KNOWLEDGE BASE

Article Type: Instructions

Mold Assembly and Machine Settings for Models, 22HF, 16HF, and 1600

Description:

Instructions on "How to" properly assemble, clean and inspect, repair and rework molds, and proper mold care.

WARNING

Never work on, clean or service this unit, control panel or any machine or open or remove any protective cover, guard, grate, door, or maintenance panel until the power or energy sources has been turned off, locked out / tagged out, and all moving parts have come to a complete stop and or blocked to prevent movement. Machinery is dangerous – avoid personal injury and or death by following manufacture, Local, and OHSA safety procedures. Contact Columbia Machine for safety decals, guards, horns and beacons.

Columbia recommends a sturdy table with a removable top plate, which can be reground as the surface deteriorates due to wear.

Columbia part number 405.32.1 (assembly table & surface height gauge-vernier calipers)

Recommended Tools cont.

- **4” Steel Wedges (for usage see page 28)**
- **Brass Hammer (Soft headed)**
- **Vernier Dial Calipers-Surface height gauge (for usage see page 29)**
- **10” Machinist Square (for usage see page 32)**
- **Torque Wrench** (range to 500 foot-pounds)
- **Miscellaneous Wrenches** appropriate for each bolt size (socket head, hex head, flat head capscrews)
- **Replacement supply** of grade5 & grade8 bolts, nuts, nylon insert locknuts, lockwashers, setscrews, (see Mold Torque Specifications Sheets)
- **Thread locking compound**, such as “Loctite #262” to be used on torqued bolts

Regular Mold Care

- After production, thoroughly clean all mold wear surfaces of any concrete materials and apply oil to the wear parts prior to storage. (Cement is a caustic that can deteriorate even hardened steel)
- Coating the wear parts with oil before storage will protect their hardened wear surface from oxidation and pitting. A cause of premature mold life.
- Inspect parts for cracks and/or wear and replace before storage.

Mold Repair and Rework

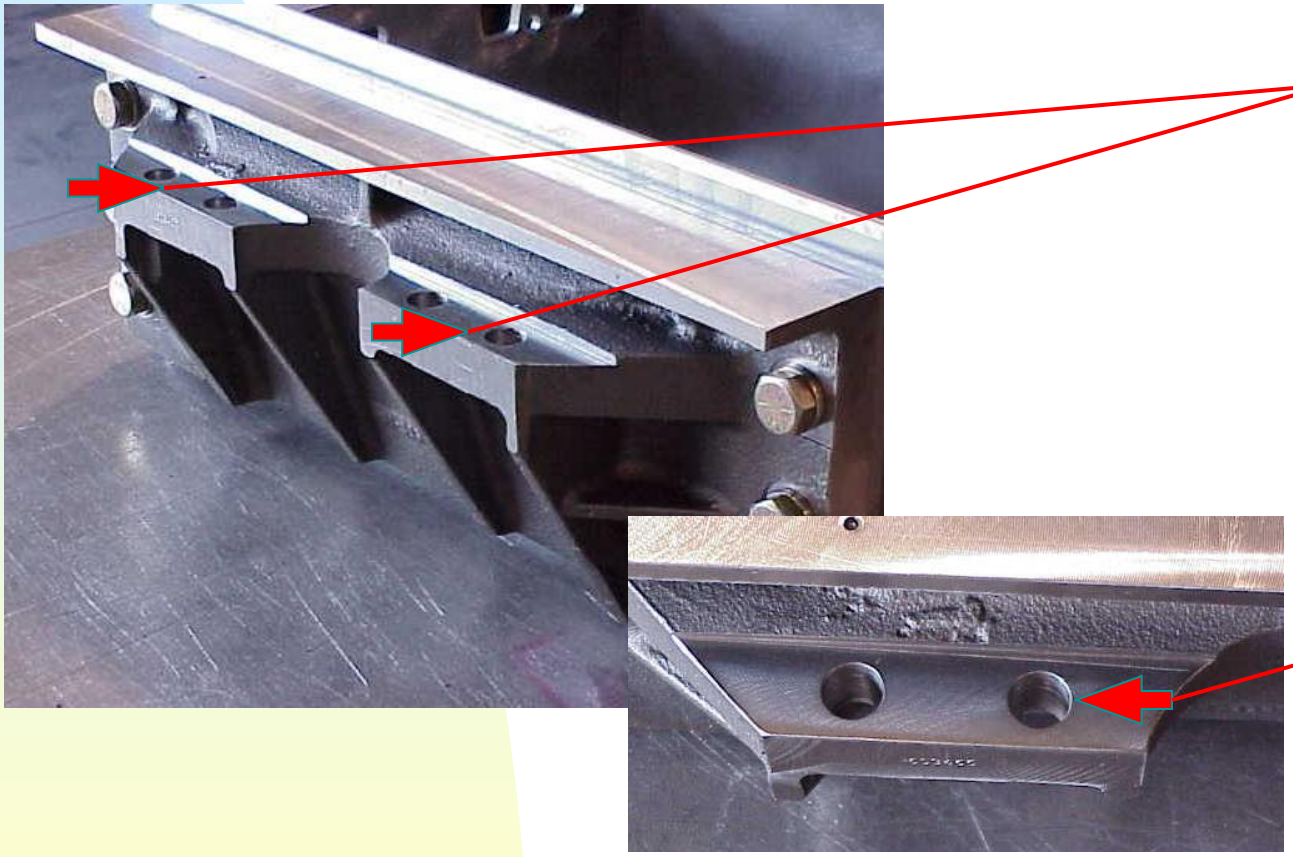
- Welding Mold Wear Parts
  - Insure good heat isolation to surrounding area
    - Surface Hardness is effected at temperature starting at 250 degrees
    - Immersion in water
    - repeated small incremental welds with quenching to cool between each step
  - Welding rod recommendation:
    - Low Hydrogen based welding rod for general welding
    - E4130 (rod used for welding SAE 4130 type Tool Steel)
      - For small spot repairs
    - Hard surfacing rod
- Welding Non Wear Surfaces
  - Low Hydrogen based welding rod
    - For welding Corebar Clips onto Corebar Assemblys
    - For Welding Cores onto Corebar Assemblies
    - General welding and patching
  - Cores should be welded to Corebar (T-1 Spring steel) using 4 passes, 2 per side of the corebar, starting from outside edge of core and stopping at the middle of the core.
- Drill and Tap Rework
  - Non wear parts can be reworked in a typical manner for mild steel
  - Hardened wear parts have same characteristics as tools used to drill and tap, requiring carbide tools
    - Soften area utilizing heat and then slow cooling Note: This will reduce mold wear life
    - Grind through case in area to be reworked

Clean and inspect all parts prior to assembling mold.

- Check for excessive wear on all surfaces, including gouges and scored surfaces (0.025” depth or greater, consider replacement).
- Radiused edges on the bottom (pallet side) of end liners, partition plates, cores, etc., cause feathered edges on the pallet side of the block.

  Tip: Outside partition plates can be rotated 180 degrees ↻.
- Check tapped holes for clean complete threads.

Clean and inspect all parts prior to assembling mold. cont.



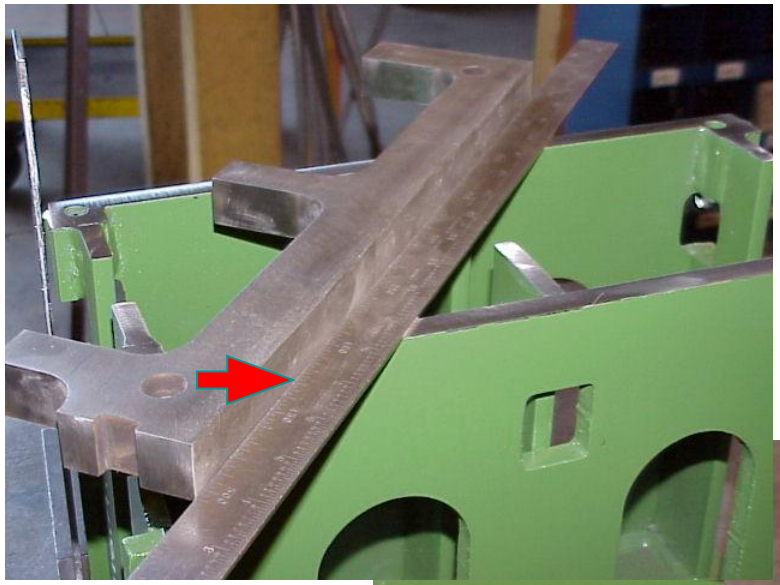
Mounting Bracket Die Support mounting surfaces should be clean, flat, free of paint or foreign material, and parallel.

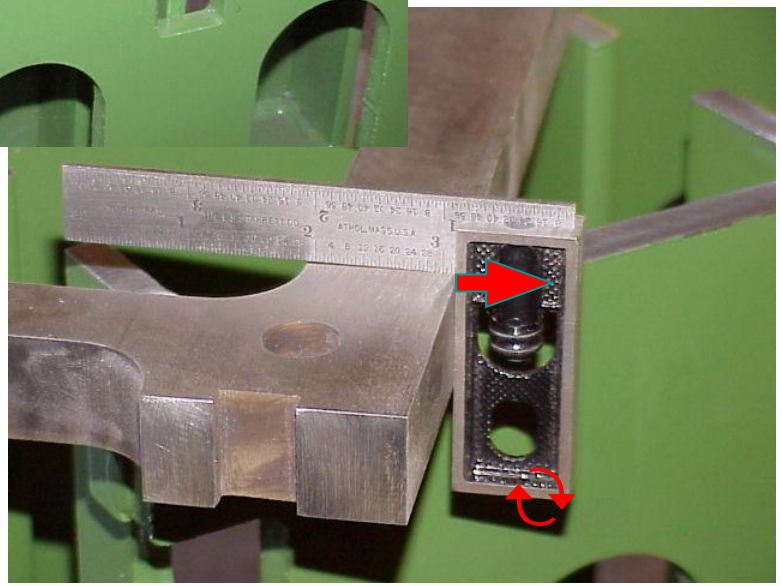
Mounting holes should not be elongated or cracked.

Tip: Also check condition of the machine die supports. The mating surfaces should be flat, parallel, and square.

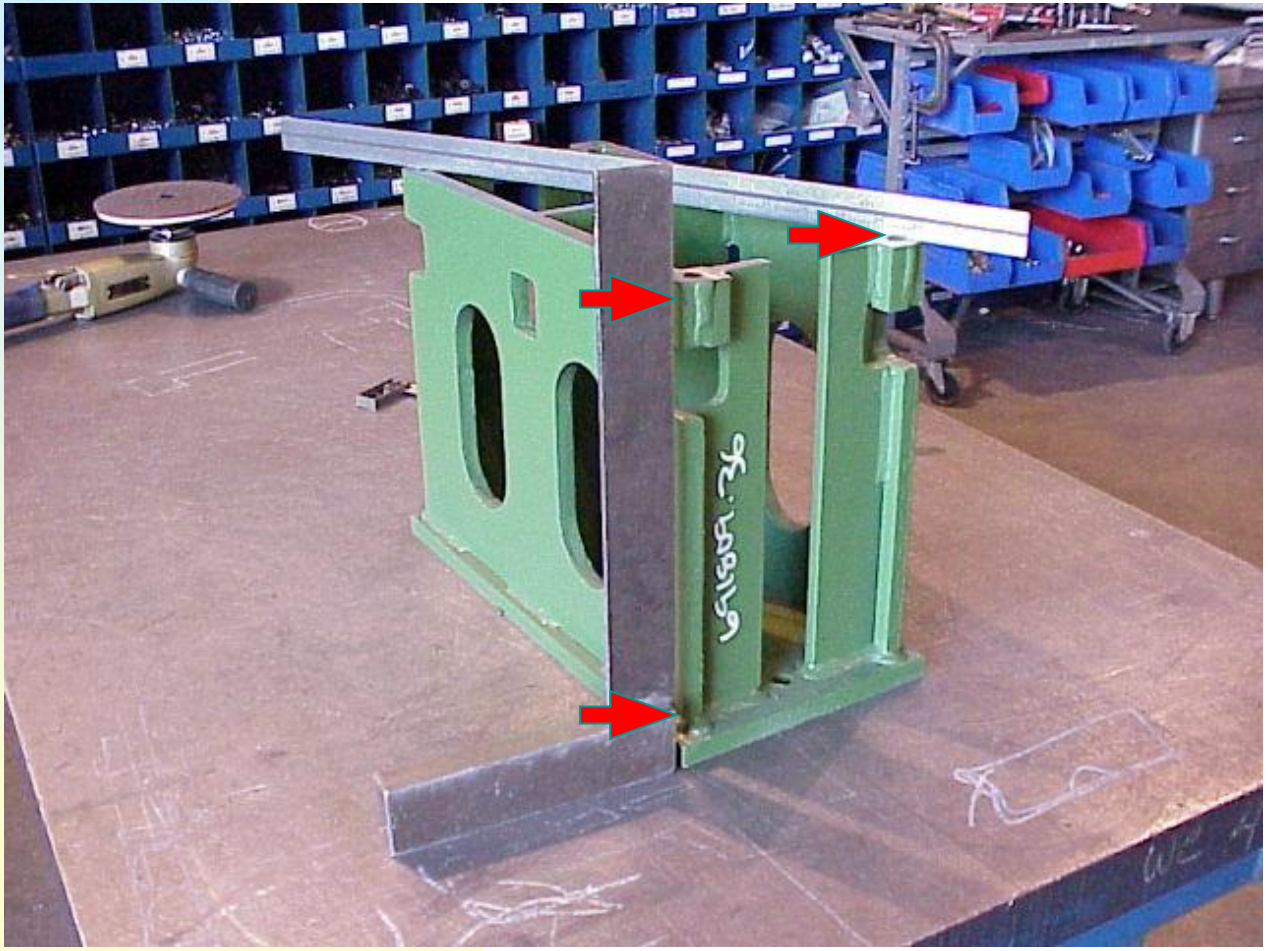
Clean and inspect all parts prior to assembling mold. cont.

- Compression shoes should be flat and straight and have clean sharp edges (rounded edges will create feathered edges on the tops of the product).
  Tip: In Most Cases, Shoes can be flipped 180 degrees for added wear life.





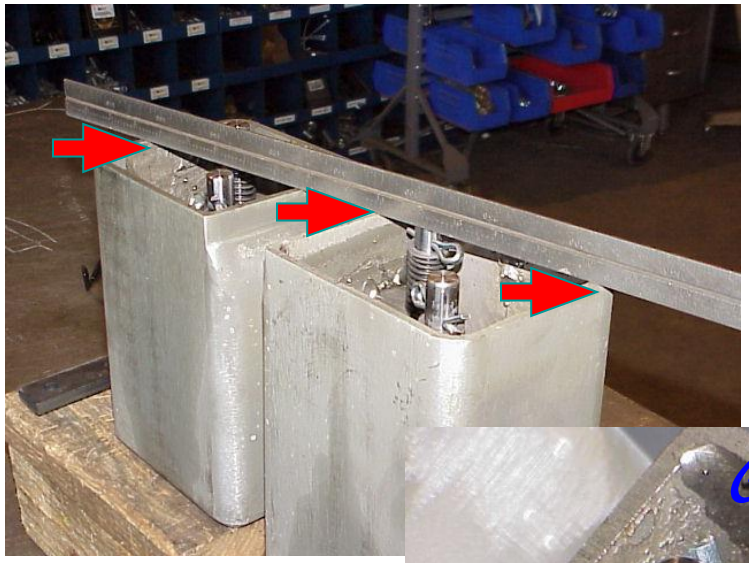
Clean and inspect all parts prior to assembling mold. cont.



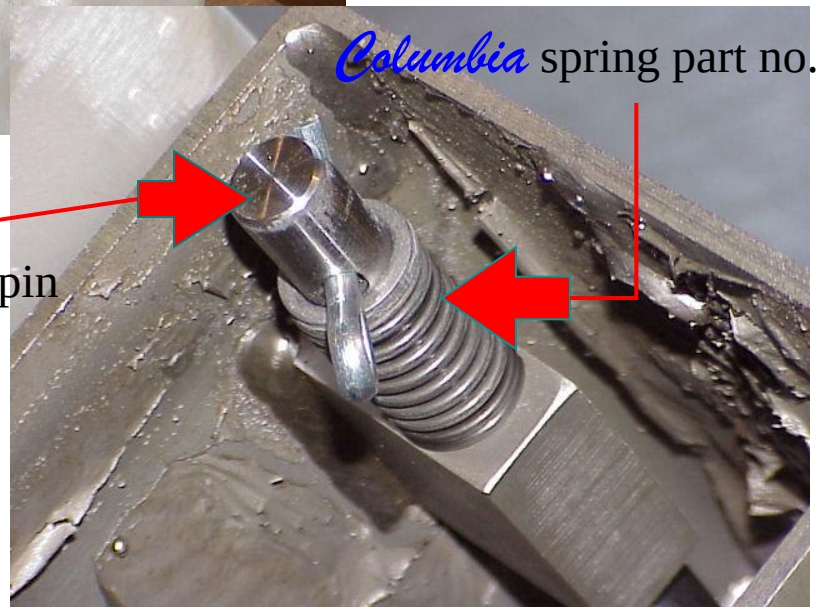
- Head plunger legs should be straight and the bottom (shoe side) should be flat.

Clean and inspect all parts prior to assembling mold. cont.

- Inspect the Corebar Assembly bottomside with a straightedge to insure bottoms are straight and flat.
- Check plunger pin to see that it operates smoothly and there is nothing interfering with venting while producing block.



Check for wear on the plunger pin - That the vent hole is closed when the pin is flush with the bottom of the core.

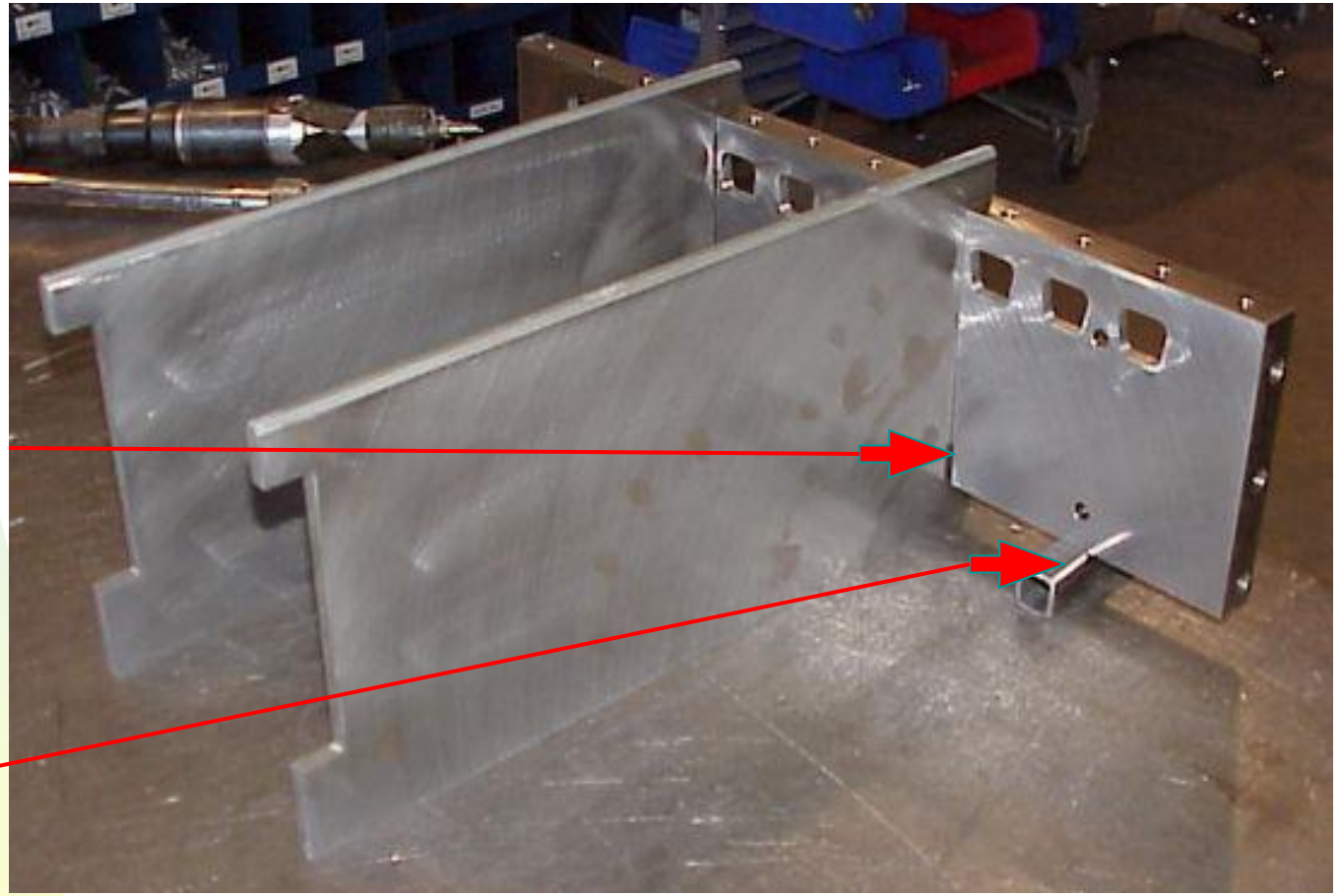


Torque Specifications

- **Torque specifications** are for comparative purposes only. All bolts of similar size and function should be tightened to the same torque. Hex and socket head capscrews used should be SAE grade 8 (or metric equivalent) on the mold box and shoes, SAE grade 5 (or metric equivalent) or better on corebar assemblies and head plungers. Because the mold assembly vibrates during operation, even properly torqued bolts can loosen and regular checking to insure proper tightness is recommended.
- *Columbia* encourages using a thread-locking compound, such as “Loctite #262” on torqued bolts.

Mold Box Assembly

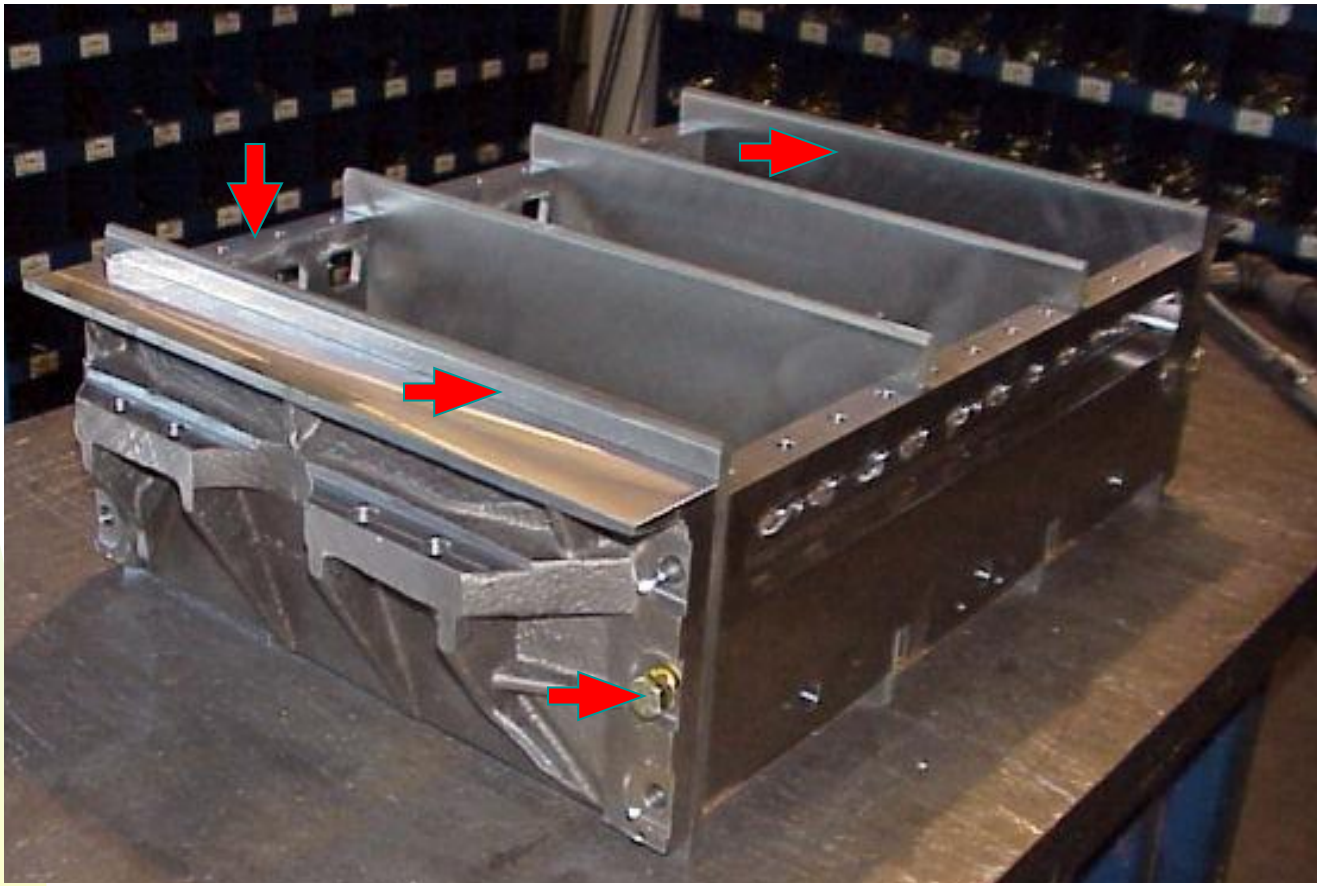
Lift one of the end plates, and position the first partition plate. Sliding one end of the interior (inside) partition plates into the end plate notches.



Optional aid is to use spacer blocks- 1” high spacers for 8-high molds. 3/8” spacers for 4-high molds.

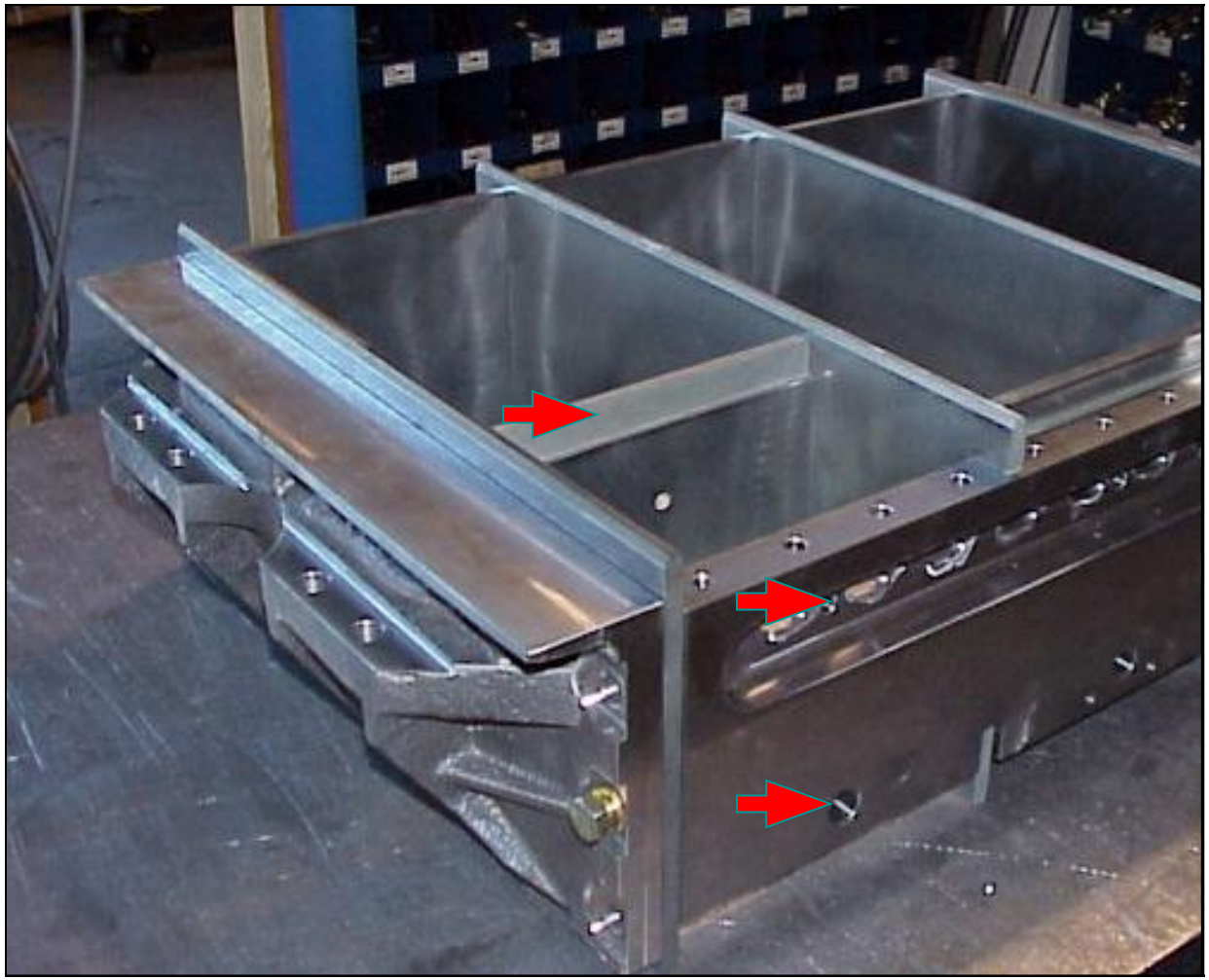
Mold Box Assembly

- Position the remaining end plate on the opposite end of the inside partition plates.
- Locate the drilled (outside) partition plates to the left and right sides of the end plates and the mounting brackets. Securing with one bolt at each corner of the box.

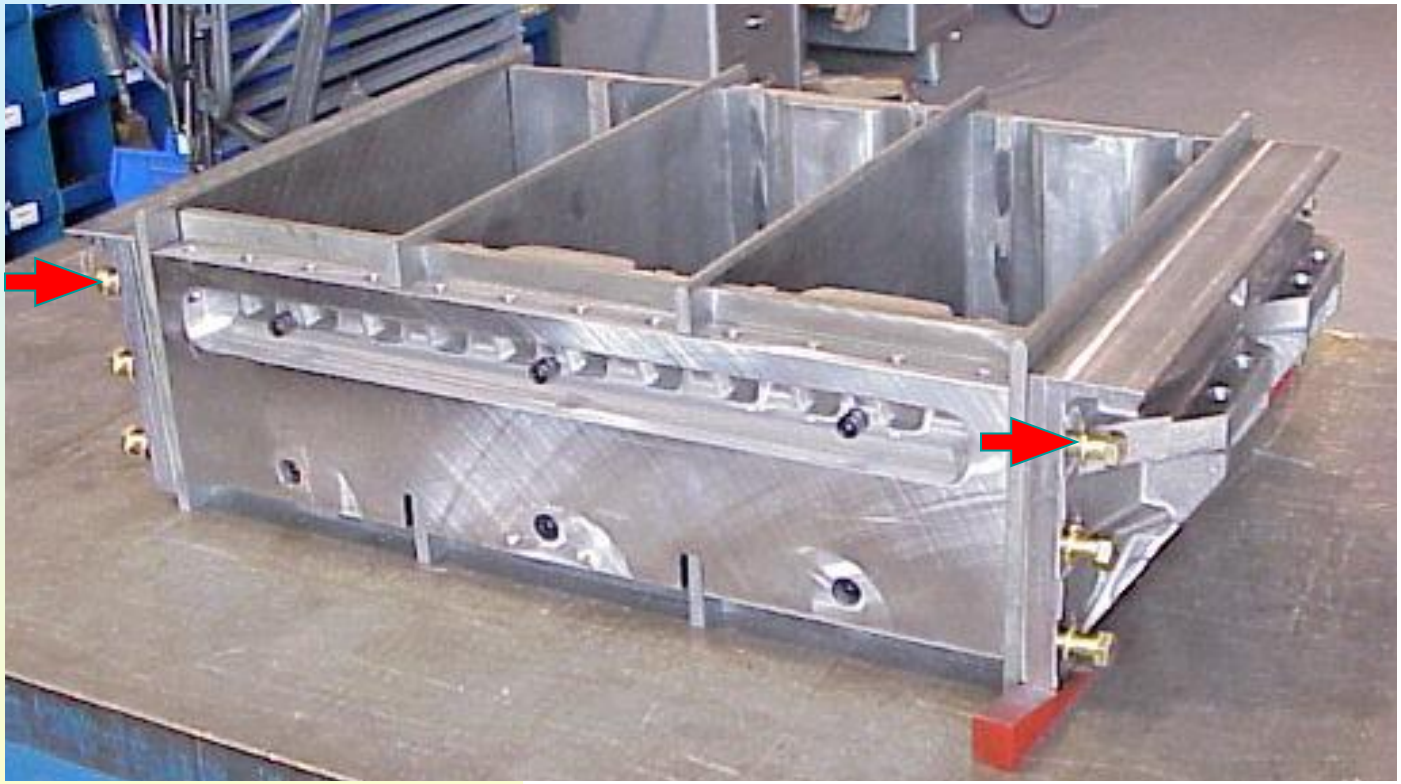


Mold Box Assembly

- Set the end liners into the cavities and install all fasteners using locktite thread locking compound. Use high collar lock washers to ensure correct thread depth.

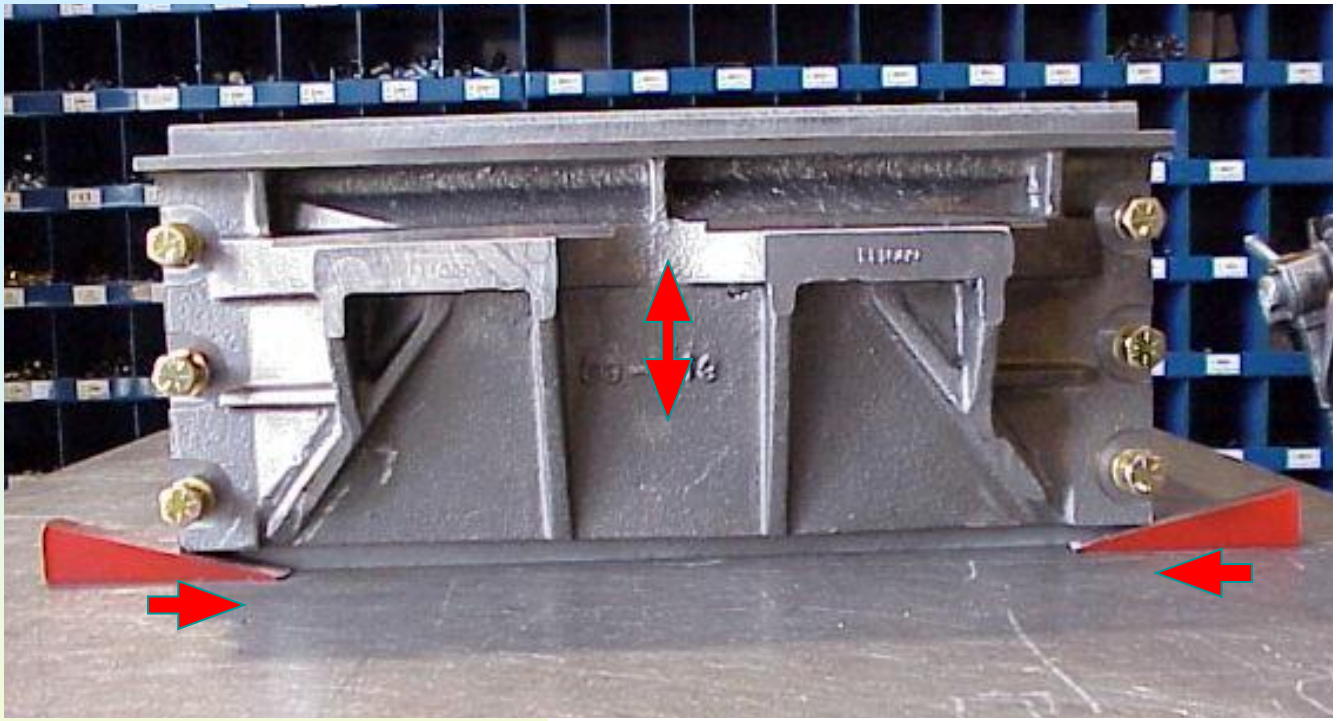


Mold Box Assembly



- Thread the remaining mounting bracket bolts and tighten to approximately 5 ft-lbs (6 Nm)

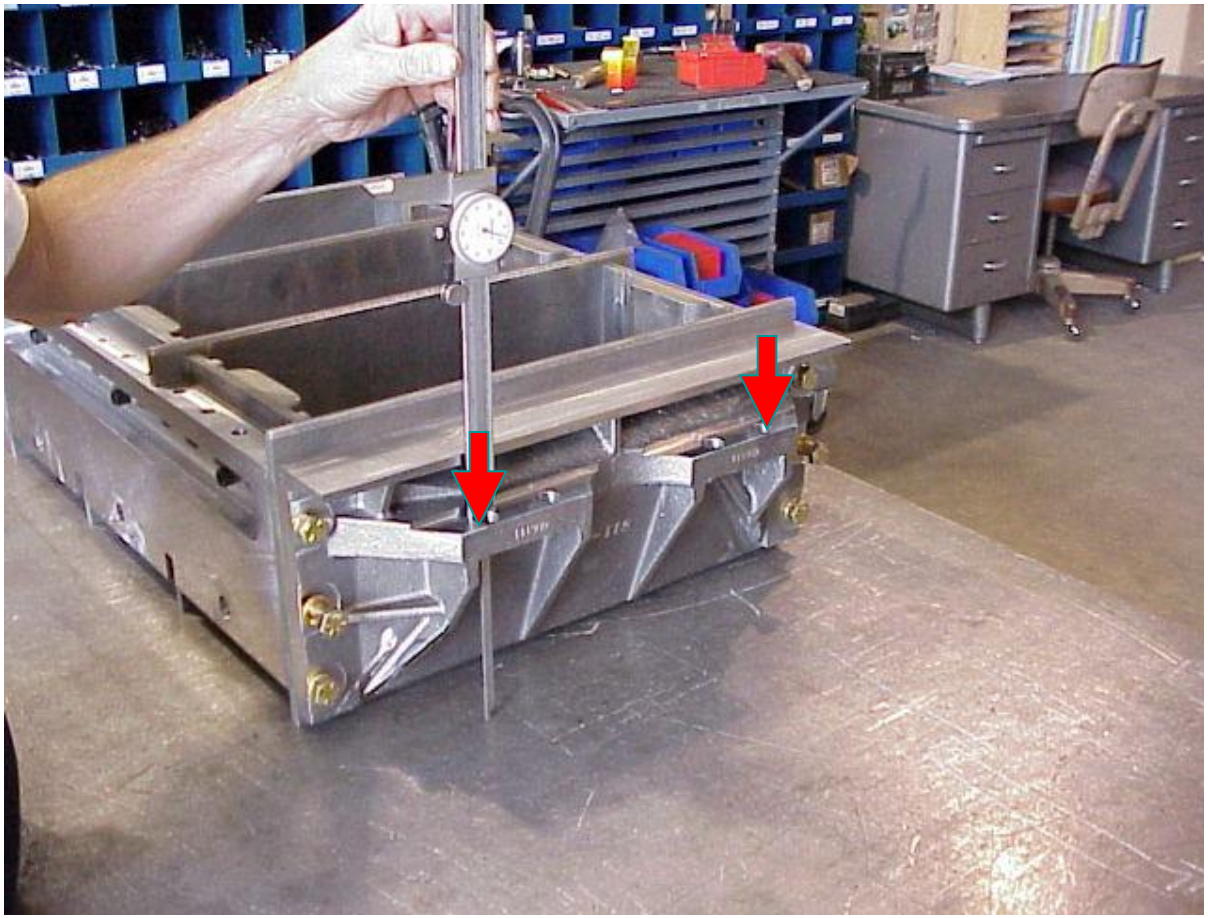
Mold Box Assembly



- Place two wedges under one mounting bracket, one under each side. Use the wedges to lift the mounting bracket only, do no lift the mold off the table. Tighten the bolts to a snug fit, you only want to hold the brackets in place, and you will need to adjust them later. Repeat this step on the other mounting bracket.

Mold Box Assembly Mounting
Bracket alignment on mold

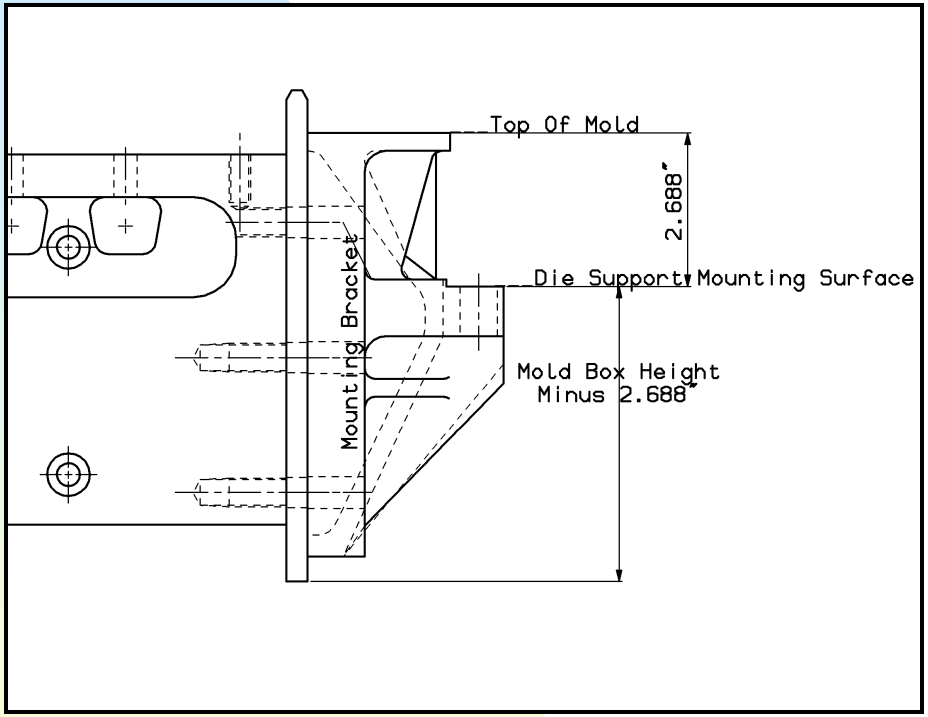
- Set the height from the bottom of the mold (flat surface in which the mold is being assembled on) to the top of the mounting bracket die support surface to within 0.005" using a mallet and height gauge (vernier dial calipers).



Mold Box Assembly

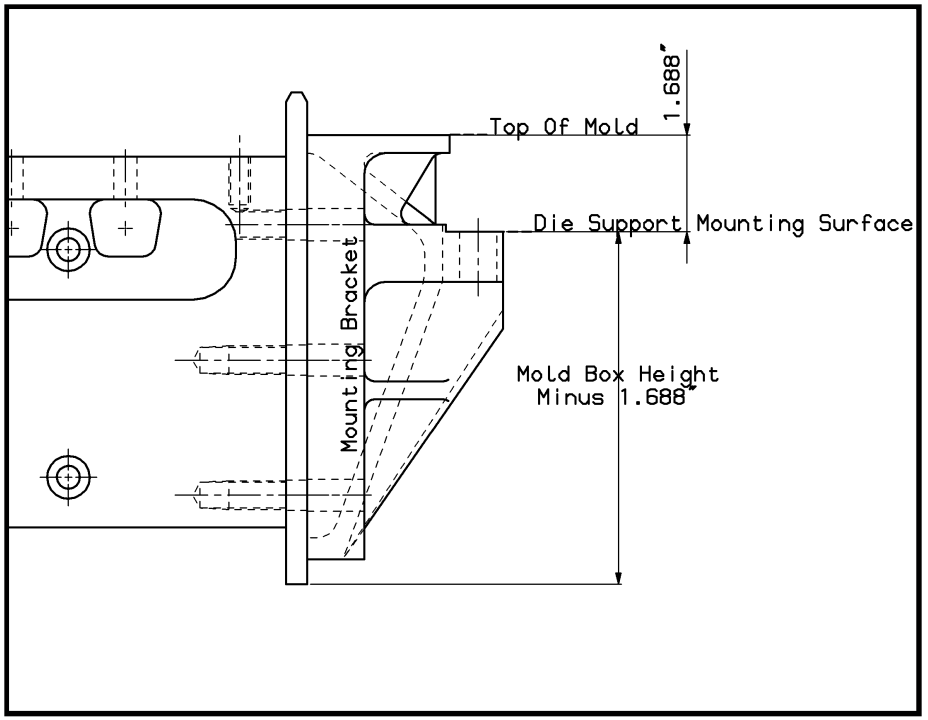
Mounting Bracket Height Adjustment Specification

2-Block Molds Model 10AC, 21, & 22



For Model 10AC, 21, & 22 the height of the die support surface to the bottom of the mold is determined by subtracting 2.687” from the overall height of the mold box.
(i.e. 7.875” - 2.687” = 5.187”)

3&4-Block Molds Model 12AB, 12AC, 16, 20, & 1600



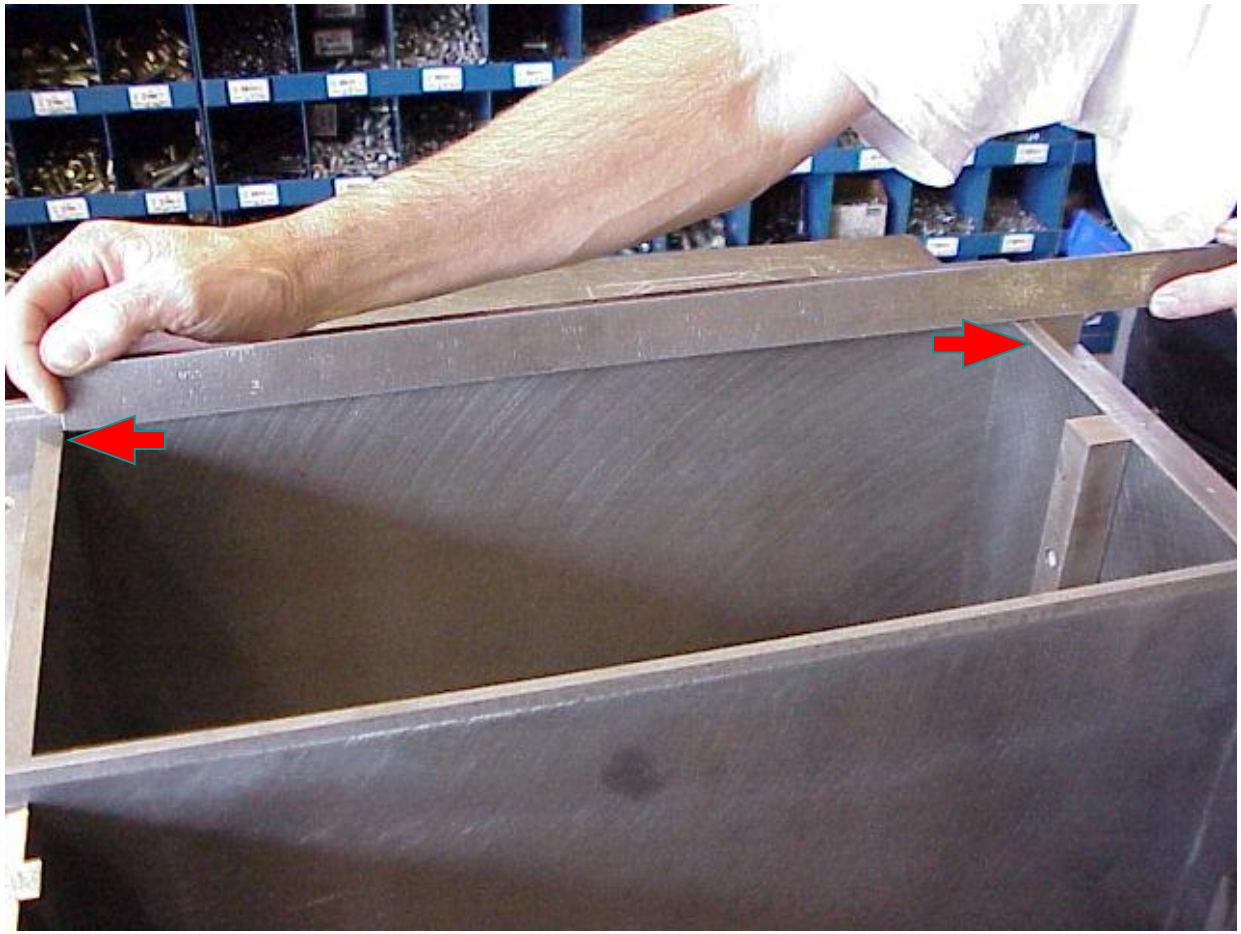
For Model 12AC, 16, & 1600 the height of the die support surface to the bottom of the mold is determined by subtracting 1.687” from the overall height of the mold box.
(i.e. 7.875” - 1.687” = 6.187”)

Mold Box Assembly

Cavity Adjustment Process

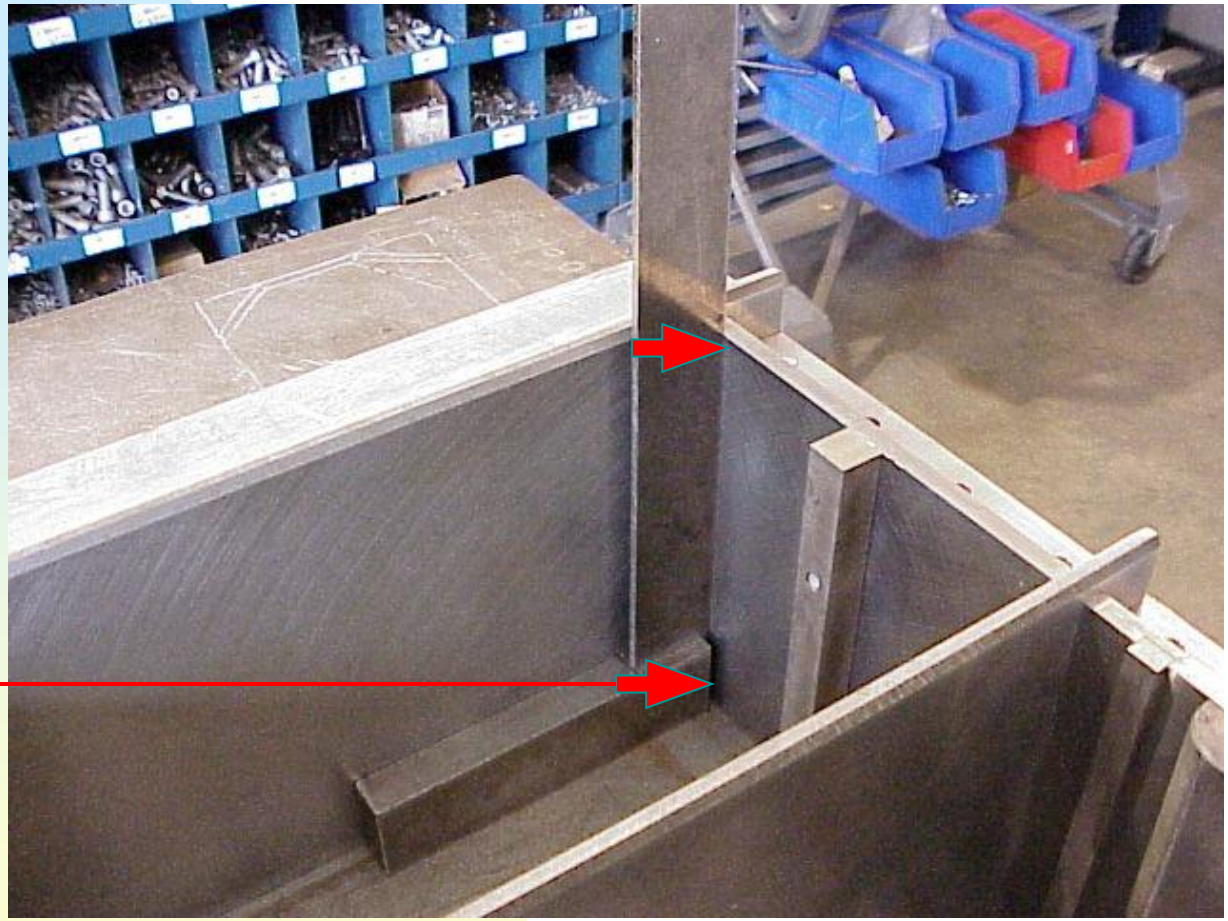
- Measure the cavity length at the top of the Mold.

Columbia assemblies the cavity to 1/32" under the modular block length.



Mold Box Assembly

Cavity Adjustment Process

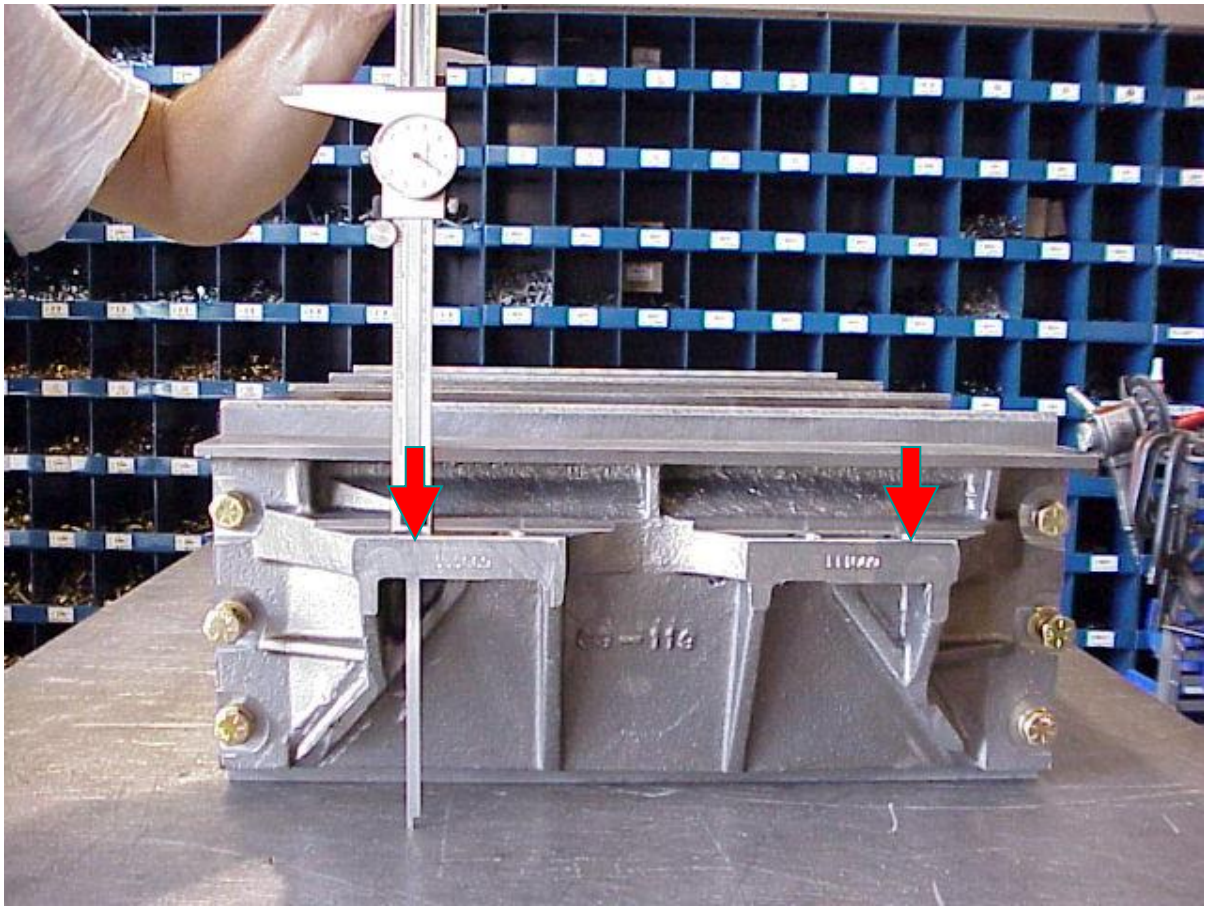


- Use a Machinist's square to check for draft on the cavity ends. Place the square inside the block cavity on the surface that the mold is being built on and slide the upright end of the square up against the end liner.

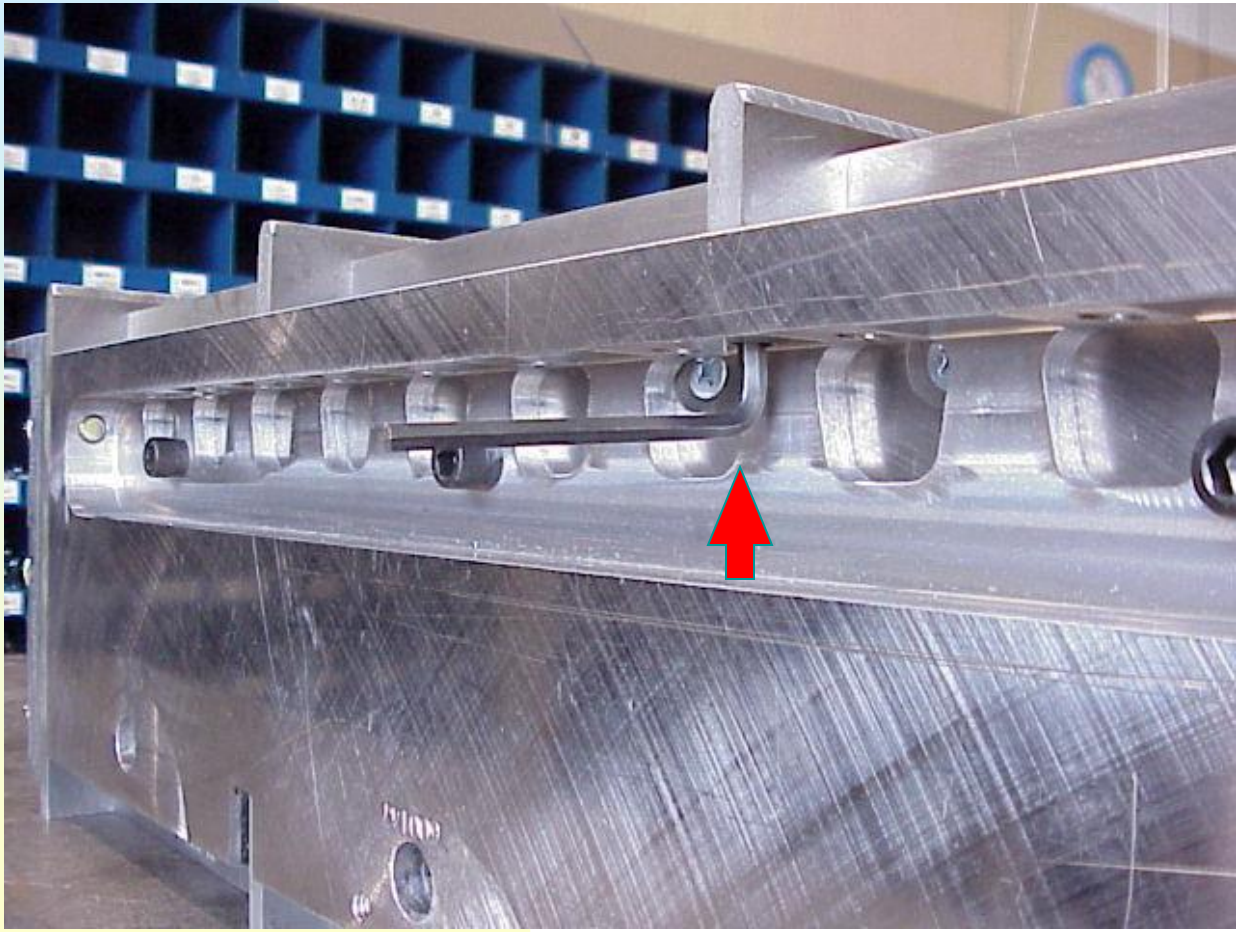
A slight positive draft (light shining through near the bottom up to 1/64" per end) is acceptable and aids in stripping the product and reducing mold wear. Avoid Negative Draft! Adjust the draft using a soft headed mallet prior to fully tightening the mntg bracket bolts.

Mold Box Assembly

- Double check the measurements of the cavity, length, draft, and mounting bracket height.
- Torque all mounting bracket bolts to 120 ft.-lbs. when the height measurements are correct.



Mold Box Assembly



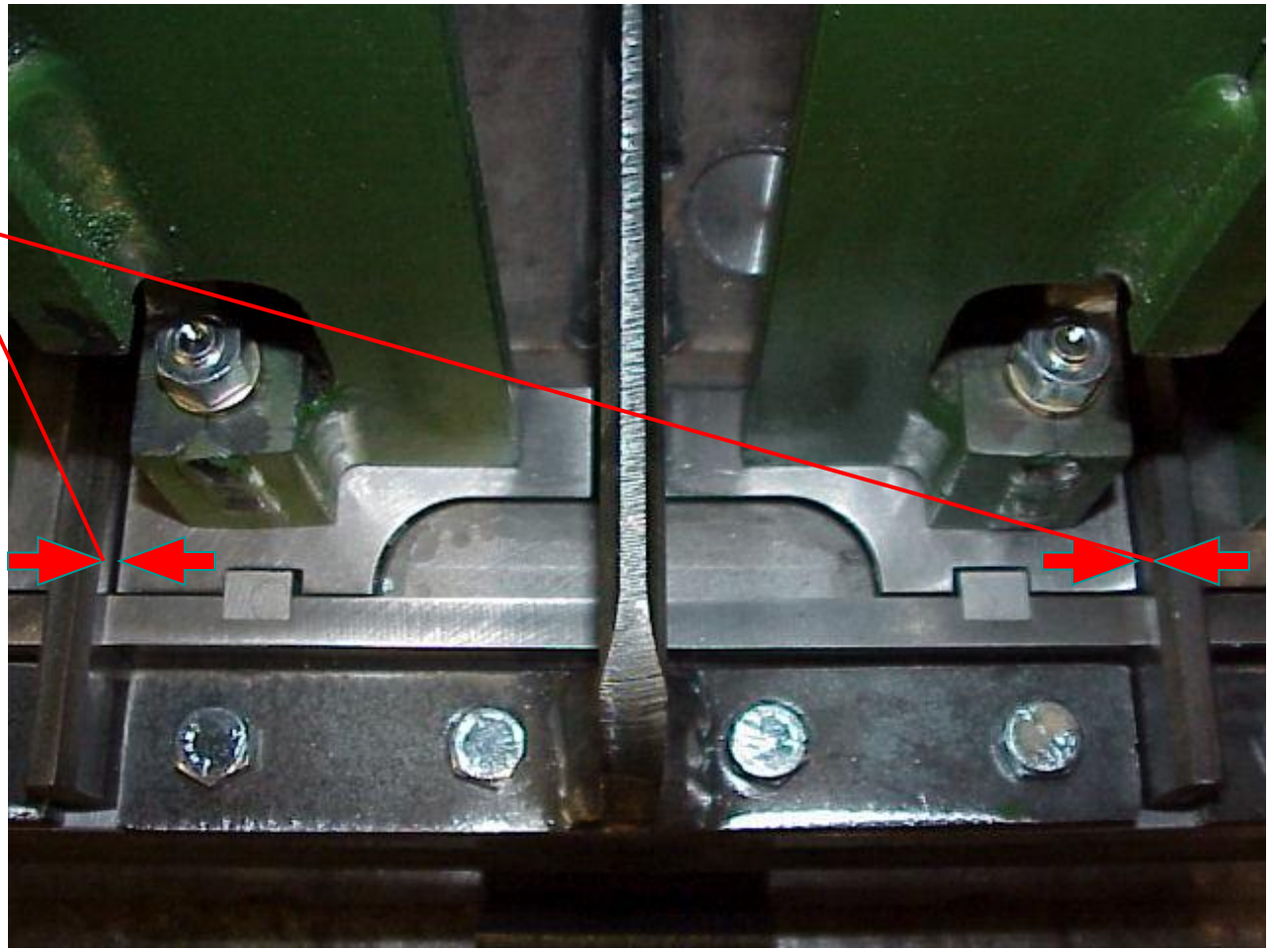
- With the cavity length and end draft adjusted, tighten the self locking setscrews which lock the partition plates. These are located on the underside of the end plate top flange.

Note: The partition plates and end plates will prematurely fail during operation if the operator/assembler fails to keep the setscrews tight.

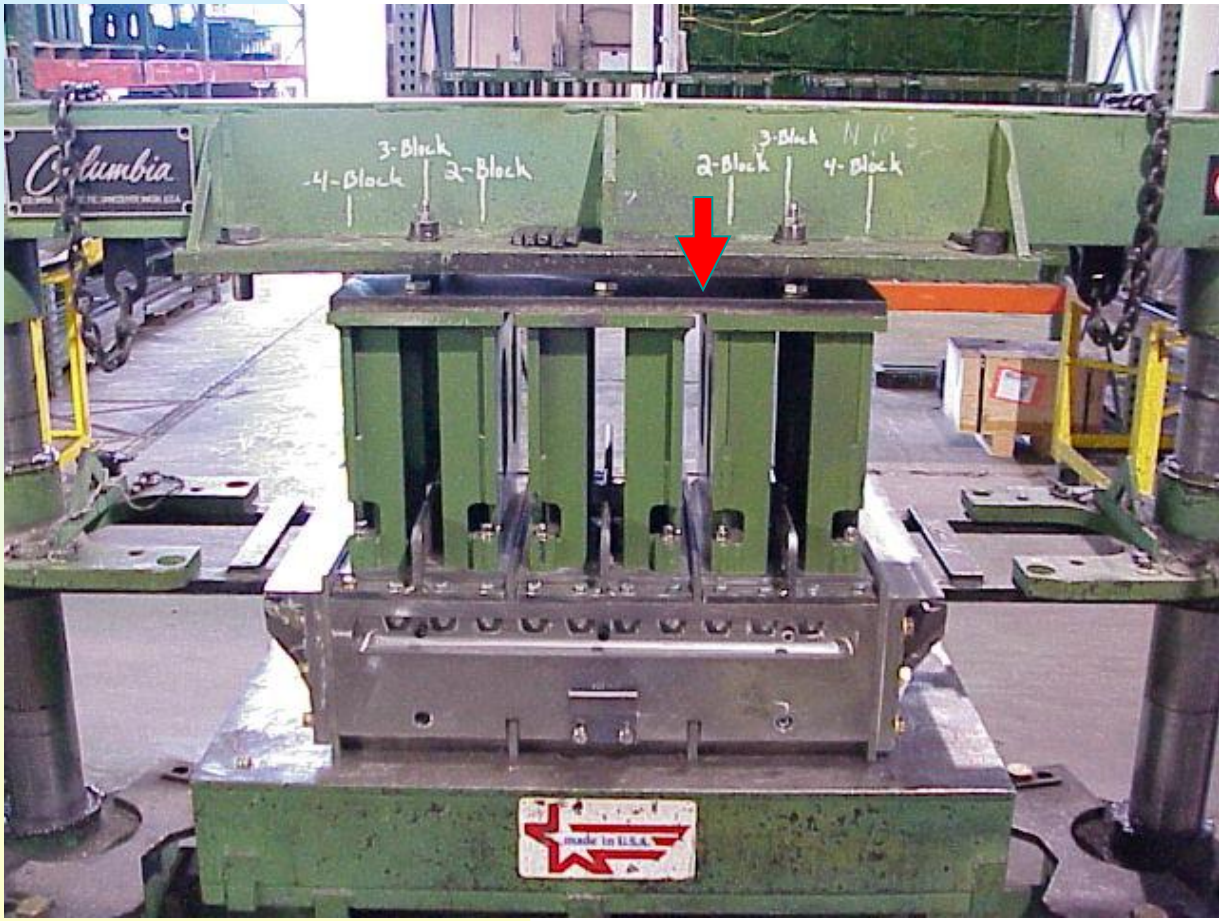
Mold Box Assembly

Head Assembly to Mold Cavity Alignment

- Set the mold box in the mold alignment fixture or Block Machine.
- Place each head plunger/shoe assembly into their respective cavities, centering them. Ensure that a 1/32" clearance exists between the shoes and the partition plates. Place the head plate on top the head plungers and insert bolts (placing lock washers on the bolts). Do not tighten the bolts to full tension. This allows adjustment from side to side.



Mold Assembly Alignment

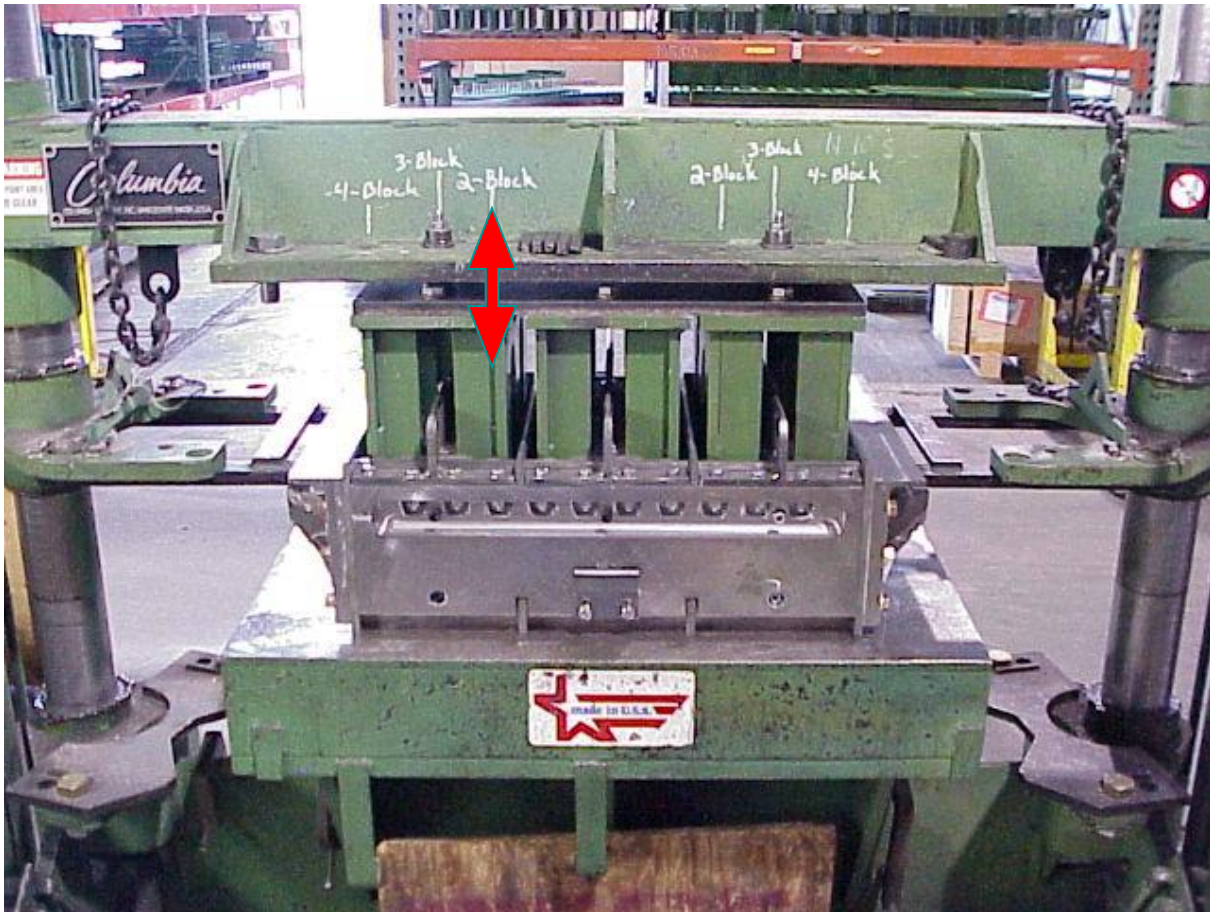


(Mold is shown in Mold Alignment Fixture)

- Bring Machine compression beam, or upper beam of Mold Alignment Fixture, down until it contacts the head assembly and bolt head assembly to compression beam.

Mold Assembly Alignment

- Cycle the head assembly in and out of the mold box to check for proper fit. *Cycle it slowly the first few times just in case the shoes are not lined up correctly*. When cycling the head assembly up and down, listen for any squeaks or clicks. Note their locations and adjust the head plungers or shoes for clearance.

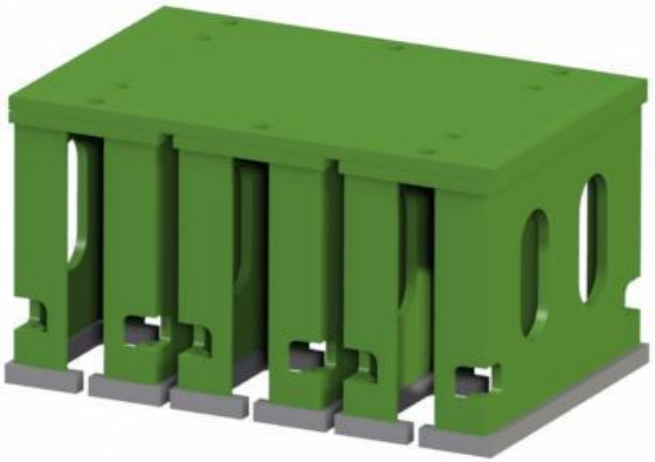


(Mold is shown in Mold Alignment Fixture)

Mold Box Assembly

Conclusion

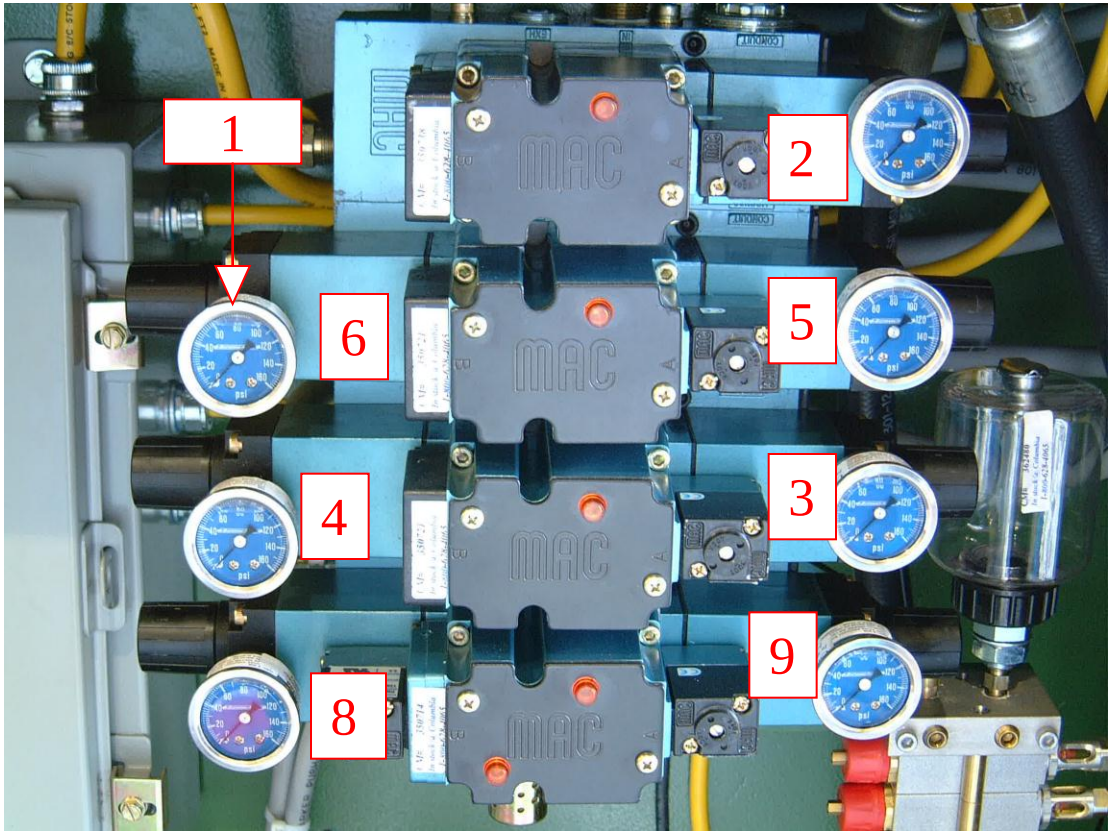
- When you are done testing the mold, Torque the head bolts to proper specifications and re-check for Proper clearances.
- **The Mold Is Now Ready For Production**



Machine Settings

Block Machine settings are very important

- 1. PRESSURE GAUGE
- 2. COMPRESSION BEAM REGULATOR
- 3. FRONT LOW PRESSURE REGULATOR
- 4. FRONT HIGH PRESSURE REGULATOR
- 5. REAR LOW PRESSURE REGULATOR
- 6. REAR HIGH PRESSURE REGULATOR
- 8. CLUTCH PRESSURE REGULATOR
- 9. BRAKE PRESSURE REGULATOR



Machine Settings

Recommended Block Machine settings

Pneumatic Adjustments

After start-up, adjustment of pneumatic control settings may be required to compensate for differences in material. To ensure the best quality block production, the following is offered as an aid to be applied in relation to an inspection of the block.

Pallet Table High Pressure: This pressure should be set just high enough to hold the pallet firmly against the mold during compression. In general, a pressure that is too low will be indicated by a feather edge at the bottom of the block. The front and rear pressures do not necessarily have to be the same.

Pallet Table Low Pressure. This pressure affects the proper filling of the mold and, consequently, block texture. In general, if block texture is loose or flaky, this pressure should be increased. The front and rear pressures do not necessarily have to be the same.

Compression Beam Pressure: Proper setting of this pressure establishes even block texture. If blocks have uneven texture or if cracks appear in the block web, decrease compression beam air pressure slightly.

Clutch Pressure: Proper setting of this pressure insures smooth operation and extended life of the clutch. Too low a pressure will cause slippage and excessive heat build up. Too high a pressure causes undue wear of clutch parts and possible damage to the motor.

Brake Pressure: This pressure affects braking action of the vibrator shaft. Too low a pressure causes slow stop time. Too high a pressure causes high stress on brake parts.

Machine Settings

Recommended Block Machine settings

Pneumatic Controls —

Make the following preliminary pressure settings:

Pallet Table Front High - 85 psi

Pallet Table Rear High - 85 psi

Pallet Table Front Low- 40 psi

Pallet Table Rear Low- 40 psi

Compression Beam - 70 psi

Clutch - 40-50 psi

Brake - 40-50 psi

Machine Settings

Recommended Block Machine settings

Pneumatic Controls —

- Adjustment for Compression Head Air May Vary Depending On Product
- Settings should be 10-15 psi lower than High Table Air

Machine Settings

Recommended Block Machine settings

Pallet Table and Compression Beam air pressure settings may vary according to block configuration and mix design. Preliminary settings are given as nominal. Avoid excessive pressures which can intensify vibration in the block machine.

Place pallet table mode selector to MANUAL and make the following preliminary pressure settings:

Pallet Table Front Low - 40 psi

Pallet Table Rear Low - 40 psi

Machine Settings

Recommended Block Machine settings

Pallet Table Adjustment

When a new mold is installed, the distance between the pallet table and mold must be adjusted to ensure proper pallet clearance. Two basic pallet table settings are suggested (see Figure 18).

1. Pavers or low height solids - Tight Pallet

Check that pallet table surface is clean and free of all objects.

Check that AUTO switch is in OFF position.

Depress PUMP START pushbutton and open main shut-off valve.

Close return line orifice valve.

Switch the following manual selector switches in the sequence noted:

COMPRESSION BEAM UP

STRIPPER BEAM UP

PALLET FEED BACK

Machine Settings

Recommended Block Machine settings

Pallet Table Adjustment cont.

Exercise extreme caution while performing this adjustment with the pump unit on.

Turn eccentric to the top position (mold in its up position)

Place a clean pallet on the pallet table

Turn the air to the pallet table on

With proper spacers under the pallet table as determined by mold height, run the stripper beam to its up position.

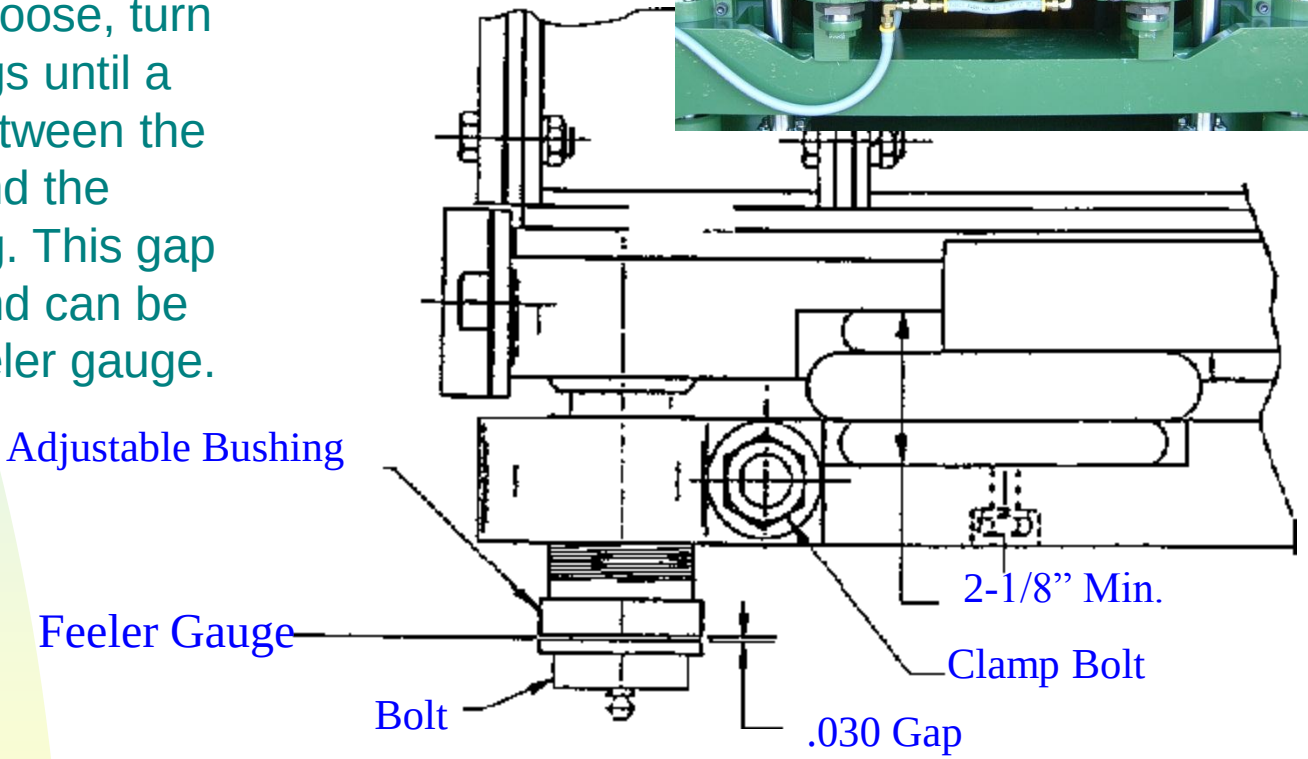
The pallet should contract the mold and slightly depress air bags.

Machine Settings

Recommended Block Machine settings

Pallet Table Adjustment cont.

- With clamp bolts loose, turn adjustable bushings until a gap is obtained between the head of the bolt and the adjustable bushing. This gap should be .030" and can be checked with a feeler gauge.



- Set all four bolts and bushings exactly the same

Machine Settings

Recommended Block Machine settings

Pallet Table Adjustment cont.

When adjusting table height, do not collapse air bags to less than 2-1/8" high. A lesser height will cause damage to the air bag. If a lower height is required, remove spacers from under pallet table assembly.

Turn off air and tighten clamp bolts to 100 ft. lbs.

This is only recommended as an initial set up. There are various methods that may be used depending on your mix, air pressures and product to be made. Contact the Columbia Block Service Dept. for help in determining how your pallet table should be set.

General Block - Loose Pallet

Follow the same procedure as above, except turn eccentric to the bottom position (mold in its down position).

Machine Settings

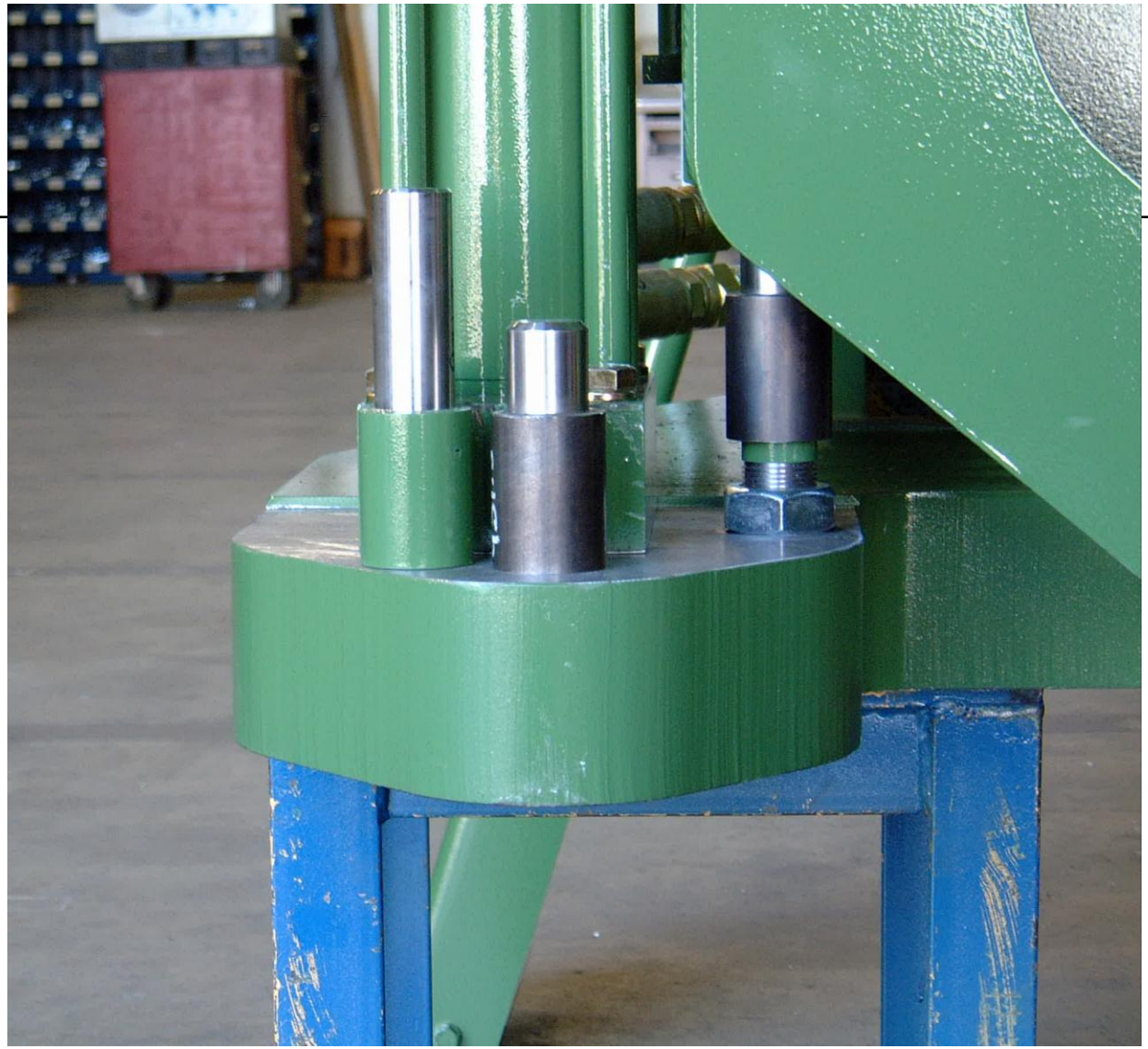
Recommended Block Machine settings

Other Machine Settings For Different Height Products

Machine Settings

Recommended Block Machine settings

Other Machine Settings For Different Height Products



Lower Height Stops

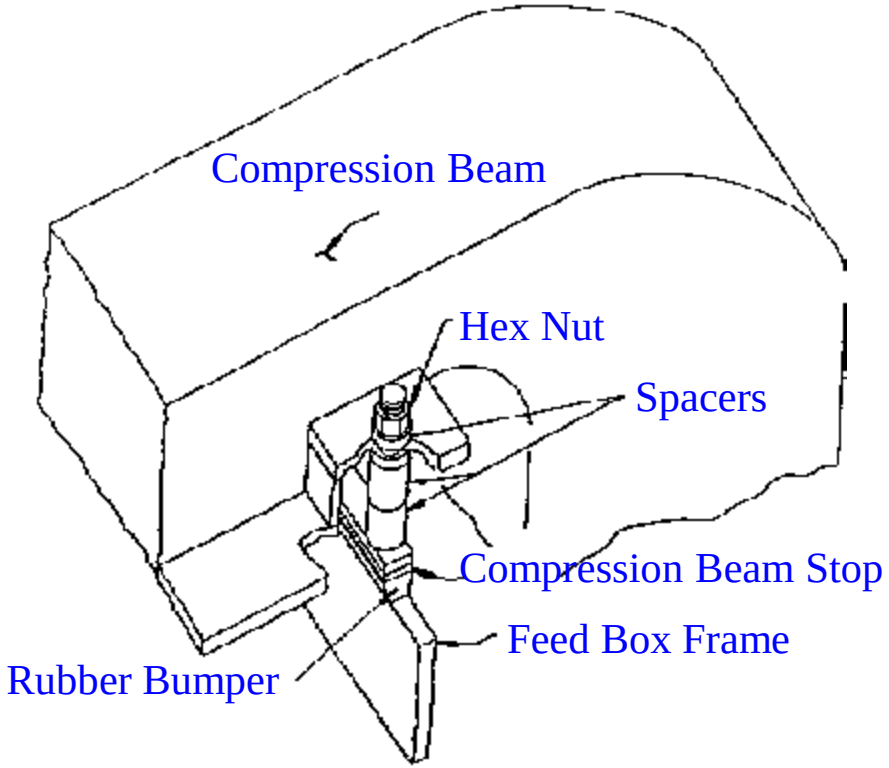
Machine Settings

Other Machine Settings For Different Height Products

Recommended Block Machine settings

Compression beam down motion is controlled by compression beam stops. Appropriate spacers must be added or removed to allow the compression beam to lower to the point that the shoes extend to the bottom of the mold or 1/8" beyond.

If changing to a shorter mold, spacers must be moved from top to bottom. If changing to a higher mold, spacers must be moved from bottom to top. The proper amount of spacers will allow the shoes to extend to the bottom of the mold or 1/8" beyond when the rubber bumper strikes the top of the feed box frame.



Compression Beam Stops

Conclusion

With Quality Molds & Proper Machine Setups

Results Will Give You Quality Product