

**AGS TOOL #:**  
**DESCRIPTION:**  
**TOOL SHOP:**



SECTION I: PLAQUES			
Required		Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>1) <b>Mold identification plaque:</b> Mount on the operator side of the mold, screw into a pocket of sufficient length &amp; width to accept the plaque. The pocket is to be deep enough so that the plaque is recessed from the outer mold surface by a minimum 1/16 inch.</p> <p>1a) Tool Number provided by AGS:                      1b) Part Description provided by AGS:                      1c) Part Number provided by AGS:                      1d) Number of cavities provided by AGS:                      1e) Customer Name provided by AGS:                      1f) Stationary mold half weight in pounds provided by tool shop.                      1g) Moving mold half weight in pounds provided by tool shop.                      1h) Total mold weight in pounds provided by tool shop.                      1i) Length of ejector stroke in inches provided by tool shop.                      1j) Mold manufacturer name provided by tool shop.                      1k) Mold manufacturer's job number provided by tool shop.                      1k) Other ID required</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>2) <b>Waterline plaques:</b> Mount non-operator side of the mold, screw into a pocket of sufficient length &amp; width to accept the plaque. The pocket is to be deep enough so that the plaque is recessed from the outer mold surface by a minimum 1/16 inch.</p> <p>2a) On the non-operator core side, a drawing of the core block viewed from the parting line surface with the location and I.D. of each cooling circuit.                      2b) On the non-operator cavity side, a drawing of the cavity block viewed from the parting line surface with the location and I.D. of each cooling circuit.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>3) <b>Hot Runner plaque:</b> Mount on the stationary-operator side of the mold, screw it to a pocket of sufficient length and width to accept the plaque(s). The pocket is to be deep enough so that the plaque is recessed from the outer mold surface by a minimum 1/16 inch.</p> <p>3a) A drawing from the parting line showing and identifying each location of the hot drops and manifold section(s).                      3b) A wiring plaque describing the size and location of the heaters and thermocouples to the components of the system and a listing of the heater by size, wattage, and manufacturer description. This plaque is to include how the heaters and thermocouples are wired to their appropriate receptacles.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>

SECTION II: CIRCUIT AND MOLD PLATE IDENTIFICATION			
Required	All stampings are to be a minimum 0.005" deep and use letters/numbers that are large enough to be readable from arms length.	Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>1) <b>Waterline circuits:</b>                      1a) Each waterline connection is to be identified with a number on each end of the "IN" or "OUT" circuit (eg. "IN1", "OUT1", "IN2", "OUT2").</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>2) <b>Hydraulic circuits:</b>                      2a) Each hydraulic connection is to be identified with a number on each end of the "SET" or "PULL" circuit (eg. "SET1", "PULL1", "SET2", "PULL2").</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>3) <b>Other circuits:</b>                      3a) Other connections are to be identified with their purpose and a number on each end of their corresponding circuit (eg. "AIR IN1", "AIR OUT1", "GAS IN1", "GAS OUT1").</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>4) <b>Mold plates:</b>                      4a) Each plate must be numbered as defined by the final mold design drawing. Each plate must also have "0" stamped in a upper top corner as the mold is hung in the press.                      4b) "TOP" must be stamped on the mold.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>

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**SECTION III: SAFETY STRAPS**

<b>Required</b>		<b>Completed By</b> 0	<b>Approved By</b> AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>1) Safety straps:</p> <p>1a) Two (2) safety straps made from C.R.S (cold roll steel). One safety strap should be located on the top closest to the operator side and the second strap should be located on the non-operator side closest to the bottom as the mold is hung in the press. Reference Appendix A.</p> <p>1b) The bottom non-operator strap must be recessed in the mold base. The top operator strap should not be recessed. Both straps shall be permanently affixed to the stationary half of the mold by two standard socket head cap screws, screwed in to the mold base or plate leaving a minimum of .030" clearance so the safety strap can slide freely. A hole on the moveable half of the mold shall be drilled and tapped to accept a socket head screw that will hold the sliding safety strap in place. Reference Appendix A.</p> <p>1b) The thickness of the strap shall be compatible with the mold weight.</p> <p>1c) The width of the strap shall be a minimum of three times the clearance holes drilled for the two bolts that shall hold the strap in place. Reference Appendix A.</p> <p>1e) The safety straps shall be stamped or engraved with the AGS tool number and painted with bright yellow enamel paint. Reference Appendix A.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p style="text-align: center;">initials</p>  <p>_____</p> <p style="text-align: center;">date</p>

**SECTION IV: MOLD HANDLING**

<b>Required</b>		<b>Completed By</b> 0	<b>Approved By</b> AGS																												
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>1) Mold lift eye bolt hole and plate handling holes:</p> <p>1a) Mold lift eye bolt hole must be located on top of the mold at its center of gravity to ensure the entire mold lifts level. For all molds a 1-1/4" eye bolt hole (1-1/4-7 UNC) is required. If the center of gravity is located on the parting line, a bridge bar secured to one half of the mold must be used. Reference Appendix B.</p> <p>1b) Holes must be drilled and tapped to allow handling of each half of the mold and each individual mold plate.</p> <p>1c) The locations of the holes are to be placed with respect to the balance point of the plates or mold half.</p> <p>1d) Mold handling holes must be drilled and tapped per the table below:</p> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width:25%;">WEIGHT TO BE LIFTED</th> <th colspan="3" style="text-align: center;">TOP, BOTTOM, AND SIDES</th> </tr> <tr> <th style="text-align: center;">POUNDS</th> <th style="text-align: center;">MINIMUM THREAD SIZE (UNC)</th> <th style="text-align: center;">MINIMUM NUMBER OF HOLES</th> <th style="text-align: center;">MINIMUM THREAD DEPTH OF HOLES</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0-500</td> <td style="text-align: center;">1/2-13</td> <td style="text-align: center;">1</td> <td style="text-align: center;">3/4"</td> </tr> <tr> <td style="text-align: center;">500-2,000</td> <td style="text-align: center;">3/4-10</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1-1/8"</td> </tr> <tr> <td style="text-align: center;">2,000-4,000</td> <td style="text-align: center;">1-8</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1-1/2"</td> </tr> <tr> <td style="text-align: center;">4,000-8,000</td> <td style="text-align: center;">1-8</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1-1/2"</td> </tr> <tr> <td style="text-align: center;">8,000-12,000</td> <td style="text-align: center;">1-1/2-6</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2-1/4"</td> </tr> </tbody> </table>	WEIGHT TO BE LIFTED	TOP, BOTTOM, AND SIDES			POUNDS	MINIMUM THREAD SIZE (UNC)	MINIMUM NUMBER OF HOLES	MINIMUM THREAD DEPTH OF HOLES	0-500	1/2-13	1	3/4"	500-2,000	3/4-10	1	1-1/8"	2,000-4,000	1-8	1	1-1/2"	4,000-8,000	1-8	1	1-1/2"	8,000-12,000	1-1/2-6	1	2-1/4"	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p style="text-align: center;">initials</p>  <p>_____</p> <p style="text-align: center;">date</p>
WEIGHT TO BE LIFTED	TOP, BOTTOM, AND SIDES																														
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0-500	1/2-13	1	3/4"																												
500-2,000	3/4-10	1	1-1/8"																												
2,000-4,000	1-8	1	1-1/2"																												
4,000-8,000	1-8	1	1-1/2"																												
8,000-12,000	1-1/2-6	1	2-1/4"																												



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**SECTION V: CONNECTIONS**

Required		Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>1) Mold water connections:</b></p> <p>1a) The mold shall be fitted with male Jiffy connectors with Teflon tape. Whenever possible use 300 series connectors.</p> <p>1b) Mold waterline connectors shall be mounted below the surface of the mold in a counter bored hole whose diameter is sufficient to allow the easy connection and disconnection of the mating female connector.</p> <p>1c) Waterlines on the top of the mold should be avoided whenever possible. If required, waterlines on top of mold are to be fitted with a drain groove connecting each countersunk waterline connector hole to allow for drainage of drips so that slight leakage will be directed away from the cavity surface.</p> <p>1d) To prevent tearing, O-ring pockets for waterlines must be the same outer diameter as the actual O-ring. Pocket depths must be 85% of the actual O-ring thickness. Reference Appendix C.</p> <p>1e) Each waterline circuit is to be tested for flow and to check for leaks.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>2) Water manifold connections:</b></p> <p>2a) Water manifolds will be attached to the non-operator sides of the mold.</p> <p>2b) The "TO MOLD" manifold will be plumbed with a AGS supplied female connector and the "FROM MOLD" manifold will be plumbed with a AGS supplied male connector.</p> <p>2c) AGS supplied connectors will be plumbed perpendicular to the top of the mold.</p> <p>2d) The water manifolds shall be fitted with male Jiffy connectors with Teflon tape. Whenever possible use 300 series connectors.</p> <p>2e) The mold will be plumbed to the manifolds with proper lengths of hoses and female Jiffy connectors. Whenever possible use 300 series connectors.</p> <p>2f) The water inlet/outlet area (in<sup>2</sup>) must be equal or greater than the combined area of all the corresponding inlet/outlet water ports. For example, a 1" manifold has an inlet area of 0.785 in<sup>2</sup>. Using the equal or greater area rule of thumb, up to seven 3/8" ports (0.11 in<sup>2</sup> per port) are available to service water lines to the mold.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>3) Hydraulic connections:</b></p> <p>3a) Each hydraulic circuit shall be plumbed with a female connector (Parker H3-63) to the set side of the circuit and male connector (Parker H3-62) to the pull side of the circuit.</p> <p>3b) Confirmation of the movement of the hydraulic circuit shall be done with adjustable end of stroke electronic switches (Parker P8S-GRFAX) on the hydraulic cylinder that confirms the full set and full pull position of the moving member.</p> <p><b>IMPORTANT: HYDRAULIC CYLINDERS MUST BE NON-MAGNETIC STAINLESS STEEL.</b></p> <p>3c) When core sequences are required, the correct sequencing valves shall be purchased and mounted on the tool.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>4) Electronic connections:</b></p> <p>4a) Core pull and set are 10 pin connectors. Female (Allied #3219 or equivalent) must be mounted on mold. Mating male (Allied #10.1920) and hood (Allied #10.0409 or equivalent). For core set use pins 1 and 2. For core pull use pins 5 and 6.</p> <p>4b) Electrical connection to the molding machine ejector confirmation, slide confirmation, or other moving mold confirmation features requiring a switch(es) will be NEMA #ML-2 style connected for a normally open switch using the black and white wires. White is common.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>

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**SECTION VI: OTHER MOLD FEATURES**

Required		Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>1) Interlock and die locks:</b> 1a) The mold shall be designed to interlock the cavity and core to prevent the cavities from shifting. 1b) The mold base shall also be fitted with parting line die locks of sufficient size and placed in locations where shifting of the cavities will be minimized. 1c) Interlocks and parting line locks must not be located where they may catch falling parts, runners, debris etc... Female parting line locks must be located on the same side of the mold from which the part is being ejected.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>2) Leader pins:</b> 2a) The mold shall be fitted with leader pins to obtain initial alignment during the mold closed phase of operation. The mold shall contain a minimum of four (4) leader pins. 2b) The leader pins shall be mounted in the corners of the mold. One leader pin shall be offset or of a different size to eliminate the possibility of mis-assembly of the two halves. 2c) The leader pin shall be of sufficient diameter to allow the mold half with the leader pins to be placed in a manner where the mold is standing on the leader pins, without damage or distortion. 2d) All leader pin bushings are to be made of solid bronze to minimize galling and excess wear on the leader pins. <b>NO STEEL BUSHINGS.</b> 2e) All leader pin bushings are to have an opening to the outside of the mold so that the bushing cannot fill with material. The opening must be the same diameter as the leader pin bushing with a minimum 1/2" clearance. Reference Appendix D.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>3) Springs:</b> 3a) Springs shall be installed in the ejector plate system to return the plate. 3b) All springs shall be pocketed and have a mechanical stop so that is cannot be over compressed. 3c) The mold is to be designed so that the spring has some preload and a maximum compression no more than 30%.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>4) Slides:</b> 4a) All slides shall be spring loaded with positive hold backs (detents) to avoid the mechanism from accidentally moving forward, to keep the slide held in position to accept the mating horn pin, and to prevent the slide from being out of position if it is mounted vertically in the mold. 4b) All slide action mechanisms must incorporate wear plates fitted with grease groves, lubrication lines, and/or grease fittings on the outside of the mold.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>5) Stop Buttons:</b> 5a) The ejector plate shall be fitted with positive stop buttons. 5b) Use larger diameter taper lock plates (progressive Components TLP75 or equivalent) in place of standard stop buttons.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date
<input type="checkbox"/> Yes <input type="checkbox"/> No	<b>6) Wear plates:</b> 6a) All areas prone to wear are to have easily replaceable wear plates fitted with grease groves, lubrication lines, and/or grease fittings on the outside of the mold. 6b) Wear plates shall be made of bronze alloy material or hardened plates that will minimize galling.	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ initials  _____ date

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**SECTION VI: OTHER MOLD FEATURES**

Required		Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>7) Ejector pins and ejector system:</p> <p>7a) All ejector pins, stripper plates, rings, and blades shall be hardened or nitrited.</p> <p>7b) All ejectors must be flush to 0.002" below the mold surface to make sure parts do not stick to ejectors.</p> <p>7c) Ejectors should be located on the lowest possible position on the part so they will not catch the part as it is being ejected (Z-axis). Distances between ejectors should not be larger than the plastic part after it shrinks.</p> <p>7d) Guided ejector plate pins are to be located securely at both ends. Guided ejector pin bushings must be made from bronze. <b>NO STEEL BUSHINGS.</b></p> <p>7e) Return pins are to be drilled and tapped 1/4-20 UNC. Reference Appendix E.</p> <p>7f) A clear, plastic shield must be mounted on top of the ejector box rails to help keep dust and debris out. Plastic shield must be impact resistant with clearance above the ejector plate and cover ejector box opening on all four sides by at least 1/2". Reference Appendix F.</p> <p>7g) An ejector confirmation switch is required when knock out pins are located under slides and mold damage can occur if the ejector plate is not fully retracted. When required, the ejector confirmation switch must be a plunger style mechanical limit switch adjustable from the outside of the mold and is to be mounted on the non-operator side of mold closer to the top. Reference Appendix G.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>8) Knock out pads:</p> <p>8a) Pads are to be bolted on the ejector plate to accept the knock out rods and must be securely mounted to the ejector system. Use Progressive Components PKO-Puck Series (PKP) or equivalent. <b>DO NOT USE HEX TYPE.</b> Reference Appendix H.</p> <p>8b) These pads are to be 1/8" from the platen. Pads will be recessed inside the clamp plate to accept the knock out rods. Reference Appendix H.</p> <p>8c) These pads are to have a 5/8"-11 NC threaded hole a minimum of 15/16" deep. Appendix</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>9) Vents:</p> <p>9a) All cavities shall have vents of a depth and land width (appropriate to the material without flashing) flowing to a .100" wide by .025" deep channel.</p> <p>9b) Vents shall mate with a secondary channel of approximately the same size and dimensions that will vent to the parting line edge to atmosphere.</p> <p>9d) Vent locations shall be determined by computer simulation or experienced personnel and must be approved by AGS.</p> <p>9e) <b>NO VENTS ON RUNNERS</b> unless approved by AGS.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>10) Mold edges:</p> <p>10a) The mold's outside edges shall be filed or radiused to be free of sharp edges on all sides by use of a 45° X 1/16" chamfer or 1/8" radius.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>11) Conventional runner and gates:</p> <p>11a) The runner shall be full round, each half in each side of mold with sharp edges at parting</p> <p>11b) Maximum allowable runner mismatch shall be .002".</p> <p>11c) Use "S" runner designs whenever possible. All runners are to have cold slug wells. All turns in runner must have a generous radius. Multiple runners must be engraved with unique marking for post mold identification. Reference Appendix I.</p> <p>11d) Runner sprue slug must not be excessive. AGS requires a round sprue puller with 5 degree undercut. Reference Appendix I.</p> <p>11e) The runner shall be balanced as to size or cavity pressure through computer simulation or experienced personnel and must be approved by AGS.</p> <p>11f) The default gate geometry shall be a submarine gate unless specifically authorized to be different by AGS. AGS prefers full round sub-gate diameters (ie. no "D" sub-gates). Ejector pins for sub-gate design must be "cone pointer keeper pin" type. Reference Appendix J.</p> <p>11g) If an edge gate is specified by AGS, land must not exceed 0.020".</p> <p>11h) The gate location shall be determined to optimize cavity fill either by computer simulation or experienced personnel and must be approved by AGS.</p> <p>11i) High volume tools, where erosion or excess wear on the runner and gate system is anticipated shall use runner plates and gate inserts in preference to cutting the runner and gate in to the parent mold steel. Runner plates shall be made of hardened steel. Gate inserts shall also be made of hardened steel unless the abrasive nature of the material requires the use of machineable ceramic.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>

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**SECTION VI: OTHER MOLD FEATURES**

Required		Completed By 0	Approved By AGS
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>12) Hot runners:</b>            12a) The manifold plate is to be slotted for easy removal of the manifold without having to remove the wiring.            12b) Manifolds are to have insulation around the heated members of the mold to minimize heat transfer to the cooled tool plates.            12c) Mold Power Input Connector for multiple drop hot runner must be DME #PIC-12-G or equivalent.            12d) Mold Thermocouple Connector for multiple drop hot runner must be DME #MTC-12-G or equivalent.            12e) Mold Power Input and Thermocouple Connector for single zone hot runner must be DME #CKPTIC1 or equivalent.            12f) Hot runner molds must be designed to have the ability to pull apart and re-assemble the hot runner plate while the mold is in the press. Reference Appendix K.            12g) Safety straps to pull and reassemble the hot runner plate while the mold is in the press are also to be built per Section III of the AGS Tooling Standard.            12h) Gate vestige for hot runners recessed into the part must not exceed dimple height.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>13) Clamp slots:</b>            13a) Clamp slot plate should be 1-3/8" thick with clamp slots located along the entire operator and non-operator side of the mold.            13b) Clamp slots to fit within platen hole mounting pattern with standard clamps and optimized to hold mold safely onto platen. Reference Appendix L.            13c) Clamp slot depth must be minimum 5/8" for to ensure proper clamp toe engagement.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>14) Pry slots:</b>            14a) All plates shall have pry slots in all four corners to open the mold and allow easy separation during maintenance. Minimum 1" long by 1/4" wide. Reference Appendix M.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>15) Sprue bushing:</b>            15a) The sprue bushing must be bolted to prevent rotation with at least one 10-32 screw. Where required the sprue bushing should be keyed to assure proper alignment with the gate            15b) The sprue bushing radius must be 1/2" (0.500") unless otherwise specified by AGS.            15c) The sprue bushing orifice diameter must be approved by AGS.            15d) <b>SPRUE BUSHING MUST BE FLUSH WITH CLAMP PLATE.</b></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>16) Shot Counter:</b>            16a) Shot counter (Progressive #CVPL-B), non-resettable <b>MECHANICAL</b>, 7 digit counter must be parting line mounted and located on operator side moveable half of the mold.  <b>DO NOT MOUNT SHOT COUNTER UPSIDE DOWN.</b></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>
<input type="checkbox"/> Yes <input type="checkbox"/> No	<p><b>17) Mold design drawings and math models:</b>            16a) A copy of the 2D final mold design (including any engineering changes) must be provided in both paper and electronic versions. 2D electronic mold designs must be provided in both PDF and STP format. <b>HOT RUNNER MOLDS MUST INCLUDE 2D HOT RUNNER DESIGN.</b>            16b) A copy of the 3D final mold design (including any engineering changes) must be provided in STP format. <b>HOT RUNNER MOLDS MUST INCLUDE 3D HOT RUNNER DESIGN.</b>            16c) The design must be complete for the full construction of the mold. The mold design must include an overlay of the mold using the primary designated injection molding machine with corresponding tie bar spacing, platen spacing, clamping holes, and ejector pattern.            16d) The bill of materials (BOM) must be included in the mold design drawing that specifies material description, material order number, amount required, supplier name, supplier address, and drawing notation for the location(s) of the material. EXCEL and DWG files are acceptable            16e) The design and BOM must identify recommended maintenance and a spare parts list required to assure precision, accuracy, and readiness through the life of the mold.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>_____</p> <p>initials</p> <p>_____</p> <p>date</p>

## SECTION VII: MISCELLANEOUS DESIGN AND CONSTRUCTION NOTES

**Steel:** Double draw when hardening and stamp hardness (eg. 48) and stamp type (eg. H-13) on all tool steels. All steel must be demagnetized prior to delivery to AGS.

**Use of Shims:** No shims shall be used in tool construction, maintenance, or repair unless specifically authorized by AGS.

**Blind Pockets:** All blind pockets shall have .030" minimum radius on all wall intersections unless otherwise stated in the part drawing.

**Inserts:** Jack screws must not use the same hole as the holding screw for the insert.

**Lube:** Proper surfaces must be lubed.

**Mold Base:** Tubular dowels must be used.

**Standoffs:** The mold shall be fitted with standoffs, rails, or similar protective mechanisms that allow the mold half or entire mold to be placed down on its bottom surface without damage to the external hydraulic cylinders, limit switches, sensing pins, or other protrusions that exceed beyond the bottom of the mold base. Standoffs are to be placed in such a manner so that the mold or mold half will not tip

**Hydraulic Cylinders:** Hydraulic cylinder connecting rod flats to be of a nominal size and width to allow a standard wrench fit.

**Welding:** All welding shall be approved by AGS before it is done. Welding is to be done to avoid brittle or unstable welds.

**Ribs and Corners:** Ribs to have maximum draft and corners to have maximum radii allowed by final math data/drawing.

**Part Number Identification:** When multi cavity tooling is built, each cavity must have a unique identification on the cavity surface so that it is molded in to the part. The size and location of the identification will be specified by AGS during final mold design review.

**Confirmation Safety Switches:** Some molds have slides, pins, blades, sleeves, or stripper rings placed in front of hydraulic mechanisms such as, but not limited to, side cores. If the mold has mechanisms that can inadvertently actuate the hydraulic mechanisms and cause damage to other components, the mechanism shall have some confirming safety mechanism (such as ejector confirmation switch) to assure no interference or damage can occur in normal operation. If the mold has slides that will be damaged by the premature action of the ejector plate the mold shall be fitted with a plaque on the side of the ejector plate stating "Damage will occur if ejectors are moved forward before mold is fully open". Reference Appendix G.

**Cavity Finish:** Unless otherwise specified, the cavity will be finished with an SPI # A3 finish with final polishing to be in the line of draw. The core shall be finished to an SPI # B3 finish with the final polishing being done at 90° to the line of draw. Polishing standards and samples are available through SPE/SPI.

**Texture Finish:** If the part is to have a textured finish, the cost of texturing shall be quoted separately from the construction of the tool. It is recognized that the aesthetics of texturing is highly judgmental. Because of this, the tooling source can only be held liable for the accuracy of the placement and depth of the texture, not the final 'look' of the textured part. Wherever possible the texture is to be specified from a test plaque supplied by the texturing source.

A section of the cavity steel is to be sent to the texturing facility for a test texture to assure the texturing will be sufficient for the need of AGS before the cavity is constructed. This sample, or an impression of it shall be sent to AGS for approval before texturing is initiated. It is recognized that some cavity materials do not lend themselves to etching or etch unevenly. If the test sample shows a problem in even texturing, the cavity material should be immediately replaced before cavity construction occurs. The replacement metal should be re-tested until its acceptability for texturing has been demonstrated.

### SPECIFIC DESIGN REQUIREMENTS/RESPONSIBILITIES

**Part Shrinkage:** Parts shrinkage is to be determined by AGS and specified on the mold design. It is understood that the part may not shrink in accordance with the material suppliers' recommendation due to mold construction, mold design, and processing. It is the responsibility of the tooling builder to execute the build of the mold in compliance to the shrinkage specifications of the design that have been supplied by AGS.

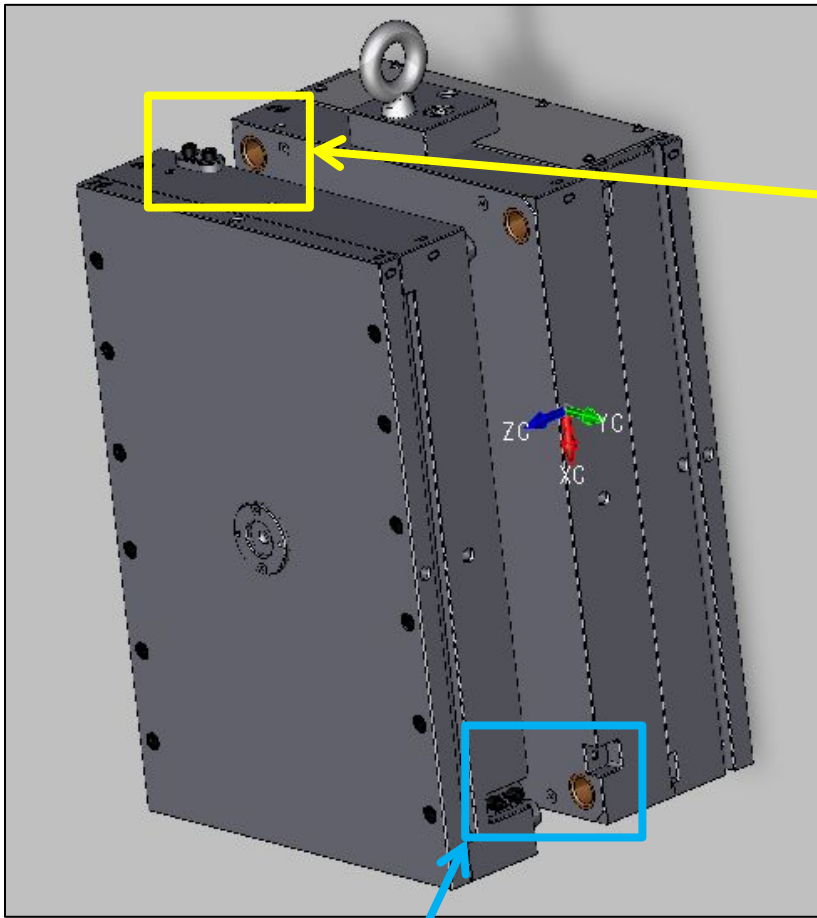
**Preliminary Mold Design Approval:** A preliminary mold design consisting of a plan view and assembly view of both core and cavity must be submitted for before the design is detailed. Steel for all plates cannot be ordered until the preliminary design has been approved by AGS.

**Final Mold Design Approval:** Final mold design must be complete enough for the full construction of the mold. AGS must approve the final mold design before final construction can be commenced. Rough machining of the pockets, squaring of the plates, and preliminary handling holes can be machined before final design completion. Any additional construction steps must be authorized by AGS without final mold design approval.

### NON-COMPLIANCE/DEVIATIONS

It is understood that certain designs may not lend themselves to compliance to these or other design/construction specifications. AGS must be notified in writing for the reasons for non-compliance. AGS must provide the affected parts with written approval for deviation from AGS requirements. Failure to comply with this section can result in legal action.

**APPENDIX A: SAFETY STRAP LOCATIONS AND DETAILS**



TOP OPERATOR SIDE SAFETY STRAP  
Do not recess.

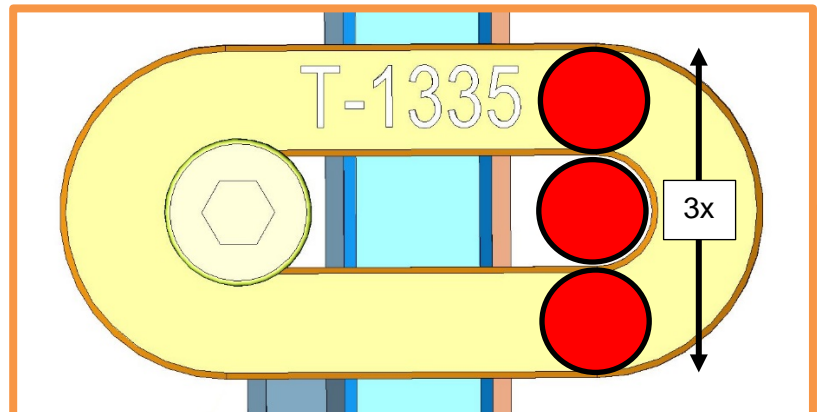
Two safety straps are required on the mold:

- One safety strap on the top operator side of the mold.
- Second safety strap on the bottom non-operator side of the mold. This strap must be recessed into the mold base to prevent damage during set-up mount and dismount.



BOTTOM NON-OPERATOR SIDE SAFETY STRAP  
Strap must be recessed to avoid hitting tie bar.

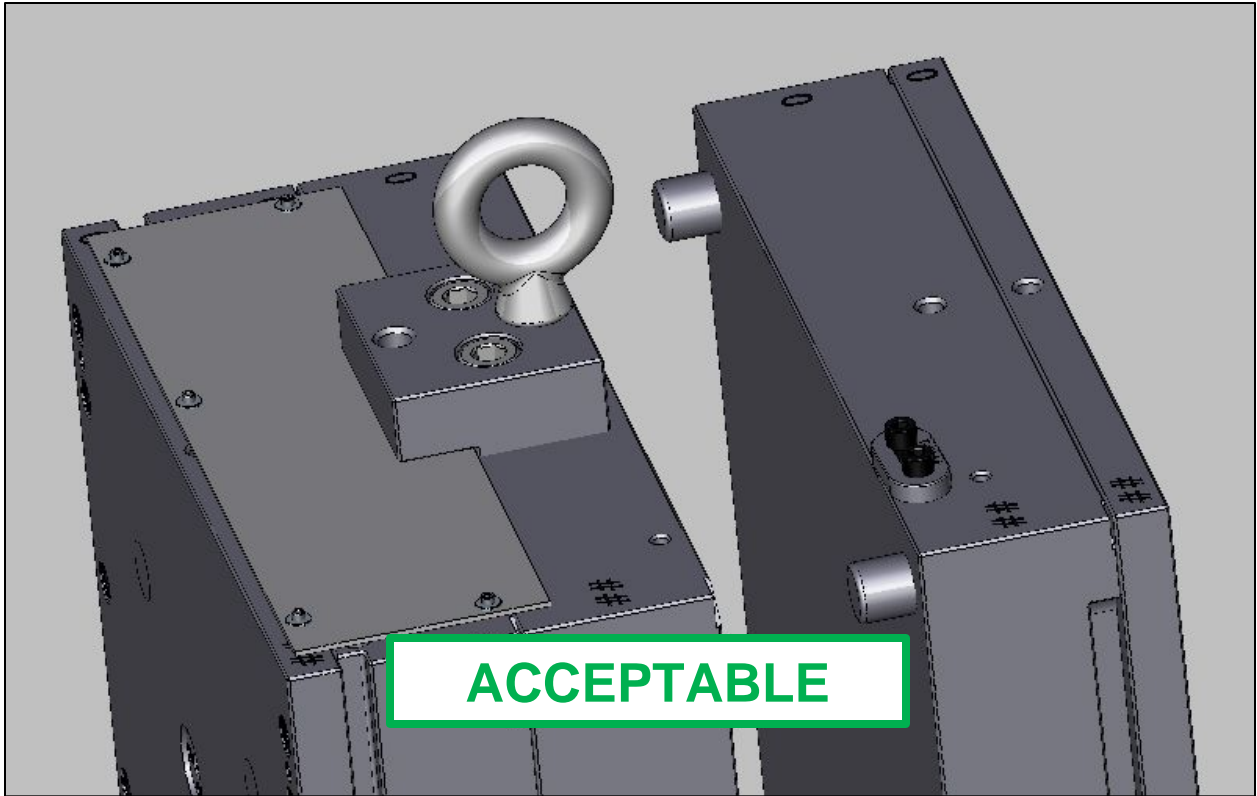
When mold is in use, both safety straps must be secured on stationary side of the mold with two socket head cap screws. When mold is not in use a hole on the moveable and stationary side will hold the sliding safety strap in place to prevent the mold from opening.



All safety straps must be painted yellow and engraved or stamped with AGS tool number (T-XXXX).

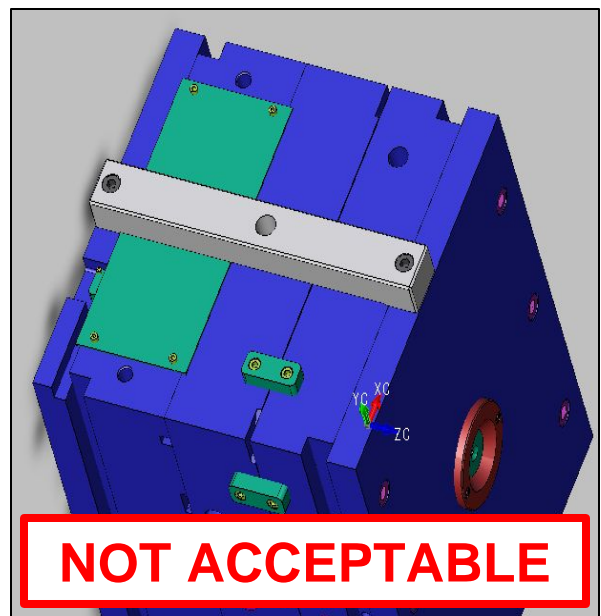
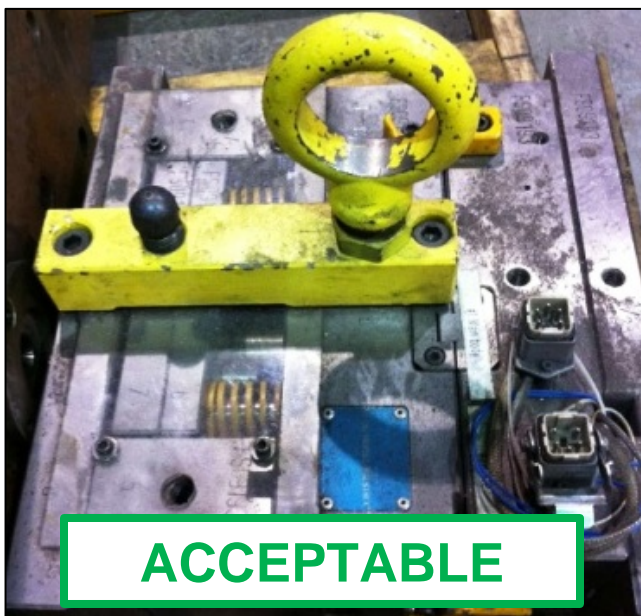
The width of the safety strap shall be a minimum three times (3x) the diameter of the holes drilled for the bolts that hold the strap in place.

## APPENDIX B: BRIDGE BAR



Mold lift eye bolt must be located on top of the mold at its center of gravity. If the center of gravity is located on or too close to the parting line a bridge bar secured to one half of the mold must be used. This eliminates the need for the set-up person to take the bridge bar on and off the mold.

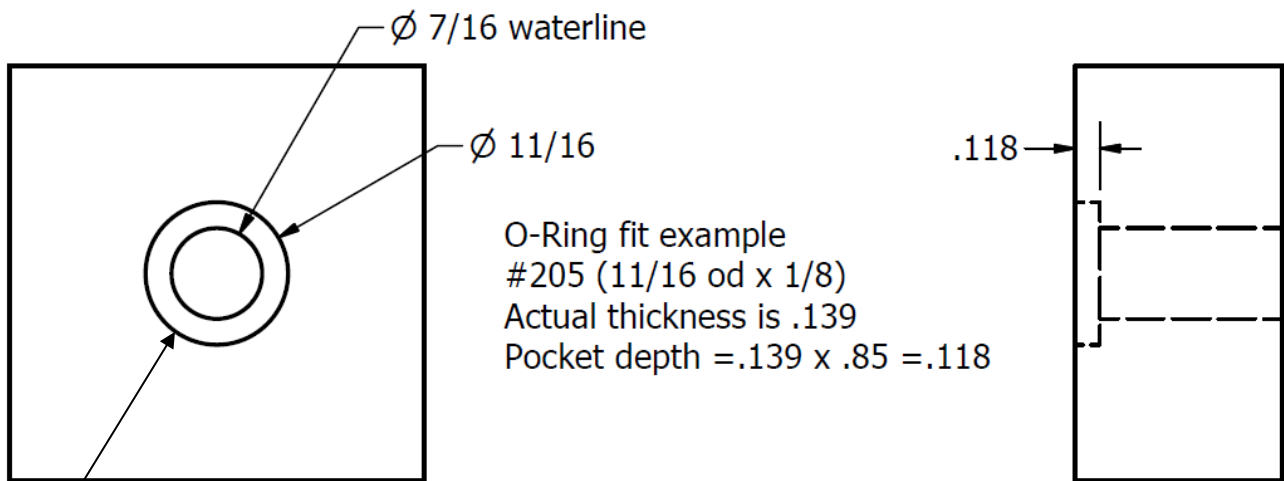
***DO NOT MOUNT AND SECURE BRIDGE BAR TO BOTH HALVES OF THE MOLD!***



## APPENDIX C: O-RING POCKETS FOR WATERLINES

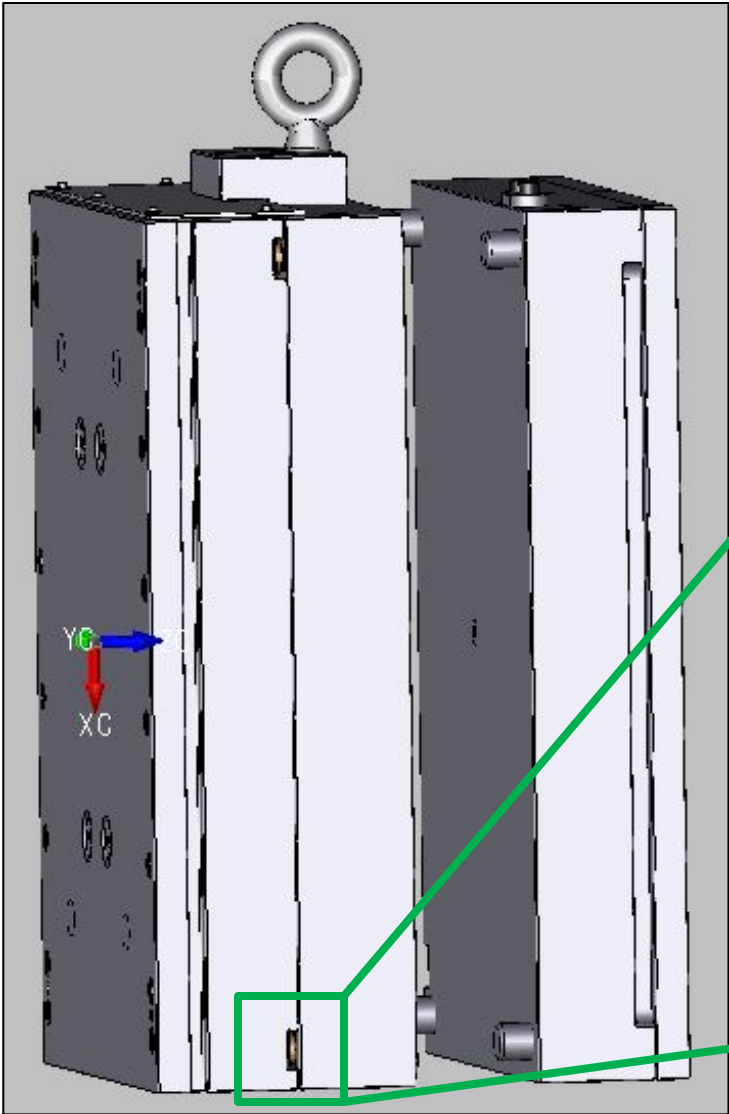
To prevent tearing, O-ring pockets for waterlines must be the same outer diameter as the actual O-ring. Pocket depths must be 85% of the actual O-ring thickness.

### O-RING EXAMPLE FOR ILLUSTRATION PURPOSES ONLY

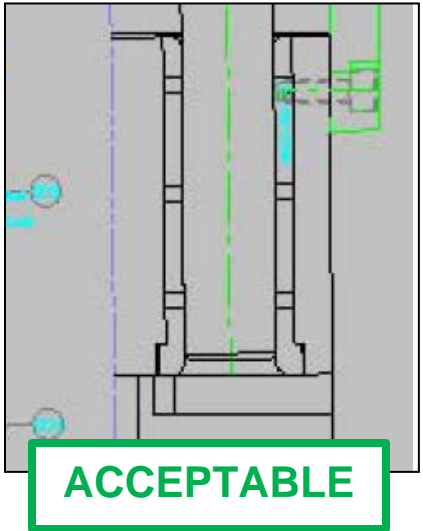
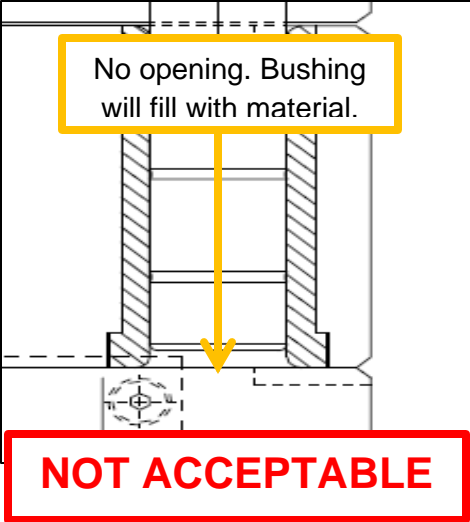
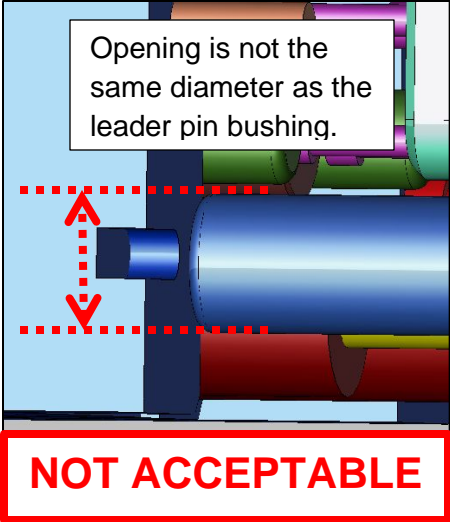
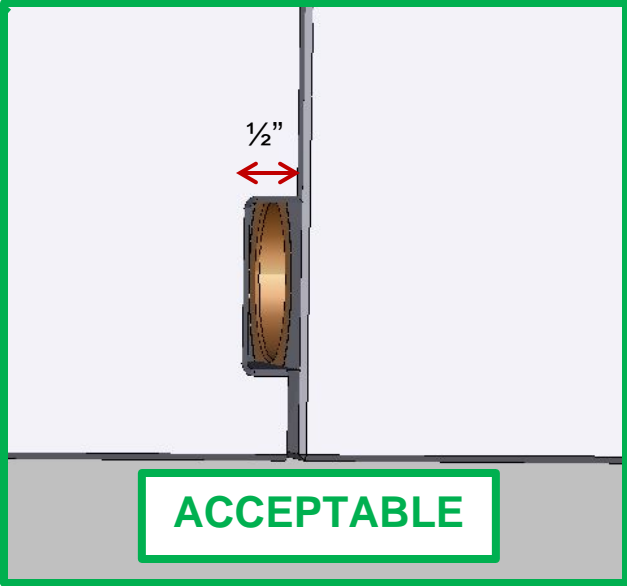


\* Outer pocket diameter must equal nominal O-Ring diameter

**APPENDIX D: LEADER PIN OPENINGS**

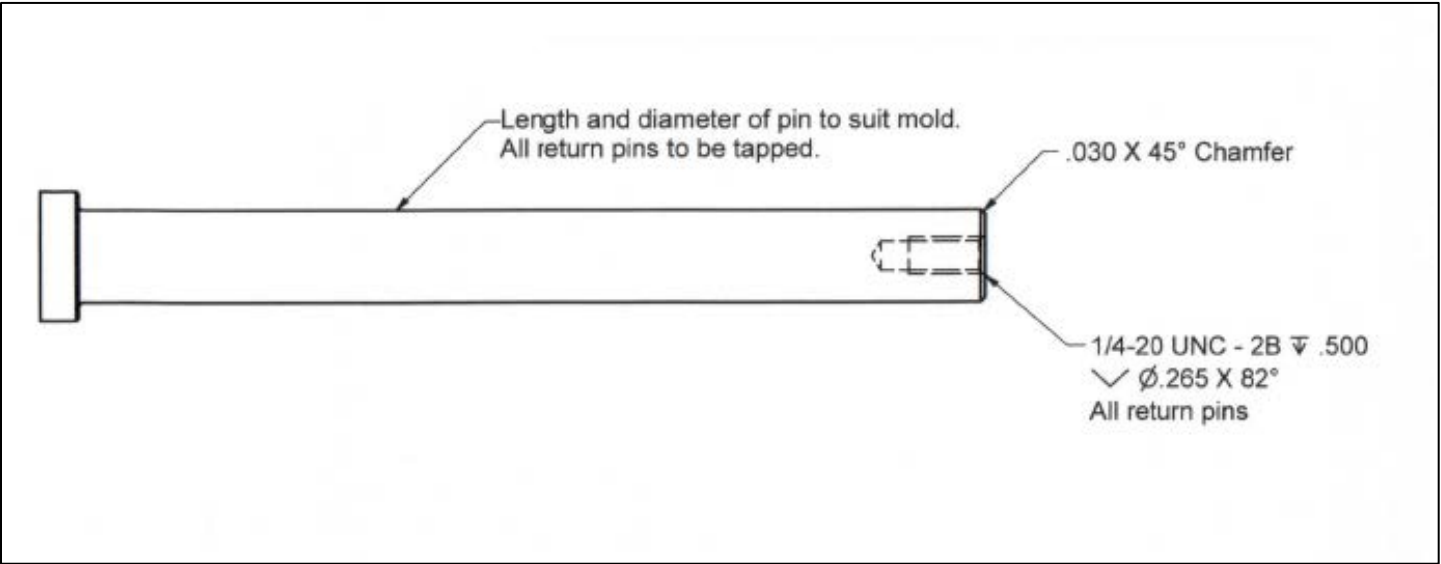
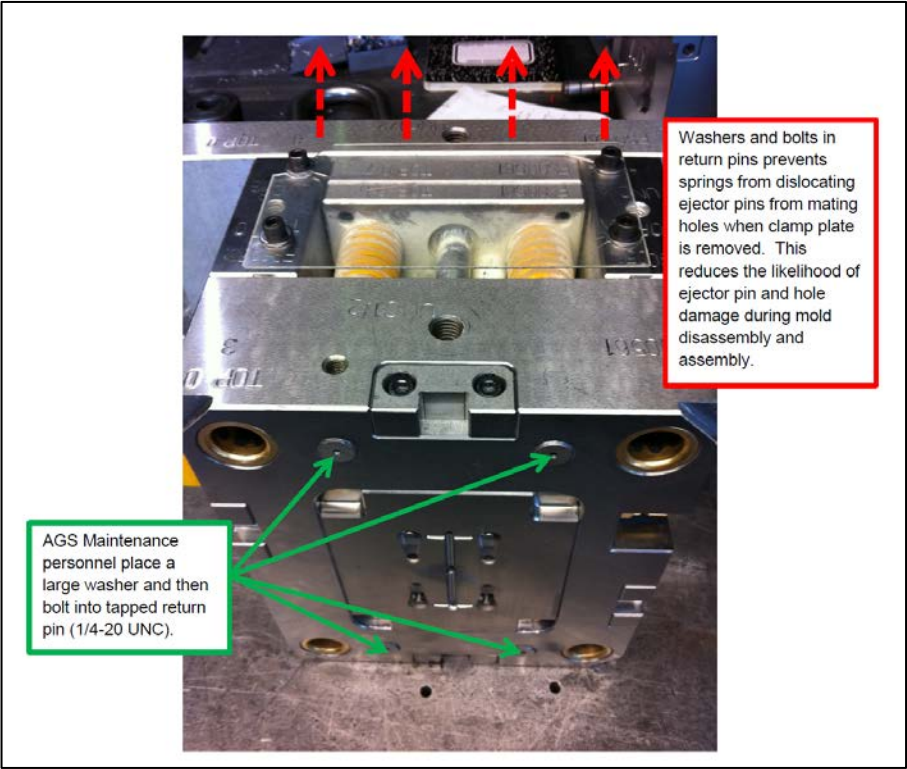
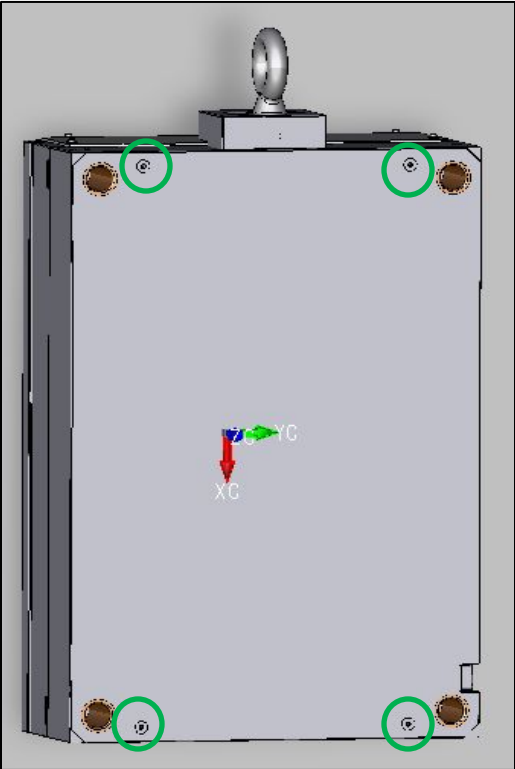


All leader pin bushings are to have an opening to the outside of the mold so that the bushing cannot fill with material. The opening must be the same diameter as the leader pin bushing with a minimum 1/2" clearance.

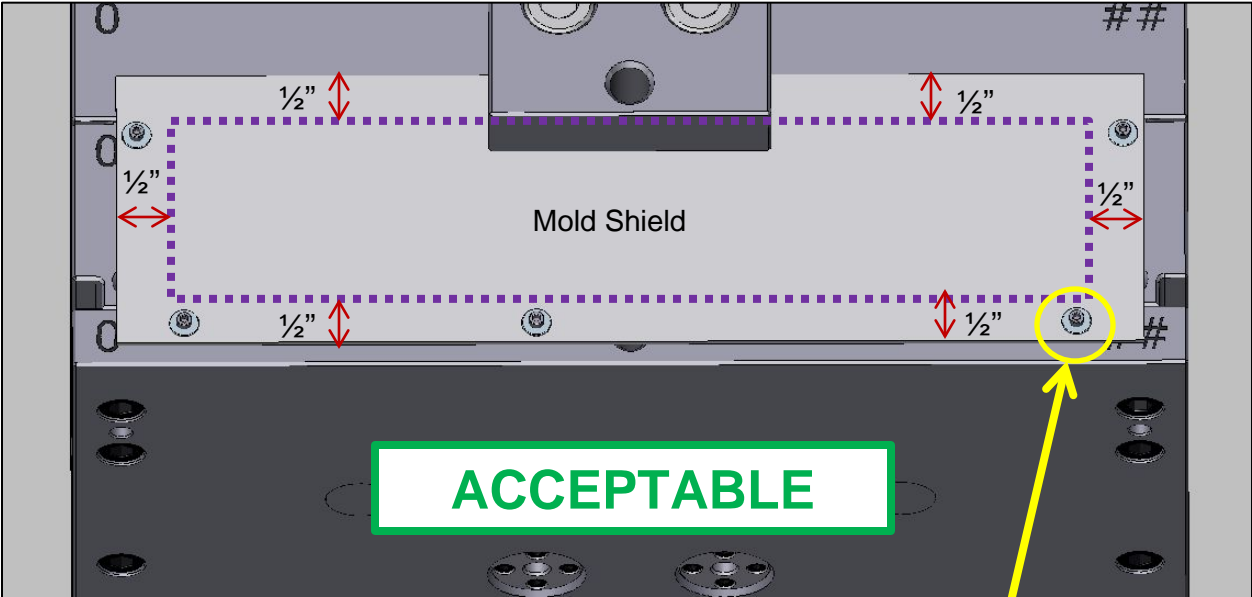


### APPENDIX E: RETURN PINS DRILLED AND TAPPED

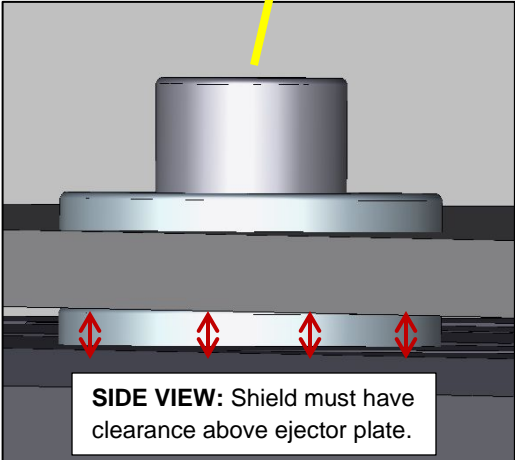
Return pins are to be drilled and tapped 1/4-20 UNC.



APPENDIX F: MOLD SHIELD



A clear, plastic shield must be mounted on top of the ejector box rails to help keep dust and debris out. Plastic shield must be impact resistant with clearance above the ejector plate and cover the ejector box opening on all four sides by at least 1/2".



## APPENDIX G: CONFIRMATION SAFETY SWITCHES



**AGS Preferred Mechanical Limit Switch Design  
Automation Direct AEM2G1101Z11-3R  
(Or Equivalent)**

### Automation Direct AEM2G1101Z11-3R or Equivalent

**Ejector Confirmation Safety Switches:** Mechanical limit switch is required when knock out pins are located under slides and mold damage can occur if the ejector plate is not fully retracted. Ejector confirmation switch must be adjustable from the outside of the mold and is to be mounted on the non-operator side of mold closer to top of mold.

**Other Confirmation Safety Switches:** Some molds have slides, pins, blades, sleeves, or stripper rings placed in front of mechanisms that can be damaged if the mechanism is inadvertently actuated. The mechanism shall have a confirming mechanical limit switch to assure no interference or damage can occur in normal operation.

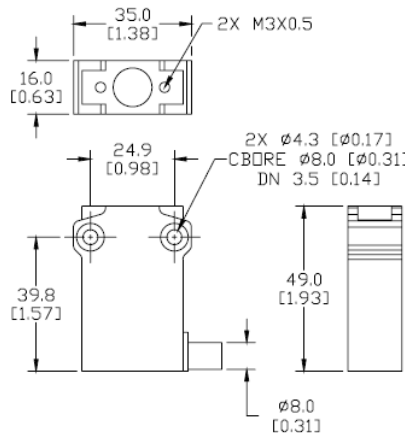
### AEM2G Series Compact Limit Switches Selection Chart

Part Number	Price	Actuator Type	Max. Actuation Speed (m/s)	Min. Actuation Force (N)/ Torque (Nm)	Min. Positive Opening Force (N)/ Torque (Nm)	Head Dimensions	Contact Config. Diagram	Connection Type	Photo
AEM2G1101Z11-3R	\$25.00	metal plunger	0.5	15	30	Figure 1	Diagram 1	Cable Out (Right)	A

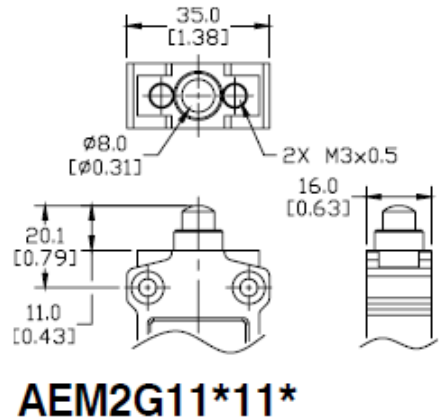
A



**AEM2Gxxx-3R  
Cable Out (Right)**



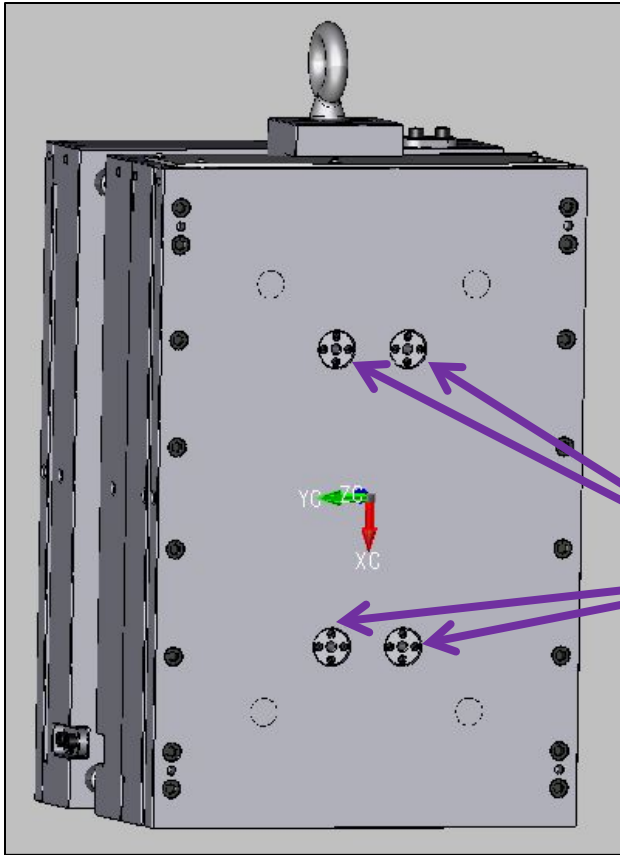
**Figure 1**



### Compact Limit Switches Cross Reference

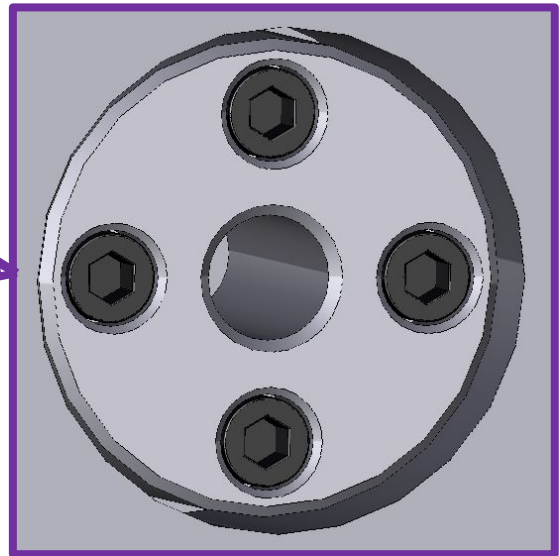
ADC	Allen-Bradley	Honeywell	Eaton Cutler-Hammer	Omron
AEM2G11Z11-3	802B-CSABXSXC3	914CE1-3	E47BCC05	D4C-1601

## APPENDIX H: KNOCK OUT PADS

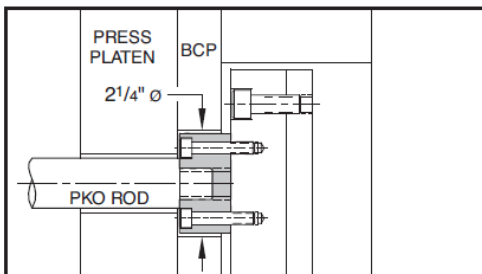
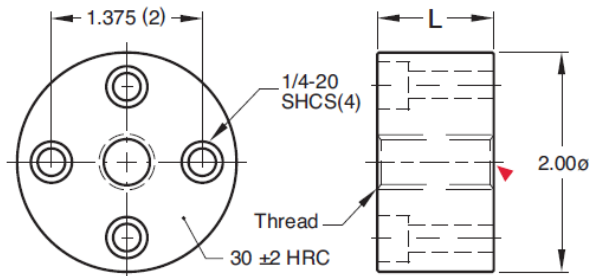


KO pads must be securely mounted to the ejector system. Use Progressive Components PKO Puck Series or equivalent. DO NOT USE HEX TYPE.

KO pads must be recessed inside the clamp plate to be 1/8" from the platen. KO pads must have 5/8-11 threaded hole a minimum 15/16" deep.



### PKO™ EXTENSIONS PUCK SERIES



▶ CAD insertion point



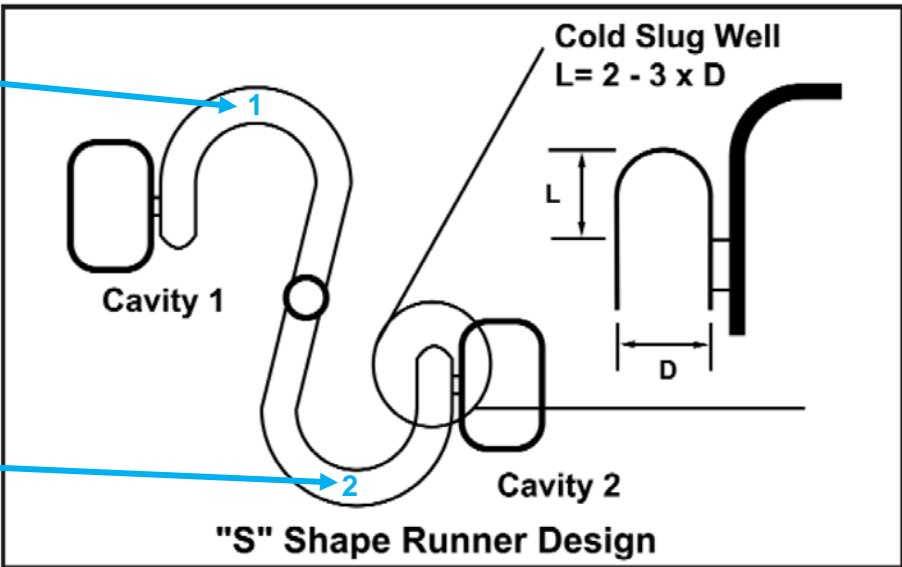
M AISI 1018

CATALOG NUMBER	Thread Internal & External	L
PKP37L10	3/8-16	1.052
PKP50L10	1/2-13	
PKP62L10	5/8-11	
PKP75L10	3/4-10	
PKPL10-NT	No Thread*	1.552
PKP37L15	3/8-16	
PKP50L15	1/2-13	
PKP62L15	5/8-11	
PKP75L15	3/4-10	
PKPL15-NT	No Thread*	

\*Mold maker machines thread on "NT" style to suit non-standard applications.

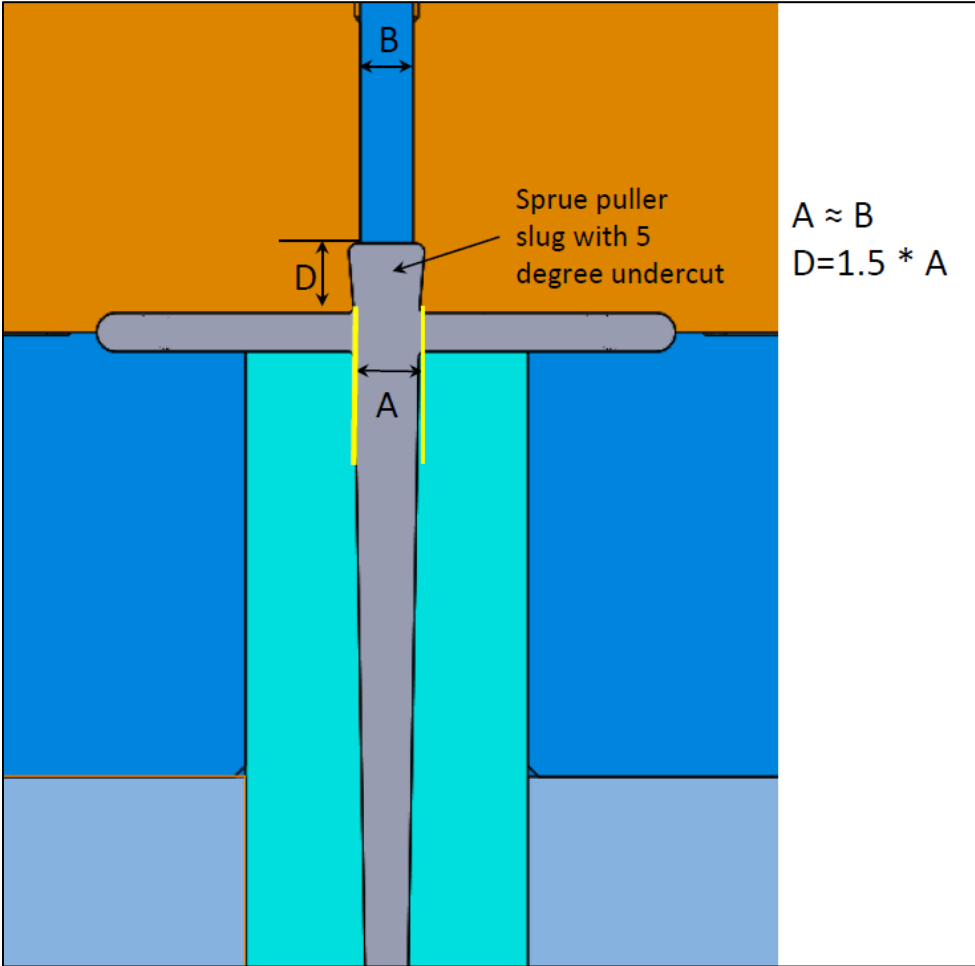
**APPENDIX I: RUNNER DESIGN, MARKING & COLD SLUG WELLS**

Multiple runners must be engraved with unique marking to help identify mold location post mold cycle.



Cold slug wells (L) must be 2 to 3 times width of runner (D).

Design balanced runners with "S" shape design whenever possible.

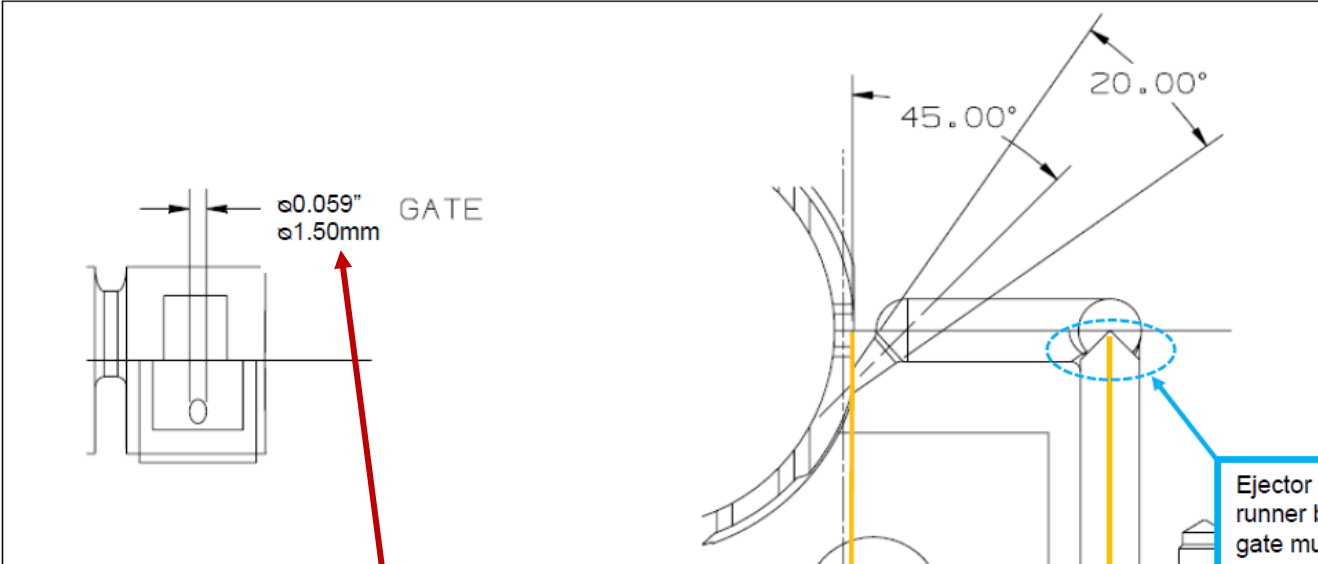


Runner slug (D) must not be excessive. Target 1.5 times width of sprue (A) where it intersects runner.

Round sprue puller with 5 degree undercut.

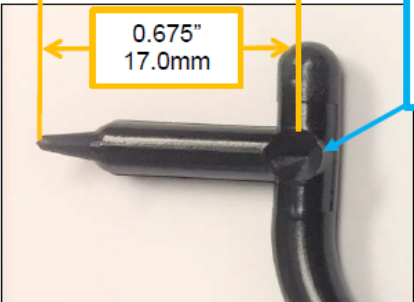
Sprue ejector pin (B) should be same width of sprue where it intersects runner (A).

### APPENDIX J: SUB-GATE DESIGN



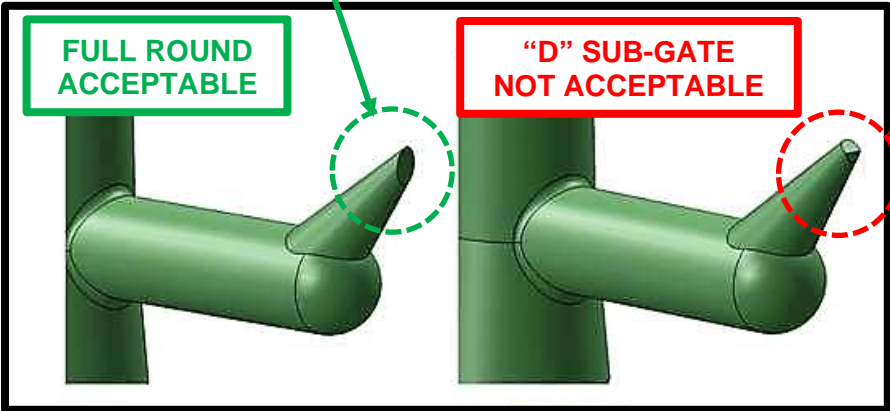
Ejector pins on runner by sub-gate must be "cone pointer keeper" style and located 0.675" (17mm) from sub-gate.

Typical sub-gate diameter is no larger than 0.059" (1.50mm) unless approved by AGS.



0.675" (17.0mm) distance from cone pointer keeper pin to end of sub-gate allows runner to flex and de-gate without leaving vestige or breaking sub-gate.

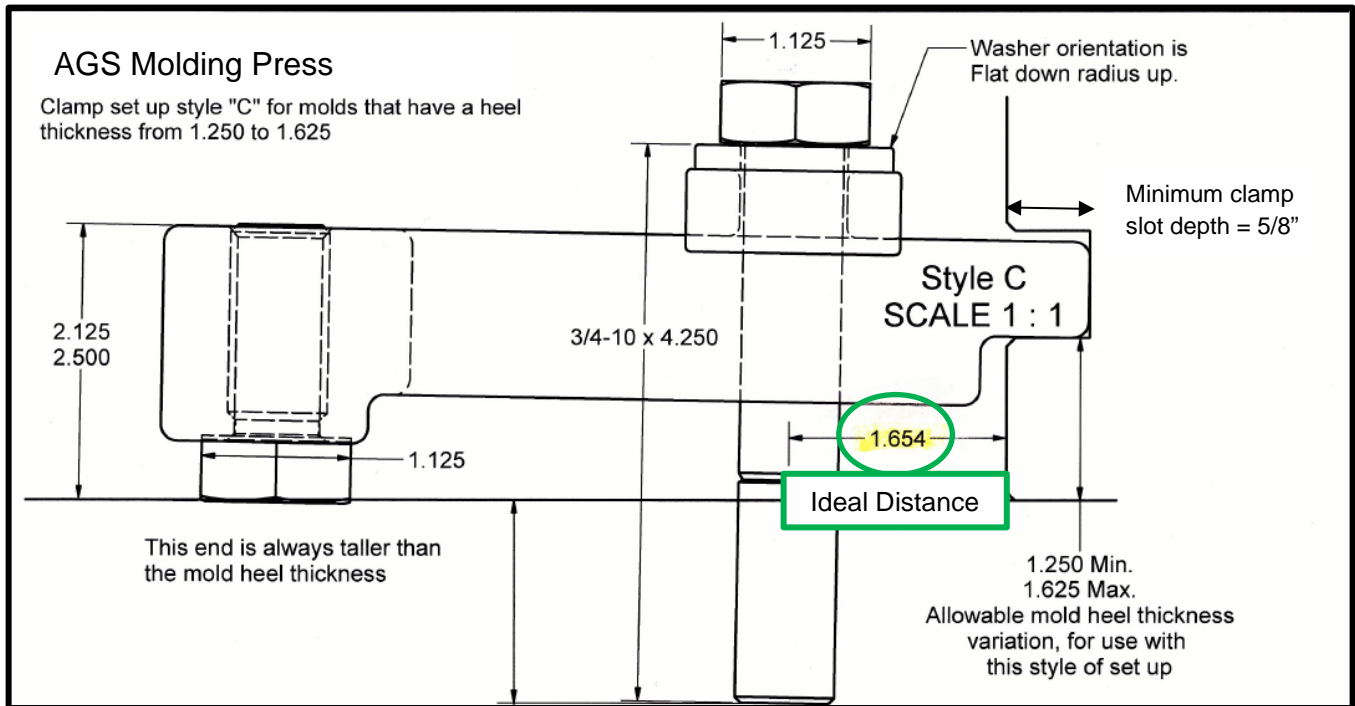
Sub-gate design must be full round diameter.



No "D" sub-gates



## APPENDIX L: CLAMP PLATE WIDTH TO PLATEN HOLES

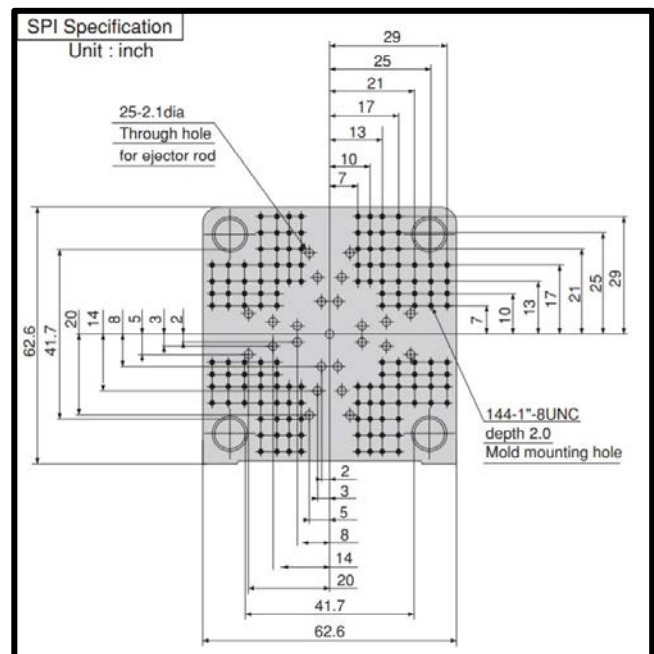
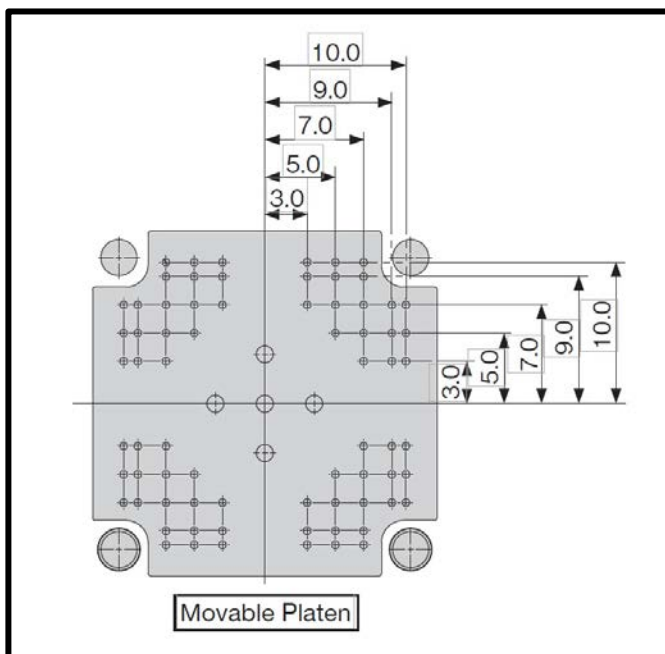


Clamp plate width to fall within SPI platen hole mounting pattern with standard clamps optimized to hold mold safely and securely onto platen.

Ideal distance from clamp plate to platen hole is 1.65".

Standard SPI platen hole distances are 5", 7", 10", 13", 17", 21", 25", and 29" from centerline.

Target clamp plate widths should be approximately 7" (180mm), 11" (280mm), 17" (430mm), 23" (585mm), 31" (790mm), 39" (740mm) and 55" (1375mm).



**APPENDIX M: PRY SLOTS**

All plates shall have pry slots in all four corners to open the mold and allow easy separation during maintenance. Minimum 1" long by 1/4" wide.

