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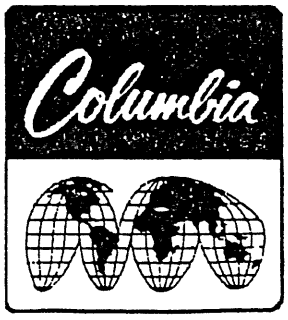
# Concrete Products Machine Fill Cycle Adjustments



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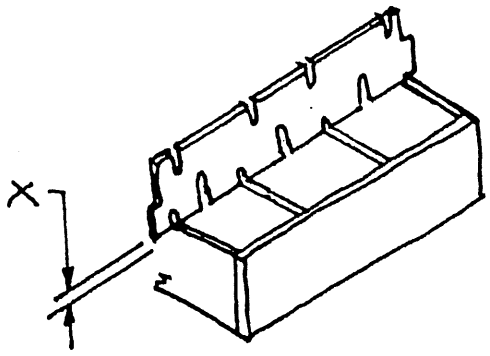
# CONCRETE PRODUCTS MACHINE FILL CYCLE ADJUSTMENTS

## Strike Off Plate

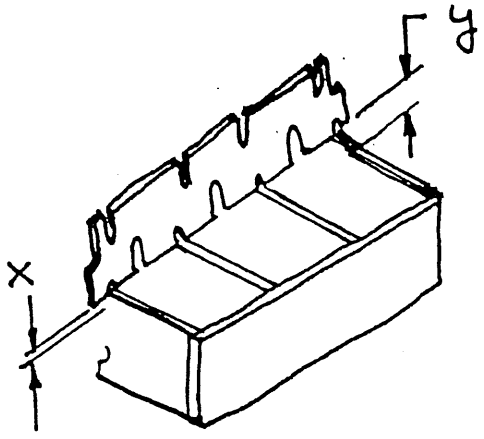
### Adjust the Strike Off Plate Height

- Move Strike Off Plate up or down
- Usually 3/8" (10 mm) is a good starting point for Block
- Pavers may require near zero 0" (0 mm) clearance
- Higher Product may require up to 3/4" (19 mm).




### For a one piece Strike Off Plate

- Angle the strike off plate up or down on either end. It does not need to be parallel. Especially if odd products are being made on one end of the mold.



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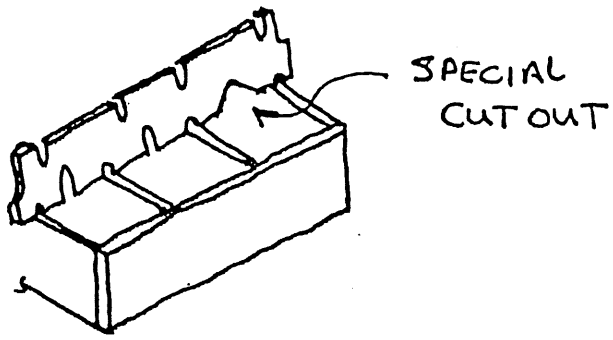
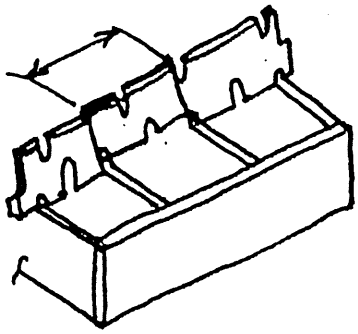
## Change the Shape of the Strike Off Plate

- Cut the plate away to leave more material in hard to fill areas.



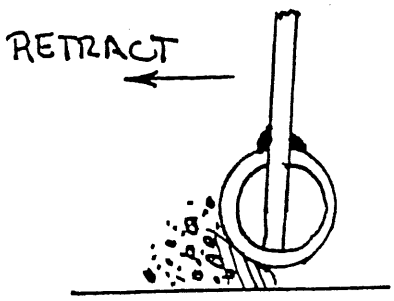

## Cut the Strike Off Plate into Sections

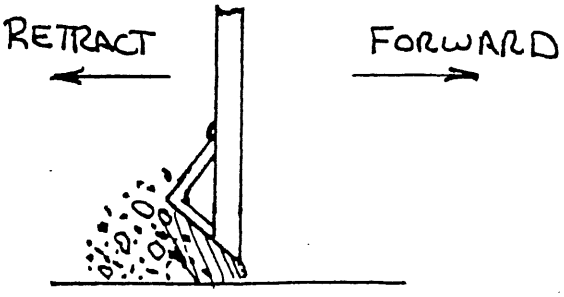
- Cut the scrape off plate into several sections (2, 3, 4, etc.) and adjust each section individually.



## Shape the Bottom of the Strike Off Plate

- Weld a round pipe or angle to the bottom of the Strike Off Plate
- Cut and re-weld the Strike Off Plate at a back angle.
- This will assist in "trawling" the material as the feed drawer retracts. It will also help prevent the material from being dragged out of the front of the mold cavity. This is especially useful on pavers and slab type product.



# Pallet Table

## Reset the Pallet Table Bolt to Bushing Clearance

- Be sure all four corners have the same clearance.
- Try various clearances from 0" to .04" (0 to 1 mm).

## Tight Pallet Table setting Vs Loose Pallet Table setting.

- Tight pallet to mold setting is preferred,
- The Pallet Table bolt and bushing do not make contact during the vibration process This minimizes bolt / bushing wear or damage.

## Instructions for Setting a Tight Pallet Table

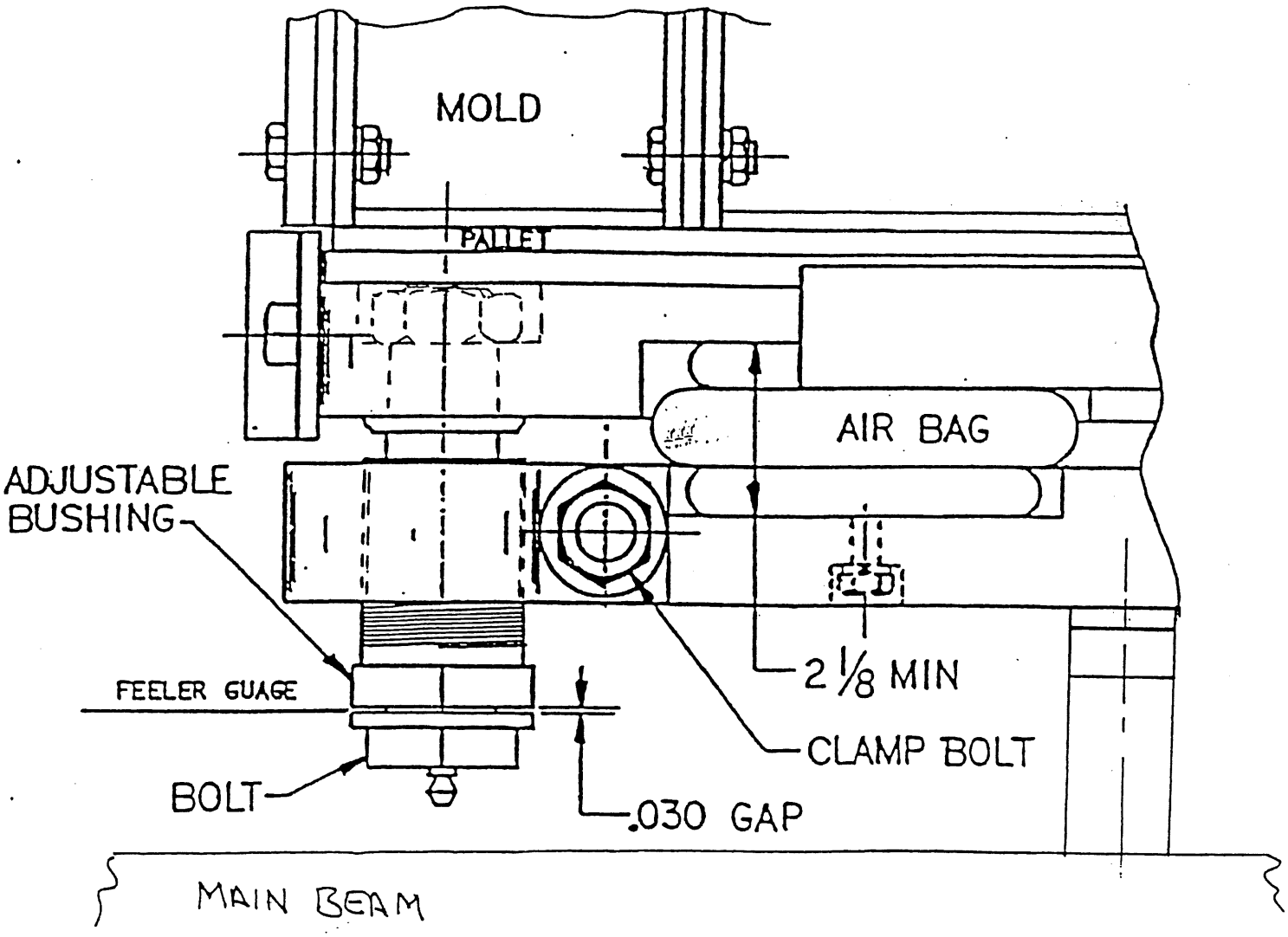
- Vibrator at top dead center (TDC).
- Clean, Flat production pallet on Pallet Table
- Stripper cylinder in up position, holding pallet to bottom of mold.
- Table air bags pressurized no greater than 40 psi (3 Bar)
- Check bolt to bushing clearance using a feeler gauge
- The clearance should be equal on all four corners.
- Clearance should be from 0" to .04" (0 mm to 1 mm)
- Make clearance less if product bulging is a problem.

- With a tight pallet table setting be sure to adjust the low air pressure.
- The low pallet table air pressure should be approximately 40 psi (3 bar)
- The pallet should vibrate between the table and mold during the fill cycle.
- Less air pressure will allow the pallet to vibrate more
- Higher air pressure will restrict the pallet vibration

## Instructions for Setting a Loose Pallet Table

- A loose pallet table setting allows the bolt and bushing to make contact during vibration for both the fill and compression cycles. This restricts the upward movement of the pallet table and allows the pallet to "float" between the pallet table and the mold. This allows the pallet to vibrate against the pallet table and mold. Because the bolt and bushing make contact during the vibration cycles they will wear faster.

- Vibrator at bottom dead center (BDC)
- No pallet on pallet table
- Stripper cylinder in up position, minimum clearance between the pallet table and the mold.
- Pallet Table air bags on low air no greater than 40 PSI (3.0 Bar)
- No gap between the pallet table bolt and bushing
- Check the clearance from the top of the pallet table pad to the bottom of the mold using the gauge provided. The gauge should slide easily at all four corners.
- The gauge is .04" (1 mm) thinner than the steel production pallets.



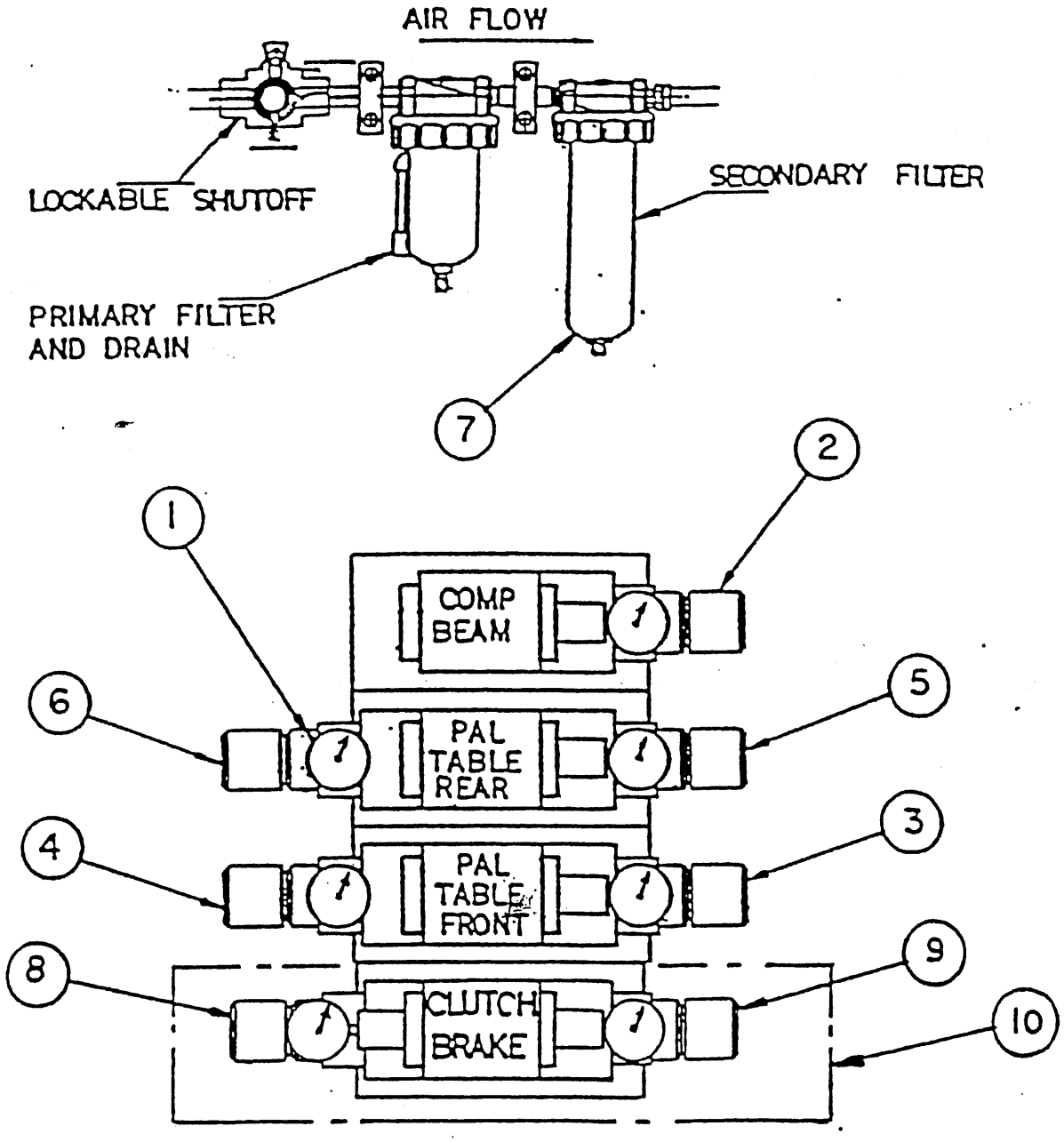
## Pallet Table Air pressure

- Low (fill cycle) pallet table air pressure can be adjusted to give the pallet more or less vibration during the fill cycle.
- The air pressure can also be different from front to back.
- The lower the air pressure the more the pallet will vibrate between the mold and pallet table. Start with the Low air set at 45 to 50 PSI (3.0 - 3.4 Bar)
- If more fill is needed either front or back, lower the appropriate side to increase or decrease the pallet vibration.
- Start with High air set at 80 - 90 PSI (5.5 - 6.0 Bar) Use no more than is required to keep the pallet tight against the mold during the compression cycle.

## Consistent Air Pressure for the Pallet Table Air Bags

- Check the air compressor to be sure it is capable of delivering a consistent amount of air at a consistent pressure to the pallet table air bags. Columbia has found at times that the compressor reservoir is not capable of storing enough air volume for the entire plant especially if used for clean-up during the production process.
- Check to be sure none of the air bags has been mounted upside down
- Check to be sure there is no air leaks from the air bags
  System Air for the plant should be 125 - 130 PSI (8.4 - 9.0 Bar)

# PNEUMATIC SYSTEM




1. Pressure Gauge
2. Compression Beam Regulator
3. Front Low Pressure Regulator
4. Front High Pressure Regulator
4. Front High Pressure Regulator
5. Rear Low Pressure Regulator
6. Rear High Pressure Regulator
7. Air Filter
8. Clutch Pressure Regulator
9. Brake Pressure Regulator
10. Optional Clutch/Brake Control Valve

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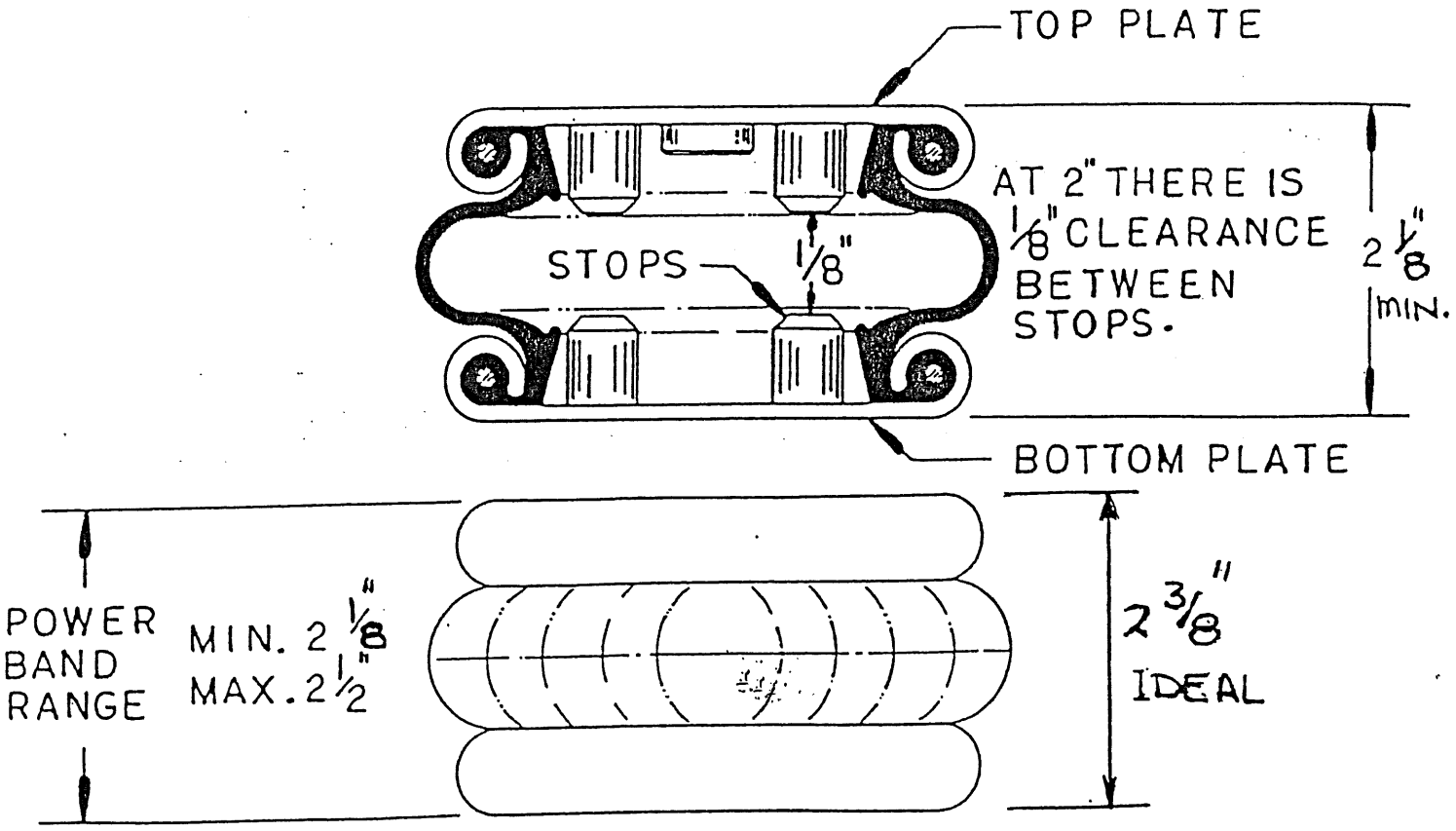
## Be sure the Pallet Table Air Bags are within the Power Zone

- The air bag overall height should be 2-3/8" (60 mm) for optimum operation.
- The minimum is 2-1/8" (54 mm)
- The maximum should be 2-1/2" (64 mm)
- If the height is not correct then add or subtract spacers between the stripper beam and the pallet table saddle.




## Steel Top Pallet Table

- Columbia has found that the polyurethane pad may dampen pallet vibration between the mold and the pallet table.
- A steel top will give a sharper vibration and help to fill the mold easier and in less time.
- If a steel top is used it must be bolted to the pallet table.
- If bolts holding steel top to the pallet table break try cutting the top in half front to back in the middle.

### Pallet Table Maintaince

- Be sure to grease the pallet table bolts and bushings on a regular basis to keep them free running and clean.
- Check the Pallet Table for flatness, especially if bold breakage is a problem.
- Do not over tighten the cross bolts that clamps the pallet table bushings into the saddle. Use silicone sealer to dampen the vibration of the cross bolt.

## Machine Vibrators

### For Machines that have Hydrostatic Vibrator Drives

- Check that the vibrator speed is correct for the type of material being used and product being produced.
- Check that the Acceleration Relief Pressure is set at 3,500 PSI (237 bar)
- Check that the Declaration Relief Pressure is 2,500 PSI.(170 Bar)
- Check that the charge pump pressure is at 350 - 375 PSI (24 - 25 Bar)
- Check that the Acceleration and Deceleration ramp pots are adjusted to give minimum slope. (Maximum Acceleration and Deceleration)
- Check that the maximum speed set for the vibrator is 3,000 RPM, for both the fill and compression speeds. If set over this amount adjust the maximum speed pot.

### The Direction of Rotation of the Vibrator can be changed

- The material may tend to migrate one direction or the other depending on the vibrator direction of rotation.
- Change the direction by changing the wiring or hoses that go to the vibrator drive motor.

### Vibration Delay

- Delay the start of the vibrator until the feed drawer has started over the mold box.
- If fill is low in the front, delay the vibrator start until the feed drawer is all the way forward.

### Double Start Vibrator

- Start and Stop the vibrators between the fill and compression cycles.
- This is especially important for paver and slab production. (Low Height)

### Second Vibration Starter Time

- Be sure the compression head shoes are just ready to contact the material in the mold before restarting the vibrator set on double start. If the vibrator starts too soon the material may "boil" and not consolidate properly. Again especially useful for low height product.

### Belt Slippage or Worn Sheaves

- Polyurethane "V" drive belts can become loose and slip, check the tension on a regular basis.
- If the vibrator drive sheaves have worn the machine may have the incorrect speed (RPM) for the vibrator.

## Mold Vibration

### Machine Foundation Pad

- With floor level machines the concrete foundation pad must be constructed as recommended on the installation drawings.

### Machine Rubber Mounts

- For pit style machines the rubber strips under the edge of the frame should be of the correct durometer and in the correct location.
- For floor level machines the rubber mounts should be installed correctly and all mounts sharing the load of the machine equally.
- Check to be sure the machine is level side to side and front to back
- Mounts should be changed regularly as the rubber hardens with age and use.
- Check to be sure the machine is sitting on the mounts. No material has been allowed to build up under the machine.
- For pit machines check be sure the frame is not rubbing on the pit walls

### Shaker Shaft

- Check that the Shaker Shaft is not Loose. Be sure the large nut on the top of the shaker shaft is tight. A loose shaker shaft can destroy itself, parallel bars or the die supports as well as give inconsistent vibration.
- Check Shaker Shaft Adjustment, be sure you have the shaker shaft length is adjusted properly and the length is the same on both sides of the machine.

## Parallel Bars

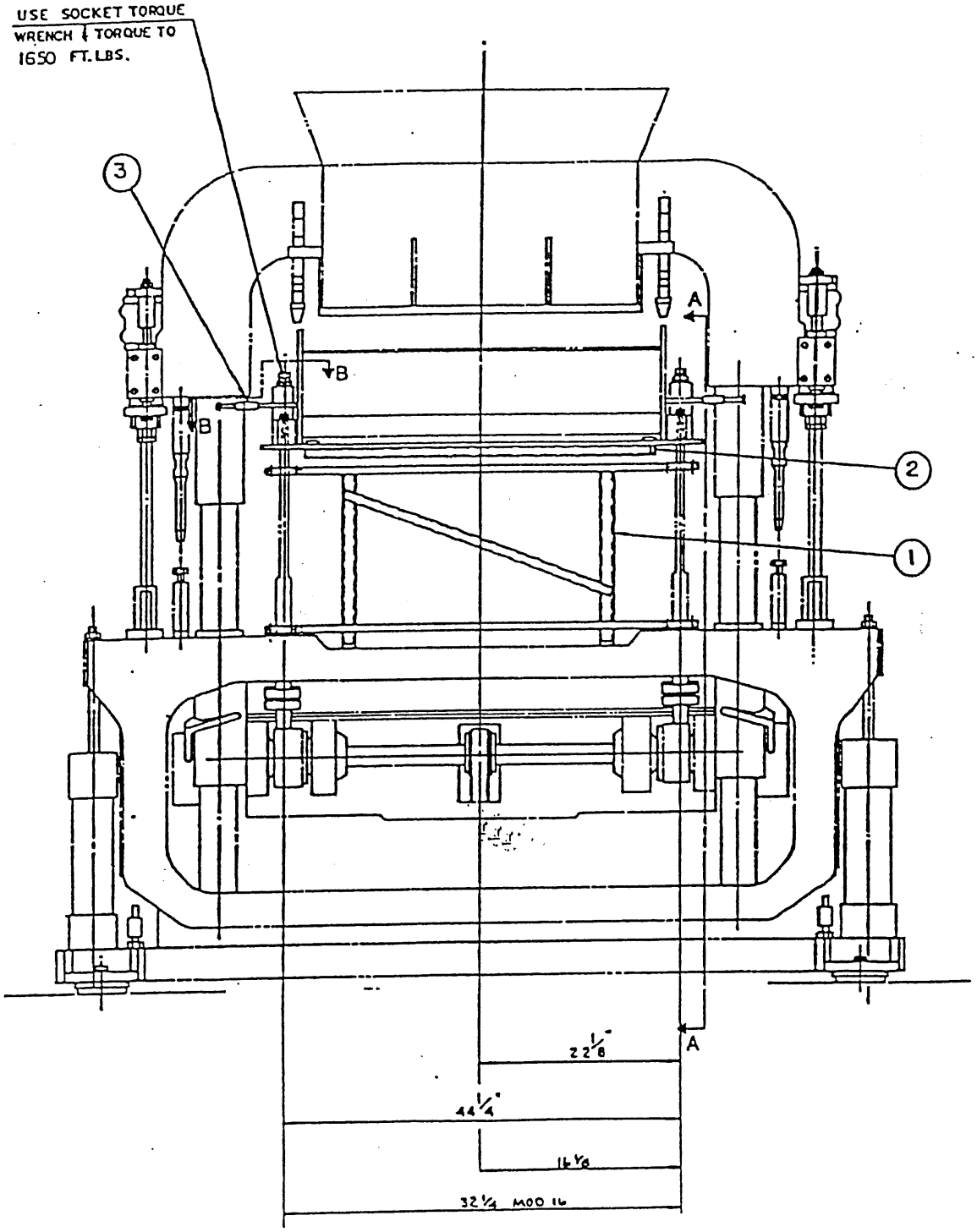
- Check that all parallel or guide bars are in good order and none are broken.
- The Parallel Bars should be flat and have no gaps between them.
- Check the front and back dimension between the sets of parallel bars. Be sure these dimensions are the same (bars are parallel).

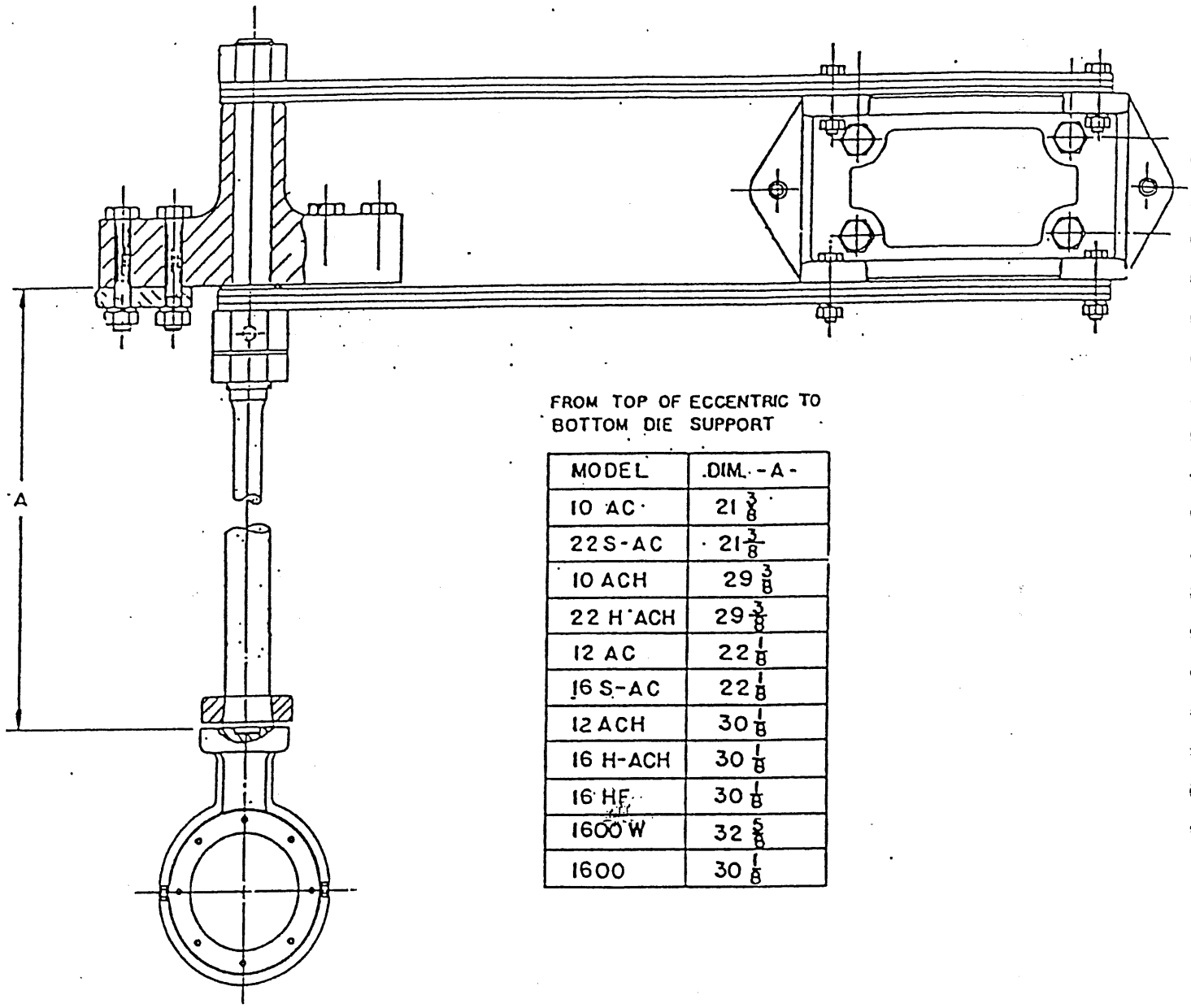
## Free Movement of the Mold

- Check that the mold has complete freedom of movement.
- Do not allow concrete to build between the mold and the machine.
- Be sure there is a gap between the front and rear mold spacer bars.
- Use silicone around the mold to prevent material spillage and to ensure free mold movement.
- Check the side seal (rubber strips) for free movement of the mold.

## Front End Alignment

- Check that the front end of the machine is aligned properly.
- This includes the vibrators, shaker shafts, die supports, parallel bars, etc.
- Use the alignment fixtures to realign the front end when any of the above items are replaced.
- Be sure the shaker shafts are parallel and vertical, and drop into the divots in the top of the vibrator eccentric housings.
- Columbia has a video and alignment jigs to assure proper alignment.


USE SOCKET TORQUE WRENCH & TORQUE TO 1650 FT. LBS.
3
A
B
B
2
1
A
22 1/8"
44 1/4"
16 1/8
32 1/4 M00 16




FROM TOP OF ECCENTRIC TO BOTTOM DIE SUPPORT

| MODEL | DIM. -A- |
|---|---|
| 10 AC | 21 3/8 |
| 22 S-AC | 21 3/8 |
| 10 ACH | 29 3/8 |
| 22 H ACH | 29 3/8 |
| 12 AC | 22 1/8 |
| 16 S-AC | 22 1/8 |
| 12 ACH | 30 1/8 |
| 16 H-ACH | 30 1/8 |
| 16 HF | 30 1/8 |
| 1600 W | 32 5/8 |
| 1600 | 30 1/8 |

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# Feed Drawer

## Change the Feed Drawer Dwell Time

- Adjust the amount of time the feed drawer is left out over the mold box.
- A longer dwell time will increase the amount of fill.

## Change the Speed of the Back Stroke

- Usually slow the feed drawer cylinder down on the return stroke to prevent material from dragging out of the front of the mold "scalping".

## Oscillation of the Feed Drawer

- Use an oscillation of the feed drawer to help break up material "bridging".
- Use oscillations to fill large volume molds
- Use oscillations to fill hare to fill mold shapes
- Use oscillations to bringing more material to the front part of the mold

## Feed Drawer Ramp

- On some machine models a small ramp section can be installed. This will raise the feed drawer at the forward most traveled of the feed drawer . This will lift the feed drawer and strike off and deposit more material in the front of the mold. This requires modification of the feed drawer rails and hold downs.

## Feed Drawer Cylinder Cushions

- Adjust the feed drawer cylinder cushions properly. This will prevent the feed drawer from slamming forward or back.

## Feed Drawer Clean-Out

- Clean out the front of the feed drawer on a regular basis to allow the feed drawer to travel fully forward and not be lifted or slowed by material build-up.
- Consider adding a push back pan option to automatically push the material back into the mold each cycle.
- Keep minimum clearance between the for the strike-off bar and the mold core bars.
- Adjust the front pan to just clear the strike-off bar.

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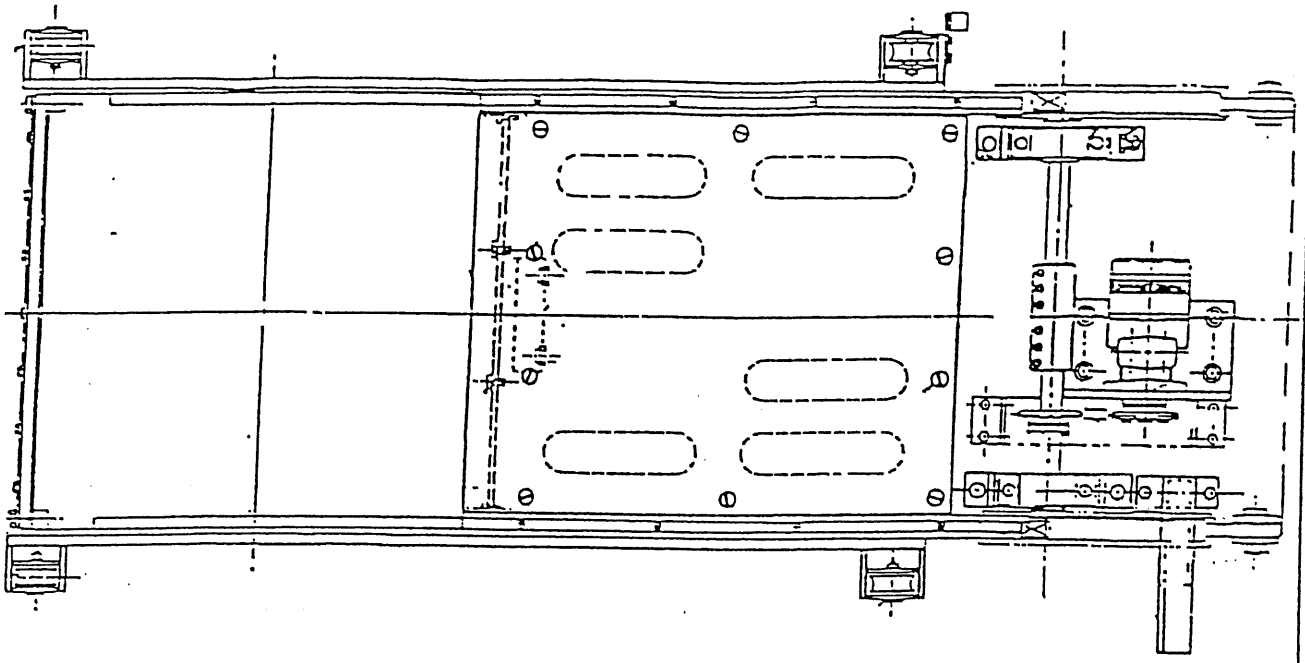
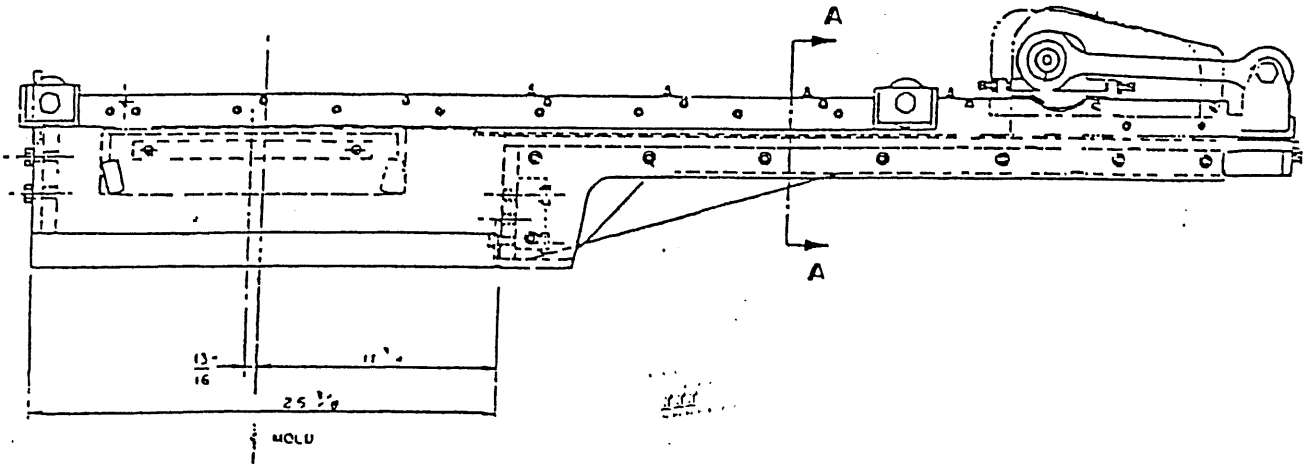
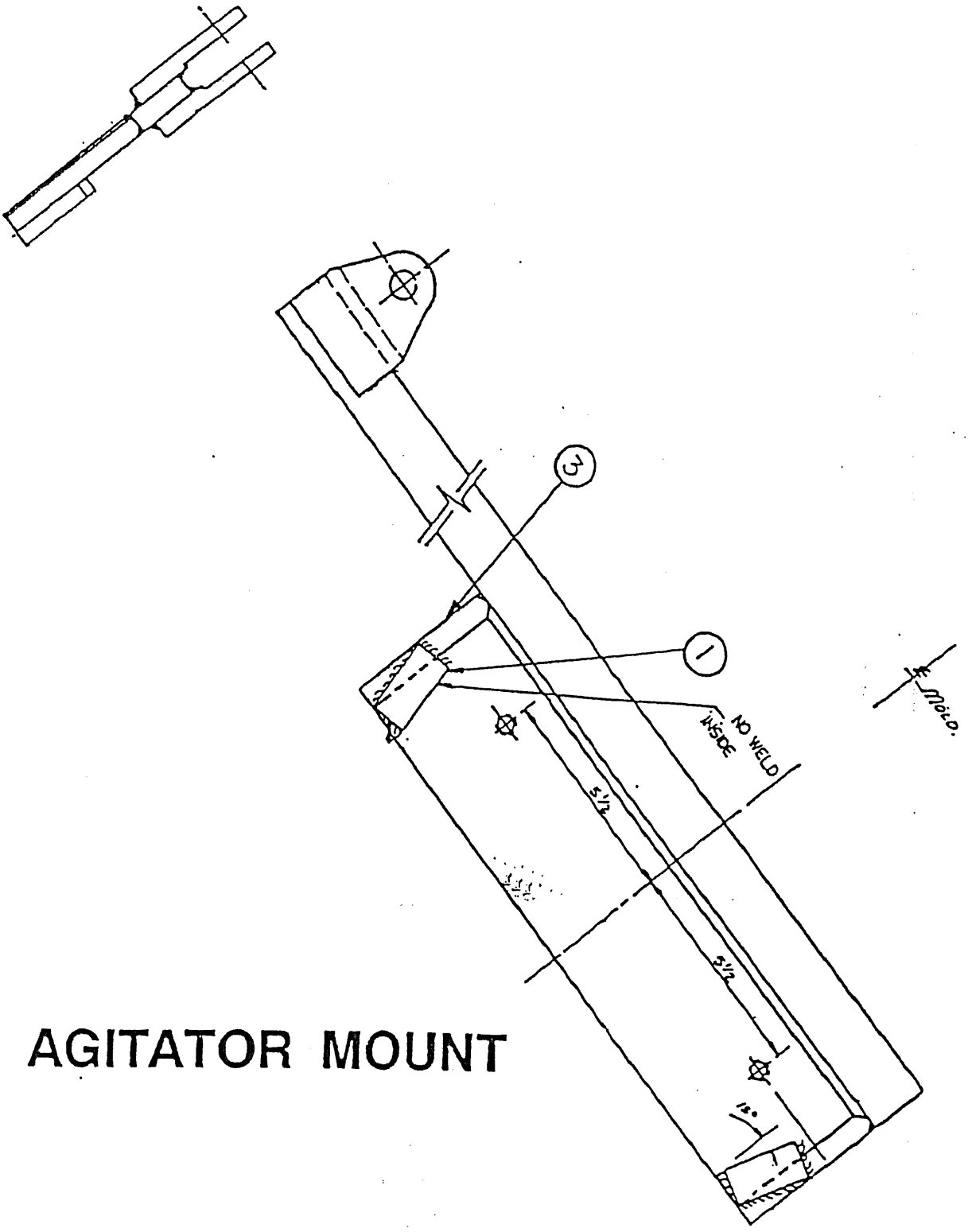
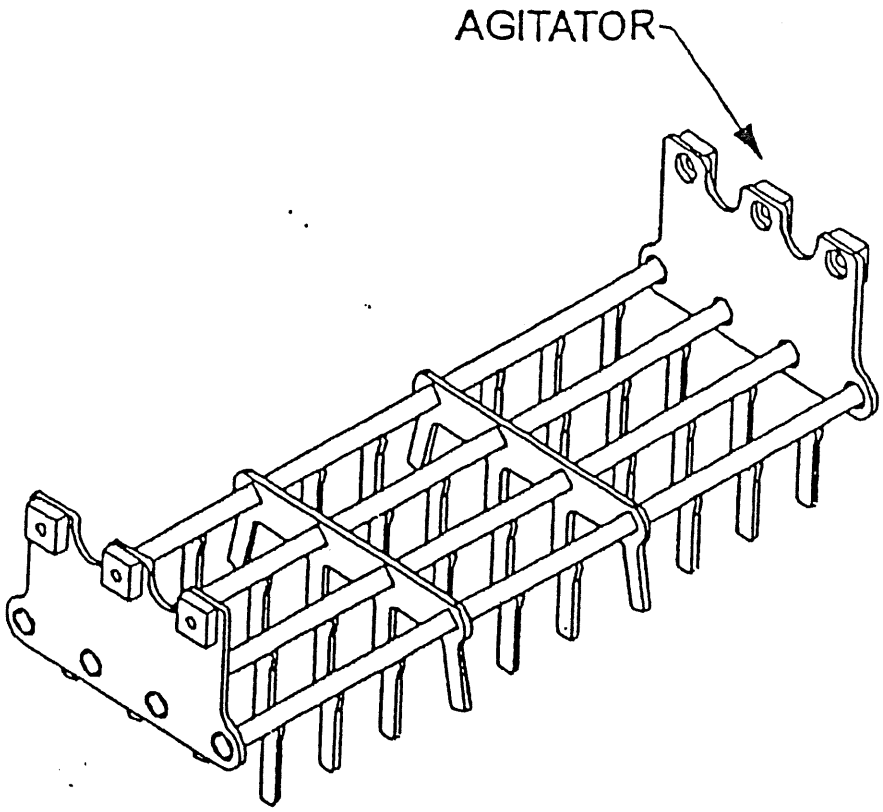


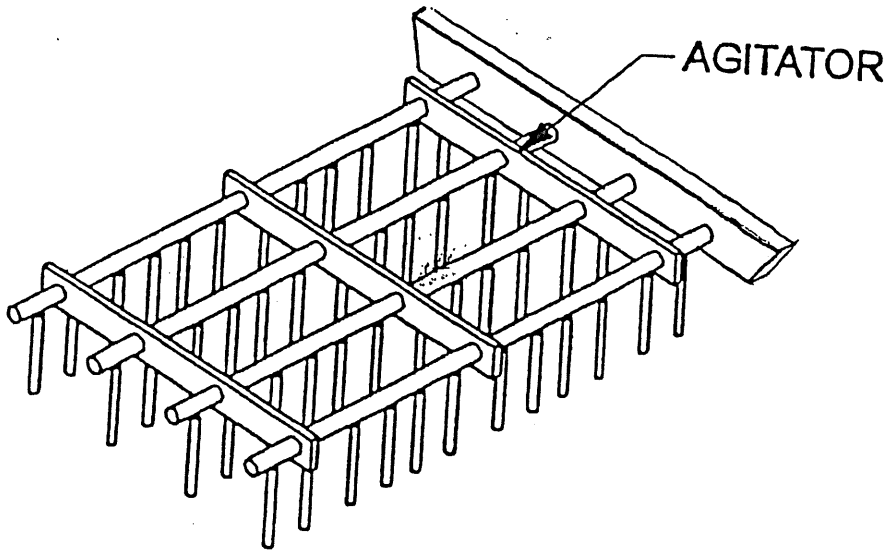



# AGITATOR MOUNT




# AGITATOR MOUNT


AGITATOR


AGITATOR

# Agitator

## Correct Agitator Rake

- Be sure the rake fitted to the machine is the correct one for the mold configuration being used.

## Delay the Agitator Start

- Delay the start of the agitator until the feed drawer is out over the mold. This will help bring more material forward and help prevent overfill at the back of the mold.

## Delay Agitator Stop

- Adjust the amount of time the agitator runs to ensure proper mold fill.

## Speed of Agitator

- With an hydraulic agitator drive, adjust the speed via the flow control.
- With an electric drive, change the ratio of the v-belt pulleys to get the optimum speed for your material and product.

## Clean the Agitator Rake

- Clean any build up from the agitator rake fingers and cross bars to allow free flow of material.
- It may be necessary to do this frequently for some materials or products.
- Be sure to remove all power and lock-out machine before starting cleaning procedures.

## Agitator Direction of Rotation

- Change the direction of the rotation.
- At times material migration can be affected.

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## Modify the Agitator

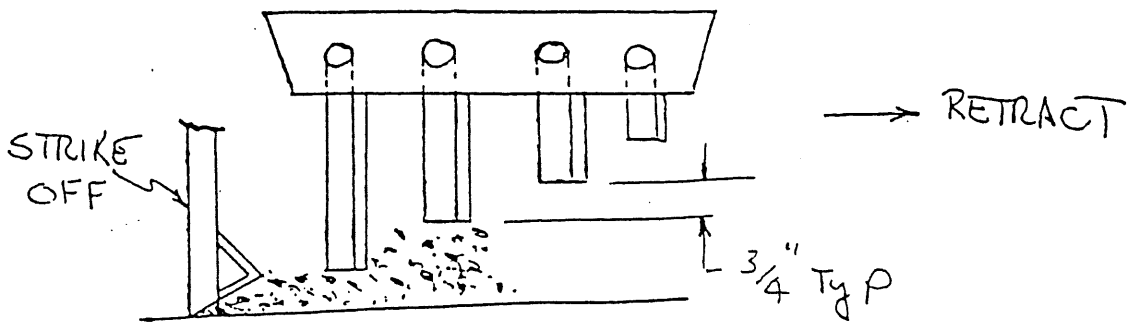
- Modify the Agitator fingers:
- Change the length of the fingers (add or subtract)
- Add or Remove Agitator fingers
- Change the location of the fingers,
  - Try locating fingers over the mold cavity
  - Try locating fingers over mold divider plate
- Change direction of the fingers
  - Bend forward or back or to the side
  - Fingers do not all need to hang straight down.

- Agitator Cross Bars
  - Vary number of cross bars 2, 3, or 4
  - Vary spacing of cross bars, can be even or varied

- Add material deflectors
  - Angles, bars, plates horizontal or vertical etc.
  - This will prevent overfill in some areas of the mold
- Remove the agitator
- Replace it with a stationary baffle or set of baffles
- Do not run the agitator (keep it stationary to carry material forward)

- Agitator Mounting
  - Use the current tapered end bar mount for a more positive movement
  - The older rod in cup design allowed agitator rock and wore more quickly

- Agitator Drive Maintaince
  - Grease slide bars on a regular basis.
  - Be sure the bearings are greased properly and are free moving.
  - Check belt or chain tension and adjust if necessary



# Machine to Mold Alignment

- Check to be sure the shaker shafts are vertical front to back and side to side.
- Check to be sure the shaker shafts align with the vibrator eccentric housings. The button on the bottom of the shaker shafts must fit the dimple of the vibrator eccentric housing without force.
- Check that the bottom of the mold surface is ninety (90) degrees to the face of the machine frame (box).
- Check that the distance from the bottom of the mold to the top of the pallet on the pallet table is the same for all four corners.
- Check to be sure the mold end brackets and die supports are not worn. Both surfaces must be flat to hold mold alignment and prevent excessive force into the shaker shaft and vibrator.

# Mold

## Modify the Core Bar Clip

- Cut relief and bevel core bar at a 45 degree angle over the mold cavity.
- This is done to assist the flow of material under the core bar
- It also helps to prevent material build up under the core bar.

## Prevent Loose Mold Bolts

- Be sure all mold bolts are tightened properly.
- Use the recommended grade of hardware
- Use lockwashers where recommended
- Use loctite as recommended to help keep bolts tight.
- Loose bolts can dampen vibration to the mold and hinder filling.

## Worn Mold Partician Plates and End Liners

- Make sure the mold is not excessively worn.

## Mold Configuration

- Some mold configurations with various types of product in the same mold box can hinder consistent mold filling.

## Steel Bar on Top of the Mold

- Weld (E70 Low Hi) a steel bar 1" (25mm) wide x (3/16" (5 mm)) thick to the front and or back of the mold.
- This will help in capturing the material better and prevent "scalping" of the material as the feed drawer retracts.
- This increases the "overfill" capabilities of the mold.

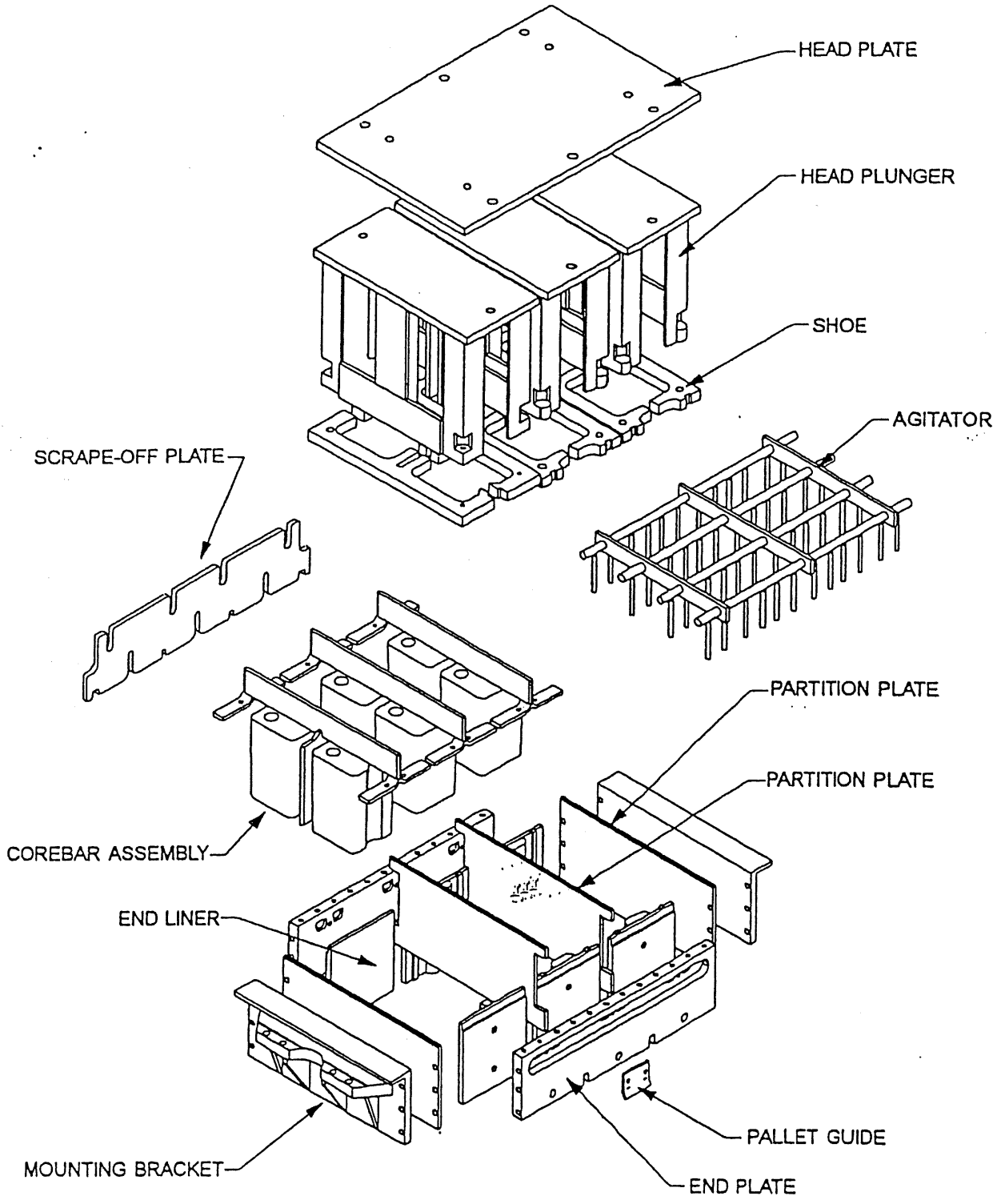
## Scalloped Partition Plates

- This can work to help fill the mold by breaking up the "bridging" material over the top of the mold.

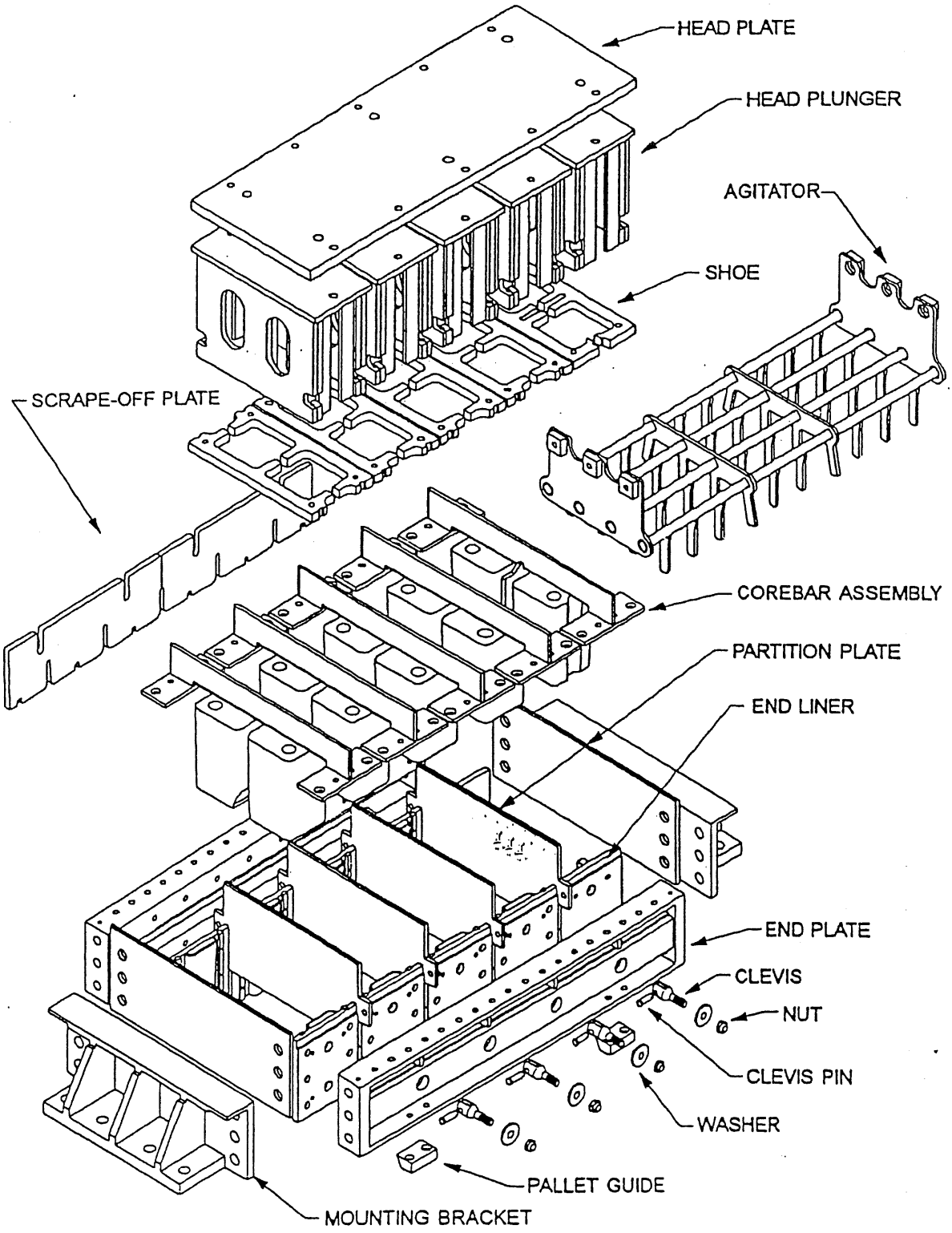
## Higher Partition Plates

- This can help to stop too much fill in the mold by restricting flow into certain areas.

# Model 16 Style Mold



# Model 50 Style Mold



### Mold Positive Taper

- Be sure the mold is assembled with the bottom opening the same or slightly larger than the top, never the other way around.

## Machine Material Hopper

- For machines that have a material hopper there is a Baffle inside.
- Adjust the baffle hopper opening according to the type of product being manufactured.
- A large opening for block and a smaller opening for pavers or slabs.

## Material Meter Feed Belt

### Add a Material Meter Feed Belt

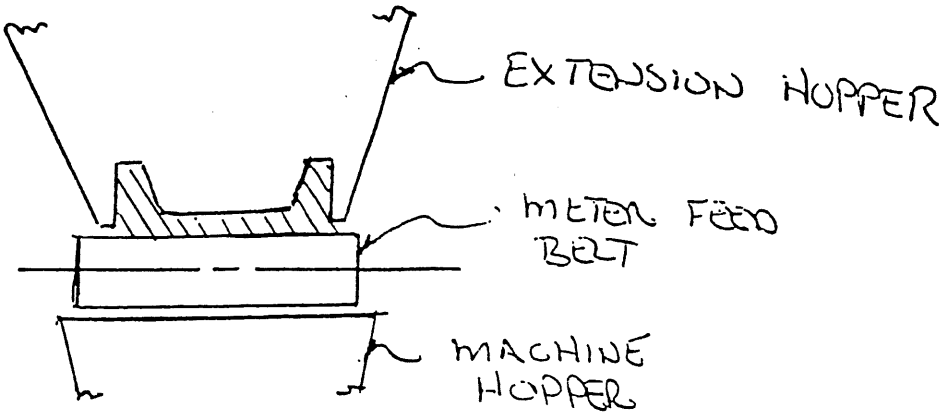
- This will ensure even flow of material into the machine hopper and or feed drawer.
- This will give a more consistent material density in the hopper and feed drawer.
- This will help produce concrete products with a more even density.

### Adjust the Meter Belt

- Adjust the meter belt to add material once per cycle for best consistency.

### Contour Material Out of the Meter Feed Belt

- Cut the opening of the meter feed belt hopper to allow more material on the sides than in the middle.
- This is done by contouring the material forming plate at the discharge of the mud hopper.



# Miscellaneous

## Mix Design

- Poor mix design will hinder flow of material into the mold.
- If the mix has too many fines it becomes "sticky" and will not flow properly.
- Too few fines and the mix will not hold its shape and may cause bulging.

## Moisture

- If the mix has too much water it may "ball" up and not flow properly.
- Too little water and the mix will not hold together.

## Mix Sequence

- An incorrect mix sequence can mean poor mixing and thus material will not flow properly.
  - Dry Blending of the aggregate
  - Pre-Wet of light weight aggregate
  - Cement addition and dry blending to prevent balling
  - Water addition, quantity, speed, distribution
  - Color, Admix... type and quantity
  - Final Mix time
  - Etc.

## Push Back Pan Device

- This device has been used to assist the filling of the front of the mold. After the feed drawer has gone back, it is possible to then tell the push back pan to come forward and put material into the front of the mold. This device will also keep the front of the feed drawer cavity clean and allow the feed drawer to come fully forward more consistently.

## Auto Density

- This can assist in keeping consistency in the product density by adjusting the feed drawer dwell time automatically.

## Bent, Warn, Varying Thickness of Pallets

- These all can have ill effects on the filling and consistency of concrete product production.

## SETTINGS FOR CONC. PROD. #

| | | | | | |
|---|---|---|---|---|---|
| ___VIBRATOR _____sec. | ___AGITATOR_____sec. | CEMENT_____lbs/kg. |
| ___FD DWELL _____sec. | ___VIB 2 START_____1/0 | FLYASH_____lbs/kg. |
| ___RELEASE_____sec. | ___1st. VIB_____sec. | LITE WT._____lbs/kg. |
| ___DENSITY_____sec. | ___2nd. VIB_____sec. | SAND_____lbs/kg. |
| ___1ST REFEED_____sec. | ___1 OSC DWL_____sec. | GRAVEL_____lbs/kg. |
| ___2nd REFEED_____sec. | ___2 OSC DWL_____sec. | COLOR_____ |
| ___3RD REFEED_____sec. | ___3 OSC DWL_____sec. | ADMIX_____ |
| ___SLUMP_____1/0 | ___SLUMB VIB_____sec. | |

Low Air (F)_____F_____R High Air (F)_____F_____R Comp. Head Air (F)_____

Strike Off Height_____Inches/mm FILL_____RPM COMP._____RPM

NOTES:_____

COLUMBIA MACHINE, INC. • 107 GRAND BLVD. • VANCOUVER, WA 98661 • PHONE 206-694-1501 • 10/93

## T-CAM FUNCTIONS

| | | |
|---|---|---|
| V1 = | AUTO DENSITY | 0 = OFF; 1 = ON |
| V2 = | VIB. DOUBLE START | 0 = OFF; 1 = ON |
| V3 = | # OF OSCILLATIONS | |
| V4 = | SLUMP | 0 = OFF; 1 = ON |
| V5 = | VIBRATOR DELAY | |
| V6 = | AGITATOR DELAY | |
| V7 = | FEED DRAWER DWELL | |
| V8 = | RELEASE TIME | |
| V9 = | DESIRED COMPRESSION TIME | |
| V10 = | REFEED TIME 1st OSCILLATION | |
| V11 = | REFEED TIME 2nd OSCILLATION | |
| V12 = | REFEED TIME 3rd OSCILLATION | |
| V13 = | OSCILLATION #1 DWELL TIME | |
| V14 = | OSCILLATION #2 DWELL TIME | |
| V15 = | OSCILLATION #3 DWELL TIME | |
| V16 = | 1st. VIB. TIME | |
| V17 = | 2nd VIB. TIME | |
| V18 = | SLUMP VIB. STOP TIME | |
| V19 = | AGITATOR STOP TIME | |
| V20 = | COMPRESSION HEAD UP END OF CYCLE | 0 = OFF; 1 = ON |
| V22 = | TWO STAGE HEIGHT STOP | 0 = OFF; 1 = ON |
| V24 = | LAST FEED DRAWER DWELL TIME | |
| V25 = | LAST CYCLE TIME | |
| V26 = | PALLET COUNT | |
| V27 = | ACTUAL COMPRESSION TIME | |
| V34 = | BLOCK MACHINE IN AUTO TIME | |
| V35 = | BLOCK MACHINE INTERLOCK TIME | 0 = OFF; 1 = ON |
| V36 = | PALLET BYPASS | 0 = OFF; 1 = ON |

# SETTINGS FOR CONC. PROD. #

Vibrator. . Vibrator Delay Time, in seconds, from the time the Feed Drawer leaves the F.D. back switch until the Vibrator First Starts .

Agitator..... Agitator Delay Time, in seconds, from the time the Feed Drawer leaves the F.D. back switch until the Agitator Starts

FD Dwell..... Feed Drawer Dwell is the Time, in seconds, that the Feed Drawer is on the F.D. Forward Switch.

Vib 2 Start..... Double Start Vibrator, On (1) / Off (0). Usually used for low height products i.e. Pavers.

Release..... Release Time, in seconds, form the time Both Height Stops have made Contact until the Strip of the Product Begins

1st Vib . . First Vibration Time, in seconds, from the Start of the Vibrator until the Vibrator Stops, when the Double Start Vibrator Option has been Selected.

2nd Vib.. ...Second Vibration Time, in seconds, from the time the Compression Head Starts Down until the Vibrator Starts Again, when Double Start Vibrator Option has been selected. Usully enough time for the head to contact material in the Mold.

Refeed Refeed Time #1, 2, or 3 is the Time, in seconds, from the Feed Drawer Back Signal until the Feed Drawer is sent Forward again

Osc Dwell Oscillation Dwell Time #1, 2, or 3 is the Time, in seconds, that the Feed Drawer stays on the Feed Drawer Forward Switch

Slump Activate Slump Mode, On(1) / Off(0). This Mode Allows the Slump Vibration Timer to Strip Product once the Slump Vibration Time has expired . irregardless of Height Stops

Slump Vib Slump Vibration Time, in seconds, from the F.D Back Signal until the Vibrator is stopped and the Product is Stripped, irregardless of Height Stops

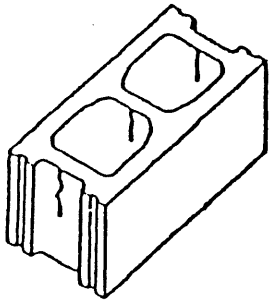
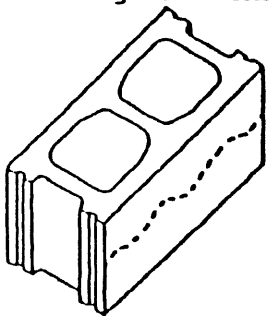
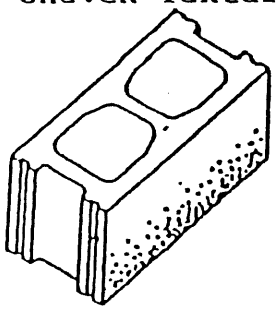
| DEFECT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Core Bar Cracks  | • Incorrect filling of mold | Check DENSITY setting |
| | • Weak block mix | Check for proper mix composition |
| | • Pallet table-to-mold clearance incorrect | Check clearance (refer to para. 3.5) |
| | • Mold core bars loose | Check and adjust |
| | • Residue buildup under core bars | Clean mold |
| Irregular Lines  | • Irregular vibration | Check vibrators for defective bearing |
| | • Loose mold or shaker shaft | Check mounting bolts for tightness |
| | • Concrete residue restricting mold movement | Remove residue |
| | • Worn mold components | Replace mold |
| Uneven Texture  | • Feed drawer dwell too short | Increase DENSITY setting |
| | • Pallet table low pressure too low | Increase low pressure |
| | • Material segregated in hopper | Check for proper mix compositio |
| | • Scrape-off plate improperly adjusted | Adjust for proper mold clearance |
| | • Pallet table-to-mold clearance incorrect | Check clearance (refer to para. 3.5) |
| | • Irregular vibration | Check vibrators for defective bearings |
| | • Compression beam air pressure too high | Decrease air pressure |

TABLE II PRODUCT TROUBLESHOOTING (Cont.)

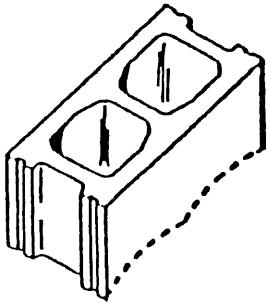
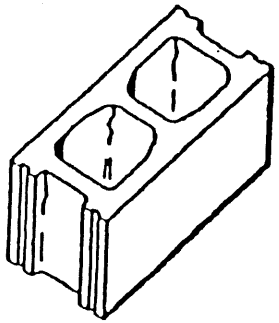
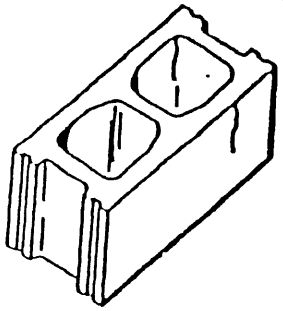
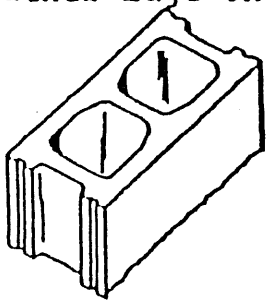
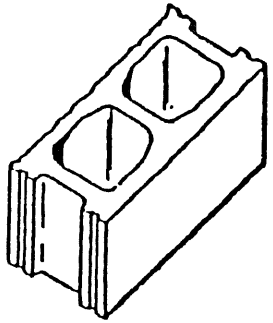
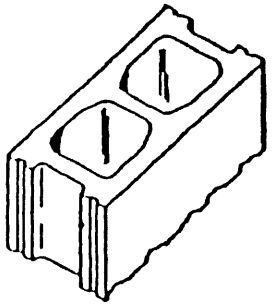
| DEFECT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Block Sucking In  | • Block mix too wet | Check for proper mix composition |
| | • Main beam flow valve improperly adjusted | Check adjustment |
| | • Clogged venting plunger holes in mold core bars | Clean plunger holes |
| Web Cracks  | • Pallet table pressure settings incorrect | Adjust settings as required |
| | • Feed drawer dwell too short | Increase DENSITY setting |
| | • Pallet table-to-mold clearance incorrect | Check clearance (refer to para. 3.5 ) |
| | • Worn mold components | Replace mold |
| | • Compression beam air pressure too high | Decrease air pressure |
| Wall Cracks  | • Pallet feeder start-stop too abrupt | Adjust flow valve cams |
| | • Take-away conveyor elevator improperly aligned with pallet table | Check height alignment |
| | • Incorrect filling of mold | Check DENSITY setting |
| | • Weak block mix | Check for proper mix composition |

TABLE II PRODUCT TROUBLESHOOTING

| DEFECT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Feather Edge on Bottom  | • Pallet table high pressure too low<br>• Hydraulic supply pressure too low<br>• Pallet table-to-mold clearance not correct<br>• Defective stripper check valve | Increase high pressure air<br>Check pump output pressure and accumulator charge pressure<br>Check clearance (refer to para. 3.5)<br>Refer to hydraulic system troubleshooting |
| Feather Edge on Top  | • Plunger shoes improperly aligned<br>• Scrape-off plate improperly adjusted | Check for equal shoe-to-mold clearance (refer to para.3.4)<br>Adjust for proper mold clearance. |
| Loose, Flaky Bottom  | • Pallet table high pressure too low<br>• Block stripped too early<br>• Pallet table-to-mold clearance incorrect<br>• Block mix too dry | Increase high pressure<br>Increase RELEASE setting<br>Check clearance (refer to para 3.5)<br>Check for proper mix compositi |

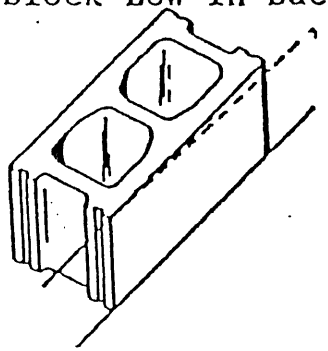
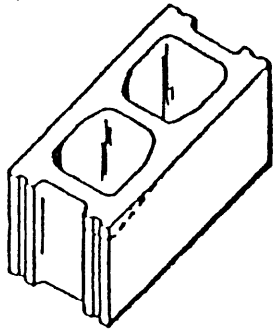
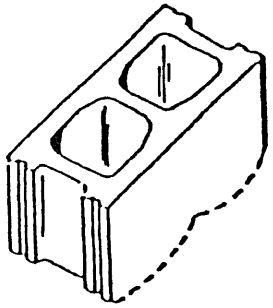
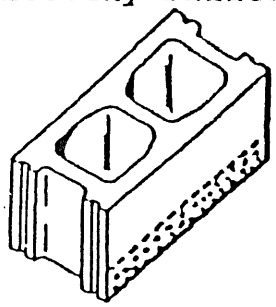
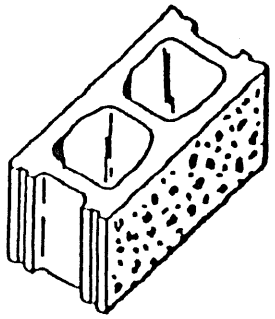
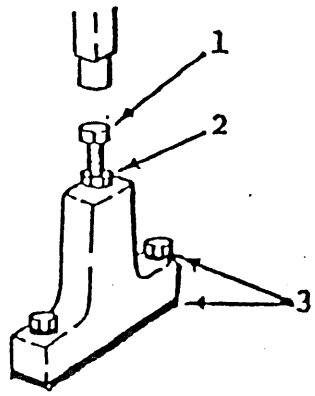
| DEFECT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Block Low in Back  | • Feed drawer dwell too short<br>• Pallet table pressure settings incorrect<br>• Concrete residue restricting mold movement<br>• Pallet table-to-mold clearance incorrect | Increase DENSITY setting<br>Adjust settings as required<br>Remove residue<br>Check clearance (refer to para. para. 3.5) |
| Low Front Corners  | • Inadequate mold fill<br>• Vibrator delay too short<br>• Residue buildup in feed drawer<br>• Concrete residue restricting free mold movement | Increase Oscillation setting<br>Increase Vibrator setting<br>Clean out feed drawer<br>Remove residue |
| Block Bulging  | • Blocks stripped too early<br>• Feed drawer dwell too long<br>• Scrape-off plate improperly adjusted | Increase RELEASE setting<br>Decrease DENSITY setting<br>Adjust for proper mold clearance |

TABLE II PRODUCT TROUBLESHOOTING (Cont.)

| DEFECT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Loosely Filled Bottom  | • Pallet table low pressure too low<br>• Scrape-off plate improperly adjusted<br>• Residue buildup around mold<br>• Pallet table-to-mold clearance incorrect<br>• Irregular vibration | Increase low pressure<br>Adjust for proper mold clearance<br>Remove residue<br>Check clearance (refer to para 3.5)<br>Check vibrators for defective bearings |
| Porous Blocks  | • Material segregated in hopper<br>• Improper block mix composition<br>• Scrape-off plate improperly adjuated<br>• Loose mold, vibrator, or shaker shaft | Check for proper mix composition<br>Add more fines to mix<br>Adjust for proper mold clearance<br>Check mounting bolts for tightness |
|  | BLOCK HEIGHT INCORRECT OR ERRATIC<br>• Electronic height stops incorrectly adjusted<br>• Insulator(s) (3) defective<br>• Release delay incorrect | Loosen locknuts (2); adjust contact bolts (1) as required<br>Replace insulators<br>Adjust RELEASE setting |

## Performance Check

As blocks are produced, check for required block quality as shown in Figure 6. It is important that each product delivered be consistent. If a discrepancy is noted in the final product and the cause is not readily apparent, consult the troubleshooting section. The defects noted are those that usually result from improper machine setup or variations in block mix material. In cases where more than one cause is listed, the first listing

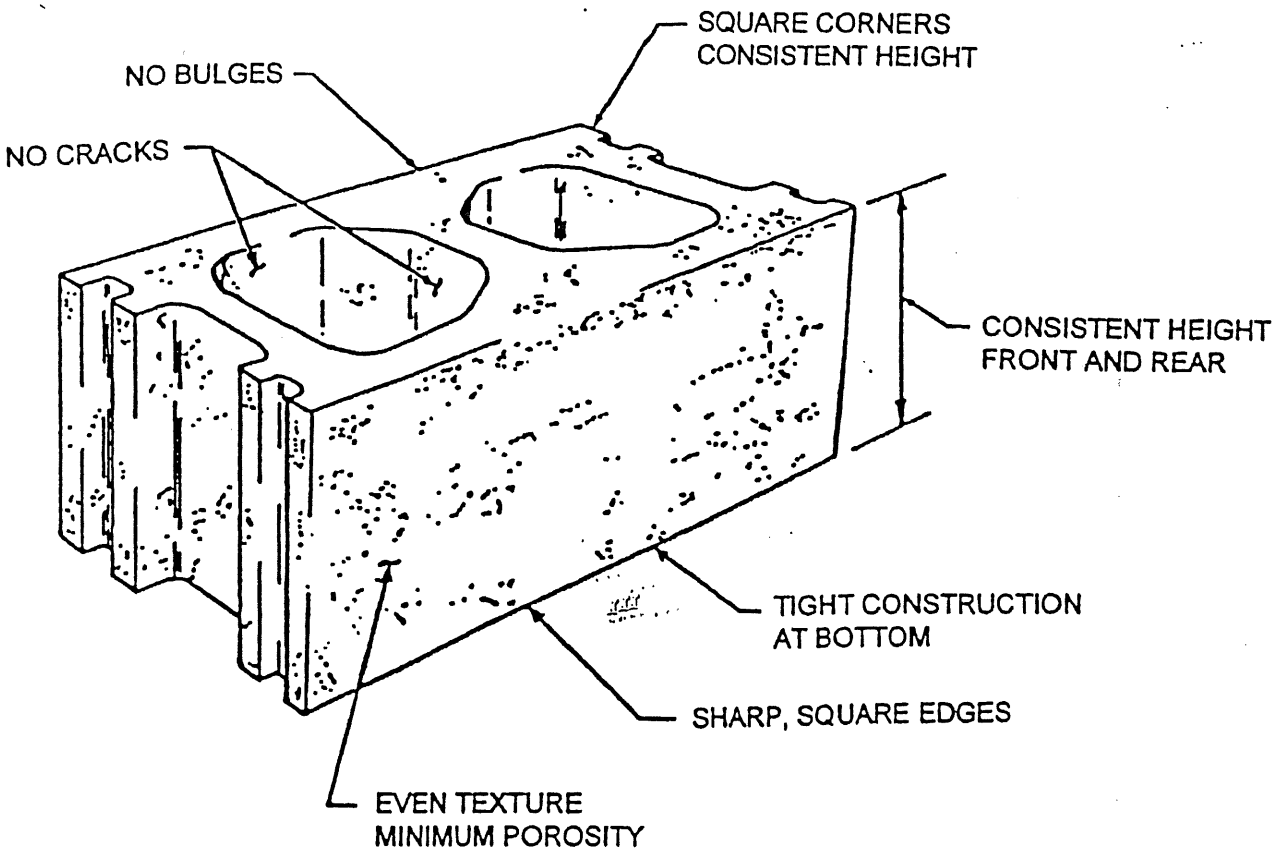



Figure 6, Optimum Block Production Characteristics

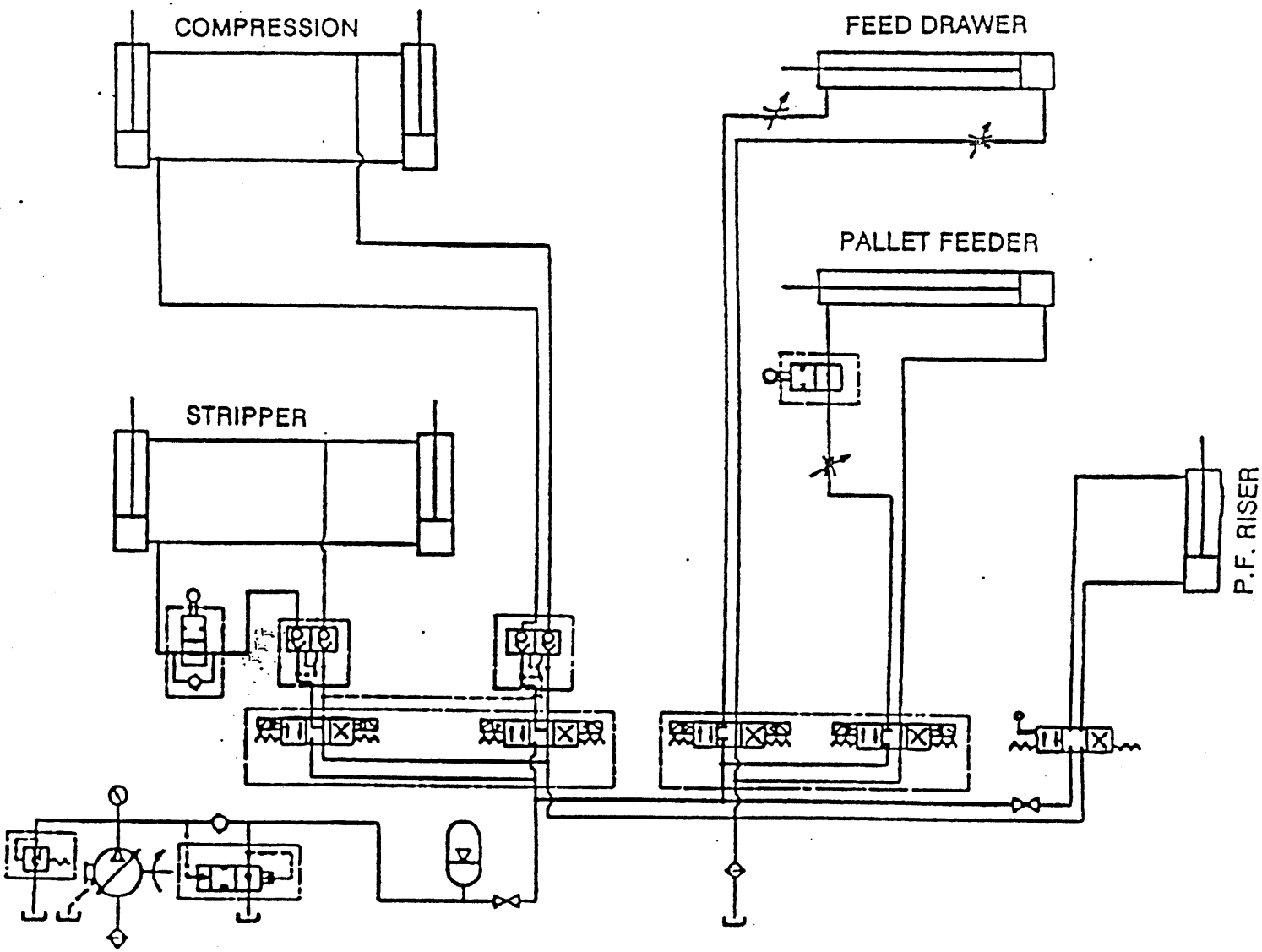



Figure 25, Typical Hydraulic Control

# THEORY OF OPERATION

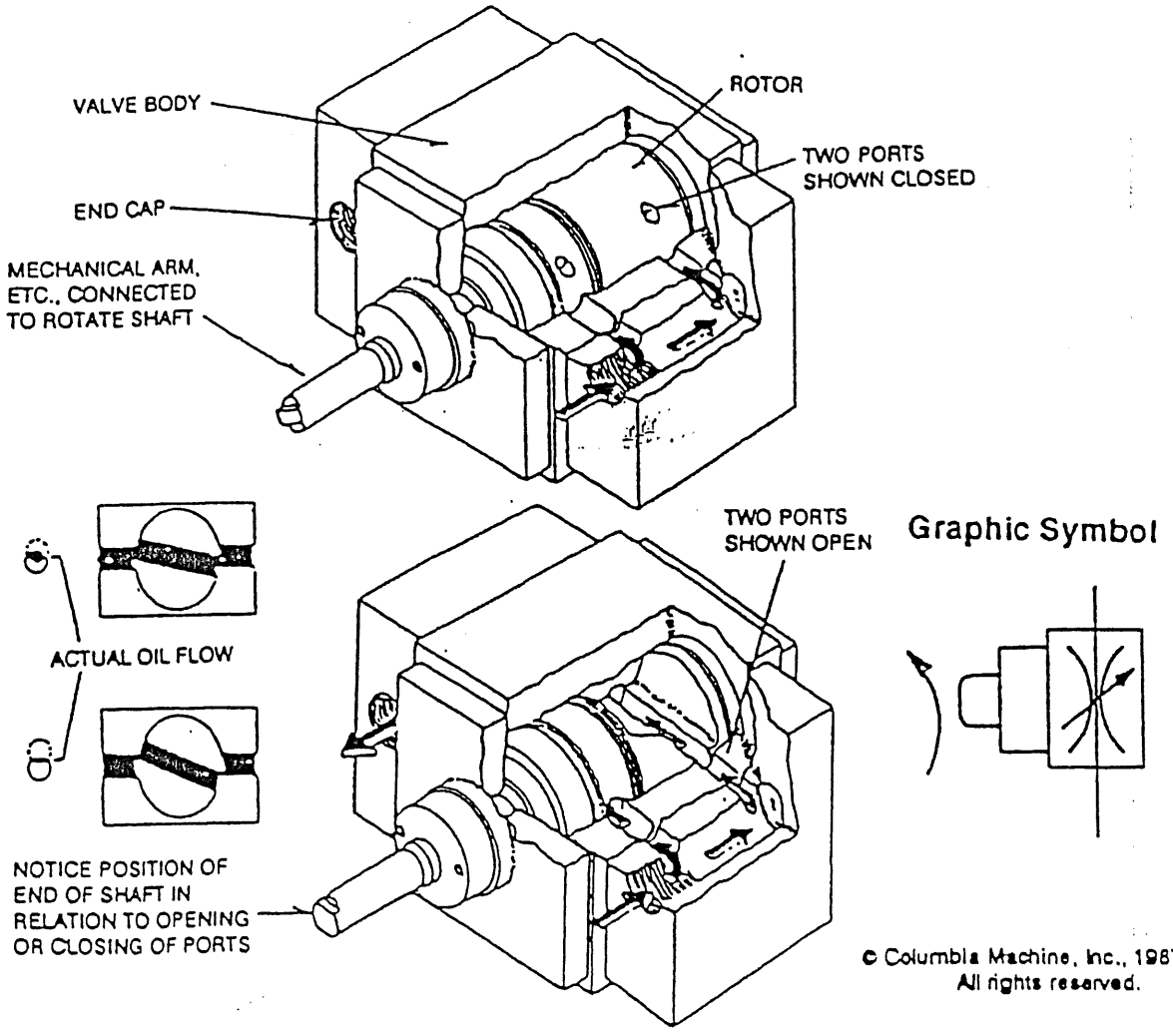
## ROTARY VALVE

### PURPOSE

The purpose of a rotary valve is to control the flow of fluid. It is distinguished from other flow control valves by its variable flow control during equipment operation. In most circuits, the rotary valve is used as a way to decelerate and accelerate an actuator. In some cases it will be used as a cushion.

### OPERATION

Rotary valves are placed in line in a hydraulic circuit. The valve consists of a rotor closely fitted in a valve body. Passages in the rotor connect to, or block, or partially connect to the ports in the valve body to provide variable flow paths. The valve rotor also acts as a shaft. The end of this shaft may be rotated manually or connect to linkage to act automatically during operation.



Racine
fluid power products

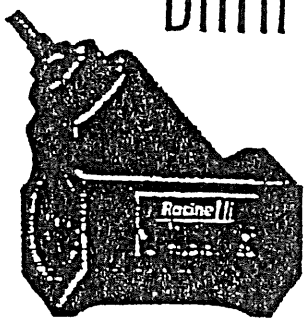
# DATA

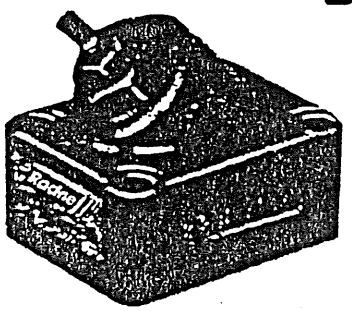
# FLOW CONTROL VALVES
## 1/4" thru 2"

NONCOMPENSATED
ADJUSTABLE

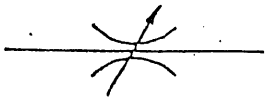
3000 PSI

SUBPLATE MOUNTED
THREADED CONNECTIONS

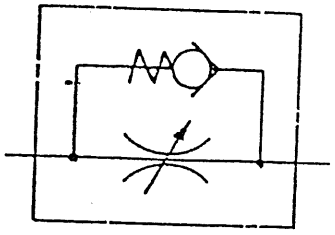




NEEDLE VALVE



NONCOMPENSATED WITH INTEGRAL RETURN CHECK



SYMBOLS

## SPECIFICATIONS

PRESSURE RATING--3000 psi (207 bars, 20.7 MPa)

OPTIONAL INTEGRAL RETURN CHECK VALVE--A flow control with integral return check valve is available. This device allows free flow in the direction opposite the controlled flow pattern. Refer to "How to Order" section.

OPTIONAL HANDWHEEL--This valve model can be furnished with a handwheel mounted to the adjusting screw. Refer to "How to Order" section.

TEMPERATURE--Under normal conditions of continuous operation, fluid temperature should not exceed 130°F (54°C). In no instance should the temperature exceed 160°F (71°C).

FLUID RECOMMENDATIONS--Premium grade hydraulic fluid with 60 SUS (10cSt) to 1000 SUS (216 cSt) viscosity at operating temperature. For detailed fluid information refer to Racine publication S-106, "Petroleum Hydraulic Fluids" and S-107, "Fire Resistant Fluids".

SEALS--Viton seals are standard to allow operation with petroleum base fluids and most fire resistant fluids.

MOUNTING POSITION--Not restricted.

APPLICATION--This series of flow control valves can be used to control the speed of actuators. They are not pressure compensated, therefore, flow rate will vary as the pressure drop changes. Integral return check valve is normally used when the flow control is mounted between the actuator and its directional control valve.

MODIFICATIONS--Consult your local Racine engineering representative or factory for deviation from these specifications.

VALVE WEIGHT (APPROXIMATE)--

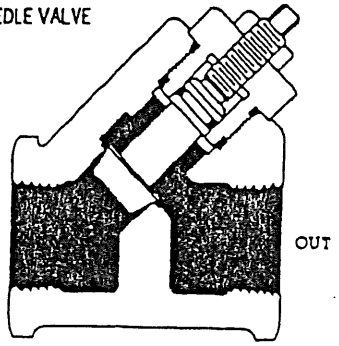
POUNDS (kg)

| PORT SIZE | INLINE MOUNTED | SUB-PLATE MOUNTED |
|---|---|---|
| 1/4" | 1.5 (0.68) | ----- |
| 3/8" | 1.5 (0.68) | 2.4 (1.09) |
| 1/2" | 3.3 (1.50) | ----- |
| 3/4" | 3.3 (1.50) | 5.2 (2.36) |
| 1" | 6.1 (2.77) | ----- |
| 1-1/4" | 6.1 (2.77) | 11.1 (5.03) |
| 1-1/2" | 25 (11.34) | ----- |
| 2" | 25 (11.34) | ----- |

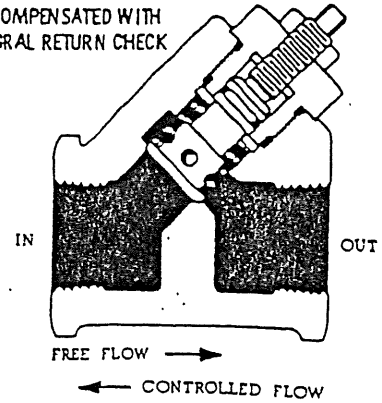
SUBPLATE WEIGHT (APPROXIMATE)—3/8" 2.3 (1.04)
3/4" 6.5 (2.95)
1-1/4" 14.6 (6.62)

## PICTORIALS

NEEDLE VALVE




NONCOMPENSATED WITH INTEGRAL RETURN CHECK



# CONCRETE PRODUCTS MACHINE

Daily Service ... Every (8 - 10 Hr.)

| 1. Grease Block Machine (Remove Excess) | Completed |
|---|---|
| a. Agitator Slide Bars and Bearings | [ ] |
| b. Compression Beam Guide Bushings | [ ] |
| c. Main Column Bushings | [ ] |
| d. Main Shaft Guide Tubes | [ ] |
| e. Pallet Table Bushings | [ ] |
| f. Vibrator Shaft Seals | [ ] |
| g. Push Back Pan Assembly | [ ] |

| 2. Clean Concrete Products Machine | Completed |
|---|---|
| a. Machine Frame Assembly | [ ] |
| b. Pallet Feeder and Pallet Table | [ ] |
| c. Main Pump Unit Assembly | [ ] |
| d. Hydrostatic Pump Unit Assembly | [ ] |
| e. Vibrator Lube Pump Unit Assembly | [ ] |
| f. Vibrator Boots ( no sharp tools) | [ ] |
| g. Under the Machine | [ ] |

| 3. Concrete Products Machine Adjustments | OK | Needs Attention |
|---|---|---|
| a. Check Tension of Vibrator Drive Belt ( don't over tighten ) | [ ] | [ ] |
| b. Inspect Vibrator Drive Belt for Wear | [ ] | [ ] |
| c. Check Hydraulic System and Cylinders | [ ] | [ ] |
| d. Check Limit Switches and Flags | [ ] | [ ] |
| e. Check for Loose Terminals, Nuts, Bolts, Etc. | [ ] | [ ] |

# CONCRETE PRODUCTS MACHINE

Daily Service ... Every (8 - 10 Hr.)

| 4. Check Main Pump Unit Assembly | OK | Needs Attention |
|---|---|---|
| a. Return Filter Gauge | [ ] | [ ] |
| b. Oil Pressure (900 PSI) | [ ] | [ ] |
| c. Oil Level in Tank | [ ] | [ ] |
| d. Oil Temperature (Less than 130 deg. F) | [ ] | [ ] |
| e. Cooling Fan Operation | [ ] | [ ] |
| f. Oil Leaks Around Assembly | [ ] | [ ] |

| 5. Check Hydrostatic Vibrator Drive Unit Assembly | OK | Needs Attention |
|---|---|---|
| a. Charge Pump Pressure (350 PSI) | [ ] | [ ] |
| b. Acceleration Pressure (3500 PSI) | [ ] | [ ] |
| c. Deceleration Pressure (2500 PSI) | [ ] | [ ] |
| d. Oil Level in Tank | [ ] | [ ] |
| e. Oil Filter Indicators ( Qty. 4 ) | [ ] | [ ] |
| f. Oil Level in Overhung Load Adapter | [ ] | [ ] |
| g Oil Leaks Around Assembly | [ ] | [ ] |

| 6. Check Vibrator Lube Pump Unit Assembly | OK | Needs Attention |
|---|---|---|
| a. Oil Pressure ( 25 - 35 PSI Working) | [ ] | [ ] |
| b. Oil Level in Tank | [ ] | [ ] |
| c. Oil Leaks Around Assembly | [ ] | [ ] |

| 7. Check Pneumatic (Air) System Assembly | OK | Needs Attention |
|---|---|---|
| a. Drain Accumulated Moisture | [ ] | [ ] |
| b. Check Air Filter | [ ] | [ ] |
| c. Check Air Pressures | [ ] | [ ] |
| d. Check for Air Leaks | [ ] | [ ] |

# TORQUE VALVES FOR STANDARD INCH CAPSCREWS AND NUTS, FOOT-POUNDS

| NOM. SIZE | THREAD SERIES | D CAPSCR DIA. | A TENSILE STRESS AREA | SAE GRADE 5 CAPSCREWS | | | | SAE GRADE 8 CAPSCREWS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | TENSILE STRENGTH | PROOF LOAD | W CLAMP LOAD | TORQUE (FT.LB.S) | TENSILE STRENGTH | PROOF LOAD | W CLAMP LOAD | TORQUE (FT. LB.S) |
| | | INCHES | IN 2 | MIN. PSI | PSI | POUNDS | LUBED K-0.15 | MIN. PSI | PSI | POUNDS | LUBED K-0.15 |
| 1/4 | 20 UNC | .2500 | .0318 | 120,000 | 85,000 | 2,027 | 6 | 150,000 | 120,000 | 2,862 | 9 |
| | 28 UNF | | .0364 | 120,000 | 85,000 | 2,320 | 7 | 150,000 | 120,000 | 3,276 | 10 |
| 5/16 | 18 UNC | .3125 | .0524 | 120,000 | 85,000 | 3,340 | 13 | 150,000 | 120,000 | 4,816 | 18 |
| | 24 UNF | | .0580 | 120,000 | 85,000 | 3,697 | 14 | 150,000 | 120,000 | 5,220 | 20 |
| 3/8 | 16 UNC | .3750 | .0775 | 120,000 | 85,000 | 4,941 | 23 | 150,000 | 120,000 | 6,975 | 33 |
| | 24 UNF | | .0878 | 120,000 | 85,000 | 5,597 | 26 | 150,000 | 120,000 | 7,902 | 36 |
| 7/16 | 14 UNC | .4375 | .1063 | 120,000 | 85,000 | 6,776 | 37 | 150,000 | 120,000 | 9,567 | 52 |
| | 20 UNF | | .1187 | 120,000 | 85,000 | 7,567 | 41 | 150,000 | 120,000 | 10,683 | 58 |
| 1/2 | 13 UNC | .5000 | .1419 | 120,000 | 85,000 | 9,046 | 57 | 150,000 | 120,000 | 12,771 | 80 |
| | 20 UNF | | .1599 | 120,000 | 85,000 | 10,192 | 64 | 150,000 | 120,000 | 14,391 | 90 |
| 9/16 | 12 UNC | .5625 | .1820 | 120,000 | 85,000 | 11,602 | 82 | 150,000 | 120,000 | 16,380 | 115 |
| | 18 UNF | | .2030 | 120,000 | 85,000 | 12,941 | 91 | 150,000 | 120,000 | 18,270 | 130 |
| 5/8 | 11 UNC | .6250 | .2260 | 120,000 | 85,000 | 14,407 | 115 | 150,000 | 120,000 | 20,340 | 160 |
| | 18 UNF | | .2660 | 120,000 | 85,000 | 16,320 | 130 | 150,000 | 120,000 | 23,040 | 180 |
| 3/4 | 10 UNC | .7500 | .3340 | 120,000 | 85,000 | 21,292 | 200 | 150,000 | 120,000 | 30,060 | 280 |
| | 16 UNF | | .3730 | 120,000 | 85,000 | 23,778 | 225 | 150,000 | 120,000 | 33,570 | 315 |
| 7/8 | 9 UNC | .8750 | .4620 | 120,000 | 85,000 | 29,452 | 320 | 150,000 | 120,000 | 41,580 | 455 |
| | 14 UNF | | .5090 | 120,000 | 85,000 | 32,448 | 355 | 150,000 | 120,000 | 45,810 | 500 |
| 1 | 8 UNC | 1.0000 | .6060 | 120,000 | 85,000 | 38,632 | 485 | 150,000 | 120,000 | 54,540 | 680 |
| | 14 NF | | .6790 | 120,000 | 85,000 | 43,286 | 540 | 150,000 | 120,000 | 61,110 | 765 |
| 1-1/8 | 7 UNC | 1.1250 | .7630 | 105,000 | 74,000 | 42,346 | 595 | 150,000 | 120,000 | 68,670 | 965 |
| | 12 UNF | | .8560 | 105,000 | 74,000 | 47,508 | 670 | 150,000 | 120,000 | 77,040 | 1,080 |
| 1-1/4 | 7 UNC | 1.2500 | .9690 | 105,000 | 74,000 | 53,779 | 840 | 150,000 | 120,000 | 87,210 | 1,360 |
| | 12 UNF | | 1.0730 | 105,000 | 74,000 | 59,551 | 930 | 150,000 | 120,000 | 96,570 | 1,500 |
| 1-3/8 | 6 UNC | 1.3750 | 1.1550 | 105,000 | 74,000 | 64,102 | 1,100 | 150,000 | 120,000 | 103,950 | 1,780 |
| | 12 NF | | 1.3150 | 105,000 | 74,000 | 72,982 | 1,250 | 150,000 | 120,000 | 118,350 | 2,040 |
| 1-1/2 | 6 UNC | 1.5000 | 1.4050 | 105,000 | 74,000 | 77,977 | 1,460 | 150,000 | 120,000 | 126,450 | 2,370 |
| | 12 UNF | | 1.5810 | 105,000 | 74,000 | 87,745 | 1,650 | 150,000 | 120,000 | 142,290 | 2,670 |