length.

cold well slugs at 3/8" length should be used for all runner intersections.

COOLING

Water Line - All molds must have recesses to accommodate 'Snap-Tite' Fittings.

WATER CIRCUITS:

1. Provide a three dimensional water schematic on all mold drawings. This should indicate all plugs external and internal.
2. Stamp water lines on mold base as "IN" and "OUT" with circuit number.

Test all mold water lines.

Bafflesmark direction of baffle on outside head.

Large cores and core pins must be water cooled.

Water lines must not interfere with clamping of the mold.

VENTING

All molds are to be vented.

Ejector pin venting should be used at end of fill.

Vent cold wells in runners.

Vent all ribs and features.

Preliminary Tool Drawings Requirements

Preliminary tool drawings are sent out by the tool maker to be reviewed. These drawings must be approved, signed and returned before any steel or components are purchased.

The following items should be included in the drawings:

- 1) A plan view
- 2) A sectional view
- 3) Parting line location(s)
- 4) Ejection
- 5) Cooling
- 6) All special actions - need not be drawn in full

Mold Drawings

Mold drawings must include the following:

1. Draw tie bars outline on mold drawings to insure no water lines, cylinders, etc. are not in the way.
2. Note shrinkage in or above the title block.
3. Note customer drawing number and revision.
4. Note mold number.
5. Steel treatment and/or plating must be specified.
6. Delivered mold must be accompanied by two complete sets of mold drawings.
7. The tool shop is responsible for staying steel safe on critical dimensions.
8. Tool drawings must be updated for all mold modifications.
9. Drawings must be provided in both digital and printed formats.

Design and Mold Inspection Report

Customer Tool No. _____ Date Received _____
 Tool No. _____ Part Dwg. No. _____
 No. of Cavities _____ Part No. _____

	REQ-D.	NOT REQ-D.
1. Mold number stamped on 2 sides of mold, both halves.	<input type="checkbox"/>	<input type="checkbox"/>
2. Eyebolts holes located on 4 sides of mold, both halves.	<input type="checkbox"/>	<input type="checkbox"/>
3. Location of clearance holes for knockout stakes meet press requirements.	<input type="checkbox"/>	<input type="checkbox"/>
4. Runners and gates polished to 600 stone minimum.	<input type="checkbox"/>	<input type="checkbox"/>
5. Radii at intersection of runner and sprue to specification.	<input type="checkbox"/>	<input type="checkbox"/>
6. Pry bar slots at all moving plates.	<input type="checkbox"/>	<input type="checkbox"/>
7. Mold vented at parting line supplied by Routsis and blind molding areas.	<input type="checkbox"/>	<input type="checkbox"/>
8. Mold to fit specified presses.	<input type="checkbox"/>	<input type="checkbox"/>
9. Diameter Locating ring Sprue Bushing Radius "0" Dimension.	<input type="checkbox"/>	<input type="checkbox"/>
10. Coolant lines clear of press tie-bars.	<input type="checkbox"/>	<input type="checkbox"/>
11. Extended nozzles must accommodate a heater band near the orifice.	<input type="checkbox"/>	<input type="checkbox"/>
12. All IN's and OUT's stamped and marked for respective cooling circuits.	<input type="checkbox"/>	<input type="checkbox"/>
13. Leader pin must enter bushing 1" before coring enters cavity.	<input type="checkbox"/>	<input type="checkbox"/>
14. Return pins to fit flush to .002 above parting line and move freely in reamed hole.	<input type="checkbox"/>	<input type="checkbox"/>

	NOT REQ-D.	REQ-D.
15. Ejector plate must move freely forward.	<input type="checkbox"/>	<input type="checkbox"/>
16. Ejector plate with spring returns must move forward and return evenly.	<input type="checkbox"/>	<input type="checkbox"/>
17. All special actions must function without undue force to activate.	<input type="checkbox"/>	<input type="checkbox"/>
18. All molds with restricted opening must be so stamped with 1/4" high figures on the operator's side of the mold.	<input type="checkbox"/>	<input type="checkbox"/>
19. All molding surfaces must be free of undercuts, pitting, and all other surface blemishes.	<input type="checkbox"/>	<input type="checkbox"/>
20. 1/16 x 450 chamfer, 4 sides of mold plates at parting lines and at top and bottom clamp plates.	<input type="checkbox"/>	<input type="checkbox"/>
21. All gates to be same size and uniform in configuration in multiple cavity molds.	<input type="checkbox"/>	<input type="checkbox"/>
22. All ejector pins, core pins, and ejector sleeves to be free-of nicks, chipped edges, and damaged chrome plate.	<input type="checkbox"/>	<input type="checkbox"/>
23. Height of ejector pins to conform to intended function.	<input type="checkbox"/>	<input type="checkbox"/>
24. Cavity numbers and customer trademark engraved in specified location.	<input type="checkbox"/>	<input type="checkbox"/>
25. All pull bars and rods to be adjusted to desired length and tightened.	<input type="checkbox"/>	<input type="checkbox"/>
26. All interchangeable inserts must be marked with drawing number or version.	<input type="checkbox"/>	<input type="checkbox"/>
27. Travel of stripper plate must be restricted.	<input type="checkbox"/>	<input type="checkbox"/>
28. All molds with electric heaters must have wattage and voltage requirement stamped on side of mold near heaters.	<input type="checkbox"/>	<input type="checkbox"/>
29. Extra set of heaters required.	<input type="checkbox"/>	<input type="checkbox"/>

	NOT REQ-D.	REQ-D.
30. Sprue Bushing keyed.	<input type="checkbox"/>	<input type="checkbox"/>
31. Ejector pins on contoured surface to be keyed.	<input type="checkbox"/>	<input type="checkbox"/>
32. Effective amount of support post, stop pins, and retaining screws at ejector housing.	<input type="checkbox"/>	<input type="checkbox"/>
33. Angular ejectors must clear undercut by .062 minimum at full stroke.	<input type="checkbox"/>	<input type="checkbox"/>
34. Angular ejectors must have hardened wear plates at ejector plate and bottom of support plate.	<input type="checkbox"/>	<input type="checkbox"/>
35. Hardened cavities and cores when specified.	<input type="checkbox"/>	<input type="checkbox"/>
36. Clean out slots required for leader pins and bushings.	<input type="checkbox"/>	<input type="checkbox"/>
37. Ejector pins are not permitted in path of slides without spring returned ejector plate.	<input type="checkbox"/>	<input type="checkbox"/>
38. All molds to be free of grease, layout fluid stains, chips in coolant lines, grinder dust, and burrs.	<input type="checkbox"/>	<input type="checkbox"/>
39. All inserts to be marked- as to types of steel.	<input type="checkbox"/>	<input type="checkbox"/>
40. Clamping slots in cavity and ejector housing.	<input type="checkbox"/>	<input type="checkbox"/>
41. All coolant lines and nipples must be free of leaks.	<input type="checkbox"/>	<input type="checkbox"/>
42. Length of ejector plate must meet press requirements.	<input type="checkbox"/>	<input type="checkbox"/>
43. All holes in pull bar supports must be in alignment.	<input type="checkbox"/>	<input type="checkbox"/>
44. Thermo couple hole required in hot runner, insulated runner, and hot nozzle holds.	<input type="checkbox"/>	<input type="checkbox"/>
45. All ejector mechanisms must have a positive return.	<input type="checkbox"/>	<input type="checkbox"/>
46. Chrome plated surfaces, all SPE - SPI #1 and #2.	<input type="checkbox"/>	<input type="checkbox"/>
47. Textured surfaces must be plated.	<input type="checkbox"/>	<input type="checkbox"/>

Tooling Inspection Checklist

I. CAVITY:

A) WATER LINES:

1. Checked for flow _____
2. Checked for leaks _____
3. Connectors installed _____
4. Baffles/diverters installed _____
5. Water lines stamped In/Out _____
6. Water diagram provided _____

B) VENTS:

1. Depth _____
2. Length _____
3. Relief _____
4. Number of vents _____
5. Counterpressure seals _____

C) CLAMP SLOTS (Cavity & Core): _____

D) EYEBOLTS (All 4 sides, Top & Bottom): _____

E) SPRUE BUSHING:

	SPECIFIED	ACTUAL
1. Retained	_____	_____
2. "O" Dim.	_____	_____
3. "R" Radius	_____	_____
4. Locating Ring	_____	_____

F) FINISH _____

G) TEXTURE _____

H) PLATING _____

I) PRY BAR SLOTS _____

J) BUSHINGS RETAINED _____

II. CORE:

A) WATER LINES:

1. Checked for flow _____
2. Checked for leaks _____
3. Connectors installed _____
4. Baffles/diverters installed _____
5. Water lines stamped In/Out _____
6. Water diagram provided _____

B) VENTS:

1. Depth _____
2. Land width _____
3. Relief _____
4. Number of vents _____
5. Counterpressure seals _____

C) EJECTOR PIN CLEARANCE _____

D) RETURN PINS _____

E) PART NUMBER ENGRAVED ON CORE _____

F) DATE WHEEL _____

G) SURFACE FINISH SPECIFIED _____

III. EJECTOR SYSTEM:

- A) EJECTOR GUIDES _____
- B) KNOCKOUT PATTERN _____
- C) STOP BUTTONS _____
- D) SUPPORT PILLARS _____
- E) PROPER HEIGHT FOR EJECTOR PINS/RETURN PINS/SLEEVES _____
- F) MOLD NUMBER STAMPED ON RISER-BOTH SIDES _____

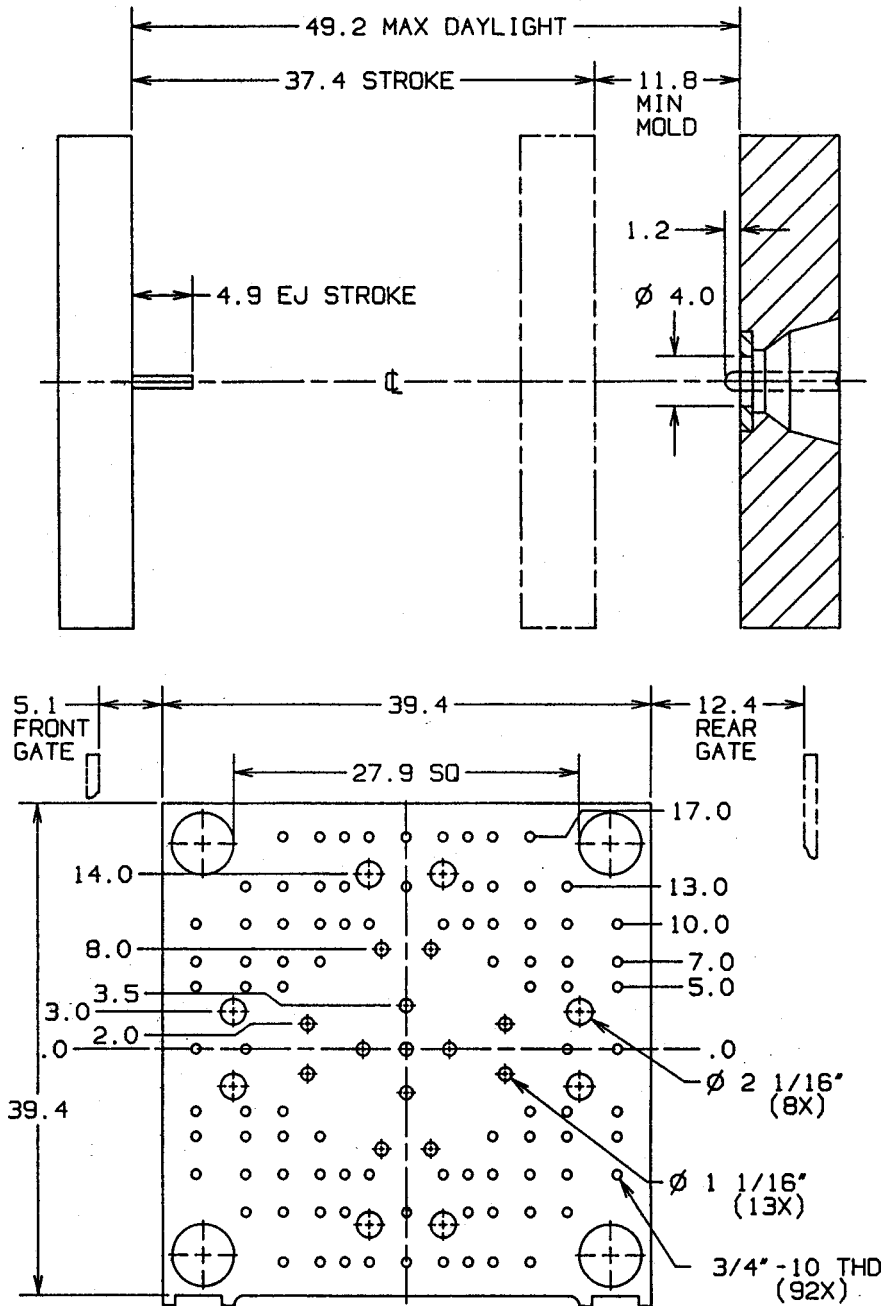
IV. GENERAL:

- A) MOLD STRAPS _____
- B) ALL EDGES DEBURRED _____
- C) FIRST SAMPLES APPROVED BY _____
- D) INSERTS MARKED FOR MATERIAL/HARDNESS _____
- E. COUNTERPRESSURE CHECKED _____

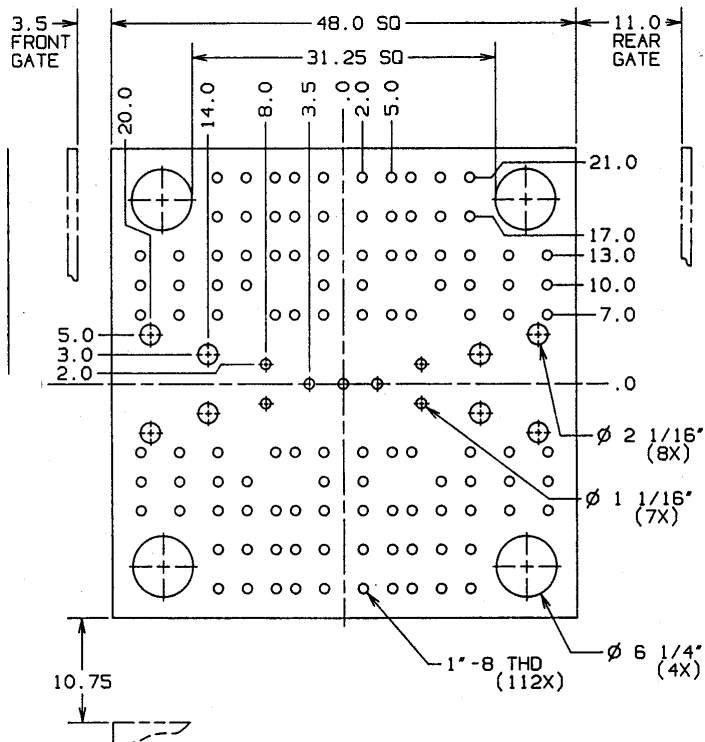
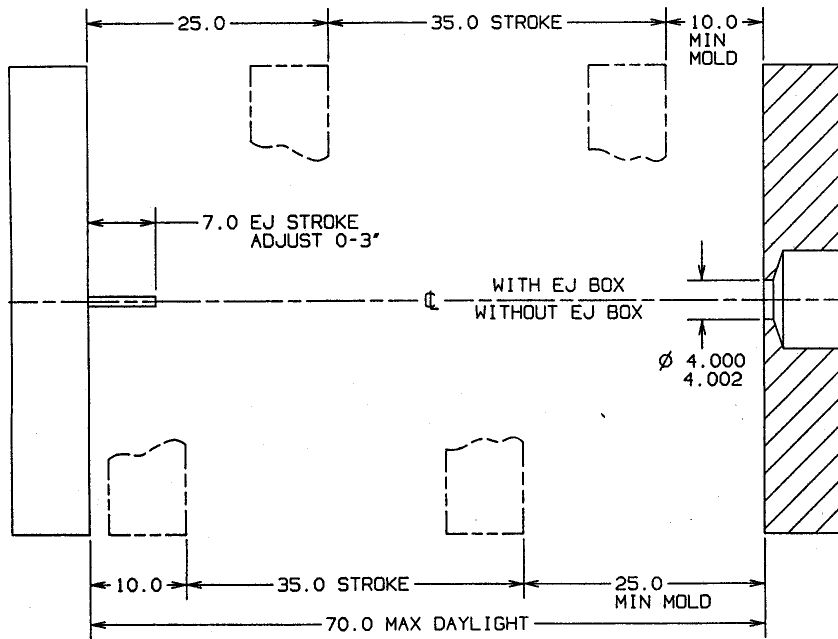
APPROVED FOR SHIPMENT: _____ DATE: _____

REVIEWED BY: _____ DATE: _____

Platens for 390 ton Toshiba, [Presses #1-5]



Platens for 390 ton Natco, [Presses #6-10]



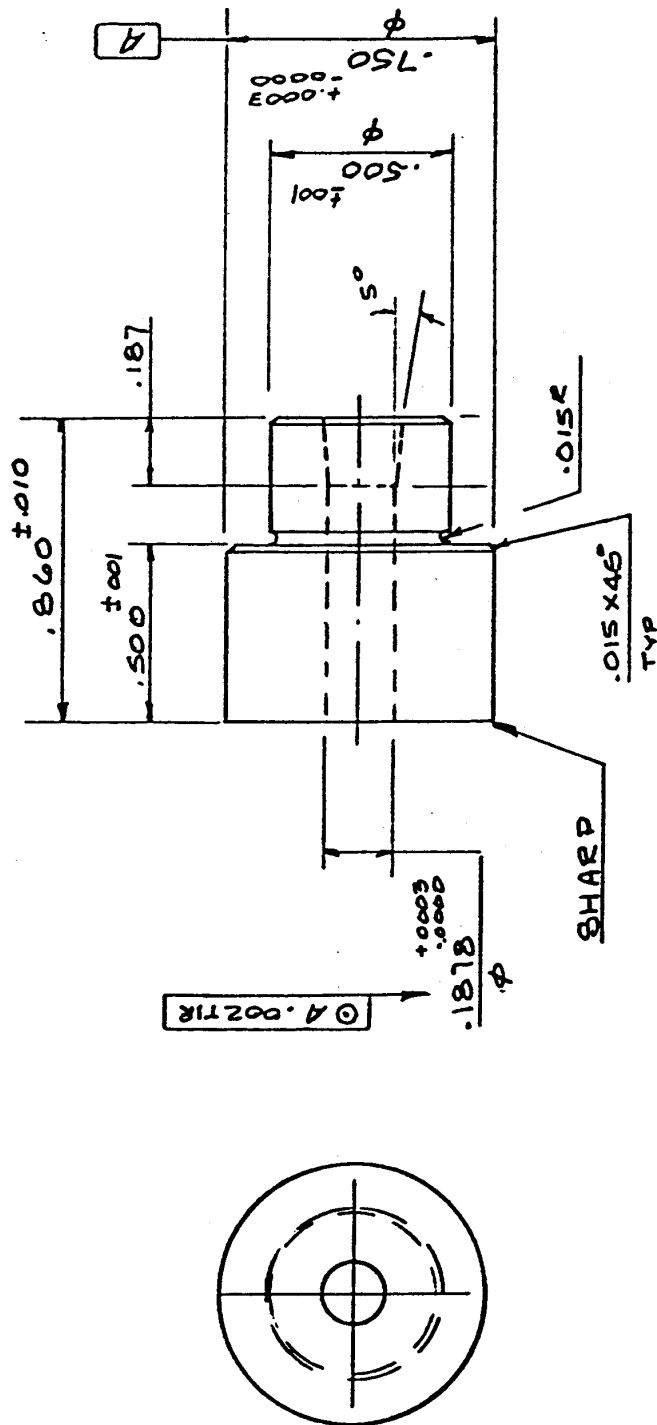
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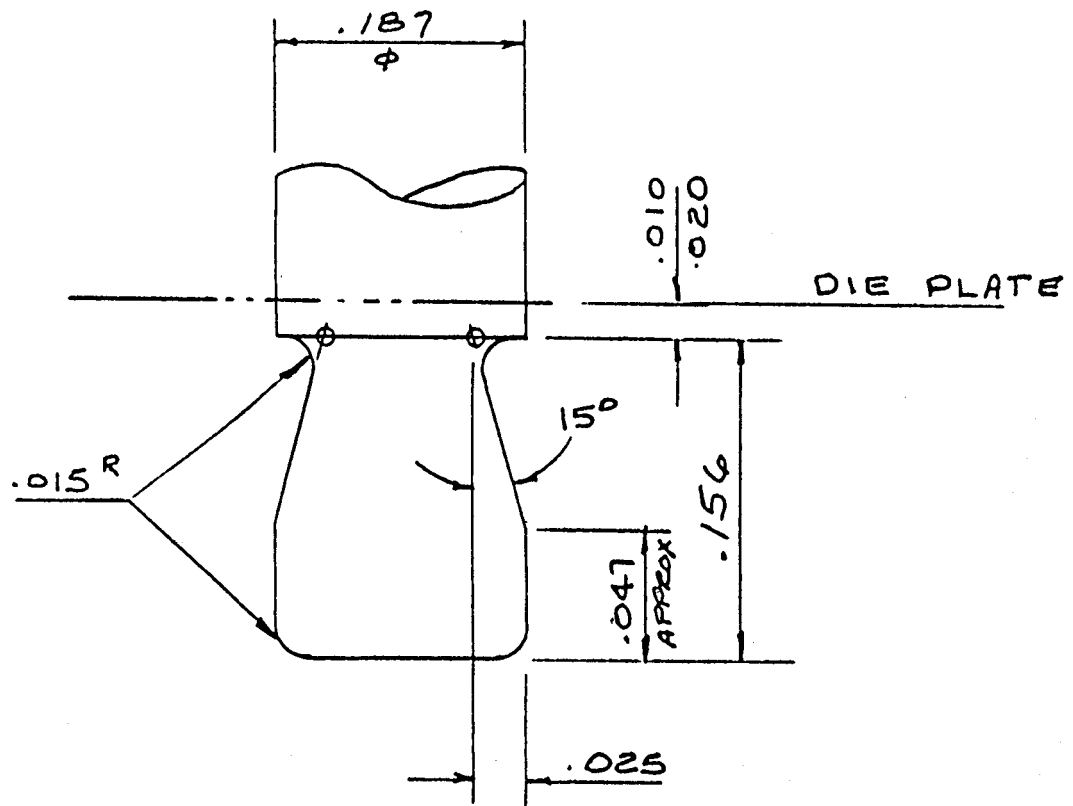
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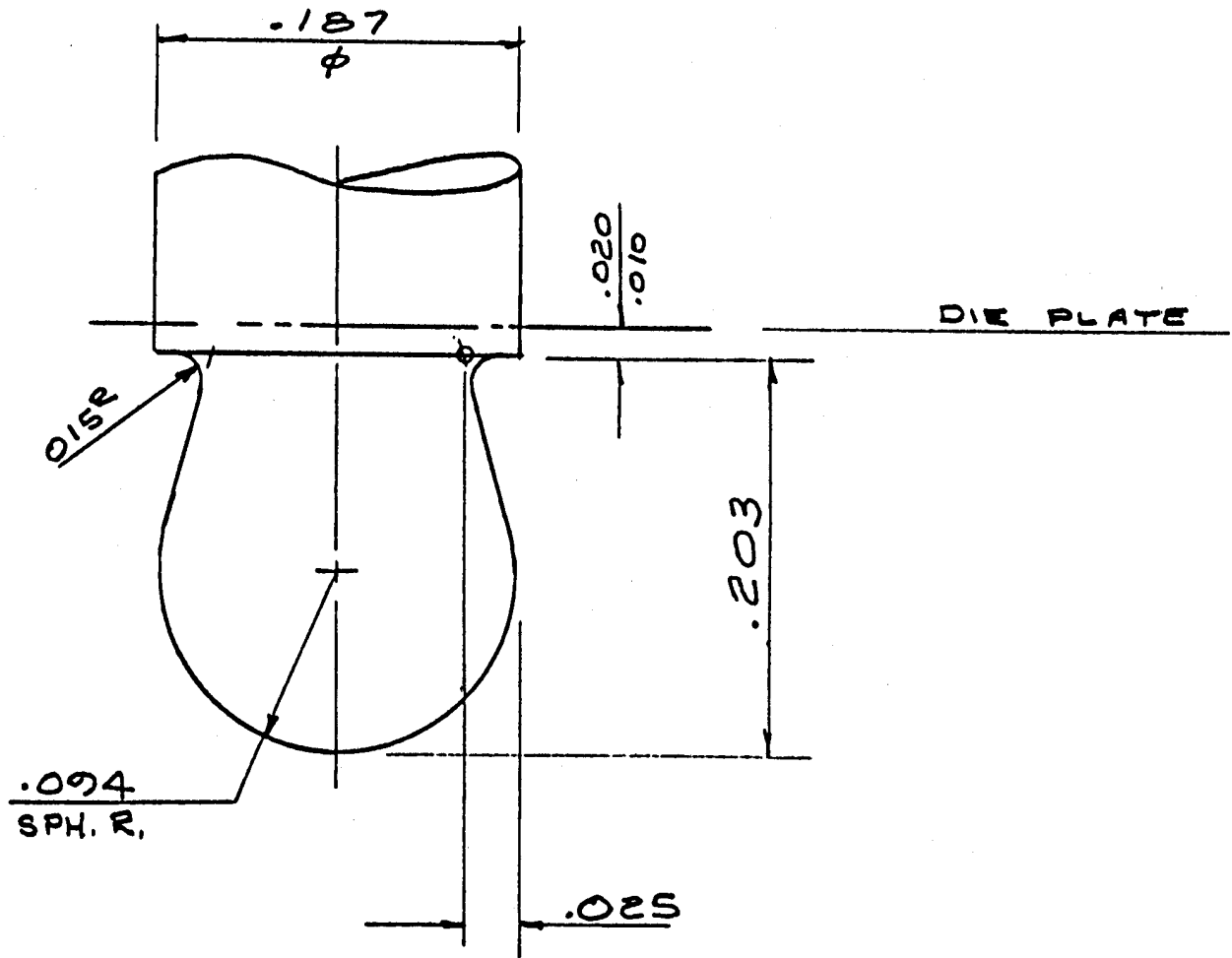
Sprue Puller Bushings



Standard Sprue Puller for Unfilled Materials



Standard Sprue Puller for Glass Filled Materials



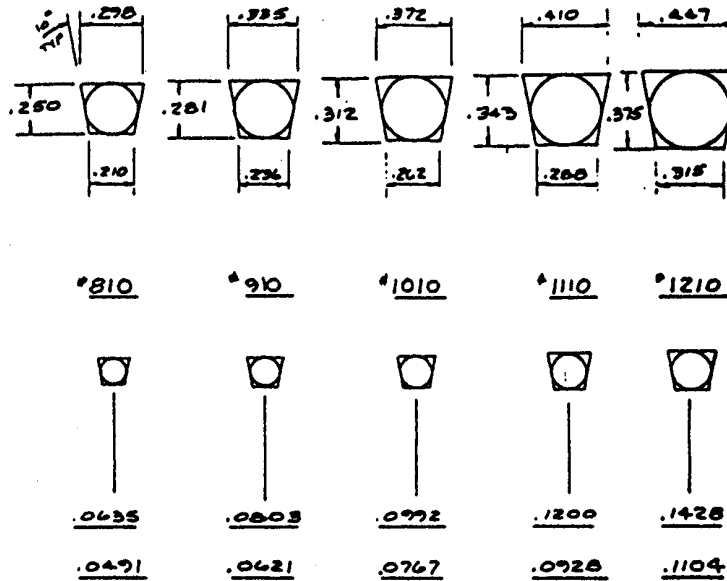
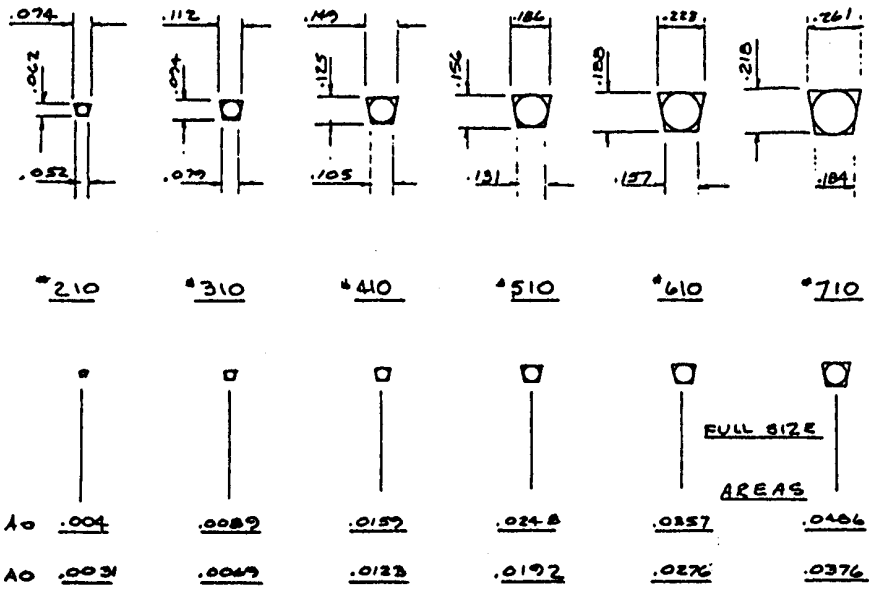
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Trapezoidal Runner

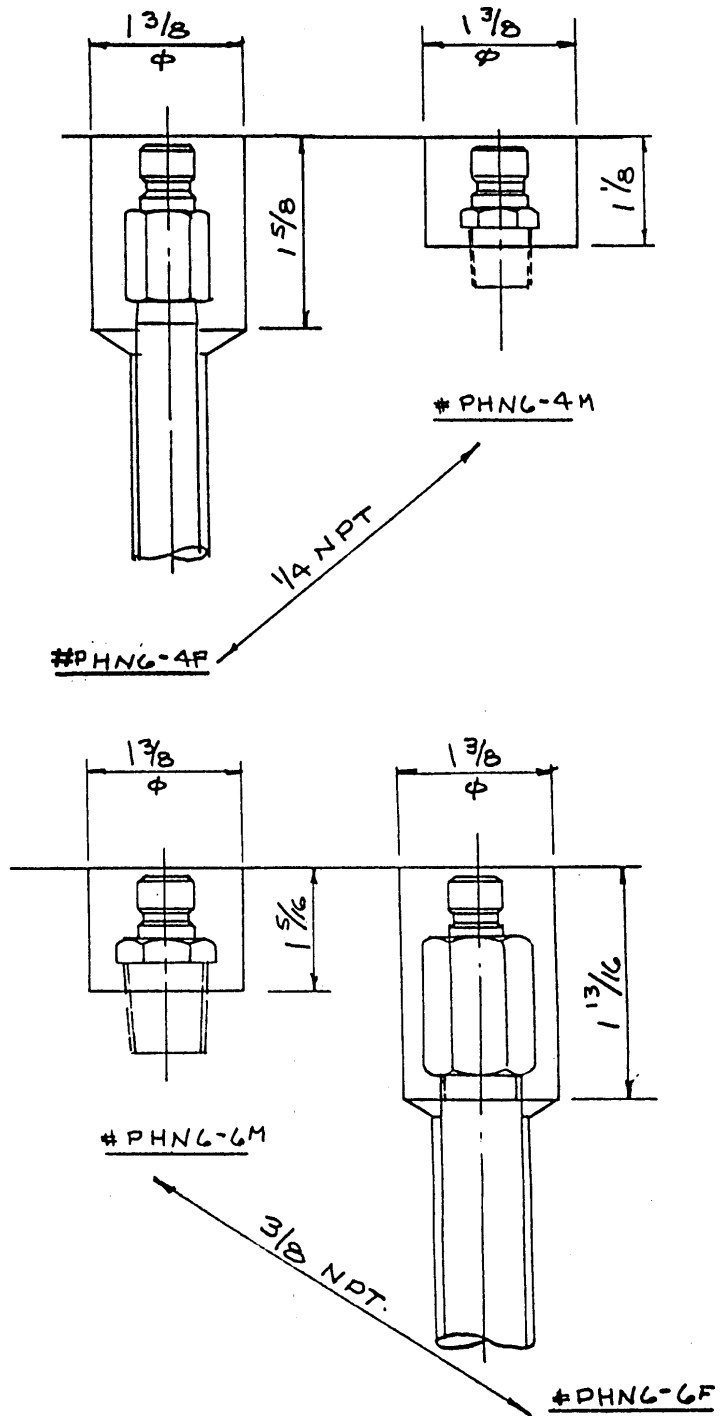


SIZE: #610 = $\frac{1}{32}\phi$ X10° FIRST DIGIT IN 32ND'S.

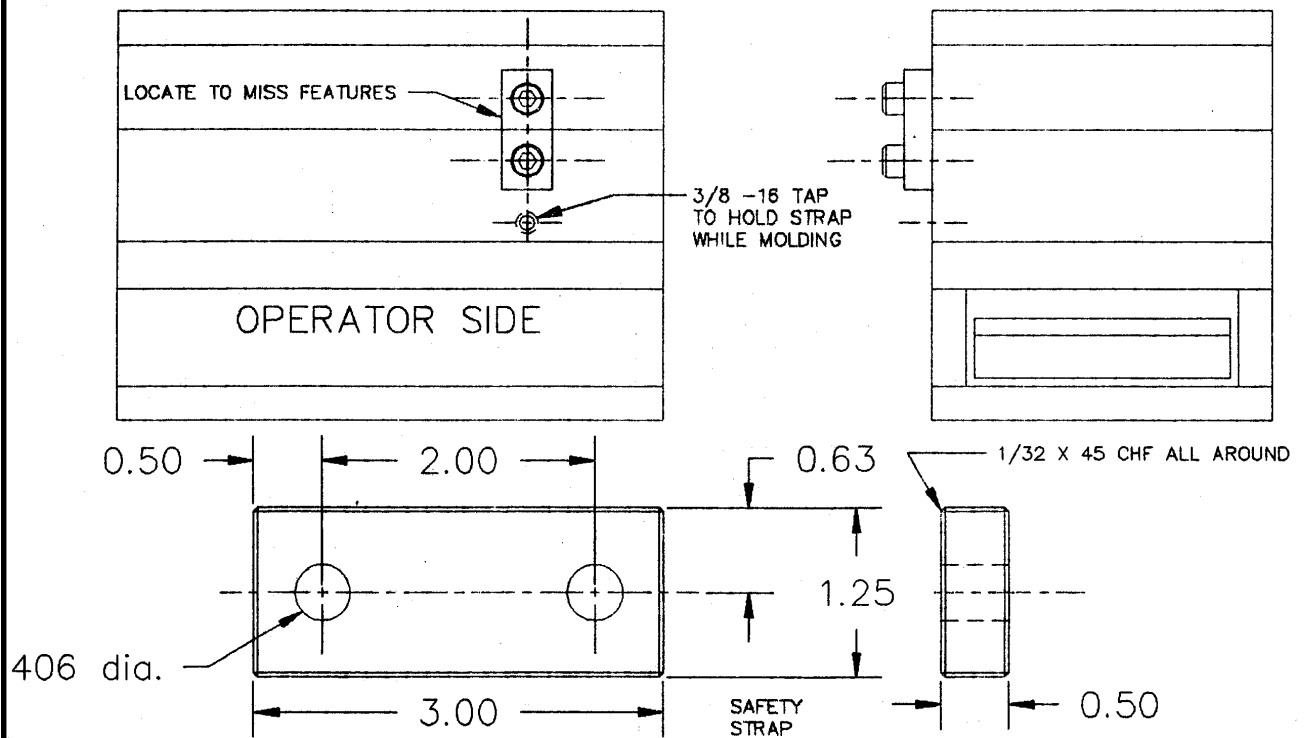
AT = AREA OF TRAPEZOID

AO = AREA OF CIRCLE

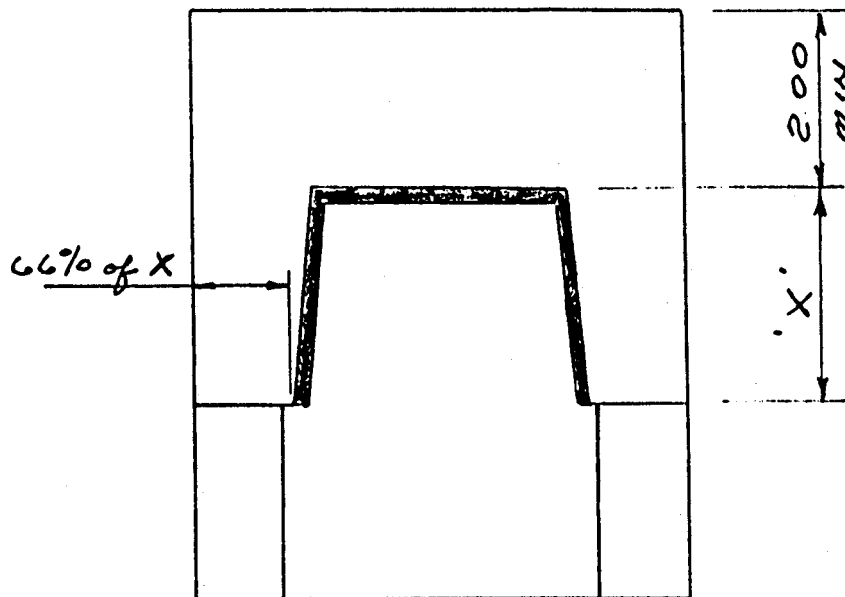
'Snap-Tite' Connectors



Mold Safety Strap



Rule of Thumb - Deep Draw Parts Formula for Figuring Mold Base



3 Plate Drop Design

