



APE CLAMP ATTACHMENT CATALOG AND OWNER'S MANUAL



800-248-8498

WWW.AMERICANPILEDRIVING.COM



SPECIFICATIONS



OPERATORS INFORMATION



MAINTENANCE AND TROUBLESHOOTING



REPLACEMENT PARTS AND BOM



REFERENCE / NOTES

This Quick Reference Guide will assist you in finding the information you're looking for.

A Table of Contents is included after the Foreword.

These precautions must always be followed to ensure personnel and equipment safety.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation where injury could occur but is unlikely to be serious or lead to death.

NOTICE

NOTICE indicates information that may help or guide you in the operation or service of the equipment.

READ THIS MANUAL THOROUGHLY BEFORE OPERATING AND / OR WORKING ON THE EQUIPMENT.

1. Only well-trained and experienced personnel should attempt to operate or maintain this equipment.
2. **NEVER** adjust, lubricate, and/or repair the unit when it is in operation or lifted above ground level.

3. **NEVER** remove, paint over, and/or cover warning or safety labels. If labels become damaged or unreadable, replace immediately.
4. All personnel should wear approved safety clothing including **HARD HATS, SAFETY SHOES, PROTECTION** when near this equipment.
5. Do **NOT** stand any closer to this equipment than necessary when it is in operation. Parts, dirt, and/or rocks may fall. **NEVER** stand under operating or elevated equipment. Keep eyes on equipment while it is running.
6. When maintaining and/or repairing the equipment, **NEVER** substitute parts not supplied or approved in writing by APE.

NOTICE

Do NOT weld or flame cut on this equipment.

7. Ensure that all lifting equipment, including cranes, wire rope, slings, hooks, shackles, etc., are properly sized for the worst caseloads anticipated during operations.
8. If there are any questions about weights, specifications, and/or performance of the unit, contact APE before handling and/or operating the equipment.
9. Check wire rope clips for tightness and wire ropes for wear daily.
10. Ensure that ground vibrations will not damage or collapse adjacent structures or excavations.
11. If abnormal equipment operation is observed, discontinue use immediately and correct the problem.

These precautions must always be followed to ensure personal and equipment safety.

NOTICE

A properly maintained fire extinguisher, suitable for oil fires, MUST be kept in the immediate vicinity of equipment operations.

12. Make sure that the drive and clamp switches are in NEUTRAL and the control panel is set to LOCAL before starting the power unit engine.
13. **NEVER** operate this equipment with hydraulic hoses that are damaged or kinked. Replace damaged hoses immediately.
14. Do **NOT** lift and/or support hydraulic hoses with wire rope slings.
15. **NEVER** attempt to connect or disconnect Quick Disconnects (QDs) when the power unit is running.
16. Do **NOT** pull on and/or attempt to move equipment with the hydraulic hoses.
17. Do **NOT** attempt to locate hydraulic leaks with your hands. High-pressure leaks can penetrate skin and cause severe damage, blood poisoning, and/or infection.
18. Do **NOT** attempt to repair leaks while the equipment is in operation.
19. Do **NOT** attempt to tighten and/or loosen fittings and/or hoses when the equipment is in operation.
20. When moving and/or transporting this equipment, make sure that the vehicle or vessel has enough capacity to handle the load. Make sure that the equipment is properly tied down.
21. When moving and/or transporting this equipment, be sure that the QD dust caps are tight and that the cap safety cables are in place. Be sure that all equipment parts are tight and/or properly secured before shipment. Unsecured parts may vibrate loose and fall during transport causing injury and/or property damage.
22. Rounded and/or damaged bolt heads and/or nuts should be replaced so that the proper torque values may be obtained. Proper torque values are necessary to prevent parts on this equipment, leads and/or crane booms from loosening and/or falling.
23. Do **NOT** place limbs, wires, or tools, etc., near clamp jaws while clamp could be energized.
24. Do **NOT** allow clothing, hoses, ropes, etc., to become entangled in, or pass between, clamp jaws.
25. Do **NOT** paint over or otherwise block grease-zerks.
26. Every 30 to 45 minutes of vibro operation, stop driving and relieve clamp pressure. Reclamp pile before resuming work.
27. Do not leave the clamp pressurized for periods of inactivity longer than 1 hour.

DANGER

*When operating in an enclosed area, exhaust fumes from the power unit should be piped outside. Continued breathing of exhaust fumes may prove **FATAL**.*

WARRANTY INFORMATION

Effective : _____

American Piledriving Equipment, Inc. (APE) warrants new products sold by it to be free from defects in materials or workmanship for a period of two (2) years after the date of delivery to the first user and subject to the following conditions:

- APE's obligation and liability under this WARRANTY is expressly limited to repairing or replacing, at APE's option, any parts which appear to APE upon inspection to have been defective in material or workmanship. Such parts shall be provided at no cost to the user, at the business establishment of APE or the authorized APE distributor of the product during regular working hours.
- This WARRANTY shall not apply to component parts or accessories of products not manufactured by APE, and which carry the warranty of the manufacturer thereof, or to normal maintenance (such as engine tune-up) or normal maintenance parts (such as filters).
- Replacement or repair parts installed in the product covered by this WARRANTY are warranted only for the remainder of the warranty as if such parts were original components of said product.
- APE makes no other warranty, expressed or implied, and makes no warranty of merchantability of fitness for any particular purpose.
- APE's obligations under this WARRANTY shall not include any transportation charges, costs of installation, duty, taxes or any other charges whatsoever, or any liability for direct, indirect, incidental, or consequential damage or delay.
- If requested by APE, products or parts for which a warranty claim is made are to be returned, transportation prepaid, to APE.

OIL MUST MEET ISO CLEANLINESS CODE 17/15/11.
OIL THAT DOES NOT MEET CLEANLINESS CODE
WILL **VOID** THE WARRANTY.

ANY IMPROPER USE, INCLUDING OPERATION
AFTER DISCOVERY OF DEFECTIVE OR WORN
PARTS, OPERATION BEYOND RATED CAPACITY,
SUBSTITUTION OF ANY PARTS WHATSOEVER,
USE OF PARTS NOT APPROVED BY APE OR ANY
ALTERATION OR REPAIR BY OTHERS IN SUCH A
MANNER AS, IN APE'S JUDGEENT, AFFECTS THE
PRODUCT MATERIALLY OR ADVERSELY, SHALL
VOID THIS WARRANTY.

ANY TYPE OF WELDING ON APE'S EQUIPMENT
WILL **VOID** THE WARRANTY UNLESS AUTHORIZED
IN WRITING BY APE

NO EMPLOYEE AUTHORIZED TO CHANGE THIS
WARRANT IN ANY WAY OR GRANT ANY OTHER
WARRANTY UNLESS SUCH CHANGE IS MADE IN
WRITNG AND SIGNED BY AN OFFICER OF APE,
INC.

This manual covers **APE Clamp Attachments** in selection, installation, maintenance, and use.

This manual was prepared to acquaint the owner, operator, and serviceman with the operation and maintenance of APE Clamps, and to aid in acquiring replacement parts. We strongly suggest that this manual be carefully studied before operating or undertaking any maintenance work on the units. It is not meant to be all inclusive as to content, and any questions and/or doubt should be directed to APE before proceeding with any operation or maintenance.

All information given in this manual is current and valid according to the information available at the time of publication. American Piledriving Equipment, Inc. reserves the rights to implement changes without prior notice.

Using this manual:

- Refer to the Table of Contents for the page location of applicable sections.
- All weights and measurements are in English and Metric units.
- Any revisions to this manual will appear on the Revision Record page at the back of this manual. The revisions themselves will be attached to the back of the manual and entitled ADDENDA with references back to the page in question in the original manual.
- Please visit www.americanpiledriving.com for further product data sheets and manuals.

Common Abbreviations:

APE = American Piledriving
Equipment

Vibro = Vibrator

QD = Quick Disconnect

mm. = Millimeters

lbs. = Pounds

psi. = Pounds per square inch

HCLW = High Collar Lock Washer

SHCS = Socket Head Cap Screw

BOM = Bill of Materials

cm. = Centimeters

in. = Inches

kip = Kilopound

kPa. = Kilopascal

Disclaimer:

This unit was tested before leaving our facility. To help provide years of trouble free usage, please review the following documentation and make sure to clean and flush the field piping before connecting to the Power Unit.

Refer to schematic diagrams and the BOM (Bill of Materials) on Pg. 46 for component part specifications and spare parts.

When calling APE, always inform your representative of the serial number to obtain quicker service.

Information provided in the Specifications chapter is not to be considered exact. Variations exist between different production series of the same unit. Contact APE with questions about any given model.

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SPECIFICATIONS

Clamp and Vibro Compatibility

| Vibro Type | Compatible Clamps | | |
|------------|---|---|--|
| 50 | <ul style="list-style-type: none"> • 50 Sheet Clamp • 150 Sheet Clamp • 200 Sheet Clamp • 126B Sheet Clamp | <ul style="list-style-type: none"> • 196 Sheet Clamp • 100 Caisson Clamp • 200 Caisson Clamp • All Single Beams | <ul style="list-style-type: none"> • C102 Wood Clamp • Hybrid Wood Clamp • 20 Wood Clamp • 25 Wood Clamp |
| 100 | <ul style="list-style-type: none"> • 50 Sheet Clamp • 150 Sheet Clamp • 200 Sheet Clamp • 126B Sheet Clamp | <ul style="list-style-type: none"> • 196 Sheet Clamp • 100 Caisson Clamp • 200 Caisson Clamp • All Single Beams | <ul style="list-style-type: none"> • C102 Wood Clamp • Hybrid Wood Clamp • 20 Wood Clamp • 25 Wood Clamp |
| 150 / 150T | <ul style="list-style-type: none"> • 50 Sheet Clamp • 150 Sheet Clamp • 200 Sheet Clamp • 126B Sheet Clamp | <ul style="list-style-type: none"> • 196 Sheet Clamp • 100 Caisson Clamp • 200 Caisson Clamp • All Single Beams | <ul style="list-style-type: none"> • C102 Wood Clamp • Hybrid Wood Clamp • 20 Wood Clamp • 25 Wood Clamp |
| 200 / 200T | <ul style="list-style-type: none"> • 150 Sheet Clamp • 200 Sheet Clamp • 126B Sheet Clamp • 196 Sheet Clamp | <ul style="list-style-type: none"> • 100 Caisson Clamp • 200 Caisson Clamp • All Single Beams • C102 Wood Clamp | <ul style="list-style-type: none"> • Hybrid Wood Clamp • 20 Wood Clamp • 25 Wood Clamp • 32 Wood Clamp |
| 200-6 | <ul style="list-style-type: none"> • 196 Sheet Clamp <i>Recommended</i> • 200 Sheet Clamp <i>Usable</i> | <ul style="list-style-type: none"> • 200 Caisson Clamp • All Single Beams • 10' Quad beams | <ul style="list-style-type: none"> • 20 Wood Clamp* • 25 Wood Clamp* • 32 Wood Clamp* |
| 300 | <ul style="list-style-type: none"> • 196 Sheet Clamp <i>Recommended</i> • 200 Sheet Clamp <i>Usable</i> | <ul style="list-style-type: none"> • 200 Caisson Clamp • All Single Beams • 10' Quad Beam | <ul style="list-style-type: none"> • 20 Wood Clamp* • 25 Wood Clamp* • 32 Wood Clamp* |
| 300-6 | <ul style="list-style-type: none"> • 196 Sheet Clamp <i>Recommended</i> • 200 Sheet Clamp <i>Usable</i> | <ul style="list-style-type: none"> • 200 Caisson Clamp • 10' Quad Beam • All Single Beams | <ul style="list-style-type: none"> • 20 Wood Clamp* • 25 Wood Clamp* • 32 Wood Clamp* |
| 400 | <ul style="list-style-type: none"> • 400 Sheet Clamp <i>Recommended</i> | <ul style="list-style-type: none"> • 200 Caisson Clamp • All Single Beams • All Quad Beams | <ul style="list-style-type: none"> • 196 Sheet Clamp <i>Usable</i> |
| 600 | <ul style="list-style-type: none"> • 400 Sheet Clamp <i>Recommended</i> | <ul style="list-style-type: none"> • 200 Caisson Clamp • All Single Beams | <ul style="list-style-type: none"> • All Quad beams |

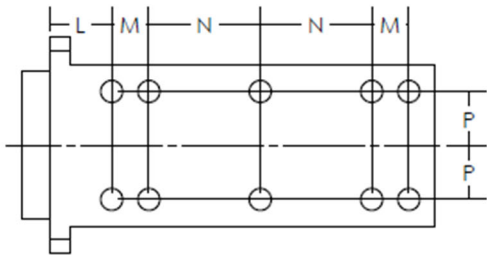
*Wood clamps need beam, caisson beam adaptor, and APE approval.

APE Sheet Clamps

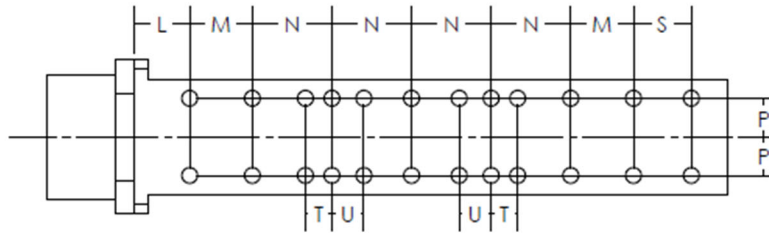
| Model | Weight | | Piston Diameter | | | | Piston Stroke | | | | Cylinder Force | | | | |
|-------|---------------------|-------------------|--------------------|--------------------|--------------------|--------------------|------------------|--------------------|--------------------|--------------------|---------------------------|-------------------|-------------------|------------------|--------------------|
| 20 | 750 lbs 340 kg | | 5 in 127 mm | | | | 2.25 in 57mm | | | | 44 short tons 391 kN | | | | |
| 50 | 1350 lbs 612 kg | | 8 in 203 mm | | | | 2.25 in 57mm | | | | 113 short tons 1005 kN | | | | |
| 150 | 1550 lbs 703 kg | | 8 in 203 mm | | | | 2.25 in 57mm | | | | 113 short tons 1005 kN | | | | |
| 200 | 2200 lbs 1000 kg | | 8 in 203 mm | | | | 2.25 in 57 mm | | | | 113 short tons 1005 kN | | | | |
| 400 | 7200 lbs 3265 kg | | 15 in 380 mm | | | | 2.85 in 72 mm | | | | 396 short tons 3519 kN | | | | |
| / | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R |
| 20 | 33.25 in 845 mm | 28.5 in 724 mm | 10 in 254 mm | 10 in 254 mm | 21.63 in 549 mm | 11.5 in 292 mm | 2.22 in 56 mm | 10.06 in 256 mm | 8.13 in 207 mm | 4.5 in 114 mm | 4.88 in 124 mm | 2.75 in 70 mm | 8.25 in 210 mm | 4 in 102 mm | 12.32 in 313 mm |
| 50 | 44 in 1118 mm | 35 in 889 mm | 12 in 305 mm | 14 in 356 mm | 23 in 584 mm | 18.3 in 465 mm | 1.44 in 37 mm | 13.88 in 353 mm | 5.77 in 147 mm | 7 in 178 mm | 5 in 127 mm | 11 in 279 mm | 8.25 in 210 mm | 4 in 102 mm | 16.32 in 414 mm |
| 150 | 44 in 1118 mm | 35 in 889 mm | 12 in 305 mm | 16 in 406 mm | 29 in 737 mm | 18.3 in 465 mm | 1.44 in 37 mm | 10.25 in 260 mm | 5.88 in 149 mm | 7 in 178 mm | 5 in 127 mm | 11 in 279 mm | 8.25 in 210 mm | 4 in 102 mm | 16.32 in 414 mm |
| 200 | 50 in 1270 mm | 41 in 1041 mm | 12 in 305 mm | 15 in 381 mm | 30.89 in 785 mm | 18.2 in 462 mm | 1.59 in 40 mm | 10.31 in 262 mm | 8.13 in 207 mm | 7 in 178 mm | 5.75 in 146 mm | 8.25 in 210 mm | / | 4 in 102 mm | 22.19 in 564 mm |
| 400 | 72.31 in 1837 mm | 60 in 1524 mm | 15.75 in 400 mm | 22.12 in 562 mm | 46 in 1168 mm | 30.78 in 782 mm | 2.86 in 73 mm | 15.75 in 400 mm | 10.94 in 278 mm | 11.06 in 281 mm | 6 in 152 mm | 6.5 in 165 mm | 8.25 in 210 mm | 4 in 102 mm | 25.06 in 637 mm |
| | | | | | | | | | | | | / | S | T | U |
| | | | | | | | | | | | | 400 | 6 in 152 mm | 2.75 in 70 mm | 3.31 in 84 mm |



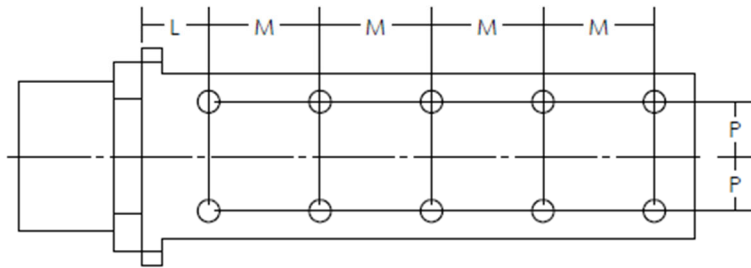
**Model 400 with
two pile guides**



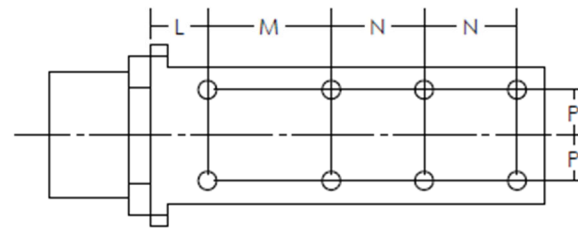
20 Bolt Pattern



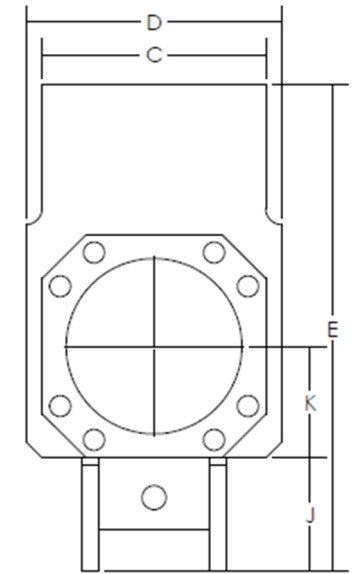
400 Bolt Pattern



200 Bolt Pattern



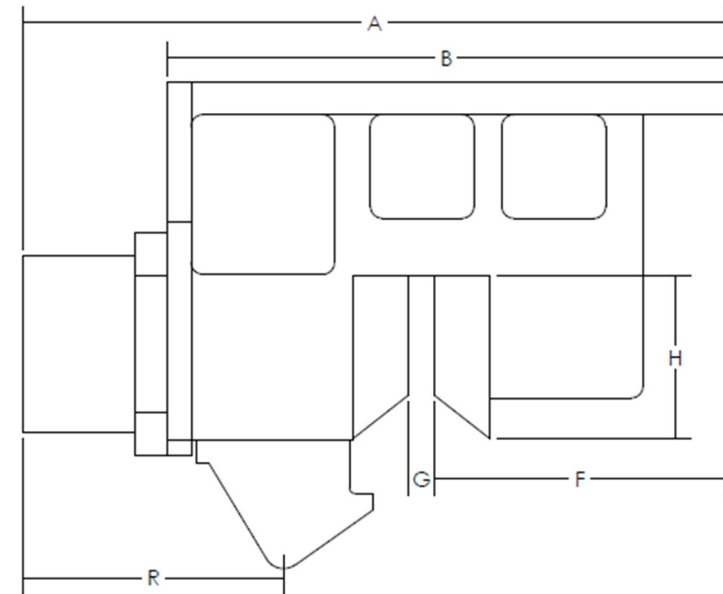
50/150 Bolt Pattern



General Sheet Clamp Dimensions

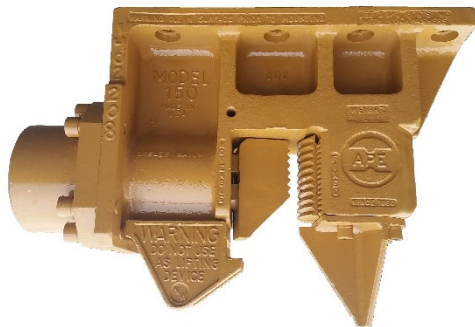


Model 50

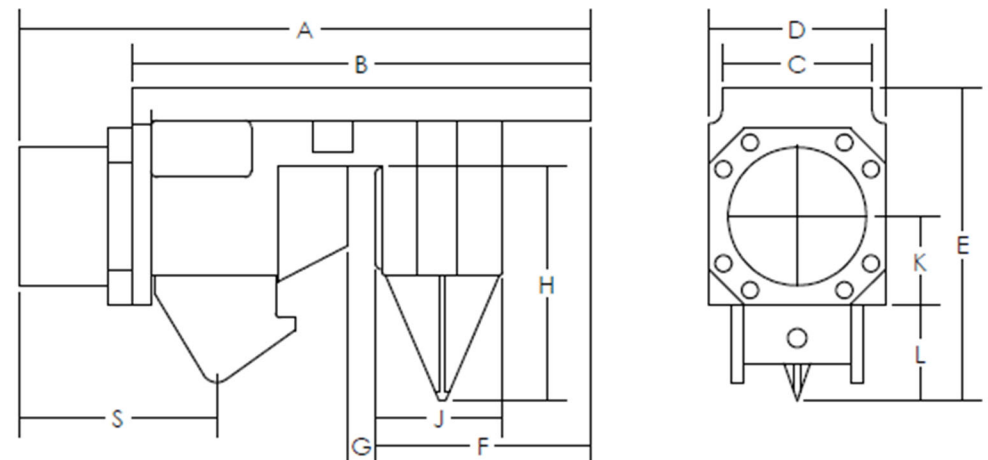


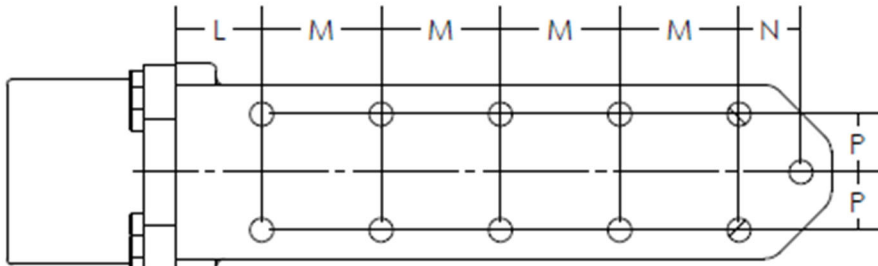
Special Sheet Clamps

| Model | Weight | | | Piston Diameter | | | | Piston Stroke | | | | Cylinder Force | | | | |
|--------------------|---------------------|--------------------|-----------------|-----------------|--------------------|--------------------|------------------|--------------------|--------------------|-------------------|-------------------|---------------------------|-------------------|-------------------|--------------------|--------------------|
| 50 Dunce | 1350 lbs 612 kg | | | 8 in 203 mm | | | | 2.25 in 57 mm | | | | 113 short tons 1005 kN | | | | |
| 150 Dunce | 1550 lbs 705 kg | | | 8 in 203 mm | | | | 2.25 in 57 mm | | | | 113 short tons 1005 kN | | | | |
| 126 J&M | 2200 lbs 1000 kg | | | 8 in 203 mm | | | | 1.86 in 47 mm | | | | 126 short tons 1120 kN | | | | |
| 196 J&M | 2850 lbs 1295 kg | | | 10 in 254 mm | | | | 3 in 76 mm | | | | 196 short tons 1744 kN | | | | |
| 300 APE | 2850 lbs 1295 kg | | | 10 in 254 mm | | | | 3 in 76 mm | | | | 196 short tons 1744 kN | | | | |
| / | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S |
| 50 Dunce | 44 in 112 cm | 35 in 889 mm | 12 in 305 mm | 14 in 356 mm | 25.88 in 657 mm | 16.67 in 423 mm | 1.71 in 43 mm | 19.75 in 502 mm | 11.18 in 284 mm | 7 in 178 mm | 8.7 in 221 mm | 5 in 127 mm | 11 in 279 mm | 8.25 in 210 mm | 4 in 102 mm | 16.32 in 415 mm |
| 150 Dunce | 44 in 112 cm | 35 in 889 mm | 12 in 305 mm | 16 in 406 mm | 30.76 in 781 mm | 16.67 in 423 mm | 1.71 in 43 mm | 18.69 in 475 mm | 11.18 in 284 mm | 7 in 178 mm | 7.64 in 194 mm | 5 in 127 mm | 11 in 279 mm | 8.25 in 210 mm | 4 in 102 mm | 16.32 in 415 mm |
| 126 J&M | 45.5 in 116 cm | 37 in 940 mm | 12 in 305 mm | 12 in 305 mm | 33 in 838 mm | 18.61 in 473 mm | 1.5 in 38 mm | 10.88 in 276 mm | 8.38 in 213 mm | 8.31 in 211 mm | 7 in 178 mm | 8.25 in 210 mm | 11 in 279 mm | 4 in 102 mm | 18.88 in 480 mm | / |
| 196 J&M | 57 in 145 cm | 45.25 in 120 cm | 12 in 305 mm | 15 in 381 mm | 35.25 in 819 mm | 22.63 in 575 mm | 2.5 in 64 mm | 10.88 in 276 mm | 9 in 229 mm | 7.38 in 187 mm | 5.88 in 149 mm | 8.25 in 210 mm | 4.28 in 109 mm | 4 in 102 mm | 24.13 in 613 mm | / |
| 300 APE | 57 in 145 cm | 45.25 in 120 cm | 12 in 305 mm | 15 in 381 mm | 34.75 in 883 mm | 22.63 in 575 mm | 2.84 in 72 mm | 10.63 in 270 mm | 9.56 in 243 mm | 7.38 in 187 mm | 5.88 in 149 mm | 8.25 in 210 mm | 4.28 in 109 mm | 4 in 102 mm | 24.38 in 619 mm | / |

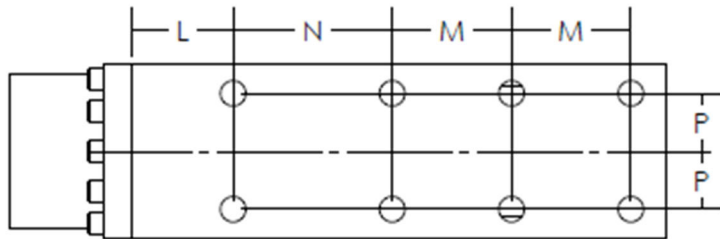


Dunce Clamp Dimensions



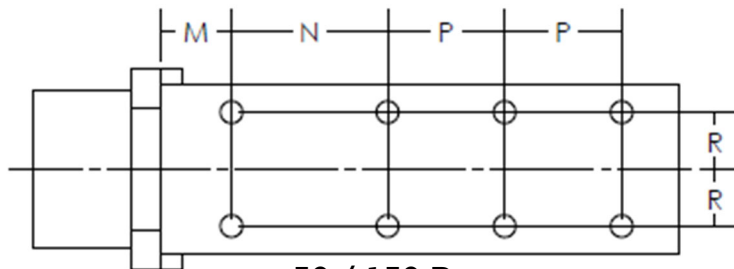


**J&M 196 / APE 300
Bolt Configuration**

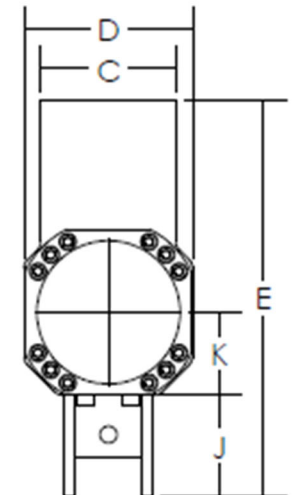
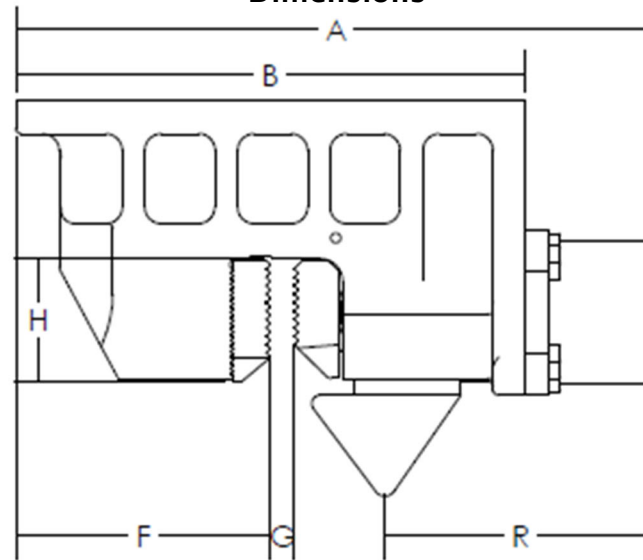


**J&M 126 Bolt
Configuration**

**J&M 196 / J&M 126 / APE 300
Dimensions**



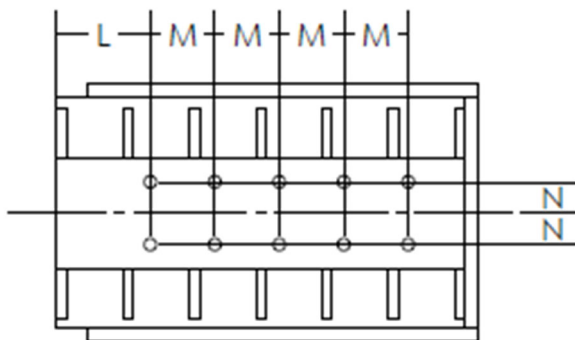
**50 / 150 Duncce
Bolt Configuration**



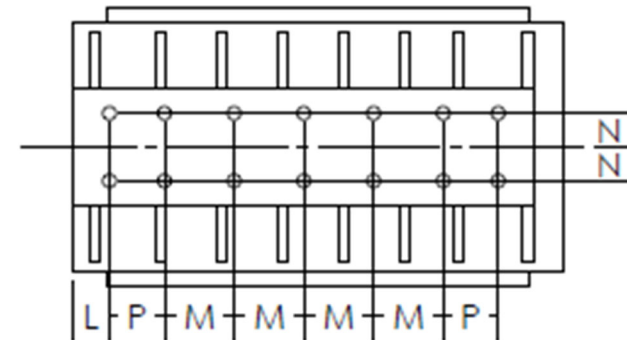
Wood / Concrete Clamps

| Model | Weight | | | | Piston Diameter | | | | Cylinder Force | | | | | |
|-------|---------------------|---------------------|---------------------|-------------------|---------------------|--------------------|-------------------|---------------------|-------------------------|--------------------|-------------------|-------------------|----------------|------------------|
| 20 | 5900 lbs 2675 kg | | | | 7 in 178 mm | | | | 67 short tons 600 kN | | | | | |
| 25 | 6500 lbs 2950 kg | | | | 7 in 178 mm | | | | 67 short tons 600 kN | | | | | |
| 32 | 9100 lbs 4130 kg | | | | 7 in 178 mm | | | | 67 short tons 600 kN | | | | | |
| / | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| 20 | 44 in 1118 mm | 42.75 in 1086 mm | 44 in 1118 mm | 20 in 508 mm | 71.5 in 1816 mm | 61.5 in 1562 mm | 6.0 in 152 mm | 32 in 813 mm | 14 in 356 mm | 26.75 in 679 mm | 7 in 178 mm | 8.25 in 210 mm | 4 in 102 mm | / |
| 25 | 56.75 in 1441 mm | 47.84 in 1215 mm | 52.25 in 1327 mm | 25.5 in 648 mm | 84.25 in 2140 mm | 74 in 1880 mm | 6.25 in 159 mm | 35 in 889 mm | 14 in 356 mm | 30.75 in 781 mm | 7.19 in 183 mm | 8.25 in 210 mm | 4 in 102 mm | / |
| 32 | 62.75 in 1594 mm | 53.55 in 1360 mm | 54.75 in 1391 mm | 32 in 813 mm | 86.25 in 2191 mm | 74 in 1880 mm | 6.0 in 152 mm | 43.33 in 1101 mm | 14 in 356 mm | 38.25 in 972 mm | 4.35 in 111 mm | 8.25 in 210 mm | 4 in 102 mm | 6.5 in 165 mm |

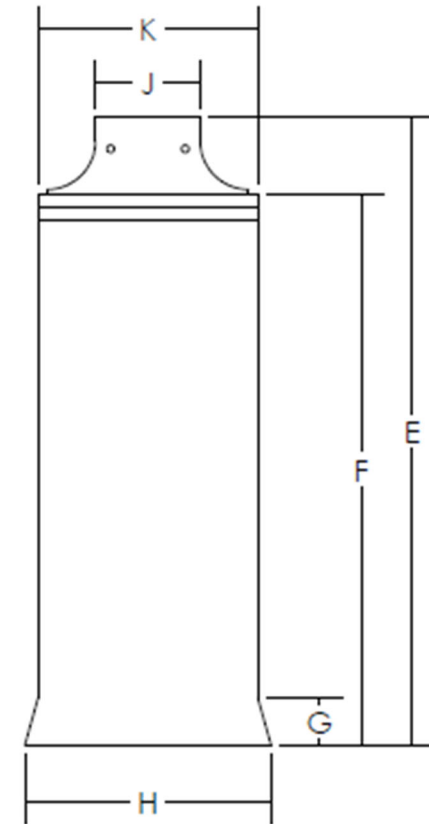
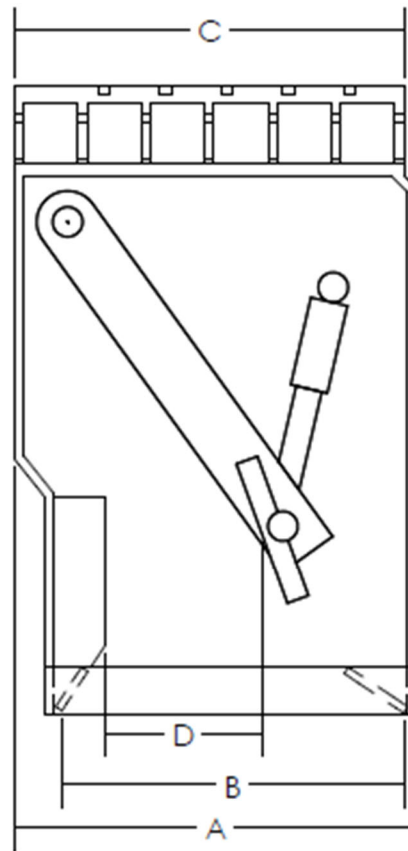
**Model 20/25
Bolt Configuration**



**Model 32
Bolt Configuration**

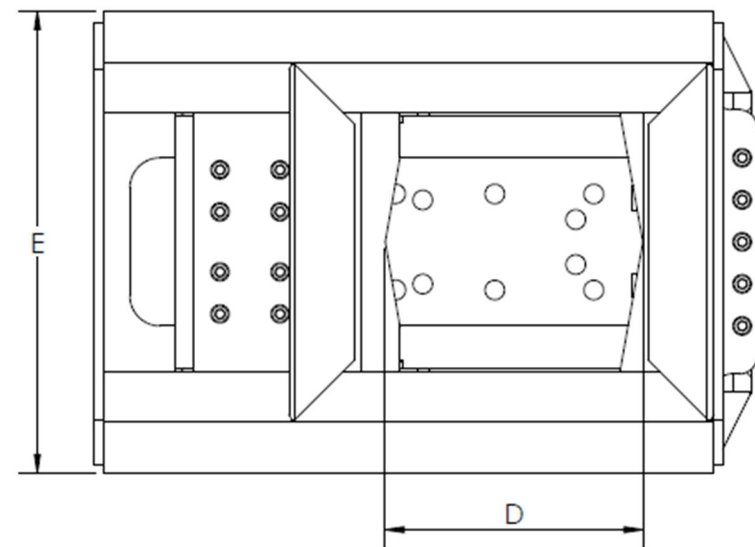
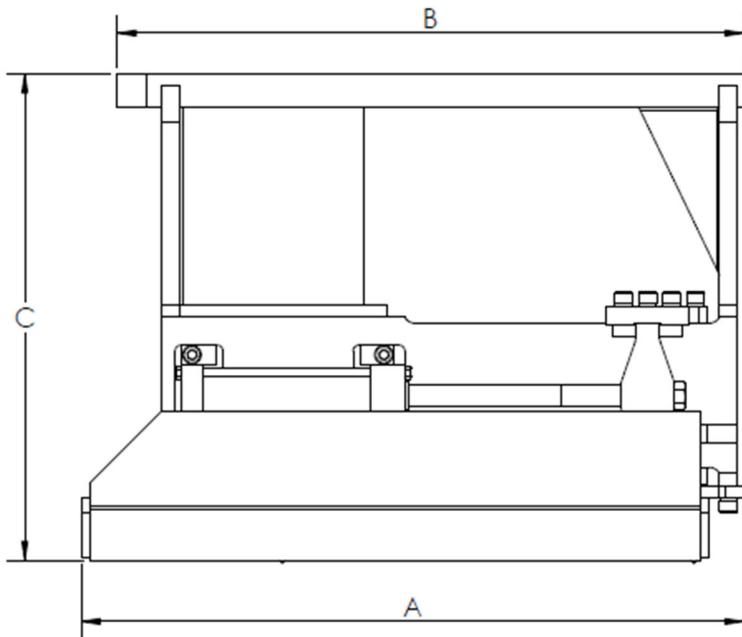


Common Appearance and Main Dimensions



Wood / Concrete Clamps (Continued)

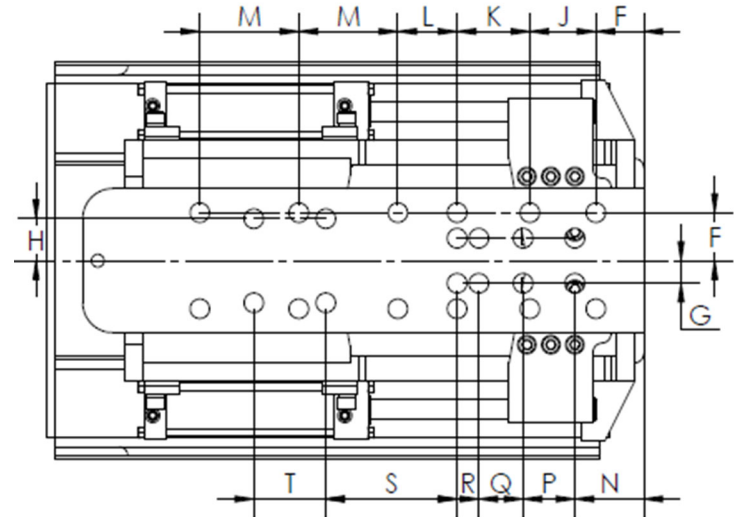
| Model | Weight | | | Piston Diameter | | | Cylinder Force | | |
|---------|---------------------|---------------------|--------------------|--------------------|-------------------|------------------|---------------------------|--------------------|-------------------|
| C102 | 3250 lbs 1475 kg | | | 4 in 102 mm | | | 30.5 short tons 271 kN | | |
| 20 Hyb. | 3800 lbs 1725 kg | | | 4 in 102 mm | | | 30.5 short tons 271 kN | | |
| / | A | B | C | D | E | F | G | H | J |
| C102 | 49.75 in 1264 mm | 46.75 in 1188 mm | 40.5 in 1042 mm | 15.5 in 394 mm | 33 in 838 mm | 4 in 102 mm | 1.88 in 48 mm | 3.5 in 89 mm | 5.5 in 140 mm |
| 20 Hyb. | 55.25 in 1403 mm | 52.25 in 1327 mm | 40.5 in 1042 mm | 20 in 508 mm | 38.5 in 978 mm | 4 in 102 mm | 1.88 in 48 mm | 3.5 in 89 mm | 5.38 in 137 mm |
| / | K | L | M | N | P | Q | R | S | T |
| C102 | 6.06 in 154 mm | 4.94 in 125 mm | 8.25 in 210 mm | 5.75 in 146 mm | 4.31 in 110 mm | 3.69 in 94 mm | 1.81 in 46 mm | 10.94 in 278 mm | 6 in 152 mm |
| 20 Hyb. | 8.25 in 210 mm | 7.13 in 181 mm | 8 in 203 mm | 12.75 in 324 mm | 6 in 152 mm | / | / | / | / |



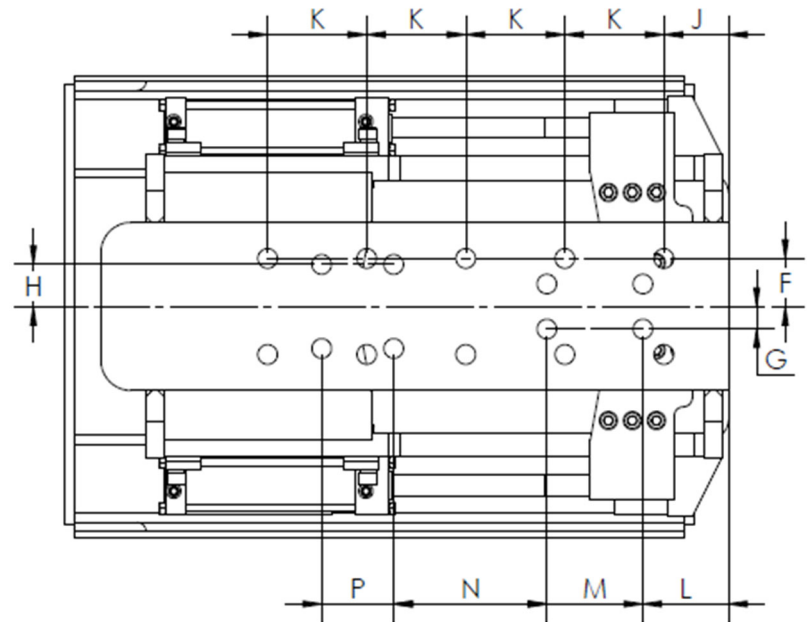


**C102 Mounted on
Model 50 Vibro**

C102 Bolt Pattern

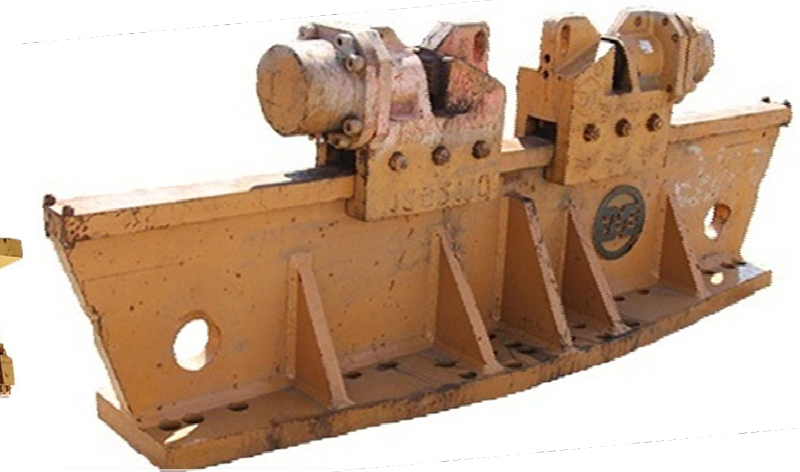


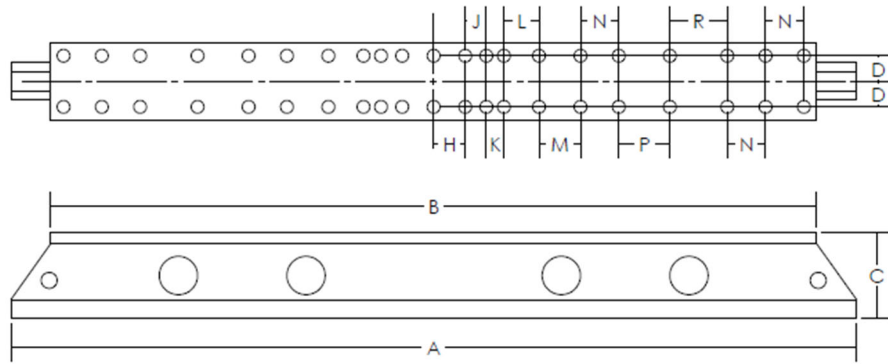
**Model 20 Hybrid
Bolt Pattern**



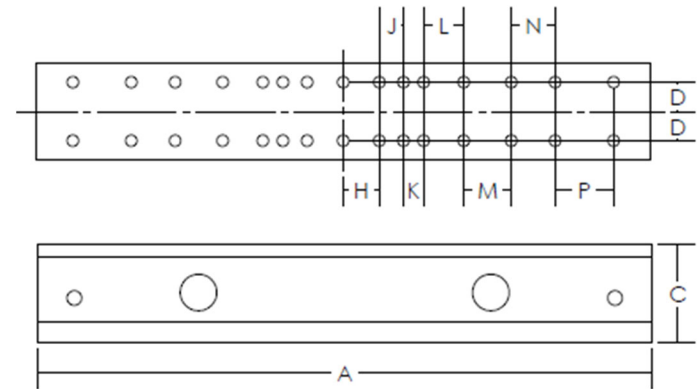
Standard Caisson Beams

| Model | Weight | A | B | C | D | E | F | G | H |
|-------|---------------------|---------------------|-------------------|--------------------|----------------|--------------------|------------------|------------------|-------------------|
| 5 ft | 1100 lbs 500 kg | 60 in 1524 mm | / | 13.41 in 341 mm | 4 in 102 mm | 13.38 in 340 mm | 5.9 in 150 mm | 2.91 in 74 mm | 4.94 in 125 mm |
| 8 ft | 1500 lbs 680 kg | 84 in 2134 mm | / | 13.41 in 341 mm | 4 in 102 mm | 13.38 in 340 mm | 5.9 in 150 mm | 2.91 in 74 mm | 4.94 in 125 mm |
| 11 ft | 3500 lbs 1590 kg | 132.5 in 3366 mm | 120 in 3048 mm | 13.41 in 341 mm | 4 in 102 mm | 12 in 305 mm | 5.9 in 150 mm | 3 in 76 mm | 4.94 in 125 mm |
| 13 ft | 3600 lbs 1635 kg | 156 in 3962 mm | / | 18 in 457 mm | 4 in 102 mm | 13.5 in 343 mm | 5.9 in 150 mm | 2.91 in 74 mm | 4.94 in 127 mm |
| / | J | K | L | M | N | P | R | S | T |
| 5 ft | 3.31 in 84 mm | 2.75 in 70 mm | 5.5 in 140 mm | 6.5 in 165 mm | / | / | / | / | / |
| 8 ft | 3.31 in 84 mm | 2.75 in 70 mm | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | / | / | / |
| 11 ft | 3.31 in 84 mm | 2.75 in 70 mm | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | / | / |
| 13 ft | 3.31 in 84 mm | 2.75 in 70 mm | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | 3 in 76 mm | 12 in 305 mm |

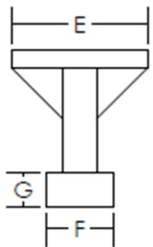




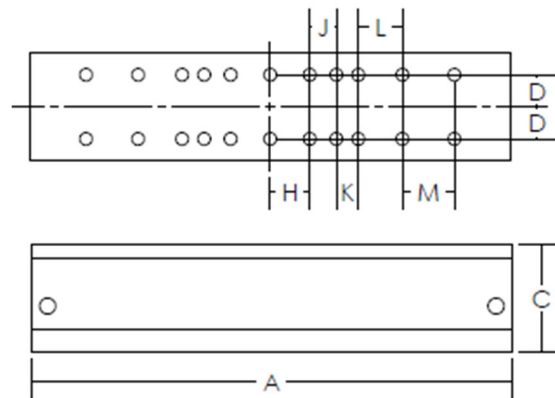
11 ft Beam



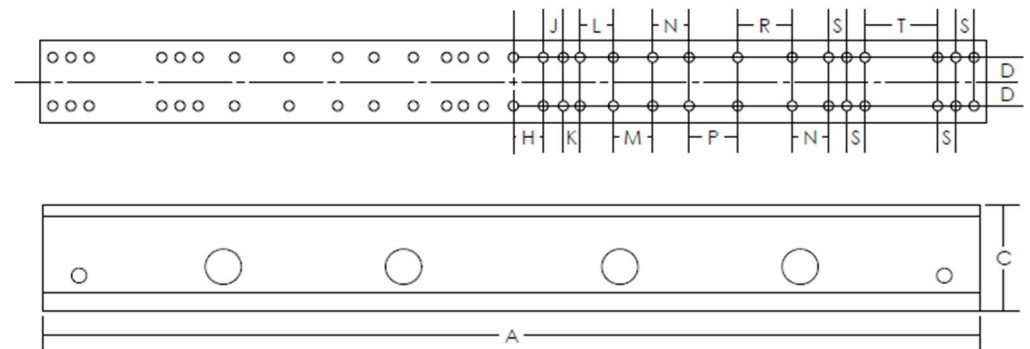
8 ft Beam



Common Profile



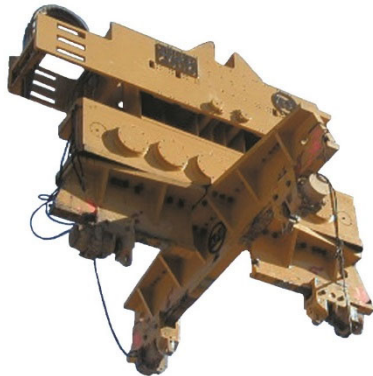
5 ft Beam



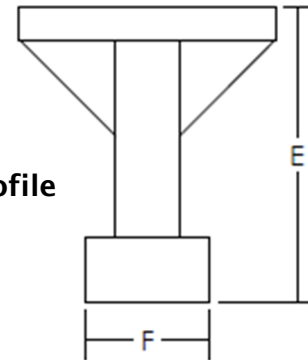
13 ft Beam

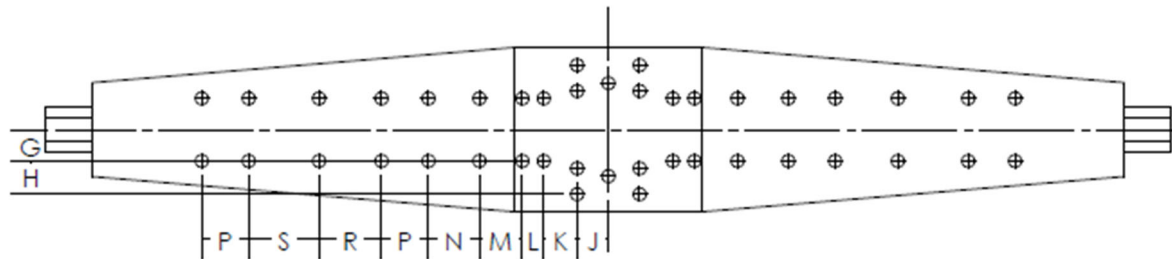
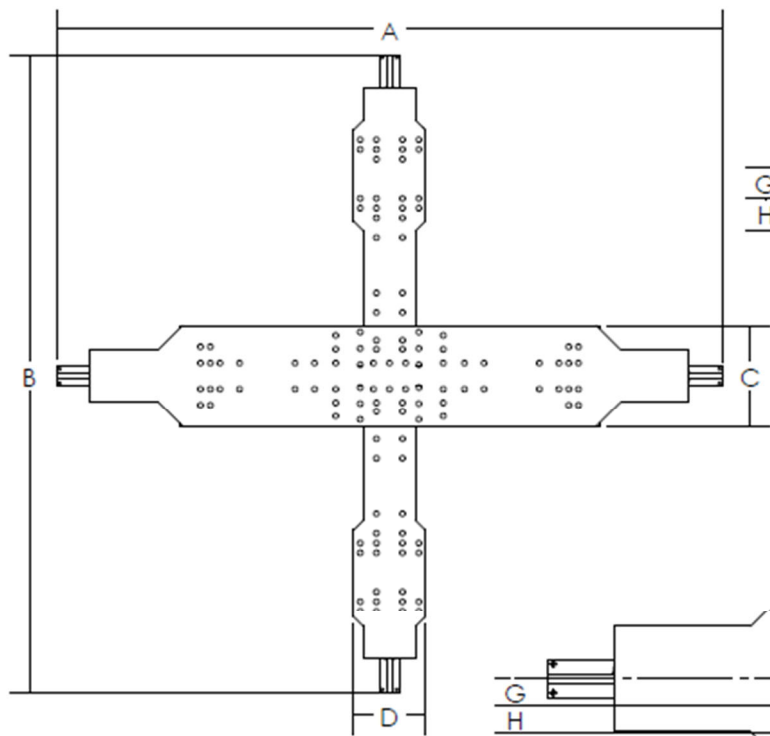
Caisson Quad Beams

| Model | Weight | A | B | C | D | E | F | G | H | J | K | L |
|-------|----------------------|-------------------|---------------------|--------------------|-----------------|------------------|------------------|-----------------|-------------------|----------------|-------------------|------------------|
| 10 ft | 7000 lbs 3175 kg | 120 in 3048 mm | 118 in 2997 mm | 22 in 559 mm | 12 in 305 mm | 24 in 610 mm | 5.9 in 150 mm | 4 in 102 mm | 4.25 in 108 mm | 4 in 102 mm | 4.25 in 108 mm | 2.75 in 70 mm |
| 11 ft | 7700 lbs 3500 kg | 132 in 3353 mm | 141.5 in 3594 mm | 31 in 787 mm | 12 in 305 mm | 30 in 762 mm | 5.9 in 150 mm | 4 in 102 mm | 4.25 in 108 mm | 4 in 102 mm | 5 in 127 mm | 7.5 in 191 mm |
| 12 ft | 8650 lbs 3920 kg | 144 in 3658 mm | 144 in 3658 mm | 28.38 in 721 mm | 12 in 305 mm | 24 in 610 mm | 5.9 in 150 mm | 4 in 102 mm | 4.25 in 108 mm | 4 in 102 mm | 4.25 in 108 mm | 2.75 in 70 mm |
| 15 ft | 15300 lbs 6940 kg | 180 in 4572 mm | 173 in 4394 mm | 31 in 787 mm | 31 in 787 mm | 30 in 762 mm | 5.9 in 150 mm | 4 in 102 mm | 4.25 in 108 mm | 4 in 102 mm | 5 in 127 mm | 7.5 in 191 mm |
| 17 ft | 21800 lbs 9900 kg | 204 in 5182 mm | 197 in 5004 mm | 31 in 787 mm | 22 in 559 mm | 40 in 1016 mm | 5.9 in 150 mm | 4 in 102 mm | 4.25 in 108 mm | 4 in 102 mm | 5 in 127 mm | 7.5 in 191 mm |
| / | M | N | P | R | S | T | U | V | W | X | Y | |
| 10 ft | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | 4.5 in 114 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | / | |
| 11 ft | 6.5 in 165 mm | 6 in 152 mm | 17 in 432 mm | 6 in 152 mm | 3 in 76 mm | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | 3 in 76 mm | |
| 12 ft | 5.5 in 140 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | 2.25 in 57 mm | 6.5 in 165 mm | 6 in 152 mm | 8 in 203 mm | 9 in 229 mm | / | |
| 15 ft | 6.5 in 165 mm | 6 in 152 mm | 17 in 432 mm | 6 in 152 mm | 3 in 76 mm | 4 in 102 mm | 6 in 152 mm | 17 in 432 mm | 6 in 152 mm | 3 in 76 mm | / | |
| 17 ft | 6.5 in 165 mm | 6 in 152 mm | 17 in 432 mm | 6 in 152 mm | 3 in 76 mm | 4 in 102 mm | 6 in 152 mm | 17 in 432 mm | 6 in 152 mm | 3 in 76 mm | 12 in 305 mm | |



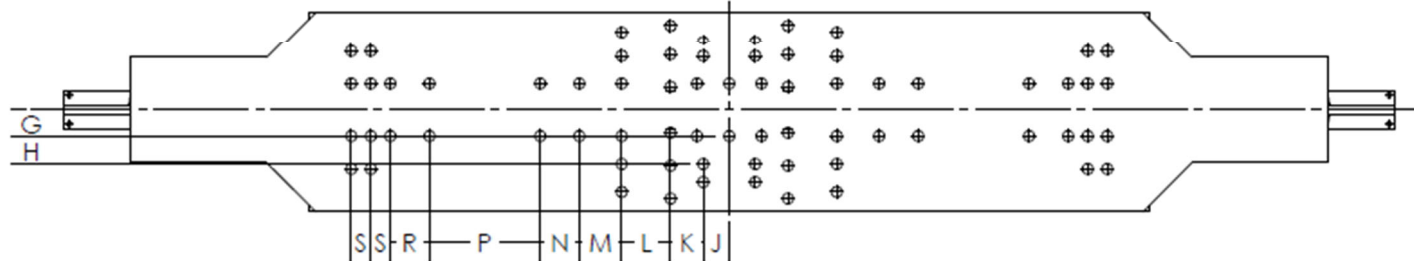
Common Profile



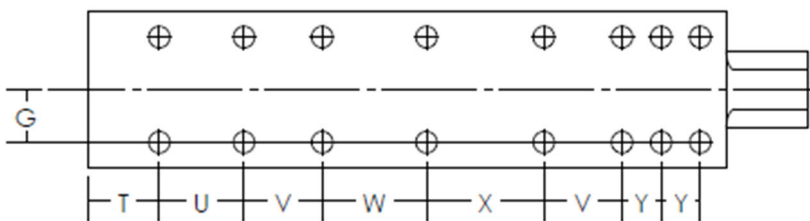


**12 ft, 10 ft
Main Beam Bolt Configuration**

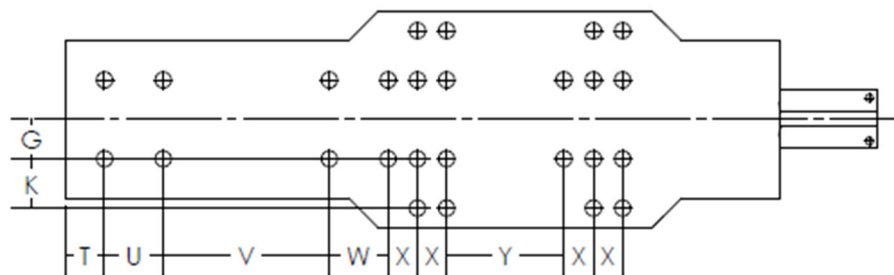
**17 ft, 15 ft, 11 ft
Main Beam Bolt Configuration**



**10 ft, 11 ft, 12 ft
Side Beam Bolt Configuration**



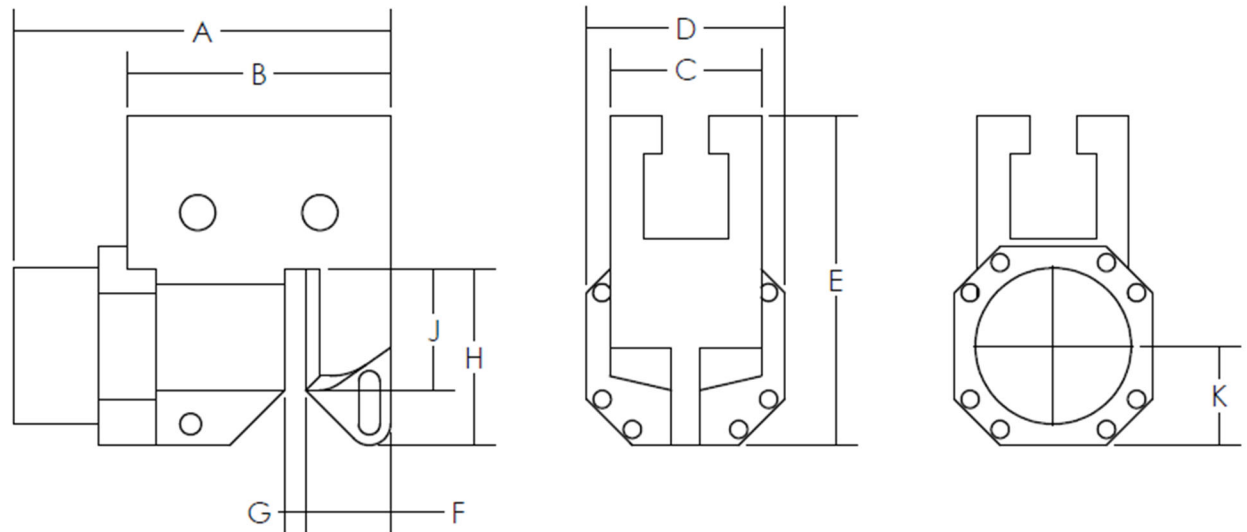
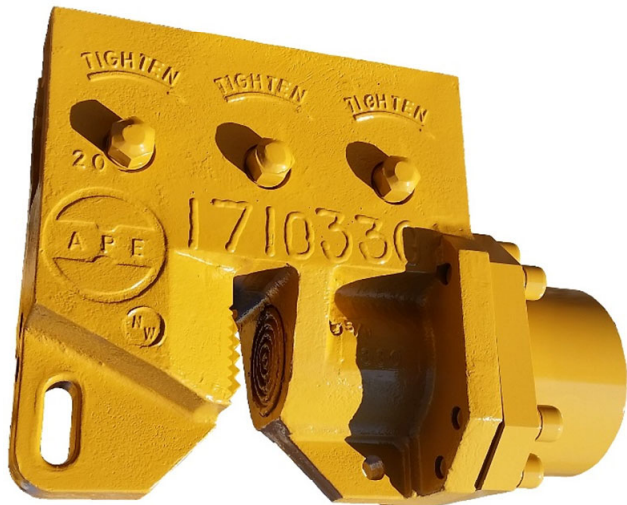
**17 ft, 15 ft
Side Beam Bolt Configuration**

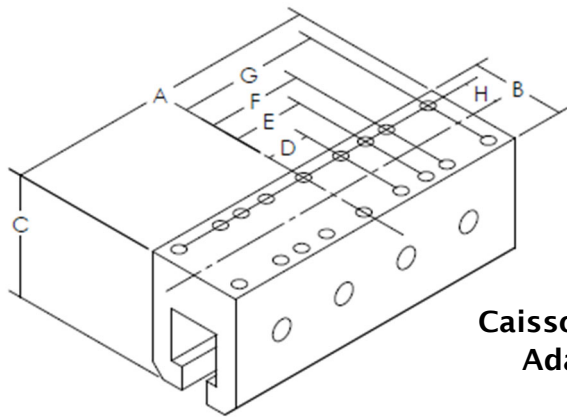


Caisson Clamps

| Model | Weight | | Piston Diameter | | | Piston Stroke | | Cylinder Force | | |
|-------|---------------------|--------------------|-----------------|-----------------|--------------------|-------------------|-----------------|----------------------------|-------------------|-------------------|
| 80 | 1050 lbs 475 kg | | 7 in 178 mm | | | 2 in 51 mm | | 86.5 short tons 770 kN | | |
| 100 | 1,150 lbs 520 kg | | 8 in 203 mm | | | 2.25 in 57 mm | | 113 short tons 1,005 kN | | |
| 200 | 1,350 lbs 610 kg | | 8 in 203 mm | | | 2.25 in 57 mm | | 113 short tons 1,005 kN | | |
| / | A | B | C | D | E | F | G | H | J | K |
| 80 | 27.88 in 708 mm | 19 in 483 mm | 11 in 279 mm | 11 in 279 mm | 22 in 559 mm | 7 in 178 mm | 1.5 in 38 mm | 11.13 in 283 mm | 7.25 in 184 mm | 5.75 in 146 mm |
| 100 | 27.63 in 702 mm | 18.63 in 473 mm | 11 in 279 mm | 14 in 356 mm | 23.38 in 594 mm | 6.7 in 170 mm | 1.5 in 38 mm | 10.88 in 276 mm | 6.87 in 175 mm | 7.25 in 184 mm |
| 200 | 34 in 864 mm | 25 in 635 mm | 11 in 279 mm | 14 in 356 mm | 23.38 in 594 mm | 10.8 in 274 mm | 1.5 in 38 mm | 10.88 in 276 mm | 7 in 178 mm | 7.25 in 184 mm |

200 Caisson

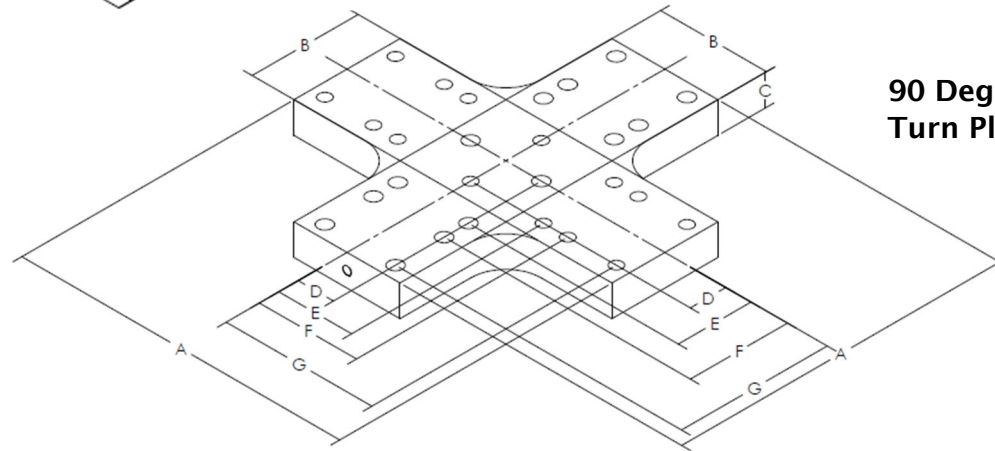
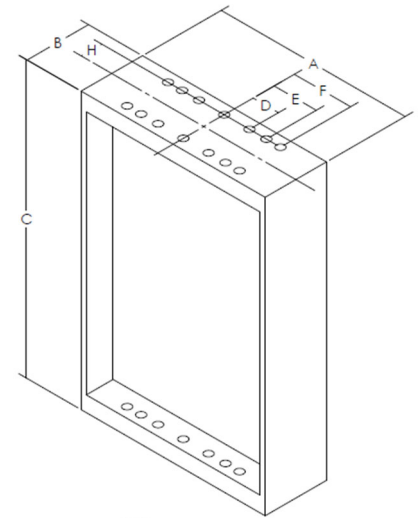




Caisson Beam Adaptor



Extension



90 Degree Turn Plate



| Item | Weight | A | B | C | D | E | F | G | H |
|-----------------------------|---------------------|-----------------|-----------------|-------------------|-------------------|-------------------|-----------------|-------------------|----------------|
| Caisson Beam Adaptor | 1170 lbs 530 kg | 37 in 940 mm | 11 in 279 mm | 14 in 357 mm | 4.94 in 125 mm | 8.25 in 210 mm | 11 in 279 mm | 16.5 in 419 mm | 4 in 102 mm |
| 4' Extension | 2500 lbs 1135 kg | 36 in 914 mm | 12 in 305 mm | 54 in 1372 mm | 4.94 in 125 mm | 8.25 in 210 mm | 11 in 279 mm | / | 4 in 102 mm |
| 8' Extension | 4000 lbs 1815 kg | 36 in 914 mm | 12 in 305 mm | 102 in 2591 mm | 4.94 in 125 mm | 8.25 in 210 mm | 11 in 279 mm | / | 4 in 102 mm |
| 90 Degree Turn Plate | 800 lbs 365 kg | 36 in 914 mm | 12 in 305 mm | 3.5 in 89 mm | 4 in 102 mm | 8.25 in 210 mm | 11 in 279 mm | 16.5 in 419 mm | 4 in 102 mm |

Other Clamp Accessories

Small and Gearbox Incorporated Universal Clamps

| Item | Weight | | Piston Diameter | | | | Piston Stroke | | | Cylinder Force** | | A | B |
|-------------------------|----------------------|----------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|-----------------|---------------------------|--------------------|---------------------|---------------------|
| Special Model 6 | 70 lbs 31.75 kg | | 3.35 in 85.1 mm | | | | 1.68 in 42.7 mm | | | 13 short tons 117 kN | | 5.0 in 127 mm | 1.06 in 27 mm |
| Standard Model 6 | 660 lbs* 300 kg* | | 3.49 in 88.6 mm | | | | 2 in 50.8 mm | | | 14 short tons 127.7 kN | | 9.5 in 241.3 mm | 1.25 in 31.75 mm |
| Model 9 | 900 lbs* 408 kg* | | 3.49 in 88.6 mm | | | | 2 in 50.8 mm | | | 14 short tons 127.7 kN | | 9.5 in 241.3 mm | 1.25 in 31.75 mm |
| / | C | D | E | F | G | H | J | K | L | M | N | P | Q |
| Special Model 6 | 9.5 in 241.3 mm | 5.5 in 139.7 mm | 6.38 in 161.9 mm | 11 in 279.4 mm | 15 in 381 mm | 5.25 in 133.4 mm | 4.13 in 104.8 mm | 4.75 in 120.7 mm | 1 in 25.4 mm | 3.06 in 77.8 mm | 2.25 in 57.2 mm | 5.38 in 136.5 mm | 8.38 in 212.7 mm |
| Standard Model 6 | 13.25 in 336.6 mm | 14.81 in 376.2 mm | 9.5 in 241.3 mm | 4.63 in 117.5 mm | 30.13 in 765.2 mm | 5.79 in 147.1 mm | 4.13 in 104.8 mm | 4.38 in 111.1 mm | 1 in 25.4 mm | 5.46 in 138.7 mm | / | / | / |
| Model 9 | 13.25 in 336.6 mm | 21.9 in 556.3 mm | 9.5 in 241.3 mm | 4.63 in 117.5 mm | 44.38 in 112.7 cm | 5.92 in 150.4 mm | 4.25 in 108 mm | 4.38 in 111.1 mm | 1 in 25.4 mm | 5.59 in 142 mm | / | / | / |

*Clamp is component of vibratory hammer; this value represents the full weight of the unit.

**Cylinder and force from 300 psi pressure setting.

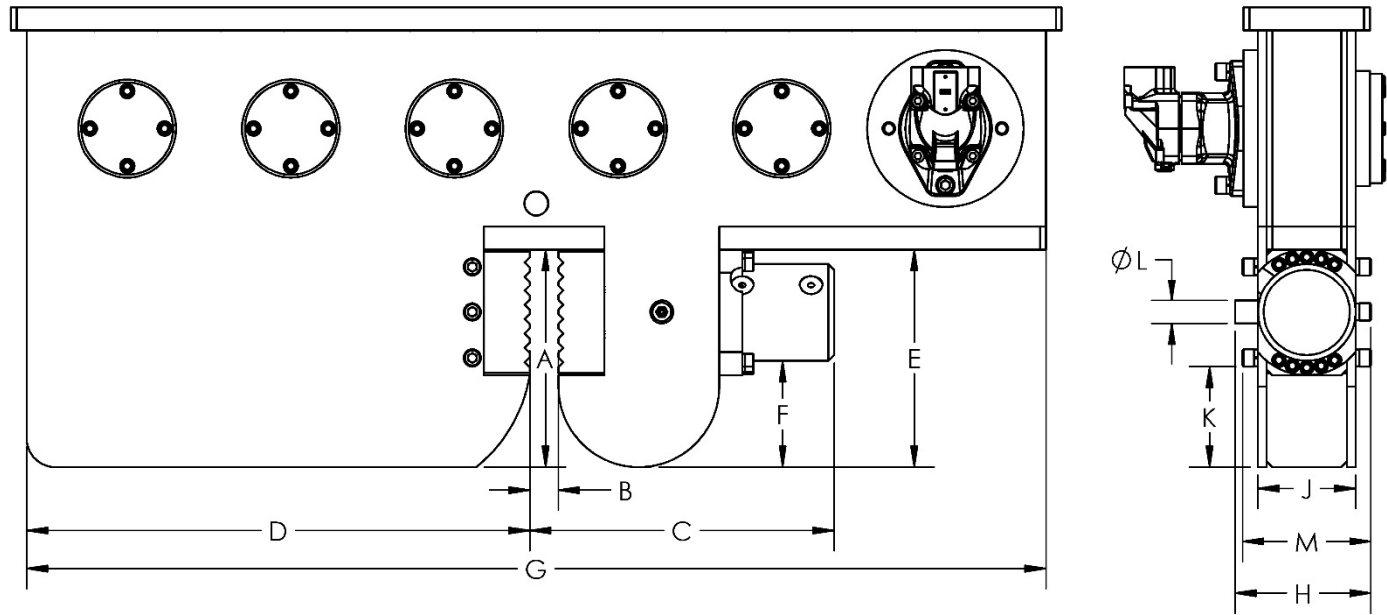
**Model 3 Vibro
with Special
Model 6 Clamp**



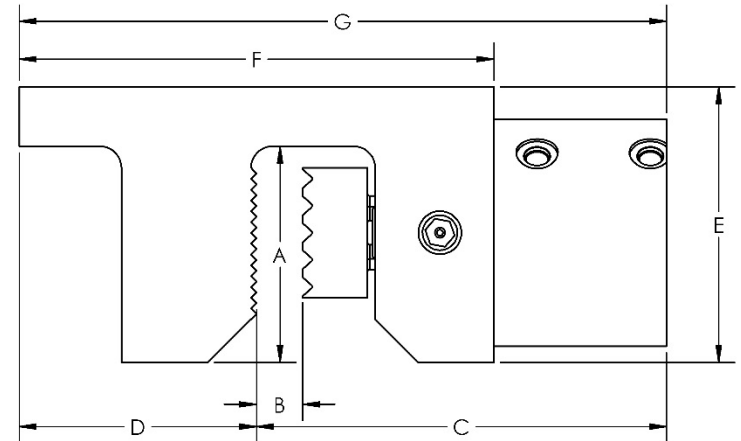
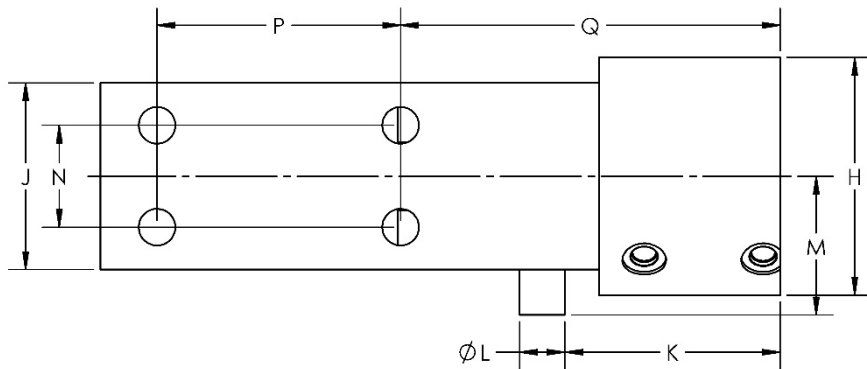
**Model 6 Vibro
with built in
Standard Model 6
Clamp**



Model 9 Vibro gearbox with built in clamp

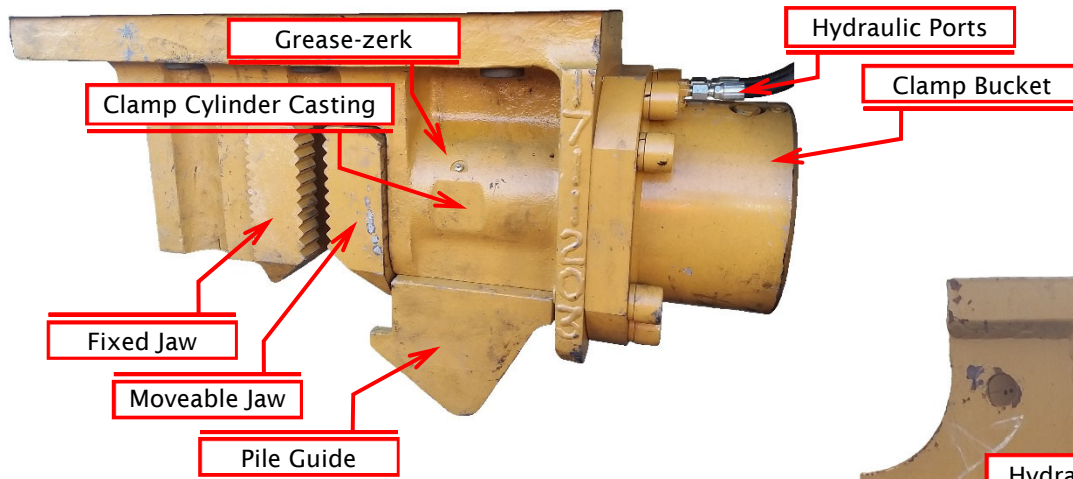


Model 6 Special Clamp



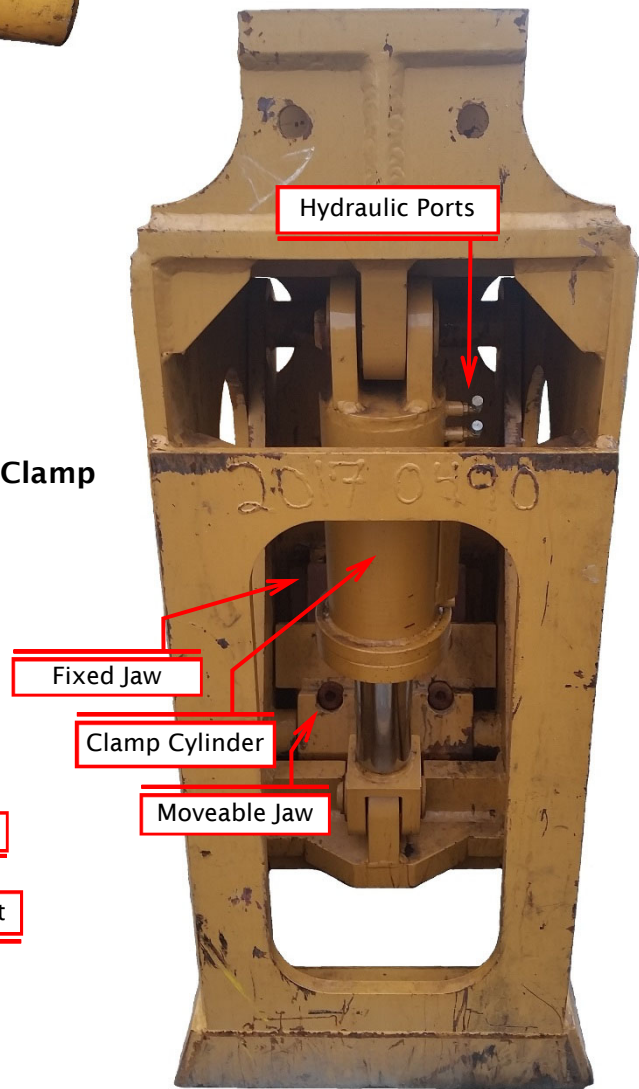
OPERATORS INFORMATION

Component Overview

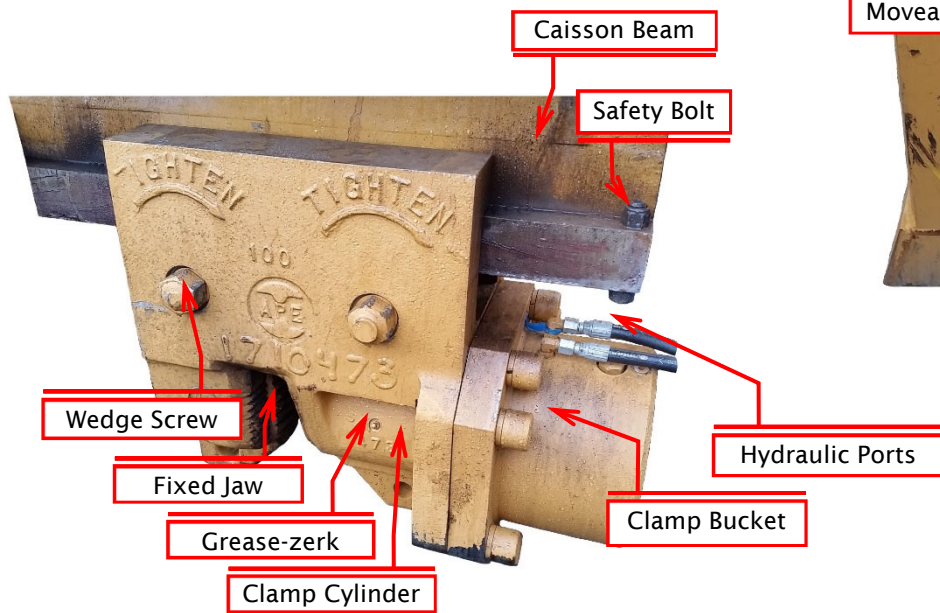


Common Sheet Clamp

Wood Clamp



Caisson Clamp on Beam





Emergency Stop

Engine Throttle

Wired Control Pendant

Clamp Switch

Drive Switch

Standard Power Unit Console

Engine Throttle

Clamp Switch

Drive Switch

Remote vs Local Toggle

Engine Start / Power On

Digital Power Unit Console

Emergency Stop

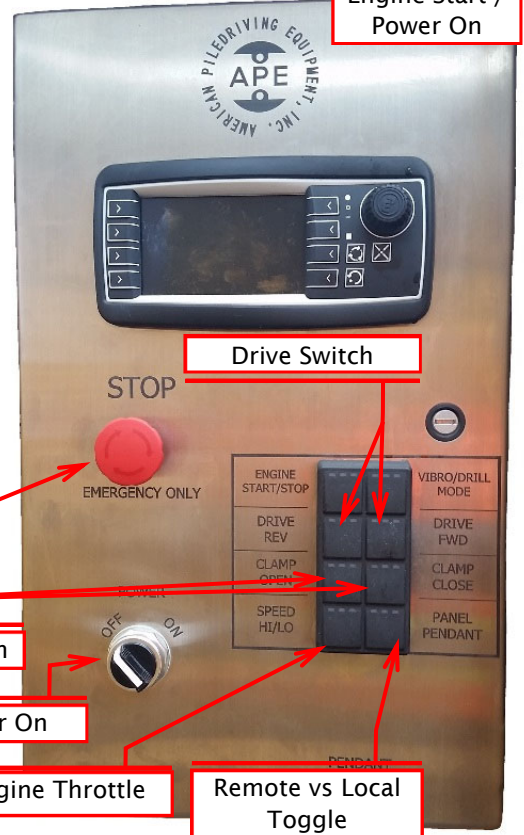
Clamp Switch

Power On

Engine Throttle

Drive Switch

Remote vs Local Toggle



OPERATORS INFORMATION

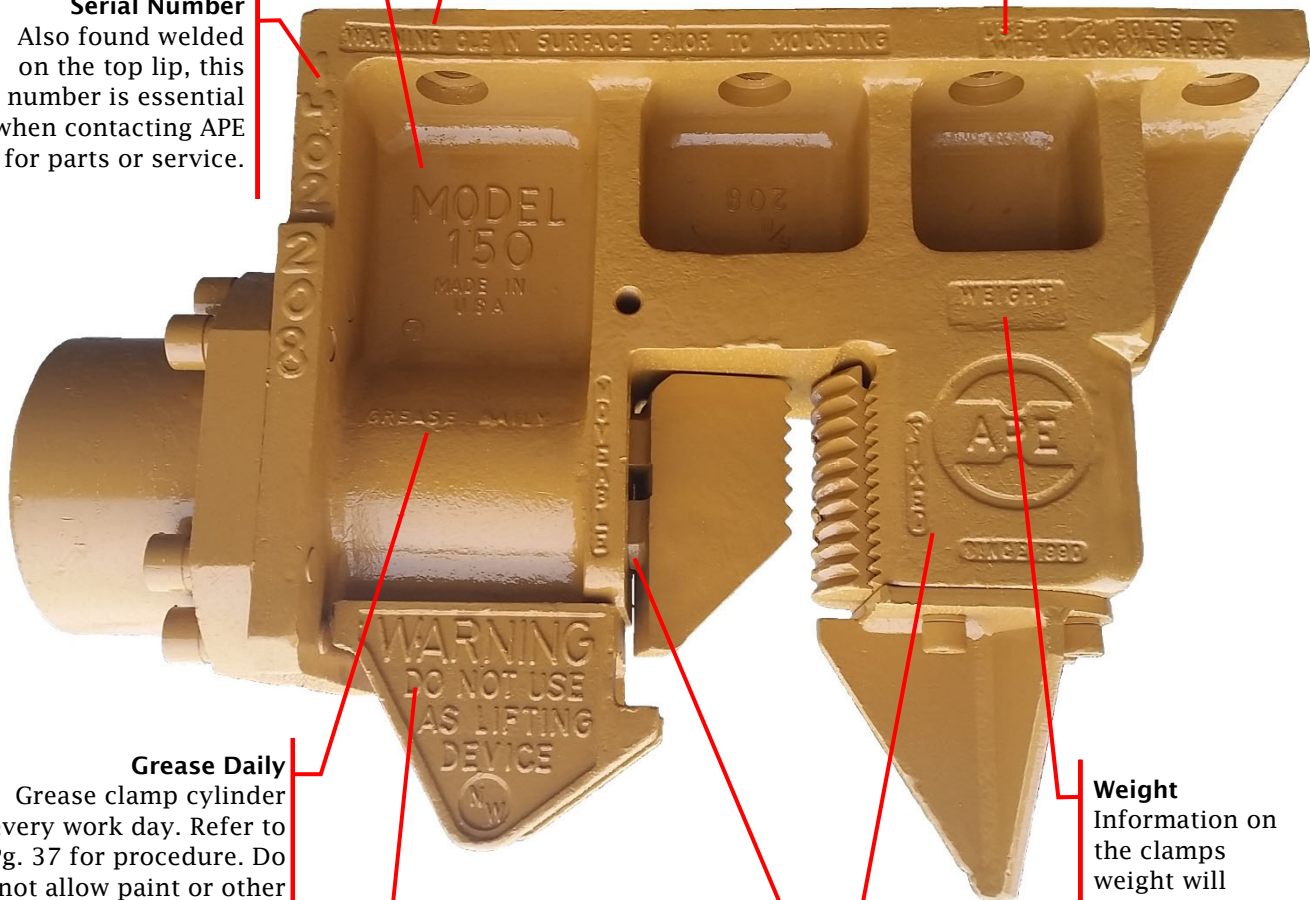
Labels and Warnings

Model Number
Cast on the clamp body, usually near the cylinder, this number is essential when contacting APE for parts or service.

Warning clean surface prior to mounting.
Clean mating surfaces before attaching clamp to vibro. Dirt or debris may cause improper mating and broken bolts.

Use 3-1/2" bolts NC with lockwashers.
Specifies which bolts to use when attaching the clamp to a vibro.

Serial Number
Also found welded on the top lip, this number is essential when contacting APE for parts or service.



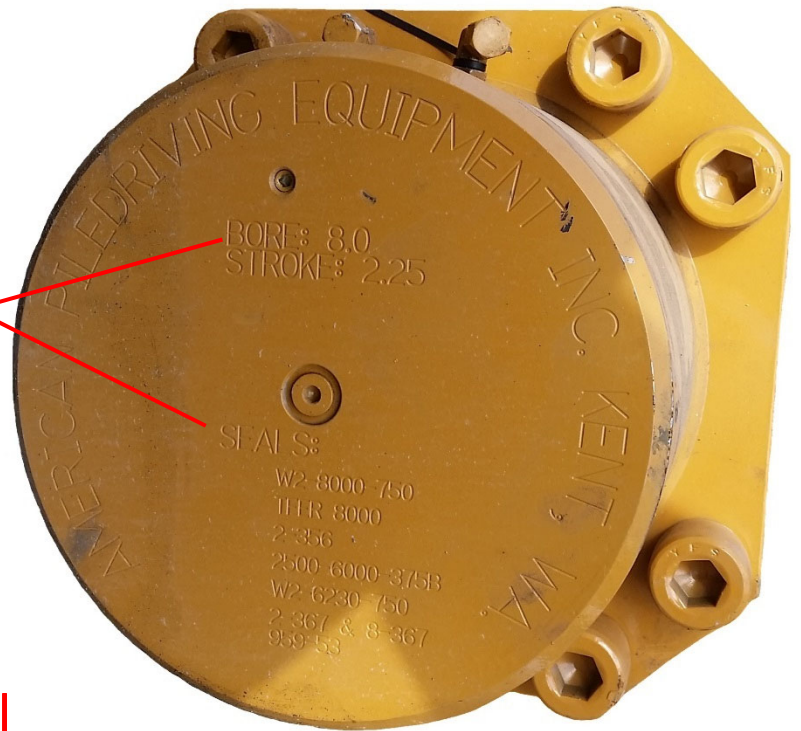
Grease Daily
Grease clamp cylinder every work day. Refer to Pg. 37 for procedure. Do not allow paint or other foreign material to block the grease fitting.

Warning Do not use as lifting device
Do not use clamp to lift piles. Clamp may lose pressure and drop load, causing property damage, serious injury, or death.

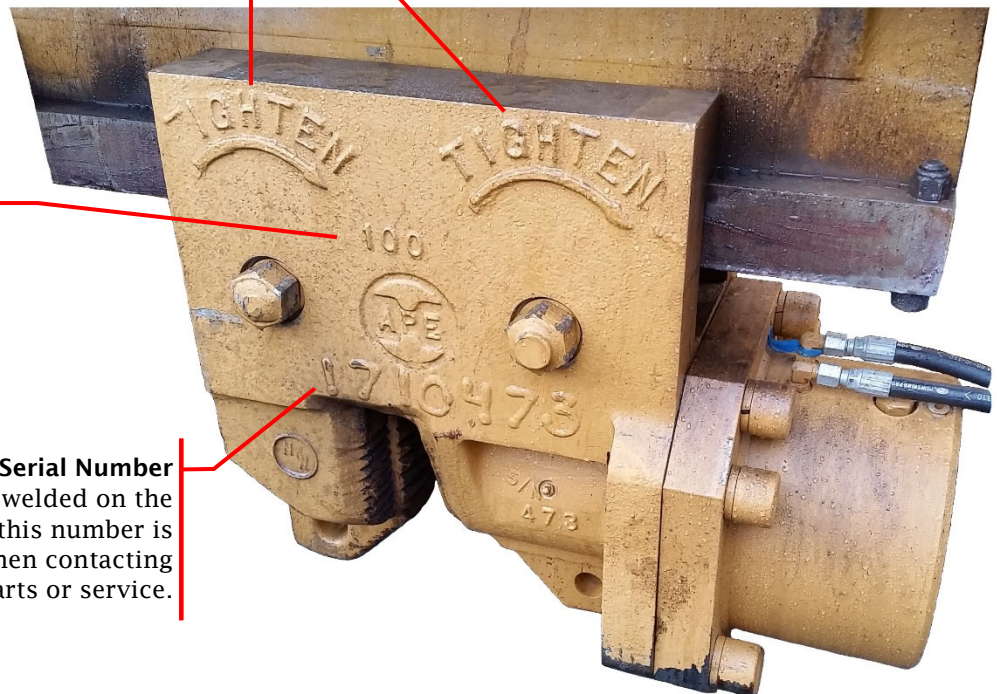
Moveable / Fixed
Most clamp castings will indicate which side of the clamp jaws are moveable and fixed. The moveable jaw will always be on the same side of the clamp as the clamp bucket.

Weight
Information on the clamps weight will often be cast on the body.

Clamp Bucket Face
Often contains information on cylinder diameter, stroke length, and clamp seals.



Tighten
Tighten or loosen caisson wedge bolts only from the side where the TIGHTEN label is displayed. Attempting to tighten from the incorrect side may damage the clamp.



Model Number
Cast on the clamp body, usually near the cylinder, this number is essential when contacting APE for parts or service.

Serial Number
Also found welded on the top lip, this number is essential when contacting APE for parts or service.

OPERATORS INFORMATION

Attaching the Clamp to a Vibrator

The vibrator is usually shipped with the hydraulic clamp already attached and hooked up. If this is not so, or the job requires multiple clamps to be used on the same vibrator, a working knowledge of how to change the clamp is necessary. All bolts should be socket head cap screws. Do not use grade five bolts.

These instructions are written with sheet clamps in mind. They are also appropriate for attaching turn plates, extensions, caisson beams, and caisson adaptors.

1. Clean all drilled and tapped threads on the bottom surface of the gearbox. Use a 1½-6 UNC tap to clean rusted threads then blow out remaining fragments with compressed air. If there is a cutting torch on the jobsite then use the oxygen setting to blast the threads clean. Hold a rag over the tapped hole to prevent flying dirt from blasting into eyes.
2. Clean both the machined bottom surface of the gearbox and the surface of the clamp/attachment. Make sure the surfaces are flat and void of all dirt. Eyeball the surface for damage.
3. Orient the clamp/attachment holes with those of the vibrator. If attaching a sheet clamp, place the clamp bucket on the same side as the vibrator hoses when possible.
4. Insert the center bolt first and work outwards. Use anti-seize and note the K value.
5. Tighten bolts according to the torque specifications in the Reference section on Pg. 90. Go around all bolts at least three times making sure they are tight.
6. After vibrating the first pile check the bolts again.
7. If one bolt breaks replace them all since they may be weak or cracked.
8. Never operate the vibrator with missing clamp/attachment bolts.

| Clamp and Beam Mounting Bolts | | |
|-------------------------------|--------------|--------------|
| Type | 1.5 - 6x3.5" | 1.5 - 6x5.0" |
| 20 Sheet | 10 | - |
| 50 Sheet | 8 | - |
| 150 Sheet | 8 | - |
| 200 Sheet | 10 | - |
| 400 Sheet | 24 | - |
| 126 Sheet | - | 8 |
| 196 Sheet | - | 11 |
| 20 Wood | 8 | - |
| 25 Wood | 8 | - |
| 32 Wood | 14 | - |
| 20 Hybrid | 10 | - |
| 5ft Caisson | 18 | - |
| 8ft Caisson | 26 | - |
| 11ft Caisson | 42 | - |
| 13ft Caisson | 58 | - |

All bolts are socket head cap screws with high collar lockwashers.

DANGER

Failure to follow cleaning steps will prevent the bolts from fully tightening, causing the clamp bolts to break. If the clamp bolts break, check the machined surfaces with a straight edge to make sure they are flat. Replace all bolts, not just those broken, when reinstalling.

NOTICE

Do not tighten bolts until all bolts have been engaged.

Do not tighten bolts while the clamp/attachment is hanging from the vibrator.

To Place a Caisson Clamp on a Beam:

1. Loosen the wedges by turning the wedge screws counter clockwise. One face of the clamp will bear the TIGHTEN label. Tighten or loosen the wedge screw by turning only this side.
2. When the wedge screw is loosened, free the wedge by striking the face of the wedge screw with a sledgehammer.
3. Slide the caisson clamp onto the beam and into position. Ideally all clamp buckets will face outwards.
4. Once at the desired separation, partially tighten the wedge screw with a wrench or impact driver. If using an impact driver *do not* tighten the nuts all the way.
5. Finish tightening the nuts with a 20lbs sledgehammer and 2" lug wrench.
6. Install safety bolts onto the ends of the caisson beam with nuts on the bottom. These will help prevent the caisson clamps from falling off during adjustments and operation.



Caisson TIGHTEN label appears on one side of the clamp above the wedge screws.

Hooking up a Vibro to the Power Unit

As shipped, most vibrators will be laid over with their hoses bundled on top. To run the clamp, the two 3/8" clamp lines from the vibro will need to be hooked up.

1. Check pressures at the power unit. If there is any pressure in the clamp CLOSE line, turn on the power unit and set the clamp switch to OPEN. Return it to neutral and continue with the procedure.
2. Clean both ends of the clamp QD's thoroughly.
3. Hook up the QD's. Trace the lines to ensure CLOSE is joined to CLOSE. Alternatively, set the QD's to either port then follow the Bleeding Lines procedure on the next page.



Power Unit quick disconnects, OPEN on left and CLOSE on right.

NOTICE

Any contaminants that enter the hydraulic fluid will severely reduce the life of the components.

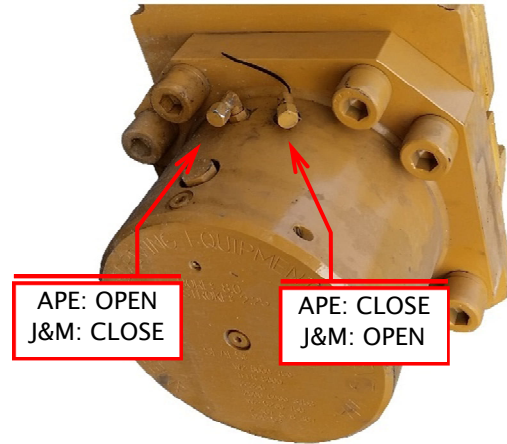
OPERATORS INFORMATION

Bleeding and Hooking Up Vibro Lines

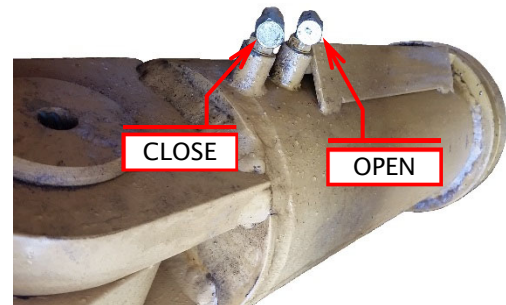
When the vibrator and hydraulic clamp are shipped with all hoses attached the hoses are usually full of oil and may be used immediately. Two hoses should connect the vibrator and each clamp.

This procedure should be performed as part of routine maintenance. Other reasons to bleed the hydraulic clamp are if a hose is connected at the job site, a damaged clamp hose replaced, or an old unit returned to service.

1. Clean all clamp bucket fittings with ether.
2. Start and warm up the power unit. Run the unit at a low idle.
3. Set clamp switch to CLOSED.
4. When the clamp is fully closed set clamp switch to Neutral.
5. Disconnect the hose at the clamp OPEN side.
6. Cap the OPEN port on the clamp bucket.
7. Place loose hose end in an empty container and set the clamp switch to OPEN for 30 seconds.
8. Set the clamp switch to Neutral and reattach the clamp OPEN hose.
9. Set the clamp switch to OPEN.
10. When the clamp is fully open set switch to Neutral.
11. Unplug the clamp CLOSE hose. Cap the CLOSE port on the clamp bucket.
12. Place the loose hose end in an empty container and set the clamp switch to CLOSE for 30 seconds.
13. Set the clamp switch to Neutral. Plug the clamp CLOSE hose back into the clamp bucket.



OPEN/CLOSE ports on caisson and sheet clamps.



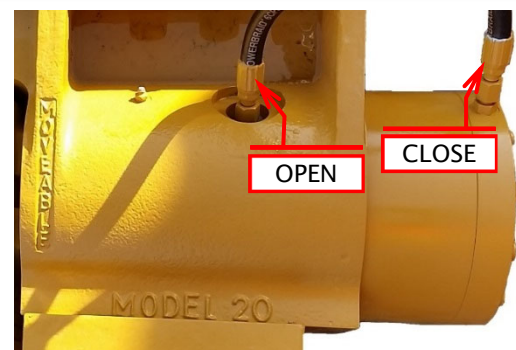
OPEN/CLOSE ports on wood clamp cylinders

WARNING

NEVER tighten or loosen connections while there is oil running through the clamp system. High pressure oil could spray and cause serious injury.

NOTICE

Any contaminants that enter the hydraulic fluid will severely reduce the life of the components.



OPEN/CLOSE ports on Model 20 sheet clamp

Changing Clamp Jaws and Pile Guides

For some jobs it will be necessary to switch out the jaws on the clamp. Ensure that the vibrator and/or clamp are laid over and supported by dunnage before beginning. For added safety disconnect the drive hoses from the power unit.

To change the fixed jaw on sheet and caisson clamps:

1. Turn on and warm up the power unit. Bleed clamp lines as described previously in this chapter if necessary before beginning the rest of the procedure. When the power unit is warmed up OPEN the clamp jaw fully.
2. Remove the bolts on the fixed jaw. If force is required to loosen the fixed jaw from the clamp body, avoid damaging the jaw teeth.
 - a. *If also installing moveable jaw, pause procedure here and move to that task.*
3. Insert new bolts according to the specifications on this page. Ensure bolts have an appropriate amount of anti-seize and note its K value.
4. Hold jaw against bolts and engage threads by hand. Once all bolts are engaged run them in without fully tightening.
5. Fully CLOSE the clamp. Maintain clamp pressure on the jaws.
6. Tighten bolts to the torque specifications given on Pg. 90.

To change the moveable jaw on sheet clamps:

1. Turn on and warm up the power unit. Bleed clamp lines as described previously in this chapter if necessary before beginning the rest of the procedure.
 - a. If a fixed sheet jaw is already installed on the unit, remove it before proceeding. Do not reinstall the fixed jaw until the moveable jaw is fully installed.
2. When warmed up CLOSE the clamp jaw fully.



KEEP LIMBS AND TOOLS CLEAR OF CLAMP JAWS WHILE CLAMP IS ENERGIZED.

Bolt specifications for fixed jaw replacement:

- Model 20, 50, 150, and 200 Sheet: 2 SHCS 1.0-8x9.0" bolts each with a 1" HCLW.
- Model 400 Sheet: 2 SHCS 1.0-8x11.0" bolts each with a 1" HCLW.
- J&M Model 126 Sheet: 2 SHCS 1.0-8x4.0" bolts each with a 1" HCLW.
- J&M Model 196 Sheet: 2 SHCS 1.0-8x4.5" bolts each with a 1" HCLW.
- Model 80b Caisson: 2 SHCS 5/8-11x2.75" bolts each with a 5/8" HCLW.
- Model 100 Caisson: 2 SHCS 5/8-11x3.75" bolts with a 5/8" HCLW.
- Model 200 Caisson: 2 SHCS 5/8-11x4.0" bolts with a 5/8" HCLW.

OPERATORS INFORMATION

3. Insert two equally sized metal spacers between the rear of the moveable jaw and the clamp body so that the moveable jaw will receive even resistance when the clamp is set to OPEN.
4. OPEN the clamp. The roll pin between the moveable jaw and the clamp plunger should shear.
5. Remove the moveable jaw once the clamp is fully OPEN.
 - a. If the roll pin did not fully shear, CLOSE the clamp and repeat steps 2 through 4 with larger metal spacers.
6. CLOSE the clamp. Use a hammer and pin to remove the remains of the roll pin from both the moveable jaw and the clamp plunger.
7. Align the new moveable jaw on the clamp plunger. Some adjustment of clamp plunger position may be needed to align the holes.
8. Insert a new roll pin into holes and tap down until it is exactly halfway, with equal depths extending into the cylinder plunger on each side of the jaw.
9. OPEN and CLOSE the clamp to make sure it has a full range of motion.

To install sheet and dunce pile guides:

1. Remove any guides that are not needed.
2. Clean bolt holes with wire brush and compressed air. If threads are rusted use a tap to clear them.
3. Bolt specifications are listed in the pop out box. Use appropriate anti-seize and note the K value.
4. Align guide on the holes and engage all bolts. Dunces guides may only be fitted on the fixed jaw side.
5. Once all bolts are started, tighten them in a star pattern to the torque specified in the torque chart on Pg. 90.



DANGER

KEEP LIMBS AND TOOLS CLEAR OF CLAMP JAWS WHILE CLAMP IS ENERGIZED.



Bottom view of roll pin hole on moveable jaw.

Bolt specifications for dunces and sheet pile guides:

- Model 20, 50, 150, and 200 Sheet clamp pile guides: 4 SHCS 1.0-8x3.0" bolts each with a 1" HCLW.
- Model 50 and 150 dunces spikes: 4 SHCS 1.0-8x2.0" bolts each with a 1" HCLW.
- Model 400 Sheet pile guide: 4 SHCS 1.0-8x4.0" bolts each with a 1" HCLW.
- J&M Model 126 and 196 Sheet pile guides: 4 SHCS 1.0-8x2.5" bolts each with a 1" HCLW.

To install square or circular jaws on wood clamps:

1. While the clamp is still upright, loosen the bolts on the fixed jaw.
2. Turn on and warm up the power unit. Bleed clamp lines as described previously in this chapter if necessary before beginning the rest of the procedure.
3. Lay the clamp and/or vibrator over so that it securely rests on dunnage.
4. OPEN the clamp jaws fully. Secure the arm with wedges.
5. Follow these steps to remove the moveable jaw.
 - a. Two bolts will be exposed at the rear. Loosen these but do not remove them.
 - b. Turn the moveable plate with a long bar and secure it open with wedges. Remove the bolts that are exposed.
 - c. Return the plate to a neutral position. Secure the teeth from below so that they won't fall when the final bolts are removed then remove the bolts and jaw.
6. Position the replacement jaw, supporting it as necessary, and insert the rear bolts. Bolt specifications are given in the pop out box. Make sure they have fresh anti-seize, noting the K value. Engage the bolts without fully tightening them.
7. Pry open the jaw and secure it as in step 6b. Insert and tighten all remaining bolts to the torques specified on Pg. 90.
8. Remove bolts on the fixed jaw. Position replacement jaw and engage bolts by hand. Use anti-seize, noting the K value. Bolt specifications are noted on this page.
9. When all fixed jaw bolts are hand tight, remove the wedges on the moveable arm.
10. Stand the vibrator and/or clamp upright and tighten the fixed jaw bolts to the torque specified on Pg. 90.



BEWARE OF SHEAR AND PINCH POINTS, ESPECIALLY BETWEEN THE MOVEABLE ARM AND THE CLAMP FRAME GAPS.



The hydraulic cylinder is NOT designed to hold pressure in this position. Oil may drain from the cylinder, gradually releasing the moveable arm.

Bolt specifications for wood clamp moveable jaw:

- Model 20, 25, and 32 Wood clamp moveable jaw: 6 SHCS 1.5-6x4.0" bolts each with a 1.5" HCLW.

Bolt specifications for wood clamp fixed jaw:

- Model 20 Wood clamp fixed jaw: 6 SHCS 1.5-6x6.5" bolts each with a 1.5" HCLW.
- Model 25 and 32 Wood clamp fixed jaw: 6 SHCS 1.5-6x3.25" each with a 1.5" HCLW.



Use caution when removing the wedges. Abrupt motion of the arm is possible and could result in property damage or serious injury.

OPERATORS INFORMATION

Clamping Force Calculations

An accurate calculation of the clamps gripping force is essential for safe operation. The values provided in the specifications pages are accurate only for a specific pressure setting and it may be necessary to calculate a new one on the job site.

- Cylinder diameters can be found on the specifications pages.
- Use the clamp CLOSE pressure value displayed by the power unit, which can be adjusted by changing the clamp relief valve setting as described in the power unit manual.
- The 20" Hybrid and C102 Wood Clamps use two pistons closing from the rod end. For these clamps only, Cylinder Area = 20.32 in² (13110 mm²). Carry out the rest of the equations as normal.



Power unit clamp CLOSE dial as seen beside the power unit control panel. Pressure measured in psi and bar.

Formulas



The true cylinder force will always be lower than the theoretical cylinder force. The true cylinder force will depend on the coefficient of friction between the jaw teeth and the pile.

$$\text{Cylinder Area} = 0.7854 \times \text{Cylinder Diameter}^2$$

$$\text{Cylinder Force (lb)} = \text{Cylinder Area (in}^2\text{)} \times \text{Clamp CLOSE Pressure (psi)}$$

(OR)

$$\begin{aligned} \text{Cylinder Force (kN)} &= \frac{\text{Cylinder Area (mm}^2\text{)} \times \text{Clamp CLOSE Pressure (Bar)}}{1,000} \\ &= \frac{\text{Cylinder Area (mm}^2\text{)} \times \text{Clamp Close Pressure (KPa)}}{1,000,000} \end{aligned}$$

Greasing the Clamp

At the start of each work day the clamp cylinder should be greased.

1. Make sure the clamp OPEN and CLOSE ports are tightly attached.
2. Clean the grease-zerk. If the grease-zerk is blocked, replace it.
3. Run the clamp cylinder back and forth while applying grease to the grease-zerk. **Use NLGI Grade 2 EP2 or equivalent.**
4. Continue to apply grease and run the clamp until grease escapes around the plunger near the jaws.



Grease-zerks are on the clamp cylinder near the jaws.

NOTICE

Do not use a pneumatic gun to apply grease. Excessive air bubbles may be introduced to the space around the clamp plunger.

Clamp Thermal Relief

Heat from the environment or vibro operation will cause hydraulic oil in the clamp to expand. This is a hazard to personnel and the equipment.

- Do not leave the clamp pressurized during downtimes longer than 1 hour.
- Every 30 to 45 minutes of work, stop and relieve clamp pressure. Re-clamp before resuming work.



Extreme hydraulic pressure can crack the clamp cylinder casing, burst hoses, or rupture the clamp seal cartridge. All may cause severe injury or death.

Do not attempt to relieve clamp pressure while vibro is in drive forward.

Check Valve Test

Many clamp pressure loss issues are related to a faulty check valve.

1. While clamp is hooked up, turn on and warm up power unit. Leave it on a low idle.
2. Remove the OPEN side hose at the clamp.
3. While taking precautions against oil spray and leakage, set clamp switch to CLOSE.
4. When clamp is fully closed check OPEN side port for bypass oil. A drip rate of roughly one drop per five seconds is acceptable.
5. If drip rate is low reattach the OPEN hose.



USE CAUTION, HIGH PRESSURE OIL MAY SPRAY FROM PORT.

DO NOT ATTEMPT TO TOUCH THE PORT OR REATTACH THE HOSE IF OIL IS SPRAYING.

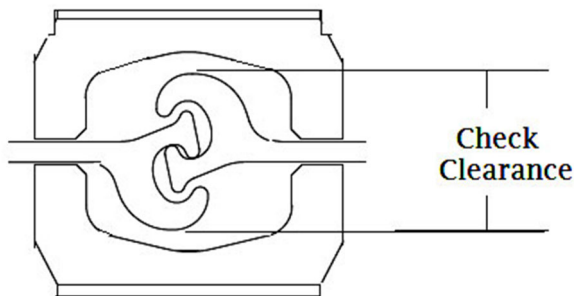
- a. If the oil is streaming or spraying do not attempt to attach the hose. Allow the leak to relieve the CLOSE side pressure and order a new check valve.

OPERATORS INFORMATION

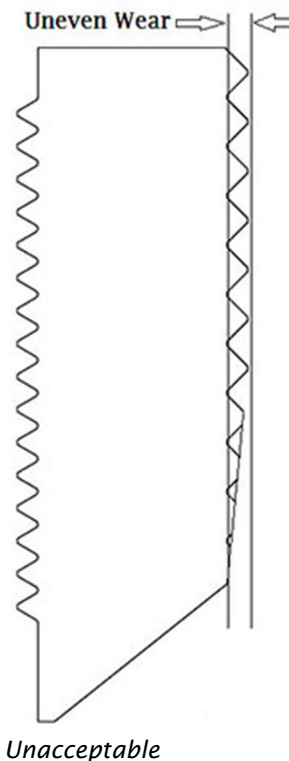
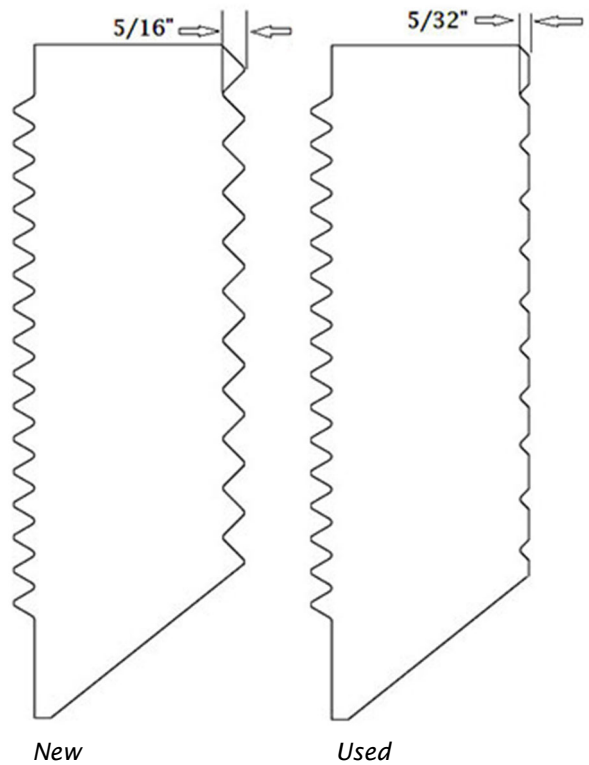
Worn Jaw Check

Periodic checks of the sheet clamp jaws are required to ensure safe operation of the vibro. Follow this procedure on the first day of work and weekly after. More frequent checks will be required in abnormal operating conditions.

1. If the clamp jaws are not fully open, turn on the power unit and open them. Turn off the power unit and keep it off for the rest of the procedure.
2. Measure between teeth valleys and peaks.
3. Teeth can be worn up to half of their original depth of $5/16"$ or 8mm if the teeth are evenly worn. Depth less than $5/32"$ or 4mm requires replacement of the clamp jaw.
4. All teeth must engage the pile. If values fall within the acceptable range but show uneven levels of wear, especially on the bottom few teeth, replace the jaw.
5. Also ensure that, at the present level of tooth wear, there is clearance in the concave region of the sheet clamp jaws to allow the inner-lock of the sheet piles.



Visualization of internal clearance of sheet jaws.



Unevenly worn jaws in need of prompt replacement.

Fluid Cleanliness

It is imperative that the hydraulic fluid is kept clean to a minimum ISO Code 17/15/11. Bulk oil does not typically meet the cleanliness standards required by APE equipment.

See attached document Understanding ISO Codes on Pg. 91 and Warranty regarding fluid cleanliness.

Storage

During short-term storage of the clamp, the following steps should be taken:

- Ensure the clamp has been freshly lubricated.
- Fully OPEN the clamp cylinder.
- Disconnect hoses.
- Cover any pressure openings and open threaded holes with suitable caps.
- Protected the unpainted surfaces from dirt and moisture. **DO NOT PAINT OVER GREASE-ZERK.**
- Do **NOT** store the clamp in an area with substances that have an aggressive corrosive nature, i.e. solvents, acids, alkalis, or salts.

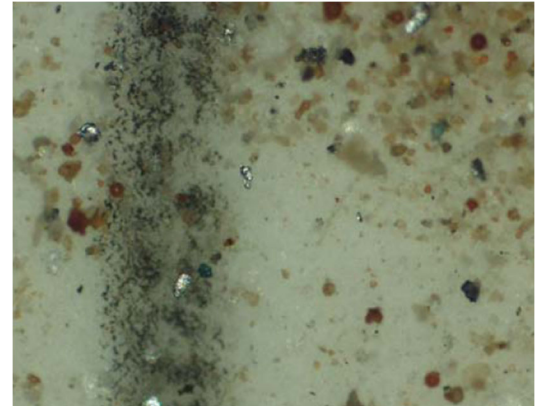
For long-term storage (over 9 months) the following additional actions are recommended:

- Repair any damage to surface paint before item is stored.
- Protect the unpainted surfaces with suitable anti-corrosion treatment such as CRC SP-350, CorrosionC corrosion inhibitor, or WD-40 Long Term Corrosion inhibitor.
- Make sure the clamp hydraulic components are completely full of clean hydraulic fluid.

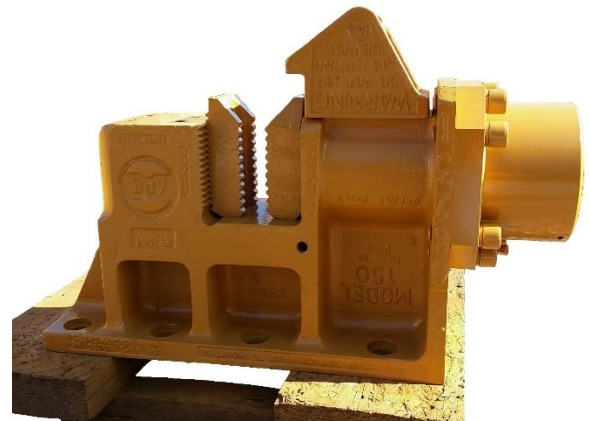
If these instructions are followed the clamp may be stored for approximately 2 years. However, as storage conditions do have a significant effect, all suggested time frames should only be considered as guide values.

NOTICE

New hydraulic fluid is **NOT** clean oil.



New hydraulic oil under microscope.



150 Sheet clamp painted for storage. Machined surface on bottom will still require protection.

MAINTENANCE / TROUBLESHOOTING

Daily Checklist

At the beginning of each shift, check the following:

- Visually inspect all bolts, nuts and screws, including those that mount the clamp to the gearbox. Vibration loosens bolts, check carefully.
- Visually inspect clamp jaws and teeth for cracking.
- Tighten bolts holding gripping jaws to the clamp.
- Grease clamp piston in accordance with the procedure found on Pg. 37.
- Visually inspect all hydraulic fittings for leaks.
- Visually inspect hoses for damage or cuts that might cause hose failure during operation.
- After starting power unit make sure that hydraulic hoses are hanging freely. Check for leaks.
- Close clamp jaws. Ensure green clamp switch lights come on.

NOTICE

Check the entire unit prior to and during set up each day or at the beginning of each shift.



DANGER

Vibration loosens bolts. Check them thoroughly.

NOTICE

It is absolutely imperative that no dirt or other impurities be permitted to contaminate the hydraulic fluid. Any contamination will drastically shorten the life of the high-pressure hydraulic system.



Metal hose braiding badly frayed, rendering the hose unsuitable for use.

Long Term Maintenance

| Non-Daily Maintenance Tasks | | |
|---|--|--|
| Weekly | Six months | Yearly |
| <ul style="list-style-type: none"> Unhook clamp lines and follow Bleeding Lines procedure on Pg. 32. Follow Worn Jaw Check procedure on Pg. 38. | <ul style="list-style-type: none"> Replace fixed and moveable clamp jaws. Use dye penetrant inspection to check clamp body for cracking around clamp jaws. | <ul style="list-style-type: none"> Replace clamp line hoses. Examine O-rings for wear. |

Preventative maintenance includes normal servicing that will keep the clamp in peak operating condition and prevent unnecessary trouble from developing. This servicing consists of periodic lubrication and inspection of moving parts and accessories of the unit. Lubrication is an essential part of preventative maintenance controlling the useful life of the clamp.

To prevent minor irregularities from developing into serious conditions that might involve shutdown and major repair, several other services or inspections are recommended. The purpose of these services or inspections is to assure the uninterrupted operation of the unit.

The intervals given in the schedule are based upon normal operation. Perform these services, inspections, etc., more often as needed for operations under abnormal or severe conditions.

- When the average temperature is above 80°F (26°C) or below -10°F (-23°C) reduce the service time intervals by one half of those specified in the chart.
- When operating in the presence of dust or sand reduce service time intervals by one-half of those specified in the chart.
- When operating more than 12 hours per day, reduce the service time intervals by one-half of those specified.
- For extended inactive periods the clamp should be run and greased once a week.

NOTICE

Thoroughly clean all lubrication ports and fittings along with their surrounding surfaces before servicing.

Prevent dirt from entering with lubricants and hydraulic oil.

MAINTENANCE / TROUBLESHOOTING

Problem Identification

| Symptom | Possible Cause | Remedy |
|---|---|---|
| <p>Clamp light doesn't illuminate when pressure is at or above 4500 PSI.</p> <p><i>OR</i></p> <p>Clamp is losing pressure over time, or clamp light doesn't illuminate when pressure is below 4500 PSI.</p> | Relief valve set too low. | Release clamp pressure and disconnect QD's. Test clamp pressure at power unit console. If below 4500 PSI reference your power unit manual for the procedure on adjusting clamp pressure. |
| | Quick disconnects not fitted properly. | Release clamp pressure. Remove, inspect, clean, and reattach QD's. |
| | There is an electrical fault. | -Check lights on both power unit console and pendant for failed bulbs. -Check electrical connections for corrosion or broken wires. |
| | Hoses are leaking. | Depressurize clamp and check hoses and QD's for leaks. Immediately halt work and replace any hose found to leak. |
| | Faulty clamp check valve. | Follow the Check Valve Test procedure on Pg. 37. |
| | Seals are leaking internally. | Check clamp rod for bad O-rings. |
| <p>Opening and closing clamp jaws seems spongy or slow.</p> | Quick disconnects not fitted properly. | Release clamp pressure and tighten QD's. It may be necessary to clean QD's of dirt or rust first. |
| | The clamp hoses have air in them. | Follow the procedure on Pg. 32 to bleed the clamp hoses. |
| | Oil leaks are slowing the clamp. | Inspect hoses and clamp seals, replacing if needed. Follow Check Valve Test procedure on Pg. 37. |
| | The plunger shaft is not properly lubricated or needs cleaning. | Remove the moveable jaw from the clamp according to the instructions given on Pg. 33. Inspect the plunger shaft and check for lubrication or debris build up. Clean the shaft if needed then lubricate using the grease-zerk on the clamp body. |
| <p>Clamp CLOSE pressure rises and falls repeatedly.</p> | <p>Leaks, internal or external, are triggering the clamp CLOSE pressure switch.</p> | Examine hoses, QD's, and power unit clamp manifold for leaks. |
| | | Follow Check Valve Test procedure on Pg. 37. |

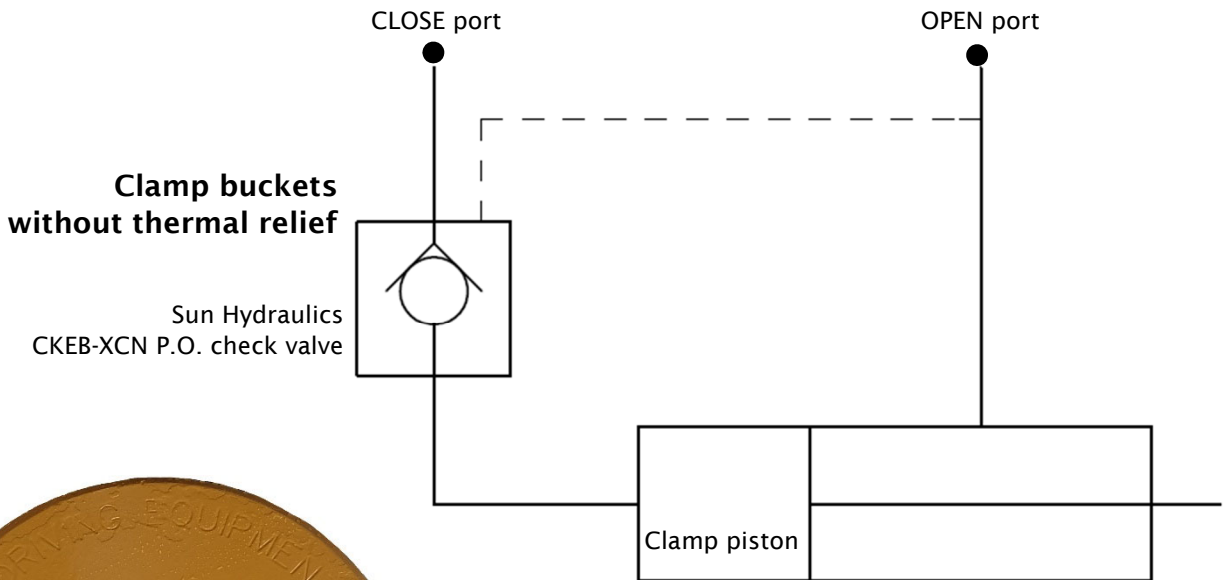
MAINTENANCE / TROUBLESHOOTING

| Symptom | Possible Cause | Remedy |
|---|--|--|
| Clamp won't close or open when the clamp switch is engaged. | Vibrator is running. | The clamp won't open while the vibrator is in operation. To open the clamp, stop the vibrator. |
| | Quick disconnects not fitted properly. | Release clamp pressure and tighten QD's. |
| | Hoses are not properly routed. | Toggle the clamp switch to see if the desired operation occurs. |
| | Diesel engine not running. | Start the power unit and allow clamp pressure to build. |
| | Leaks are allowing oil to bypass the clamp circuit. | Check for leaks and faulty components as with clamp lights failing to illuminate. |
| | There is an electrical fault. | Check for the following: -Defective clamp switch. -Broken or loose wire in the pendant or pendant cable. -Defective OPEN solenoid. -Broken or loose wires. -Defective or sticking clamp timing delay relay. |
| | Clamp rod seized. | Check lubrication history and examine clamp rod if possible. |
| Clamp pump is defective. | Check for proper clamp pump operation and replace if needed. | |
| Bolts attaching clamp to vibrator break. | Mating surfaces not adequately cleaned. <i>OR</i> The bolts were not torqued properly. | Detach the clamp from the vibro and follow the procedure on Pg. 30 for reattaching. Perform the cleaning steps diligently and use all new bolts. Ensure every bolt is properly torqued. |
| Cracks found in clamp body near jaws. | Clamp body is old or was exposed to excessive force. | Contact APE for advice and evaluation, replacement may be required. |
| Clamp jaw teeth are cracked. | Clamp teeth are old or were exposed to excessive force. | Replace clamp jaws according to the procedures on Pg. 33. |
| Hydraulic oil leaking from bucket in area other than clamp line fittings. | Plug or seal on the clamp bucket body has come loose, or a crack has appeared. | Tighten fittings at leak site. If this does not solve the problem or the leak is not coming from a fitting, contact APE. <i>DO NOT SERVICE EQUIPMENT WHILE CLAMP IS UNDER PRESSURE.</i> |

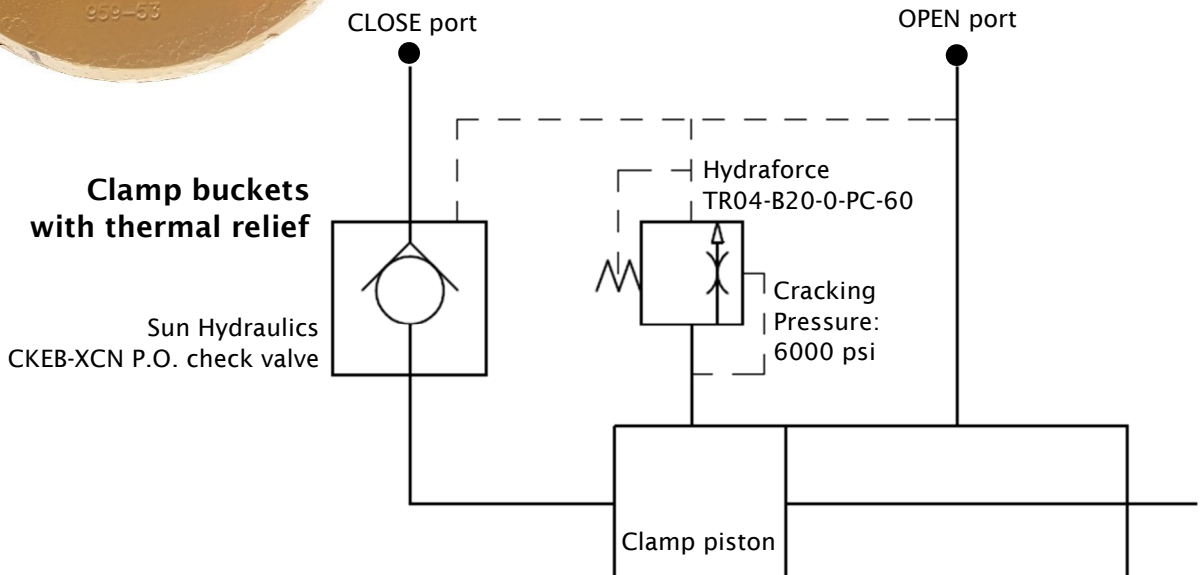
MAINTENANCE / TROUBLESHOOTING

Hydraulic Schematics

These schematics are for use with all APE caisson and sheet clamps (except Model 20). The Model 20 and Wood Clamps link directly from the OPEN/CLOSE ports to the clamp cylinder. Refer to your power unit manual for adjusting the power unit clamp circuit pressure.

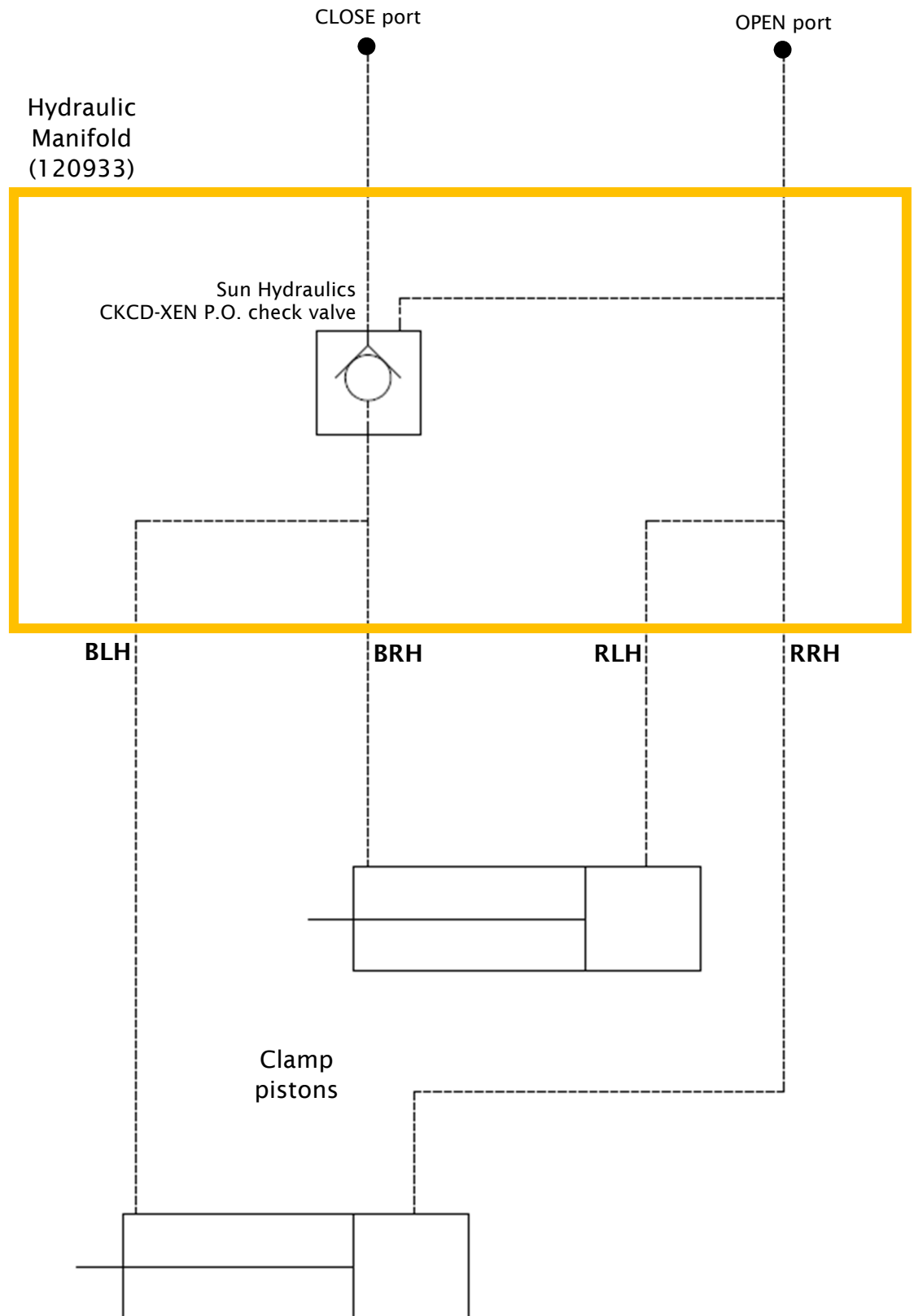


Thermal relief indicated by 2nd off-center plug on clamp bucket face



MAINTENANCE / TROUBLESHOOTING

This schematic is appropriate for both the C102 and Hybrid 20 clamps.



REPLACEMENT PARTS / BOM

Ordering Parts

When ordering parts be sure to include the model and serial number of the unit or component. The serial number may be located by referring to Labels on Pg. 28. Confirm all telephone orders in writing immediately to avoid duplicating shipment.

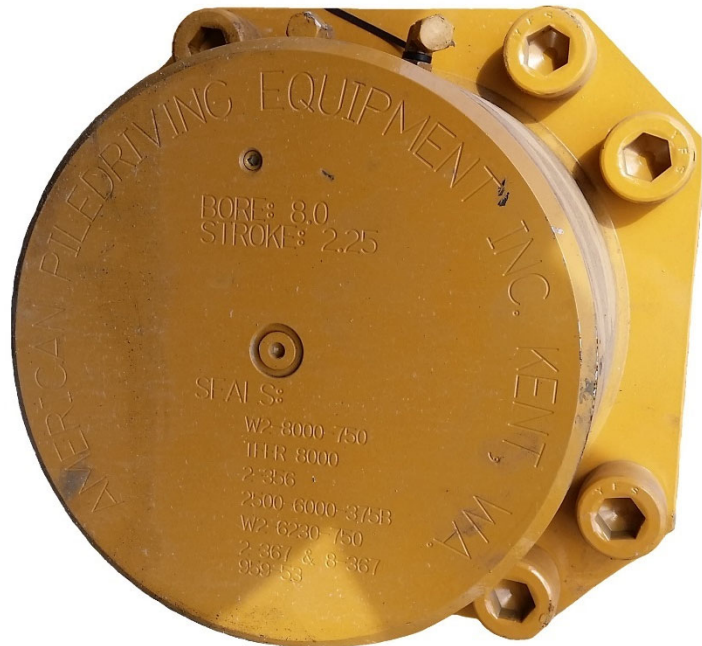
ORIGINAL EQUIPMENT: Where component serial numbers are given, these apply only to equipment and components originally furnished with the unit. Where equipment has been changed or upgraded these numbers may not be an adequate description.

SHIPMENT: State to whom shipment is to be made and method of shipment desired, otherwise our own judgment will be used.

SHORTAGES: Claims for shortages or errors should be made immediately upon receipt of parts. No responsibility will be assumed for delay, damage, or loss of material while in transit. Broken, damaged, or lost material should be refused, or a full description made of damage or loss to the carrier agent on the freight or express bill.

RETURN OF PARTS: If for any reason you desire to return parts to the factory or to any distributor from whom these parts were obtained, you must first secure permission to return the parts.

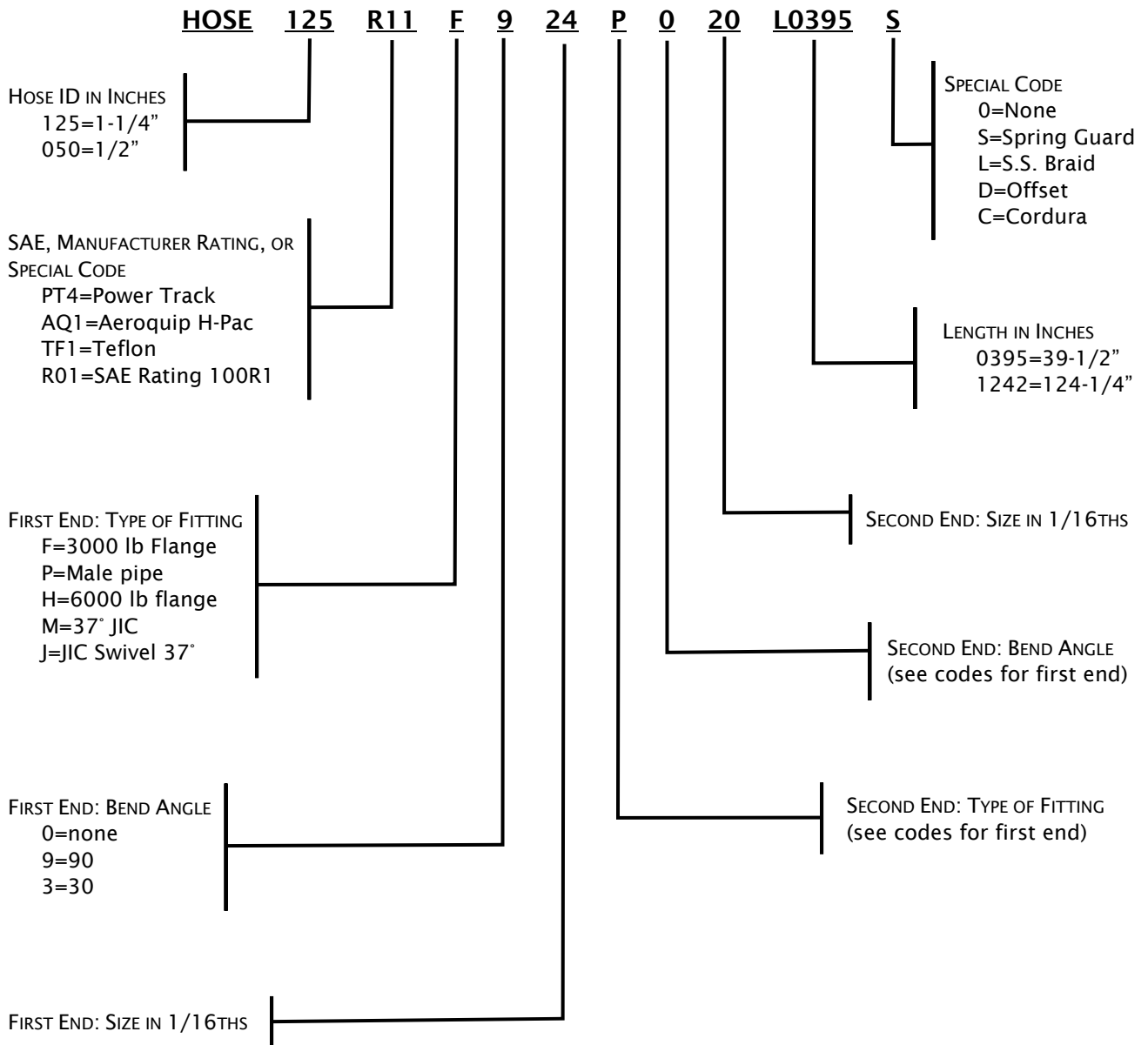
Shipping instructions will be given along with this permission. A ten percent handling charge must be assessed against the returned shipment unless an error is made by the factory or by the distributor when filling your order.



Most clamp buckets will have seal information printed on the bucket face.

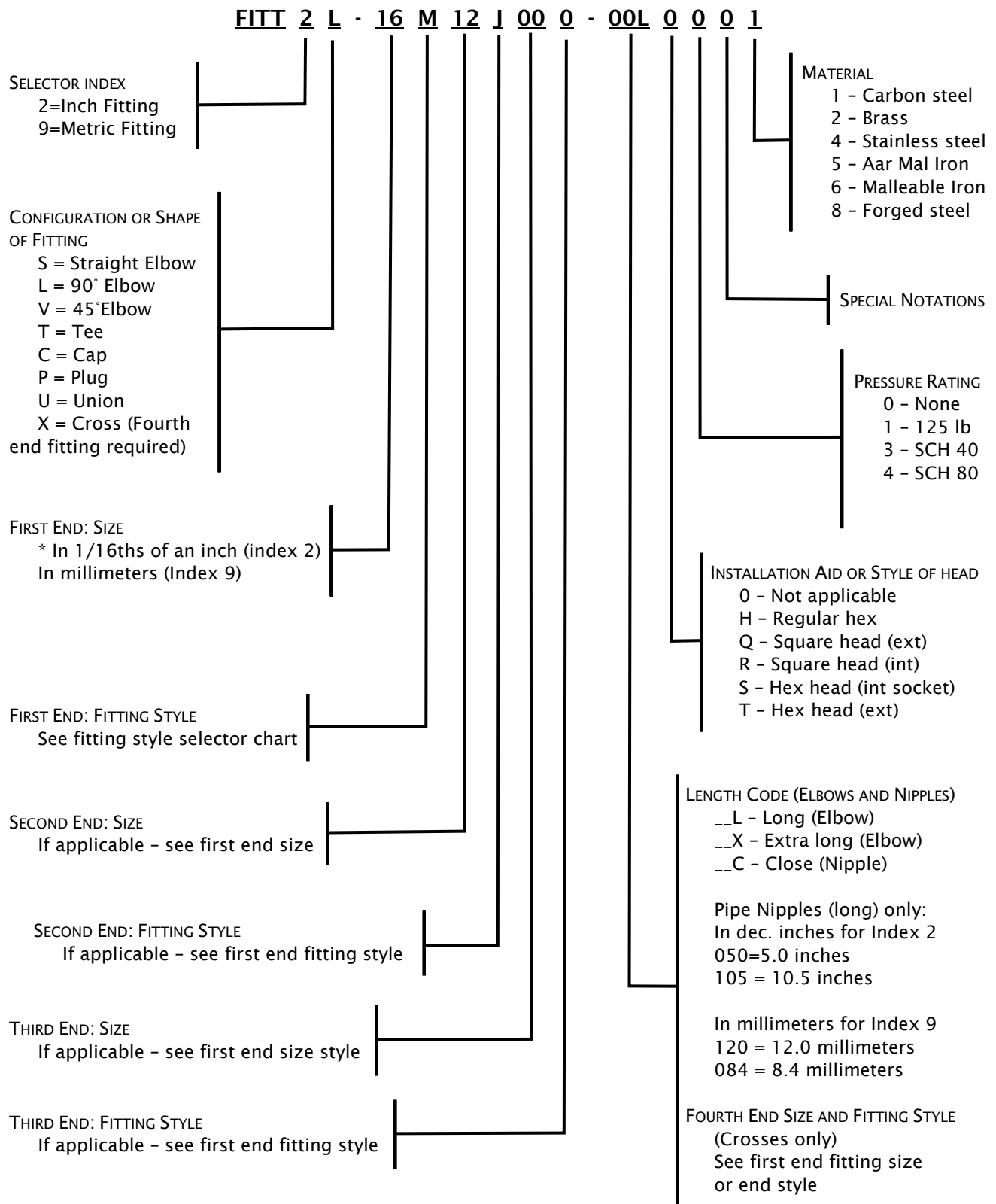
Hose and Fitting Replacement

The Hose Description Code is a 24-digit number enabling easier and quicker identification whenever a hose replacement is desired. The key below explains the structure of the coded number in detail.

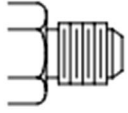
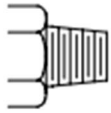
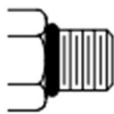
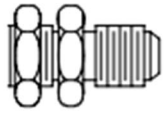
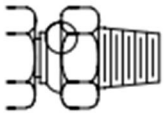
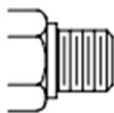



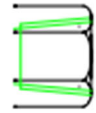
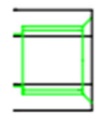
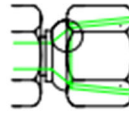
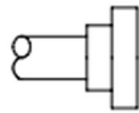
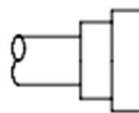
REPLACEMENT PARTS / BOM

Like the Hose Description Code, the Fitting Key described below will aid in the identification and ordering of fittings.



Fitting Style Selector Chart for End Fitting

| | | |
|----------|---|--------------------------------------|
| M |  | JIC Male 37° Flare |
| P |  | Male Pipe NPT |
| R |  | SAE Male O-Ring (& Adjustable) |
| B |  | JIC Male 37° Flare Bulkhead |
| D |  | Male Pipe NPT Swivel |
| S |  | BSP Male Pipe |

| | | |
|----------|--|---------------------------------------|
| J |  | JIC Female 37° Flare (& Swivel) |
| Q |  | Female Pipe NPTF |
| K |  | SAE Female O-Ring |
| N |  | Female Pipe NPSM-Swivel |
| F |  | Split Flange 3000 PSI Code 61 |
| H |  | Split Flange 6000 PSI Code 62 |

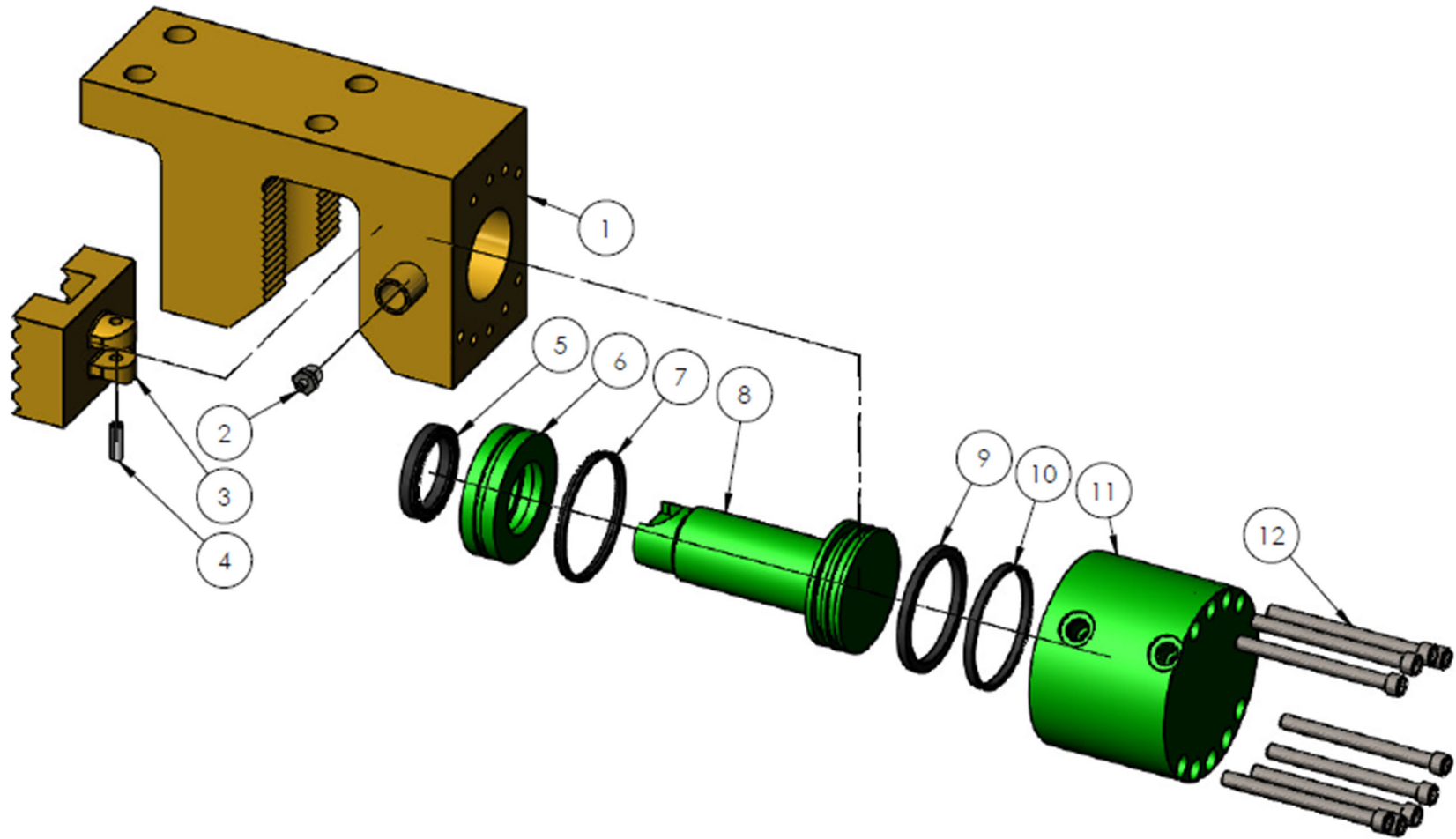
Bills of Materials

Model 6 Removeable Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--------------------------|--------------------------------------|
| 1 | 1 | 1007061 | Clamp Body | |
| 2 | 1 | 221001 | Grease Zerk | Straight 1/8 th NPT |
| 3 | 1 | 1006936 | Jaw, Model 3/6/9 | |
| 4 | 1 | | Rod Pin | |
| | 1 | 1006938 | Cylinder Assembly | |
| 5 | 1 | | *Rod Seal | 2500-2000-375B |
| 6 | 1 | 1006934 | Hydraulic Gland | |
| 7 | 1 | | *Gland Seal | Parker 2-236 O-Ring and 8-236 Backup |
| 8 | 1 | 1006935 | Cylinder Rod | |
| 9 | 1 | | *Piston Seal | Custom Bronze Filled Ring with PTFE |
| 10 | 1 | | *Piston Wear Band | W125-03375-0250 |
| 11 | 1 | 1006933 | Cylinder Housing | |
| 12 | 9 | 130131 | Bolts, Cylinder Mounting | SHCS 3/8-16x4.5x1.5 |

*Included in Seal or Bolt Kit

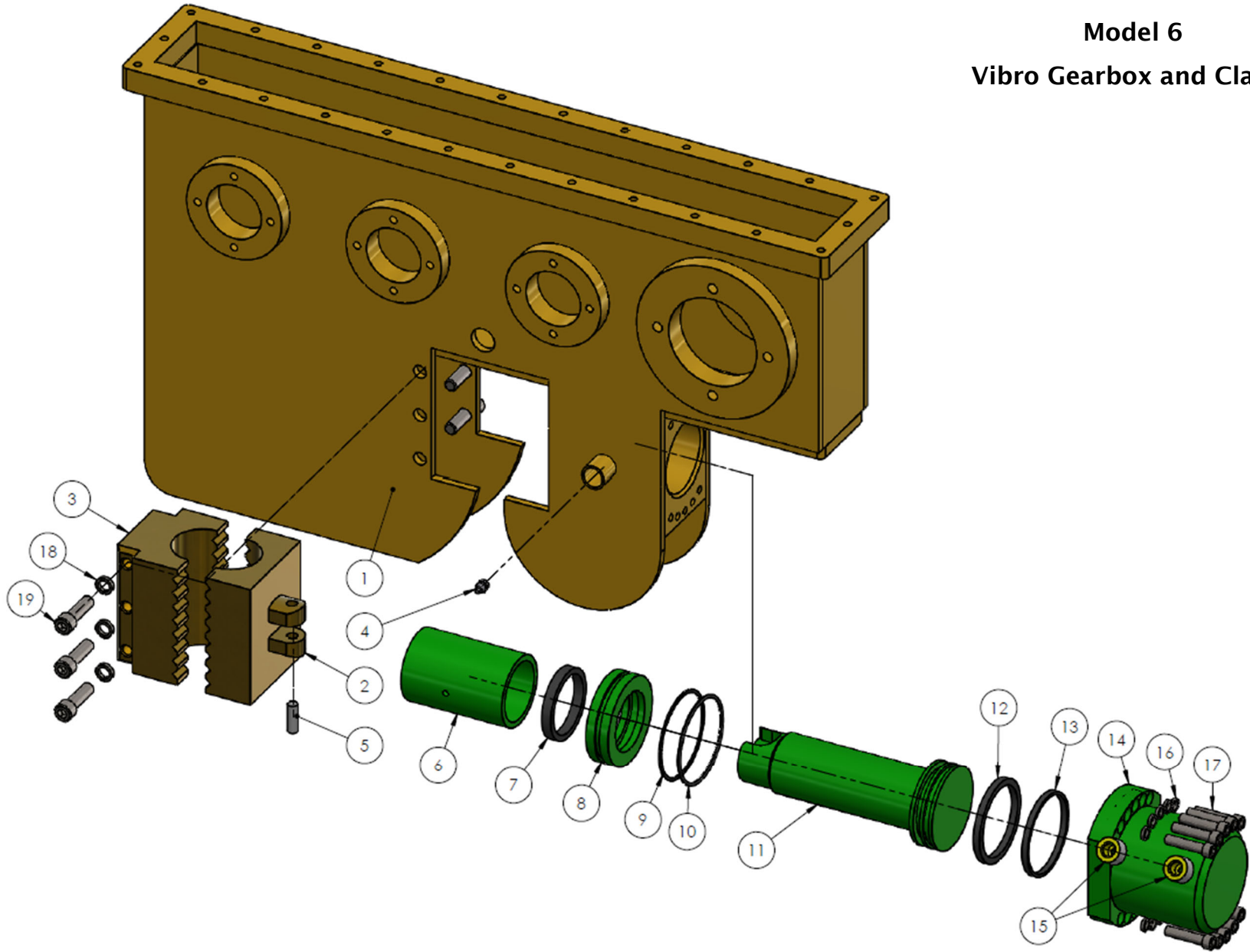
Model 6
Removeable Clamp



Model 6 and 9 Combined Gearbox and Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-----------------------------------|--------------------------------|
| 1 | 1 | | Vibro Gearbox Type | |
| | | 1006659 | Gearbox, Model 6 | |
| | | 1001624 | Gearbox, Model 9 | |
| 2 | 1 | 205005 | Moveable Jaw, Model 3/6 | |
| 3 | 1 | 205006 | Fixed Jaw, Model 3/6 | |
| 4 | 1 | 221001 | Grease Zerk | Straight 1/8 th NPT |
| 5 | 1 | 205102 | Jaw Pin | |
| | 1 | 1006668 | Cylinder Assembly | |
| 6 | 1 | 1001643 | Cylinder Sleeve Insert, Model 6 | |
| 7 | 1 | | Rod Seal | 250-02.500-375B Polyseal |
| 8 | 1 | 1001645 | Hydraulic Cylinder Gland, Model 6 | |
| 9 | 1 | | Gland Seal Backup | 8-238 Backup 90 Duro Nitrile |
| 10 | 1 | 1002151 | Gland Seal | 2-238 O-Ring 90 Duro Nitrile |
| 11 | 1 | 1001642 | Cylinder Rod, Model 6 | |
| 12 | 1 | | Piston Seal | PS1850-56 |
| 13 | 1 | | Rod Wear Ring 3-1/2" OD | 612-350-025 |
| 14 | 1 | 1001644 | Cylinder Bucket, Model 6 | |
| 15 | 2 | | SAE Boss 3/8" | |
| 16 | 10 | 1003050 | Washers, Cylinder Bucket | HCLW 3/8" |
| 17 | 10 | 160333 | Bolts, Cylinder Bucket | SHCS 3/8-16x1.75 |
| 18 | 6 | 100027 | Washers, Fixed Jaw | HCLW 1/2" |
| 19 | 6 | 100163 | Bolts, Fixed Jaw | SHCS 1/2-13x1.75 |

Model 6
Vibro Gearbox and Clamp

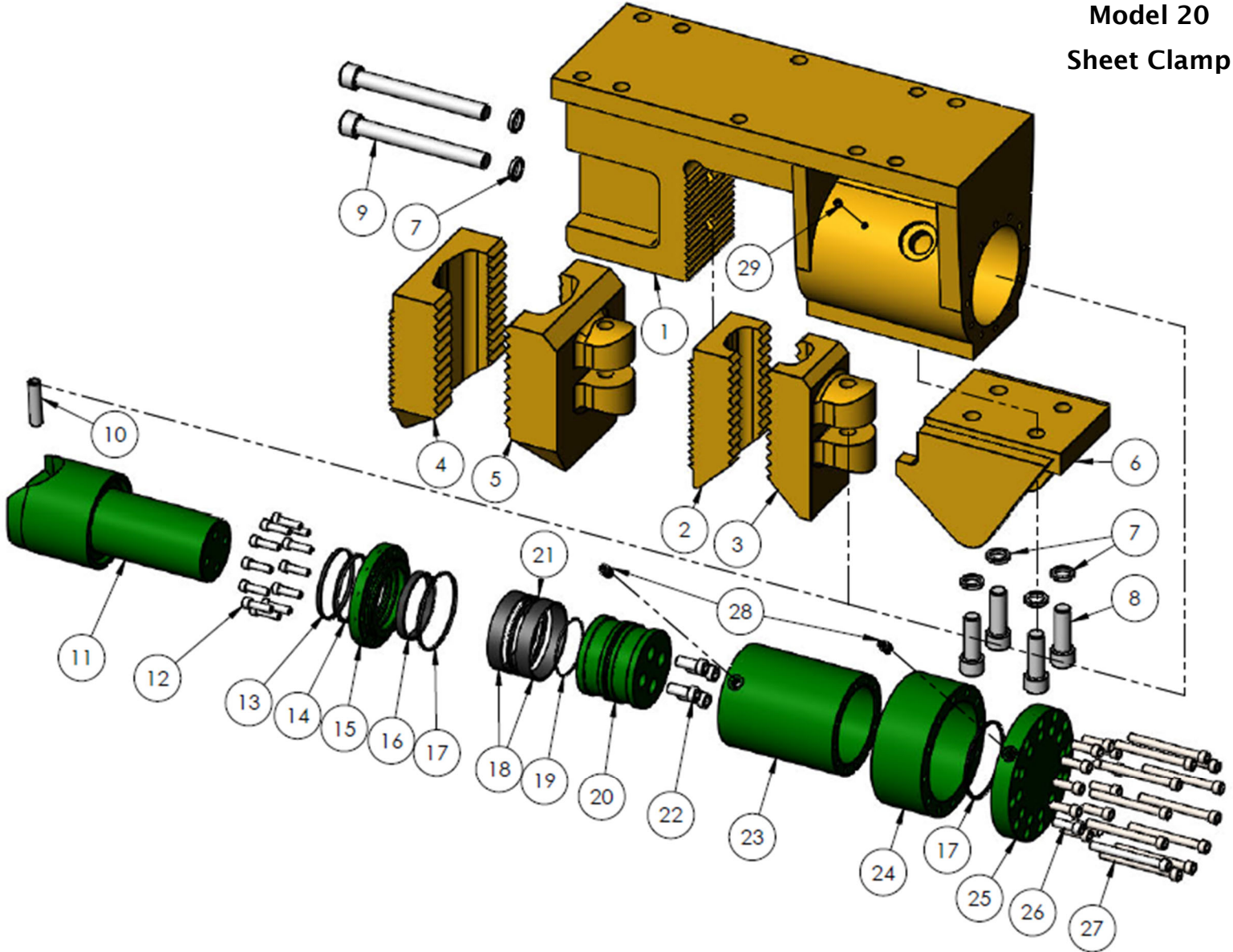


Model 20 Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|---|--|
| 1 | 1 | | Model 20 Sheet Clamp Body w/ Nylon Sleeve | |
| 2 | 1 | 221014 | Fixed Jaw, Single Sheet | |
| 3 | 1 | 221008 | Moveable Jaw, Single Sheet | |
| | | | Double Sheet Jaws | |
| 4 | 1 | 221011 | Fixed Jaw, Double Sheet | |
| 5 | 1 | 221005 | Moveable Jaw, Double Sheet | |
| 6 | 1 | 221017 | Sheet Pile Guide | |
| 7 | 6 | 1003063 | *Washers, General | HCLW 1.0" |
| 8 | 4 | 1003018 | *Bolts, Pile Guide | SHCS 1.0-8x3.0" Long |
| 9 | 2 | 124206 | *Bolts, Fixed Jaw | SHCS 1.0-8x9.0" Long |
| 10 | 1 | 221002 | Jaw Pin | Spiral Pin 0.75" dia x 3.25" Long |
| | 1 | 208001 | Model 20 Clamp Cylinder Assembly | |
| 11 | 1 | 208015 | Model 20 Piston Rod | |
| 12 | 12 | 100851 | Bolts, Cylinder Gland (LOCTITED) | SHCS 0.438-14x1.5" Long |
| 13 | 1 | | *Rod Wiper | DT-4000 Wiper U-1003 |
| 14 | 1 | | *Rod Seal and Backup | 568-345 N-7002 and 80-345 Contoured Backup |
| 15 | 1 | 208019 | Rod End Cap, Cylinder Gland | |
| 16 | 1 | | *Rod Wear Ring | Wear Ring 8000-68B |
| 17 | 2 | | *Mounting Flange and End Cap Seal O-Ring and Backup | 568-248 N-7002 and 80-248 Contoured Backup |
| 18 | 2 | | *Piston Wear Ring | Wear Ring 612-500-100 |
| 19 | 1 | | *Rod and Cap Seal O-Ring | 568-238 CMPD N-7002 |
| 20 | 1 | 208006 | Piston Vibro Model 20 | |
| 21 | 1 | | *Piston Seal | PS1850-80 Bronze PTFE w/ Energizer |
| 22 | 4 | 110411 | Bolts, Piston Cap | SHCS 0.625-18x1.5" Long |
| 23 | 1 | 208017 | Cylinder Shell - Model 20 | |
| 24 | 1 | 208013 | Spacer (20 Clamp Cylinder) | |
| 25 | 1 | 208021 | Cylinder Mounting Flange | |
| 26 | 12 | 400043 | Bolts, Flange | SHCS 0.5-13x1.5" Long |
| 27 | 12 | 160337 | *Bolts, Cylinder Mounting | SHCS 0.5-13x5.5" Long |
| 28 | 2 | 100053 | Straight Fitting, #6 JIC to #6 ORB | FITT2S-06M06R |
| 29 | 1 | 221001 | Grease-zerk | Straight 1/8" NPT |

*Included in Seal or Bolt Kit

Model 20
Sheet Clamp

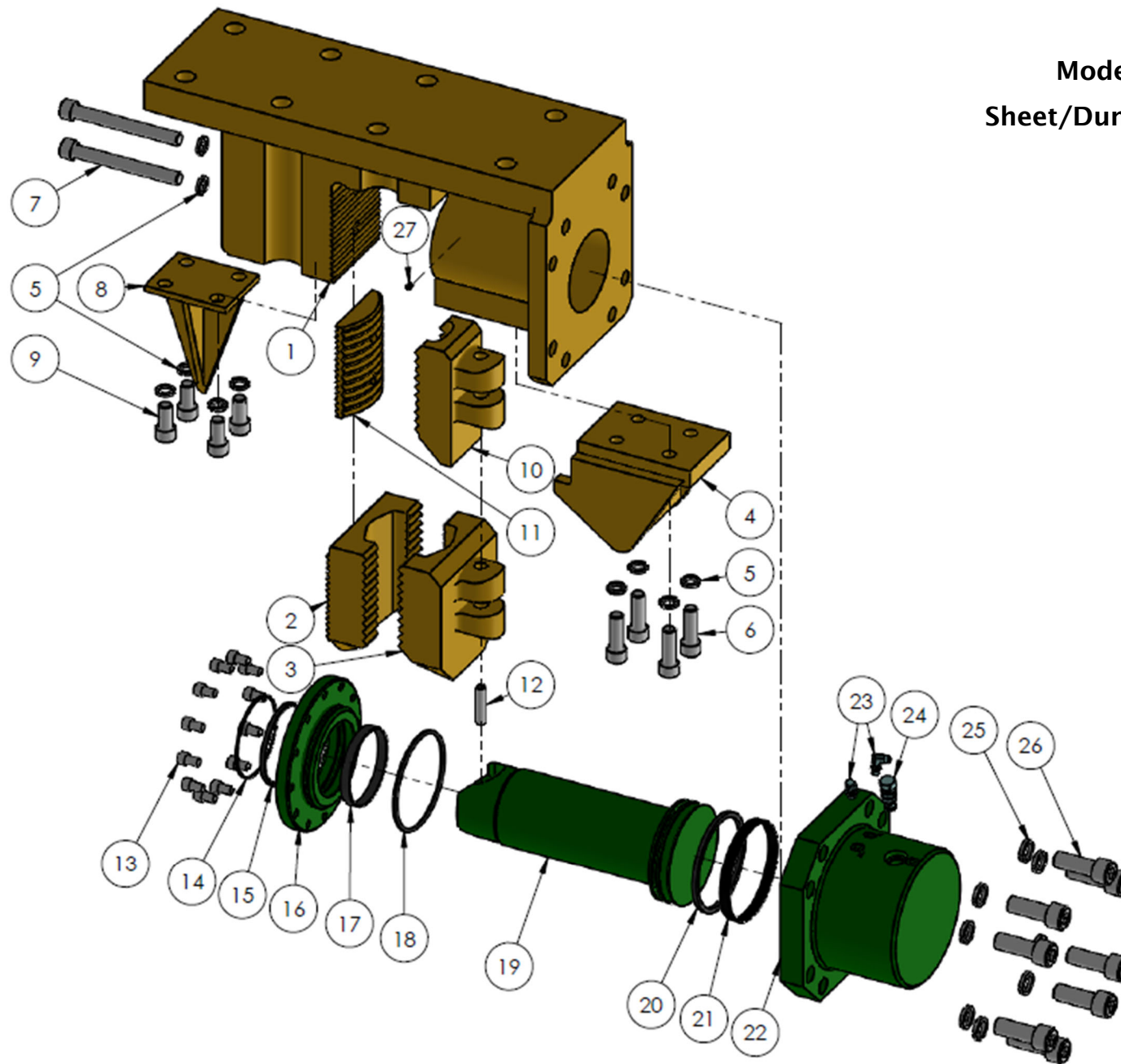


Model 50 Sheet/Dunce Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|--|
| 1 | 1 | | Model 50 Sheet Clamp Body w/ Rod Bushing | |
| 2 | 1 | 221011 | Fixed Jaw, Double Sheet | |
| 3 | 1 | 221005 | Moveable Jaw, Double Sheet | |
| 4 | 1 | 221017 | Sheet Pile Guide | |
| 5 | 10 | 1003063 | *Washers, Common | HCLW 1.0" |
| 6 | 4 | 1003018 | *Bolts, Sheet Pile Guide | SHCS 1.0-8x3.0" Long |
| 7 | 2 | 124206 | *Bolts, Fixed Jaw | SHCS 1.0-8x9.0" Long |
| | | | <i>Dunce Clamp Configuration</i> | |
| 8 | 1 | 221017 | Dunce Pile Guide | |
| 9 | 4 | 1003015 | Bolt, Dunce Pile Guide | SHCS 1.0-8x2.0" Long |
| 10 | 1 | 221006 | Moveable Jaw, Single Sheet | |
| 11 | 1 | 221015 | Dunce Fixed Jaw | |
| 12 | 1 | 221002 | Jaw Pin | Spiral Pin 0.75" dia x 3.25" Long |
| | 1 | 222000 | <i>Sheet Clamp Cylinder 8" Assembly</i> | |
| 13 | 12 | 1003804 | *Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18x1.0" Long |
| 14 | 1 | 1004852 | *Rod Wiper | AN Wiper SH959-53 |
| 15 | 1 | 1004542 | *Rod Seal | 250-06.000-375B Lubrithane Polyseal |
| 16 | 1 | 222004 | Front Seal Plate, Cylinder Gland | |
| 17 | 1 | 222014 | *Rod Wear Band | Wear Guide 06250-0750-125 |
| 18 | 1 | | *Head Seal O-Ring and Backup | 568-367 O-Ring CMPD F-7001 and 80-367 Contoured Backup |
| 19 | 1 | 222007 | 8" Sheet Cylinder Rod | |
| 20 | 1 | 1006105 | *Piston Seal | PS1850-128 Bronze PTFE w/ Energizer |
| 21 | 1 | | *Piston Wear Band | Wear Guide 08000-0750-125 |
| 22 | 1 | 1001409 | 8" Hydraulic Cylinder Barrel | |
| 23 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 24 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 25 | 8 | 1000848 | *Washers, Cylinder Mounting | HCLW 1.25" |
| 26 | 8 | 124204 | *Bolt, Cylinder Mounting | SHCS 1.25-12x4.0" Long |
| 27 | 1 | 221001 | *Grease-zerk | Straight 1/8" NPT |

*Included in Seal or Bolt Kit

Model 50
Sheet/Dunce Clamp

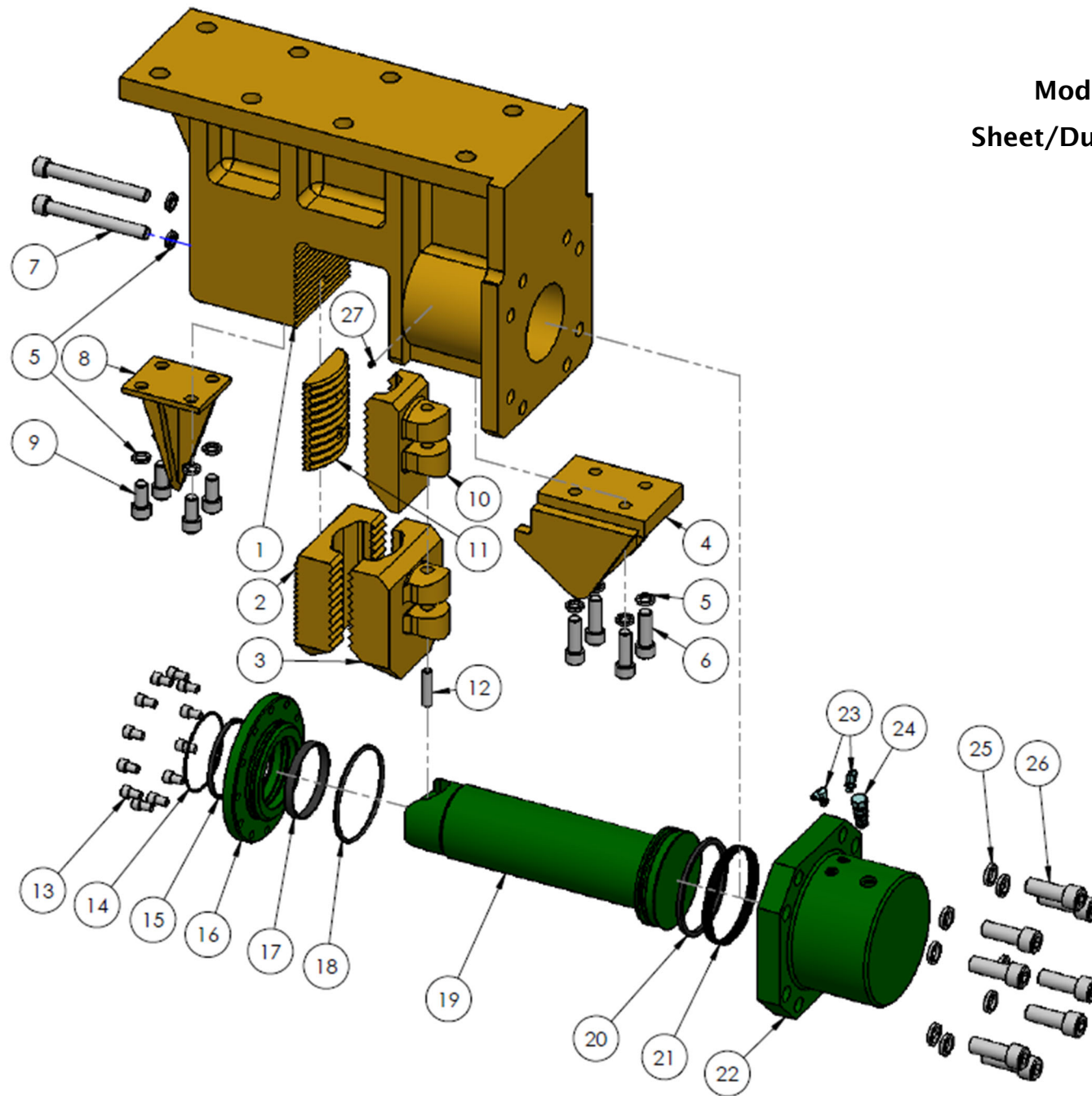


Model 150 Sheet/Dunce Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|---|
| 1 | 1 | 221019 | Model 150 Sheet Clamp Body w/ Rod Bushing | |
| 2 | 1 | 221011 | Fixed Jaw, Double Sheet | |
| 3 | 1 | 221005 | Moveable Jaw, Double Sheet | |
| 4 | 1 | 221017 | Sheet Pile Guide | |
| 5 | 10 | 124207 | *Washers, Common | HCLW 1.0" |
| 6 | 4 | 1003018 | *Bolts, Pile Guide | SHCS 1.0-8 x 3.0" Long |
| 7 | 2 | 124206 | *Bolts, Fixed Jaw | SHCS 1.0-8 x 9.0" Long |
| | | | <i>Dunce Clamp Configuration</i> | |
| 8 | 1 | 221017 | Dunce Pile Guide | |
| 9 | 4 | 1003015 | Bolts, Dunce Pile Guide | SHCS 1.0-8 x 2.0" Long |
| 10 | 1 | 221006 | Moveable Jaw, Single Sheet | |
| 11 | 1 | 221015 | Dunce Fixed Jaw | |
| 12 | 1 | 221002 | Jaw Pin | Spiral Pin 0.75" dia x 3.25" Long |
| | 1 | 222000 | <i>Sheet Clamp Cylinder 8" Assembly</i> | |
| 13 | 12 | 1003804 | *Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18 x 1.0" Long |
| 14 | 1 | 1004852 | *Rod Wiper | AN Wiper SH959-53 |
| 15 | 1 | 1004542 | *Rod Seal | 250-06.000-375B Lubrithane Polyseal |
| 16 | 1 | 222004 | Front Plate Seal, Cylinder Gland | |
| 17 | 1 | 222014 | *Rod Wear Band | Wear Guide 06250-0750-125 |
| 18 | 1 | | *Head Seal O-Ring and Backup | 568-367 CMPD F-7001 and 80-367 Contoured Backup |
| 19 | 1 | 222007 | 8" Sheet Cylinder Rod | |
| 20 | 1 | 1006105 | *Piston Seal | PS1850-128 Bronze PTFE w/ Energizer |
| 21 | 1 | | *Piston Wear Band | Wear Guide 08000-0750-125 |
| 22 | 1 | 1001409 | 8" Hydraulic Cylinder Barrel | |
| 23 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 24 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 25 | 8 | 124205 | *Washers, Cylinder Mounting | HCLW 1.25" |
| 26 | 8 | 124204 | *Bolts, Cylinder Mounting | SHCS 1.25-12x4.0" Long |
| 27 | 1 | 221001 | *Grease-zerk | Straight 1/8" NPT |

*Included in Seal or Bolt Kit

Model 150
Sheet/Dunce Clamp

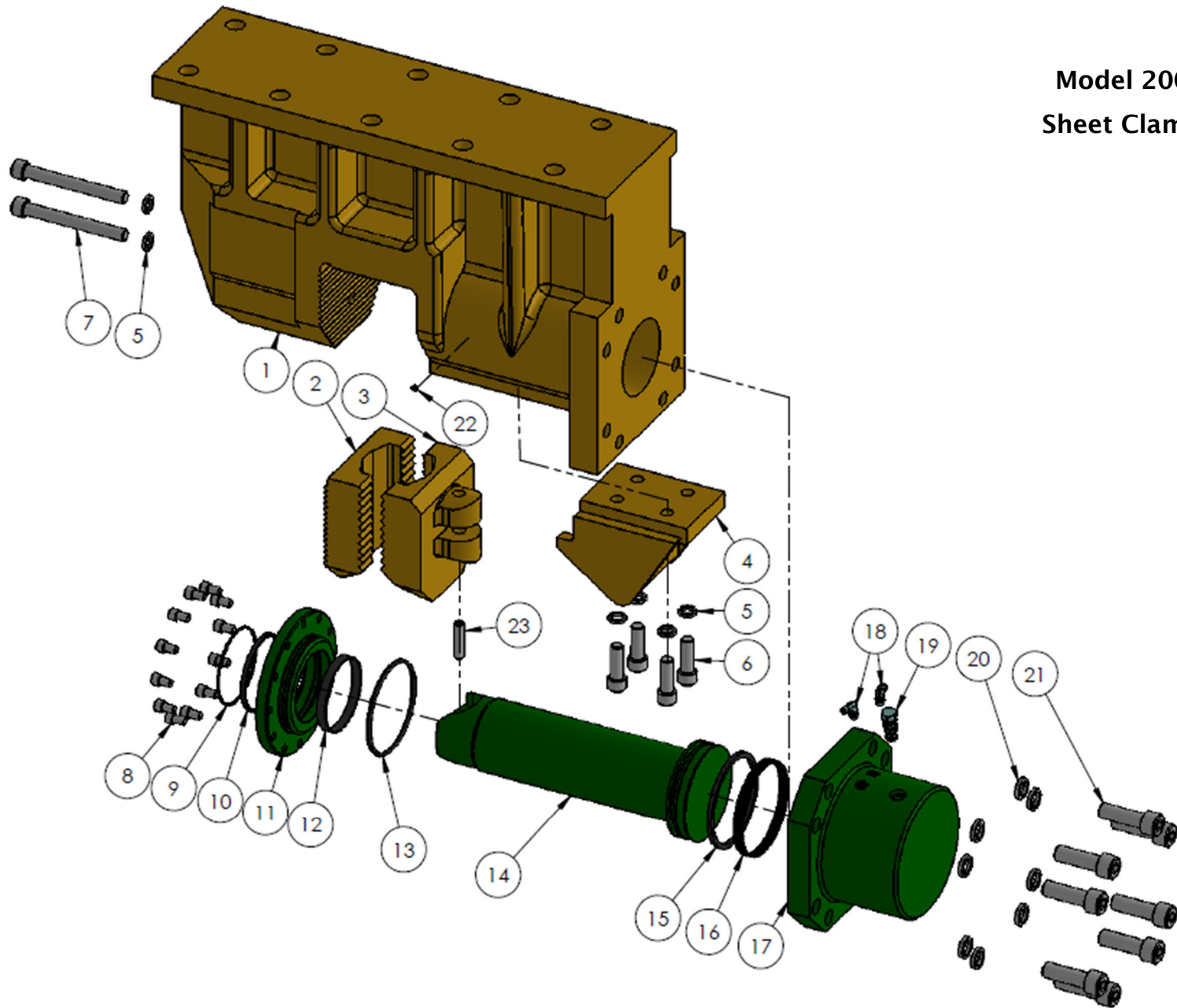


Model 200 Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|---|--|
| 1 | 1 | 232001 | Model 200 Sheet Clamp Body w/ Rod Bushing | |
| 2 | 1 | 221011 | Fixed Jaw, Double Sheet | |
| 3 | 1 | 221005 | Moveable Jaw, Double Sheet | |
| 4 | 1 | 221017 | Sheet Pile Guide | |
| 5 | 6 | 124207 | *Washers, General | HCLW 1.0" |
| 6 | 4 | 1003018 | *Bolts, Pile Guide | SHCS 1.0-8x3.0" Long |
| 7 | 2 | 120206 | *Bolts, Fixed Jaw | SHCS 1.0-8x9.0" Long |
| | 1 | 222000 | Sheet Clamp Cylinder 8" Assembly | |
| 8 | 12 | 1003804 | *Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18x1.0" Long |
| 9 | 1 | 1004852 | *Rod Wiper | AN Wiper SH959-53 |
| 10 | 1 | 1004542 | *Rod Seal | 250-06.000-375B Lubrithane Polyseal |
| 11 | 1 | 222004 | Front Plate Seal, Cylinder Gland | |
| 12 | 1 | 222014 | *Rod Wear Band | Wear Guide 06250-0750-125 |
| 13 | 1 | | *Head Seal O-Ring and Backup | 568-367 O-Ring CMPD F-7001 and 80-367 Contoured Backup |
| 14 | 1 | 232007 | 8" Sheet Cylinder Rod 200 | |
| 15 | 1 | | *Piston Seal | PS1850-128 Bronze PTFE w/ Energizer |
| 16 | 1 | | *Piston Wear Band | Wear Guide 08000-0750-125 |
| 17 | 1 | 1001409 | 8" Hydraulic Cylinder Barrel | |
| 18 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 19 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 20 | 8 | 120205 | *Washers, Cylinder Mounting | HCLW 1.25" |
| 21 | 8 | 124204 | *Bolts, Cylinder Mounting | SHCS 1.25-12x4.0" Long |
| 22 | 1 | 221001 | *Grease-zerk | Straight 1/8 NPT |
| 23 | 1 | 221002 | Jaw Pin | Spiral Pin 0.75" dia x 3.25" Long |

*Included in Seal or Bolt Kit

Model 200
Sheet Clamp



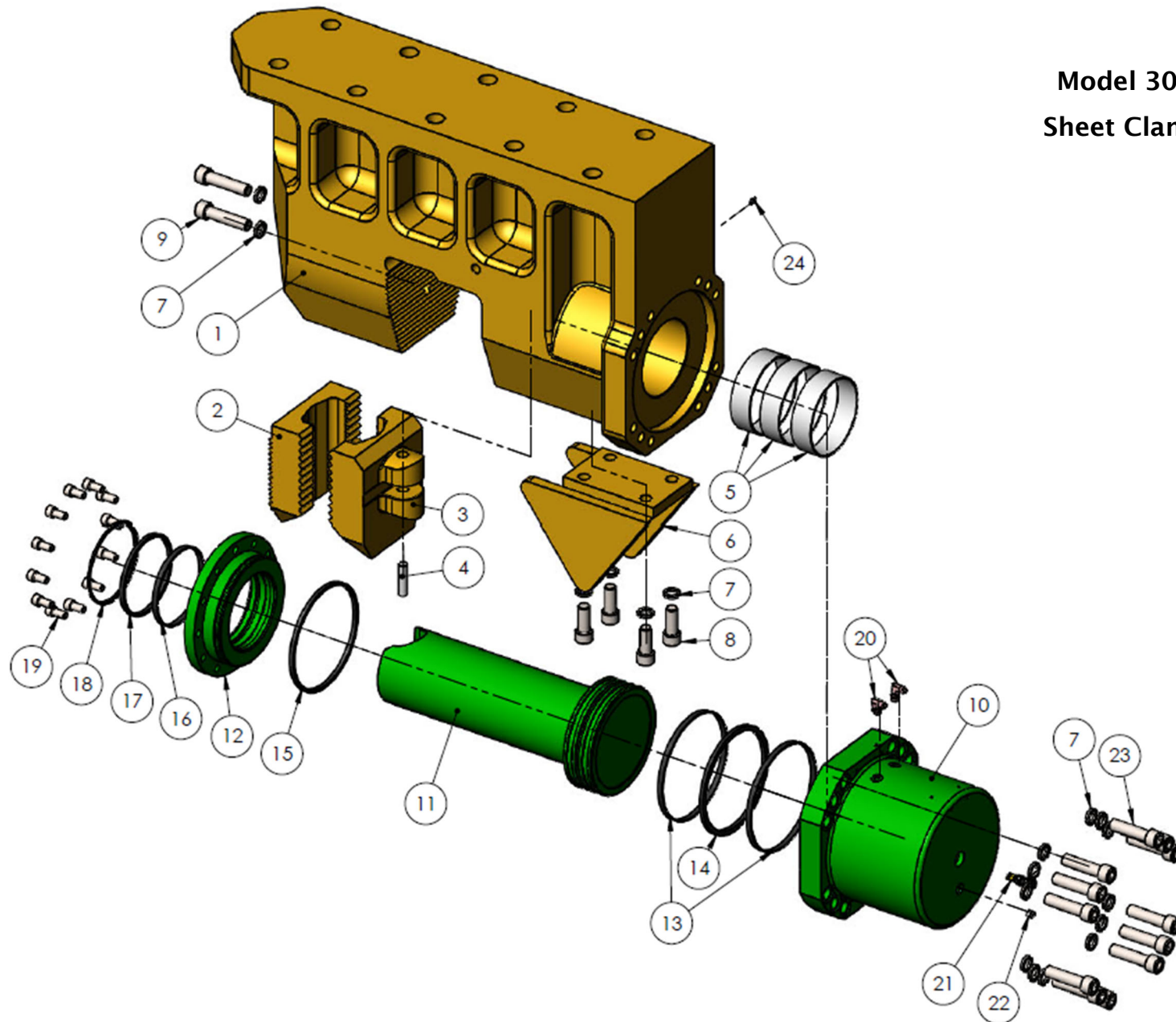
Model 300 Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|------------------------------------|---|
| 1 | 1 | 1009879 | APE 300 Clamp Body Mach | |
| 2 | 1 | 221011 | Fixed Jaw, Double Sheet | |
| 3 | 1 | 221005 | Movable Jaw, Double Sheet | |
| 4 | 1 | 221002 | Jaw Pin | Spiral Pin 0.75" x 3.0" Long |
| 5 | 3 | 120929 | Rod Wear Ring | 7.0 ID x 7.25 OD x 2.0" Verco Cool blue ultra precision wear ring |
| 6 | 1 | 100983 | Pile Guide | |
| 7 | 18 | 100209 | Washers, Common | HCLW 1.0" |
| 8 | 4 | 100213 | Bolts, Pile Guide | SHCS 1.0-8x2.5" Long |
| 9 | 2 | 1003081 | Bolts, Fixed Jaw | SHCS 1.0-8x4.25" Long |
| | 1 | 1009877 | 300 Cylinder Assembly | |
| 10 | 1 | 120917 | 196 Cylinder Bucket | |
| 11 | 1 | 1009878 | SC 300 Piston Rod | |
| 12 | 1 | 120919 | Rod End Cap - 196 | |
| 13 | 2 | 120551 | *Piston Bearing | 612-1000-050 |
| 14 | 1 | 120915 | *Piston Seal and Expander | PR-10000-60B w/-447 Expander |
| 15 | 1 | 120549 | *Gland Seal | 448 GT Ring |
| 16 | 1 | 120555 | *Rod Bearing | 0.5x7.00x.12 |
| 17 | 1 | 120553 | *Rod Seal | TR-056 |
| 18 | 1 | 120921 | *Rod Wiper | SH959-57 |
| 19 | 12 | 100575 | Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-11x1.25" Long |
| 20 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 21 | 1 | 120629 | Check Valve | Sun CKCD-XEN |
| 22 | 1 | 122014 | #6 MORB Plug | 6408-H06-O |
| | 1 | 1003082 | **Soc Set Cone PT | 1/2-13x1.0" |
| 23 | 12 | 100212 | Bolts, Cylinder Mounting | SHCS 1.0-8x4.0" Long |
| 24 | 1 | 221001 | Grease-zerk | Straight 1/8" NPT |

*Included in Seal Kit

**Used in place of MORB plug in older models

Model 300
Sheet Clamp



Model 400 Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Part Number |
|------|----------|------------|--|--|
| 1 | 1 | 1001112 | Model 400T Sheet Clamp Body w/ Sleeve | |
| 2 | 1 | 1001115 | Fixed Jaw, 400 Clamp | |
| 3 | 1 | 1001116 | Moveable Jaw, 400 Clamp | |
| 4 | 1 | 1002304 | 400 Sheet Clamp Pile Guide | |
| 5 | 36 | 124207 | *Washers, Common | HCLW 1.0" |
| 6 | 4 | 1003018 | *Bolts, Pile Guide | SHCS 1.0-8x3.0" Long |
| 7 | 2 | 160844 | *Bolts, Fixed Jaw | SHCS 1.0-8x11.0" Long |
| 8 | 1 | 1001111 | Plastic Sleeve | |
| | 1 | | Model 400 Clamp Cylinder Assembly | |
| 9 | 15 | | *Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18 x 1.75" Long |
| 10 | 1 | 1002261 | *Rod Wiper | D010000 10" Rod Wiper Slotted |
| 11 | 1 | 1002260 | Rod Seal | P-50010000-750-4615 Deep Polypack, Polyurethane |
| 12 | 1 | 1001114 | 400 Clamp - Gland | |
| 13 | 1 | | Rod Wear Band | PDTF 10" OD x 1" Wide x 1/8 Thk Bronze Filled Teflon Wear Ring |
| 14 | 1 | | *Head Seal O-Ring and Backup | Parker 2-458 and 8-458 Backup |
| 15 | 1 | 1001113 | 400 Clamp - Piston / Rod | |
| 16 | 1 | | Piston Seal | P-50014000-750-4615 Deep Polypack, Polyurethane |
| 17 | 1 | | Piston Wear Band | PDTC 15" OD x 1" Wide x 1/8 Thk Bronze Filled Teflon Wear Ring |
| 18 | 1 | 1001117 | 400 Clamp - Cylinder Bucket | |
| 19 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 20 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 21 | 1 | 1001160 | Thermal Relief Valve | Hydra Force TF04-B20-0-PC-60 |
| 22 | 1 | 110935 | Plug, #4 ORB | FITT2P-04R |
| 23 | 30 | 300015 | *Bolts, Cylinder Mounting | SHCS 1.0-8x5.0" Long |
| 24 | 4 | 221001 | *Grease-zerk | Straight 1/8" NPT |
| 25 | 1 | 221002 | *Jaw Pin | Spiral Pin 0.75" dia x 3.25" Long |

*Included in Seal or Bolt Kit

Model 126 J&M Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|--|
| 1 | 1 | 810493 | 126 Clamp Body | |
| 2 | 1 | 110419 | Fixed Jaw, DS | |
| | 1 | 110515 | (or) Fixed Jaw, Universal | |
| | 1 | 110541 | (or) Fixed Jaw, H-Beam | |
| 3 | 1 | 810499 | Moveable Jaw, DS | |
| | 1 | 810495 | (or) Moveable Jaw, 126b Universal | |
| | 1 | 810497 | (or) Moveable Jaw, 126b H-Beam | |
| 4 | 1 | 120929 | Wear Ring | 7 ID x 7.25 OD x 4.010 Verco Cool Blue Ultra Precision Wear Ring |
| 5 | 1 | 100983 | Pile Guide | |
| 6 | 16 | 100209 | Washers, Common | HCLW 1.0" |
| 7 | 4 | 100213 | Bolts, Pile Guide and Cylinder/Piston | SHCS 1.0-8x2.5" Long |
| 8 | 1 | 130449 | Jaw Pin | Spiral Pin 0.75"x3.0" Long |
| | 1 | | 126 Cylinder Assembly | |
| 9 | 1 | 120401 | *Gland Seal | 2-269 O-Ring 90 Durometer |
| 10 | 1 | 120553 | *Rod Seal | TR-056 Rod T-Seal Buna-N |
| 11 | 1 | 120555 | *Rod Bearing | .5Wx7.00IDx.12 |
| 12 | 1 | 120567 | 126B Rod End Cap | |
| 13 | 2 | 120283 | *Head / Piston Seal | TP-064 Piston T-Seal Buna-N |
| 14 | 1 | 120931 | 126B 1pc Piston & Rod | |
| | 1 | 120575 | 126 Cylinder Rod** | |
| | 1 | 120849 | *Piston & Cylinder Rod Seal** | 2-261 O-Ring 90 Durometer |
| | 1 | 120569 | 126 Piston** | |
| | 3 | 100213 | Bolts, Cylinder/Piston | SHCS 1.0-8x2.5" Long |
| 15 | 2 | 120285 | *Piston Bearing | 912-8000-500 |
| 16 | 1 | 810491 | 126 Clamp Bucket | |
| 17 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 18 | 1 | 120629 | P.O. Check Valve | CKCD-XEN |
| 19 | 12 | 100212 | Bolts, Cylinder Mounting and Fixed Jaw | SHCS 1.0-8x4.0" Long |
| 20 | 1 | 221001 | Grease-zerk | Straight 1/8" NPT |
| 21 | 1 | 1003082 | Soc Set Cone PT | 1/2-13x1.0" |

*Included in Seal or Bolt Kit

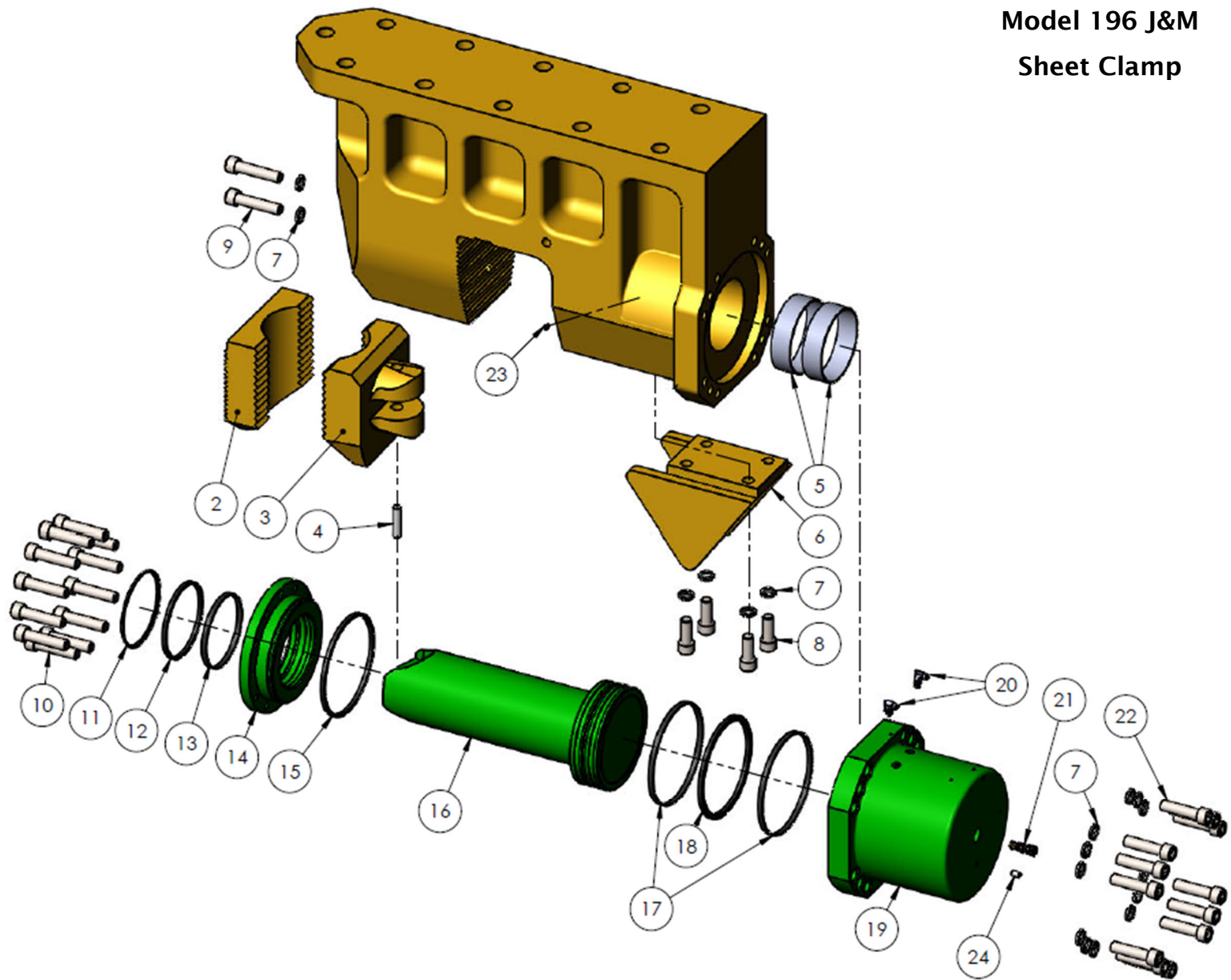
**Replaces item 14 in some models

Model 196 J&M Sheet Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-------------------------------------|---|
| 1 | 1 | 810947 | 196 Clamp Casting Assembly | |
| 2 | 1 | 810463 | Fixed Jaw, 196 Clamp | |
| 3 | 1 | 810461 | Moveable Jaw, 196 Clamp | |
| 4 | 1 | 130449 | Jaw Pin | Spiral Pin 0.75" x 3.0" Long |
| 5 | 2 | 120929 | Rod Wear Ring | 7.0 ID x 7.25 OD x 2.0" Verco Cool blue ultra precision wear ring |
| 6 | 1 | 100983 | Pile Guide | |
| 7 | 18 | 100209 | Washers, Common | HCLW 1.0" |
| 8 | 4 | 100213 | Bolts, Pile Guide | SHCS 1.0-8x2.5" Long |
| 9 | 2 | 1003021 | Bolts, Fixed Jaw | SHCS 1.0-8x4.5" Long |
| | 1 | | 196 Cylinder Assembly | |
| 10 | 12 | 100575 | Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-11x1.25" Long |
| 11 | 1 | 120921 | Rod Wiper | SH959-57 |
| 12 | 1 | 120553 | *Rod Seal | TR-056 Rod T-Seal Buna-N |
| 13 | 1 | 120555 | *Rod Bearing | 612-0725-050 |
| 14 | 1 | 120919 | Rod End Cap - 196 | |
| 15 | 2 | 120915 | Head Seal | TP-069 T-Seal Buna-N |
| 16 | 1 | 120913 | 196 1pc Piston & Rod | |
| | 1 | 120535 | <i>196 Cylinder Rod**</i> | |
| | 1 | 120347 | <i>*Piston/Cylinder Rod Seal**</i> | 2-261 O-Ring 90 Duro |
| | 1 | 120537 | <i>196 Piston**</i> | |
| | 3 | 1001628 | <i>Bolts, Piston/Cylinder Rod**</i> | SHCS 1.5-6x3.0" Long |
| 17 | 2 | 120551 | *Piston Bearing | 612-1000-050 |
| 18 | 1 | | *Piston Seal | PS1850-160 Bronze PT |
| 19 | 1 | 120917 | 196 Cylinder Bucket | |
| 20 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 21 | 1 | 120629 | Check Valve | Sun CKCD-XEN |
| 22 | 12 | 100212 | Bolts, Cylinder Mounting | SHCS 1.0-8x4.0" Long |
| 23 | 1 | 221001 | Grease-zerk | Straight 1/8" NPT |
| 24 | 1 | 1003082 | Soc Set Cone PT | 1/2-13x1.0" |

*Included in Seal kit
 **Replaces item 16 in some models

Model 196 J&M
Sheet Clamp



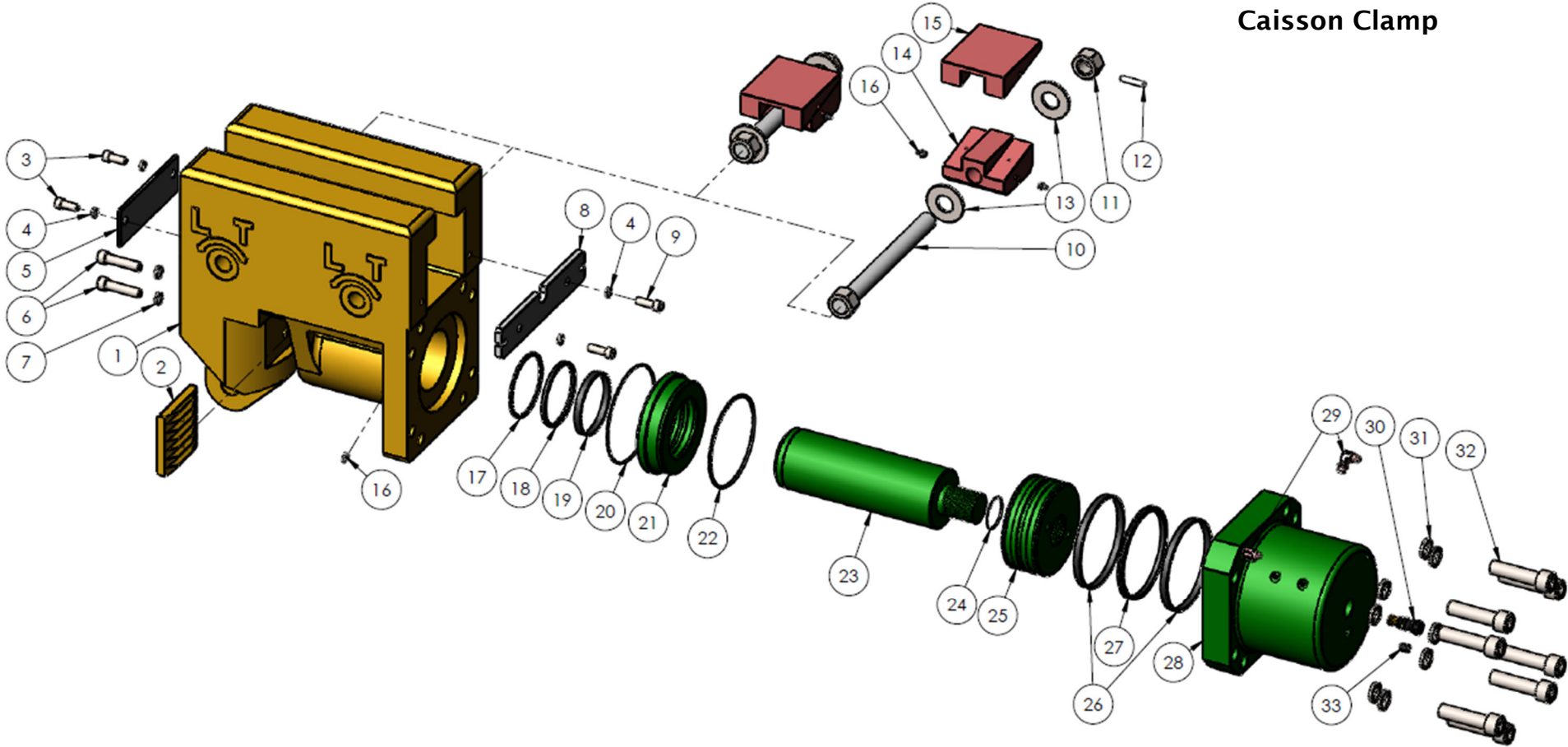
Model 80 Caisson Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|--|
| 1 | 1 | 810061 | 80B Clamp Housing | |
| 2 | 1 | 120107 | Fixed Jaw, Caisson | |
| 3 | 2 | 100119 | *Bolts, Wedge Guard | SHCS 0.5-13x1.25" Long |
| 4 | 4 | 100121 | *Washers, Wedge Guard and Chain Anchor | HCLW 0.5" |
| 5 | 1 | 120119 | Wedge Guard | |
| 6 | 2 | 400157 | *Bolts, Fixed Jaw | SHCS 0.625-11x2.75" Long |
| 7 | 2 | 124115 | Washers, Fixed Jaw | HCLW 0.625" |
| 8 | 1 | 120751 | Chain Anchor | |
| 9 | 2 | 100513 | *Bolts, Chain Anchor | SHCS 0.5-13x1.5" Long |
| | 2 | 810109 | 80b Screw Assembly (*Quantities below given per subassembly) | |
| 10 | 1** | 120201 | Threaded Rod | 1.25-4x13.75" Long ACME |
| 11 | 2** | 120199 | Wedge Nut | 1.25-4 Hex Nut ACME |
| 12 | 1** | 120521 | Spring Pin | 0.375x2.0" Long |
| 13 | 4 | 120111 | *Washers, Screw Assembly | 1.25 H.S. Flat Washer |
| 14 | 2 | 120101 | Wedge, Male Half, Brass | |
| 15 | 2 | 120103 | Wedge, Female Half, Steel | |
| 16 | 5 | 221001 | *Grease-zerk | Straight 1/8" NPT |
| | 1 | | Model 80 Clamp Cylinder Assembly | |
| 17 | 1 | 120345 | *Rod Wiper | AN Wiper SH959-41 |
| 18 | 1 | 120625 | *Rod Seal | Parker BR 3120 4500 |
| 19 | 1 | 120627 | Rod Bearing | W0-4750-500 |
| 20 | 1 | 120100 | Plate Seal | Parker 2-263 90 durometer |
| 21 | 1 | 120623 | Rod End Cap | |
| 22 | 1 | 120347 | *Gland Seal O-Ring and Backup | Parker 2-261 90 durometer and 8-261 backup |
| 23 | 1 | 120631 | Cylinder Rod | |
| 24 | 1 | 120281 | *Rod and Cap Seal O-Ring | Parker 2-140 90 durometer |
| 25 | 1 | 120313 | Piston | |
| 26 | 2 | 120355 | *Piston Bearings | W2-7000-500 |
| 27 | 1 | 120357 | *Piston Seal | TP-060 Piston T-Seal Buna-N |
| 28 | 1 | 120621 | 80B Clamp Cylinder Bucket | |
| 29 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 30 | 1 | 120629 | P.O. Check Valve | CKCD-XEN |
| 31 | 8 | 100209 | *Washers, Cylinder Mounting | HCLW 1.0" |
| 32 | 8 | 100212 | *Bolts, Clamp Mounting | SHCS 1.0-8x4.0" Long |

| | | | |
|----|---|------------|-----------------------|
| 33 | 1 | *Set Screw | 1/2-13x1.0" Long HSSS |
|----|---|------------|-----------------------|

*Included in Seal or Bolt kit

**Model 80
Caisson Clamp**

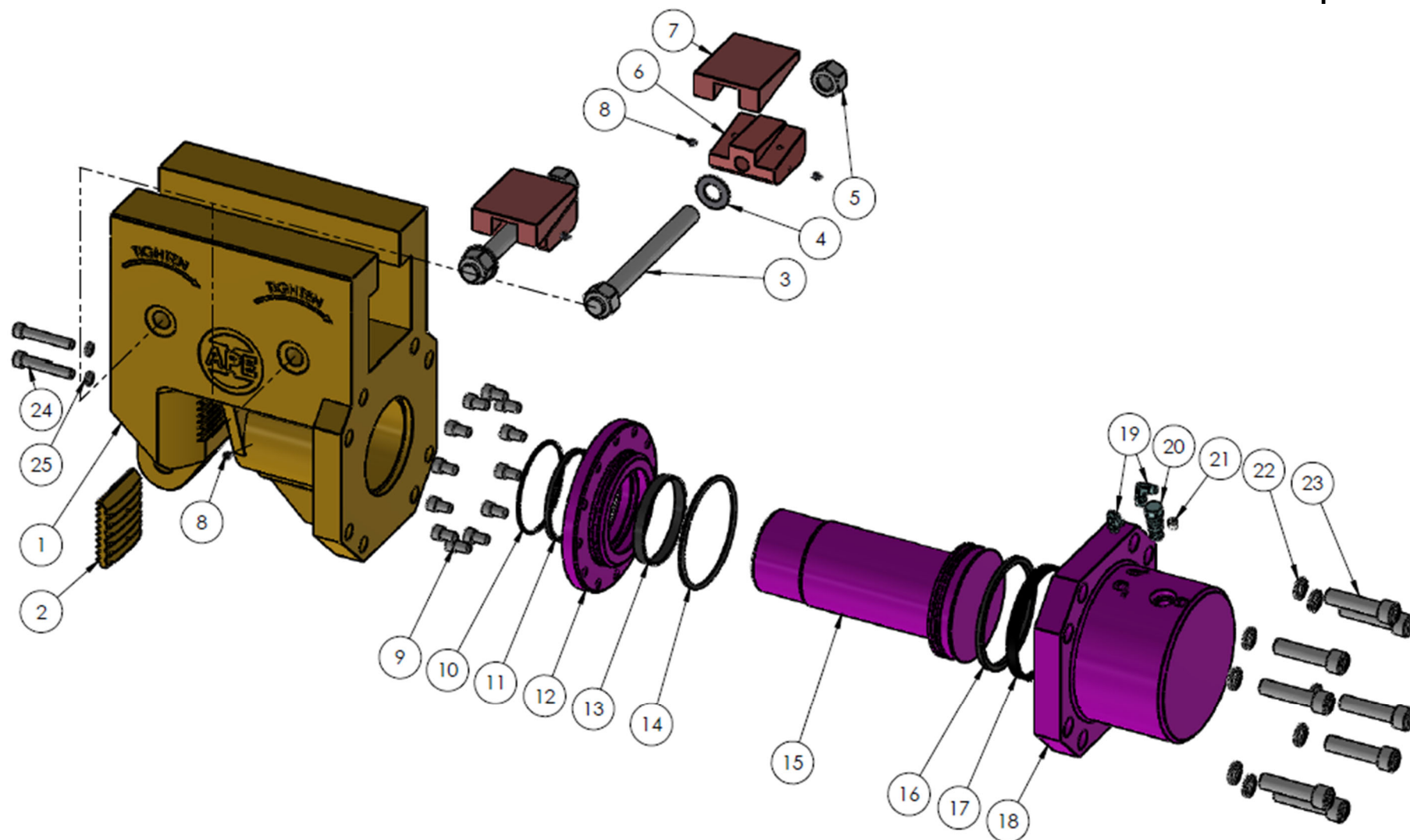


Model 100 Caisson Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|--|
| 1 | 1 | 250101 | Model 100 Caisson Clamp Body | |
| 2 | 1 | 250202 | Fixed Jaw, Caisson 1.25" Thick | |
| | 1 | 250202N | (or) Fixed Jaw, Caisson 0.75" Thick | |
| | 2 | 124211A | APE Caisson Screw Assembly (*Quantities below given per subassembly) | |
| 3 | 1** | | Threaded Rod | 1.25-5x14" Long ACME rod |
| 4 | 2** | 120111 | 1.25" H S Flat Washer | Fastenal 33124, 1/8" thick, plain F436 |
| 5 | 2** | 124212 | Wedge Nut | 1.25-5 ACME Hex Nut |
| 6 | 2 | 250102 | Wedges, Male Half, Bronze | |
| 7 | 2 | 250105 | Wedges, Female Half, Steel | |
| 8 | 5 | 221001 | *Grease-zerk | Straight 1/8" NPT |
| | 1 | 250001 | Caisson Clamp Cylinder Assembly | |
| 9 | 12 | 1003804 | Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18x1.0" Long |
| 10 | 1 | | *Rod Wiper | AN Wiper SH959-53 |
| 11 | 1 | | *Rod Seal | 250-06.000-375B Lubrithane Polyseal |
| 12 | 1 | 222004 | Cylinder Gland | |
| 13 | 1 | | *Rod Wear Band | Wear Guide 06250-0750-125 |
| 14 | 1 | | *Head Seal O-Ring and Backup | 568-367 O-Ring CMPD F-7001 and 80-367 Contoured Backup |
| 15 | 1 | 250003 | 8" Caisson Piston and Rod | |
| 16 | 1 | | *Piston Seal | PS1850-128 Bronze PTFE w/ Energizer |
| 17 | 1 | | *Piston Wear Band | Wear Guide 08000-0750-125 |
| 18 | 1 | 1001409 | 8" Hydraulic Cylinder Bucket | |
| 19 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 20 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 21 | 1 | 122014 | #6 MORB Plug | 6408-H06-O |
| 22 | 8 | 124205 | *Washers, Cylinder Mounting | HCLW 1.25" |
| 23 | 8 | 124204 | *Bolts, Cylinder Mounting | SHCS 1.25-12x4.0" Long |
| 24 | 2 | 110308 | *Bolts, Fixed Jaw | SHCS 0.625-11x4.0" Long |
| 25 | 2 | 124115 | *Washers, Fixed Jaw | HCLW 0.625" |

*Included in Seal or Bolt kit

Model 100
Caisson Clamp

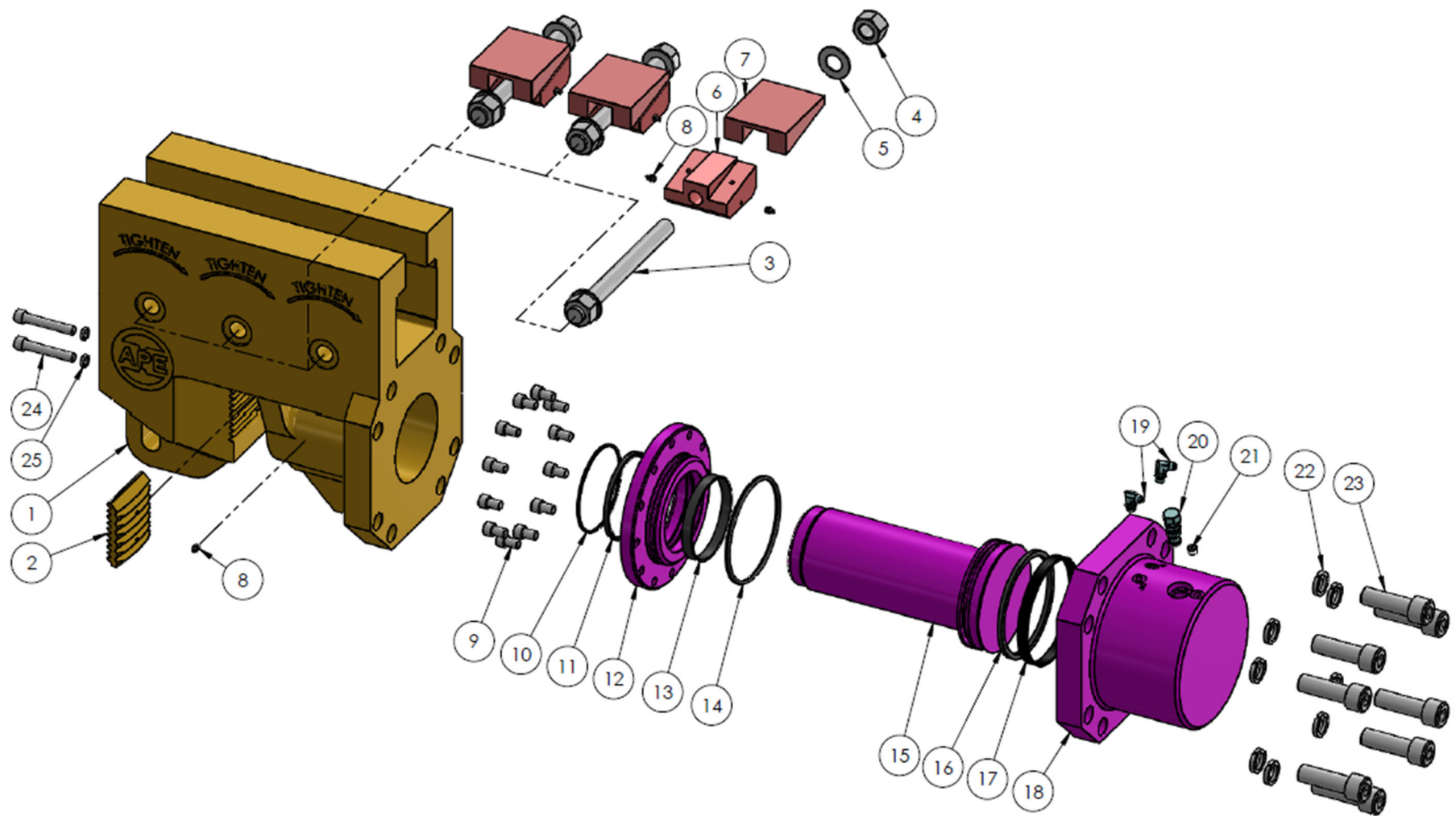


Model 200 Caisson Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|--|--|
| 1 | 1 | 260101 | Caisson Clamp 200 Body w/ Rod Bushing | |
| 2 | 1 | 250202 | Fixed Jaw, Caisson 1.25" Thick | |
| | 1 | 250202N | (or) Fixed Jaw, Caisson 0.75" Thick | |
| | 1 | 250202H | (or) Fixed Jaw, Caisson 1.5" Thick | |
| | 3 | 124211A | APE Caisson Screw Assembly (*Quantities below given per subassembly) | |
| 3 | 1** | | Threaded Rod | 1.25-5x14" Long ACME rod |
| 4 | 2** | 120111 | 1.25" H S Flat Washer | Fastenal 33124, 1/8" thick, plain F436 |
| 5 | 2** | 124212 | Wedge Nut | 1.25-5 ACME Hex Nut |
| 6 | 3 | 250102 | Wedge, Male Half, Bronze | |
| 7 | 3 | 250105 | Wedge, Female Half, Steel | |
| 8 | 7 | 221001 | *Grease-zerk | Straight 1/8" NPT |
| | 1 | 250001 | Caisson Clamp Cylinder Assembly | |
| 9 | 12 | 1003804 | Bolts, Cylinder Gland (LOCTITED) | SHCS 0.625-18x1.0" Long |
| 10 | 1 | | *Rod Wiper | AN Wiper SH959-53 |
| 11 | 1 | | *Rod Seal | 250-06.000-375B Lubrithane Polyseal |
| 12 | 1 | 222004 | Cylinder Gland | |
| 13 | 1 | | *Rod Wear Band | Wear Guide 06250-0750-125 |
| 14 | 1 | | *Head Seal O-Ring and Backup | 568-367 O-Ring CMPD F-7001 and 80-367 Contoured Backup |
| 15 | 1 | 250003 | 8" Caisson Piston and Rod | |
| 16 | 1 | | *Piston Seal | PS1850-128 Bronze PTFE w/ Energizer |
| 17 | 1 | | *Piston Wear Band | Wear Guide 08000-0750-125 |
| 18 | 1 | 1001409 | 8" Hydraulic Cylinder Bucket | |
| 19 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 20 | 1 | 222016 | P.O. Check Valve | CKEB-XCN |
| 21 | 1 | 122014 | #6 MORB Plug | 6408-H06-O |
| 22 | 8 | 124205 | *Washers, Cylinder Mounting | HCLW 1.25" |
| 23 | 8 | 124204 | *Bolts, Cylinder Mounting | SHCS 1.25-12x4.0" |
| 24 | 2 | 124214 | *Bolts, Fixed Jaw | SHCS 0.625-11x4.25" |
| 25 | 2 | 124115 | *Washers, Fixed Jaw | HCLW 0.625" |

*Included in Seal or Bolt kit

Model 200
Caisson Clamp



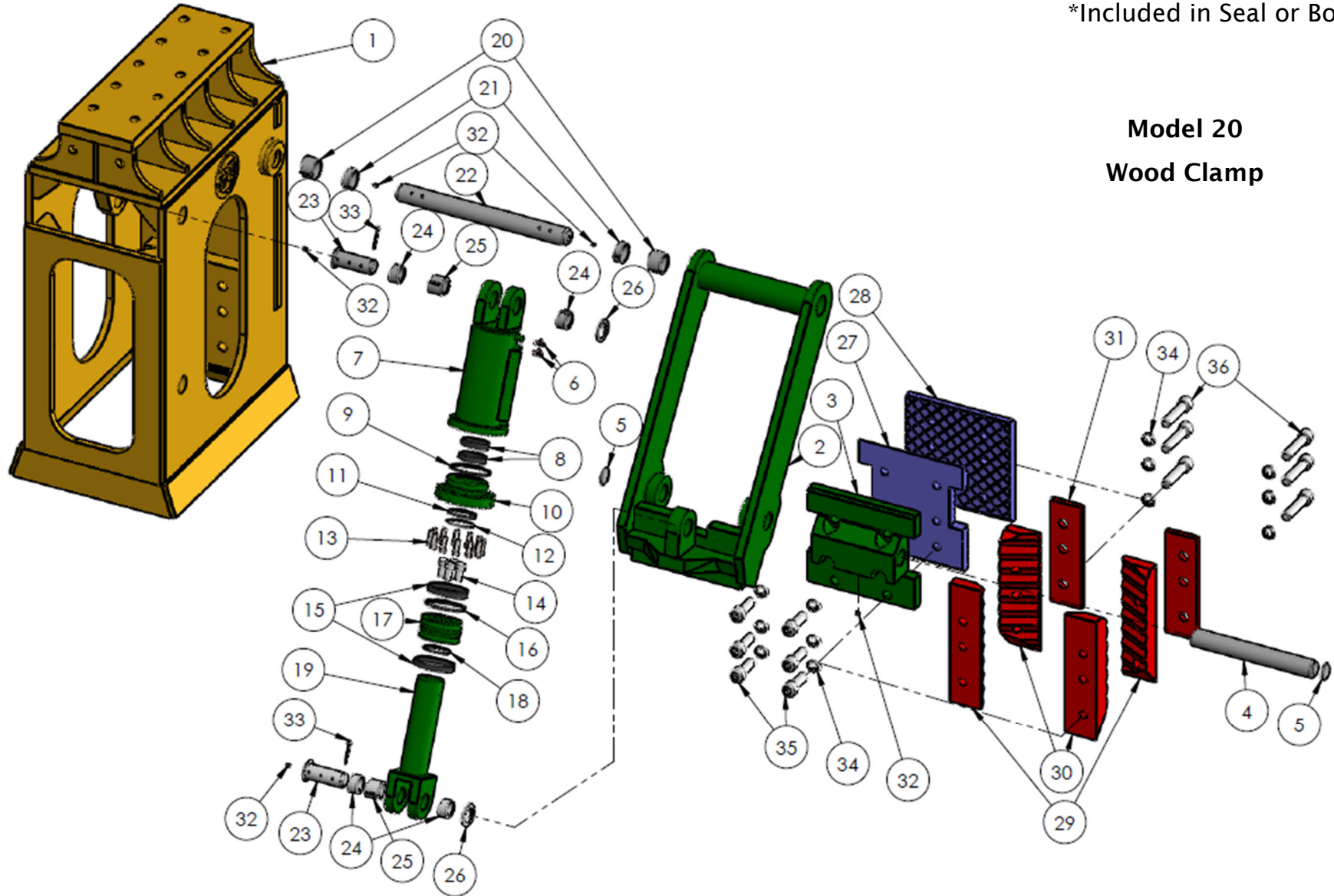
Model 20 Wood Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-------------------------------------|---|
| 1 | 1 | 1002218 | Model 20 Wood Clamp Body | |
| | 1 | 1002125 | 20" Swing Arm Assembly | |
| 2 | 1 | 1002219 | 20" WC Swing Arm | |
| 3 | 1 | 1002124 | 20" WC Moveable Jaw Pivot | |
| 4 | 1 | 1002123 | 20" WC Moveable Jaw Shaft | |
| 5 | 2 | | Swing Arm Cover | 3.0" dia x 3/16" Thick |
| | | 1002126 | Wood Clamp Cylinder Assembly | |
| 6 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 7 | 1 | 1002127 | Cylinder Barrel Assembly | |
| | | 1002131 | Cylinder Rod Assembly | |
| 8 | 2 | | *Rod Wear Rings | 8000-76E |
| 9 | 1 | | *Gland Seal O-Ring and Backup | 568-363 O-Ring N70 and 80-363 Contoured Backup |
| 10 | 1 | 1002130 | Cylinder Gland | |
| 11 | 1 | | *Rod Seal | 250-04.500-375B-PO Lubrithane Polyseal |
| 12 | 1 | | *Rod Wiper | AN Wiper AN-41-SH Urethane |
| 13 | 12 | | Bolts, Cylinder Gland | SHCS 0.625-18x2.0" Long |
| 14 | 4 | 400401 | Bolts, Piston | SHCS 1.0-8x2.0" Long |
| 15 | 2 | | *Piston Wear Rings | Wear Ring 612-700-100 |
| 16 | 1 | | *Piston Seal | TFE-R-7000 Teflon |
| 17 | 1 | 1002129 | Cylinder Piston | |
| 18 | 1 | | *Rod and Cap Seal w/ Double Backups | 568-246 O-Ring N70, (x2) 80-246 Contoured Backups |
| 19 | 1 | 1002128 | Cylinder Rod and Clevis Assembly | |
| 20 | 2 | 1002133 | Spring Bushing | Connex 3.5" OD x 3.0" ID x 2.25" Long |
| 21 | 2 | 1002134 | Spring Bushing | Connex 3.5" OD x 3.0" ID x 1.25" Long |
| 22 | 1 | 1002136 | Swing Arm Shaft | |
| 23 | 2 | 1002137 | Cylinder Pin | |
| 24 | 4 | 1002132 | Spring Bushing | Connex 3.0" OD x 2.5" ID x 1.5" Long |
| 25 | 2 | 1002135 | Spring Bushing | Connex 3.0" OD x 2.5" ID x 2.5" Long |
| 26 | 2 | 1002138 | Cylinder Pin Keeper | |
| | | | Jaws for Concrete | |
| 27 | 1 | 1002212 | Moveable Jaw - Concrete 20" | |
| 28 | 1 | 1002213 | Fixed Jaw - Concrete 20" | |
| | | | Jaws for Wood | |
| 29 | 2 | 1002140 | Ape Wood Jaw, Right Hand 23" | |
| 30 | 2 | 1002139 | Ape Wood Jaw, Left Hand 23" | |
| 31 | 2 | 1002211 | Spacer - Wood Jaws | |
| 32 | 5 | 221001 | Grease-zerk | Straight 1/8" NPT |

| | | | | |
|----|----|--------|---------------------|--------------------------------------|
| 33 | 2 | | Cotter Pin | Stainless Steel 0.25"x4.0" or longer |
| 34 | 12 | 124202 | Washers, Jaws | HCLW 1.5" |
| 35 | 6 | 120819 | Bolts, Moveable Jaw | SHCS 1.5-6x4.0" Long |
| 36 | 6 | 100193 | Bolts, Fixed Jaw | SHCS 1.5-6x6.5" Long |

*Included in Seal or Bolt Kit

Model 20 Wood Clamp



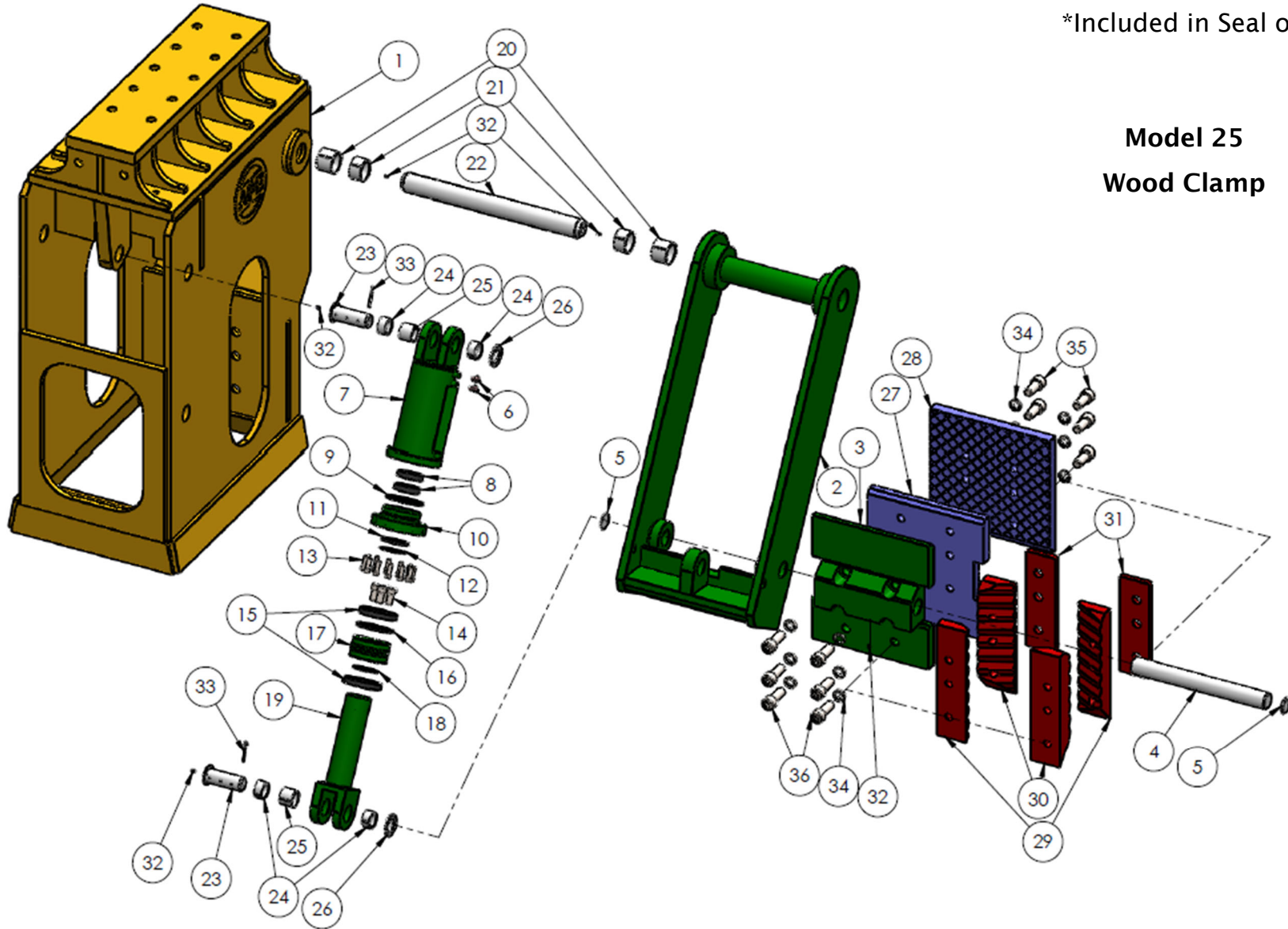
Model 25 Wood Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-------------------------------------|---|
| 1 | 1 | 1002224 | Model 25 Wood Clamp Frame | |
| | 1 | 1002231 | 25" Swing Arm Assembly | |
| 2 | 1 | 1002226 | 25" WC Swing Arm | |
| 3 | 1 | 1002227 | 25" WC Moveable Jaw Pivot | |
| 4 | 1 | 1002228 | 25" WC Moveable Jaw Shaft | |
| 5 | 2 | 1002230 | Swing Arm Cover | 3.0" dia x 0.25" Thick |
| | | 1002126 | Wood Clamp Cylinder Assembly | |
| 6 | 2 | 130057 | 90 Elbow Fitting #6 JIC to #6 ORB | FITT2L-06M06R |
| 7 | 1 | 1002127 | Cylinder Barrel Assembly | |
| | | 1002131 | Cylinder Rod Assembly | |
| 8 | 2 | | *Rod Wear Rings | 8000-76E |
| 9 | 1 | | *Gland Seal O-Ring and Backup | 568-363 O-Ring N70 and 80-363 Contoured Backup |
| 10 | 1 | 1002130 | Cylinder Gland | |
| 11 | 1 | | *Rod Seal | 250-04.500-375B-PO Lubrithane Polyseal |
| 12 | 1 | | *Rod Wiper | AN Wiper AN-41-SH Urethane |
| 13 | 12 | | Bolts, Cylinder Gland | SHCS 0.625-18x2.0" Long |
| 14 | 4 | 400401 | Bolts, Piston | SHCS 1.0-8x2.0" Long |
| 15 | 2 | | *Piston Wear Rings | Wear Ring 612-700-100 |
| 16 | 1 | | *Piston Seal | TFE-R-7000 Teflon |
| 17 | 1 | 1002129 | Cylinder Piston | |
| 18 | 1 | | *Rod and Cap Seal w/ Double Backups | 568-246 O-Ring N70, (x2) 80-246 Contoured Backups |
| 19 | 1 | 1002128 | Cylinder Rod and Clevis Assembly | |
| 20 | 2 | 1002233 | Spring Bushing | Connex 4.0" OD x 3.5" ID x 3.0" Long |
| 21 | 2 | 1002232 | Spring Bushing | Connex 4.0" OD x 3.5" ID x 2.25" Long |
| 22 | 1 | 1002229 | Swing Arm Shaft | |
| 23 | 2 | 1002137 | Cylinder Pin | |
| 24 | 4 | 1002235 | Spring Bushing | Connex 3.0" OD x 2.5" ID x 1.5" Long |
| 25 | 2 | 1002234 | Spring Bushing | Connex 3.0" OD x 2.5" ID x 2.5" Long |
| 26 | 2 | 1002138 | Cylinder Pin Keeper | |
| | | | Jaws for Concrete | |
| 27 | 1 | 1002236 | Moveable Jaw, Concrete 25" | |
| 28 | 1 | 1002237 | Fixed Jaw, Concrete 25" | |
| | | | Jaws for Wood | |
| 29 | 2 | 1002140 | Ape Wood Jaw, Right Hand 23" | |
| 30 | 2 | 1002139 | Ape Wood Jaw, Left Hand 23" | |
| 31 | 2 | 1002211 | Spacer - Wood Jaws | |
| 32 | 5 | 221001 | Grease-zerk | Straight 1/8" NPT |

| | | | | |
|----|----|--------|---------------------|--------------------------------------|
| 33 | 2 | | Cotter Pin | Stainless Steel 0.25"x4.0" or longer |
| 34 | 12 | 124202 | Washers, Common | HCLW 1.5" |
| 35 | 6 | | Bolts, Fixed Jaw | SHCS 1.5-6x3.25" Long |
| 36 | 6 | 120819 | Bolts, Moveable Jaw | SHCS 1.5-6x4.0" Long |

*Included in Seal or Bolt Kit

Model 25 Wood Clamp



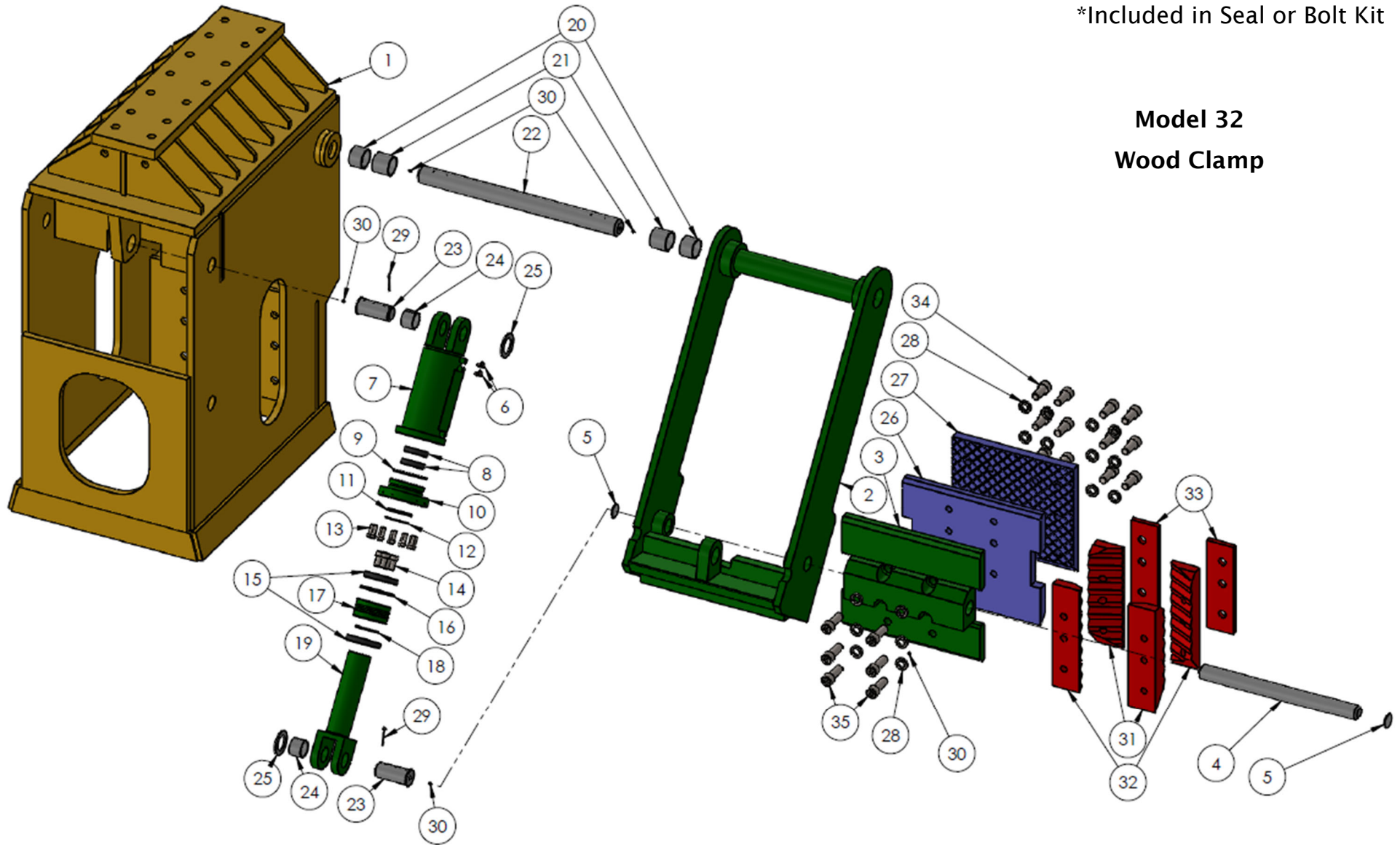
Model 32 Wood Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-------------------------------------|---|
| 1 | 1 | | Model 32 Wood Clamp Frame | |
| | 1 | | 32" Swing Arm Assembly | |
| 2 | 1 | | 32" WC Swing Arm | |
| 3 | 1 | | 32" WC Moveable Jaw Pivot | |
| 4 | 1 | | 32" WC Moveable Jaw Shaft | |
| 5 | 2 | | Swing Arm Cover | 3.0" dia x 3/16" Thick |
| | | | Wood Clamp Cylinder Assembly | |
| 6 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 7 | 1 | | Cylinder Barrel Assembly | |
| | | | Cylinder Rod Assembly | |
| 8 | 2 | | *Rod Wear Rings | 8000-76E |
| 9 | 1 | | *Gland Seal O-Ring and Backup | 2-367N70 and 8-363 Backup |
| 10 | 1 | 1002130 | Cylinder Gland | |
| 11 | 1 | | *Rod Seal | 250-04.500-375B-PO Lubrithane Polyseal |
| 12 | 1 | | *Rod Wiper | AN Wiper AN-41-SH Urethane |
| 13 | 12 | | Bolts, Cylinder Gland | SHCS 0.625-18x2.0" Long |
| 14 | 4 | 400401 | Bolts, Piston | SHCS 1.0-8x2.0" Long |
| 15 | 2 | | *Piston Wear Rings | Wear Ring 612-700-100 |
| 16 | 1 | | *Piston Seal | TFE-R-7000 Teflon |
| 17 | 1 | 1002129 | Cylinder Piston | |
| 18 | 1 | | *Rod and Cap Seal w/ Double Backups | 568-246 O-Ring N70, (x2) 80-246 Contoured Backups |
| 19 | 1 | 1002128 | Cylinder Rod and Clevis | |
| 20 | 2 | | Spring Bushing | Connex 3.5" ID x 4.0" OD x 2.75" Long |
| 21 | 2 | | Spring Bushing | Connex 3.5" ID x 4.0" OD x 3.5" Long |
| 22 | 1 | | Swing Arm Shaft | |
| 23 | 2 | | 32" WC Cylinder Pin | |
| 24 | 2 | 1002234 | Spring Bushing | Connex 3.5" ID x 4.0" OD x 2.5" Long |
| 25 | 2 | 1002138 | Cylinder Pin Keeper | |
| | | | Jaws for Concrete | |
| 26 | 1 | 909015 | Moveable Jaw, Concrete 32" | |
| 27 | 1 | 909013 | Fixed Jaw, Concrete 32" | |
| 28 | 18 | 124202 | Washers, Common | HCLW 1.5" |
| 29 | 2 | | Cotter Pin | Stainless Steel 0.25"x4.0" or longer |
| 30 | 5 | 221001 | Grease-zerk | Straight 1/8" NPT |
| | | | Jaws for Wood | |
| 31 | 2 | 1002140 | Ape Wood Jaw, Right Hand 23" | |
| 32 | 2 | 1002139 | Ape Wood Jaw, Left Hand 23" | |

| | | | | |
|----|----|---------|---------------------|-----------------------|
| 33 | 2 | 1002211 | Spacer - Wood Jaws | |
| 34 | 12 | | Bolts, Fixed Jaw | SHCS 1.5-6x3.25" Long |
| 35 | 6 | 120819 | Bolts, Moveable Jaw | SHCS 1.5-6x4.0" Long |

*Included in Seal or Bolt Kit

Model 32 Wood Clamp

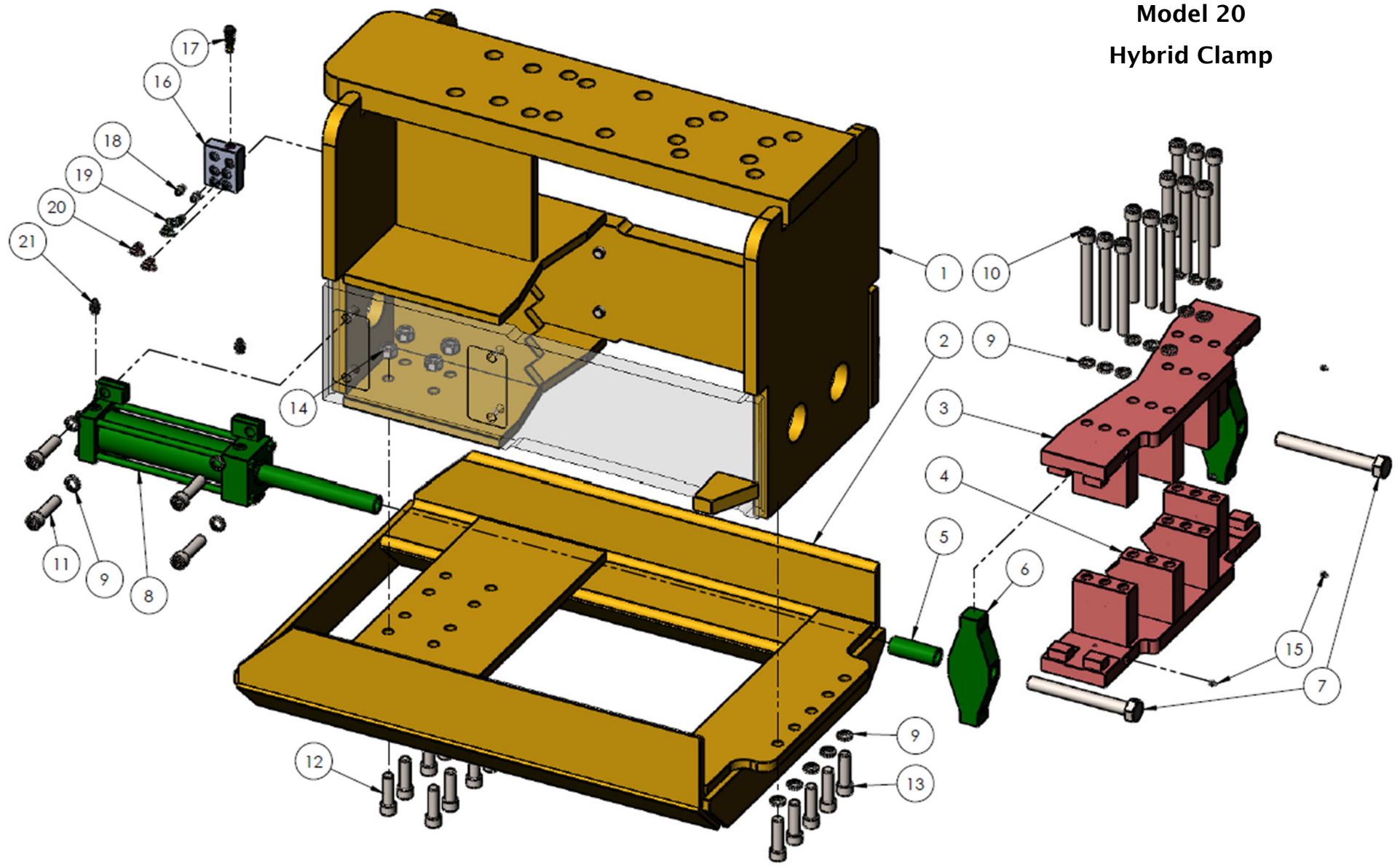


Hybrid 20 Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|---|-----------------------------|
| 1 | 1 | 1007195 | Model 20 Hybrid Clamp Body | |
| 2 | 1 | 1007193 | Guard Guide | |
| 3 | 1 | 1007197 | Inside Moveable Jaw | |
| 4 | 1 | 1007199 | Outside Moveable Jaw | |
| 5 | 2 | 1007201 | Adaptor Pipe | |
| 6 | 2 | 1007200 | Cross Head | |
| 7 | 2 | | Bolts, Arm Mount | HHBolt 1.25-12x11.0x2.0 |
| 8 | 2 | 120859 | Georgia-Yates Hydraulic Cylinder | Yates H6A-N4.0x12x1.75T4S11 |
| | | 1000432 | *Seal Kit and Replacement Gland | GHC-HH-PRG-017 |
| 9 | 25 | 1003063 | Washers, General | HCLW 1.0 |
| 10 | 12 | 140731 | Bolts, Moveable Jaw | SHCS 1.0-8x9.5x2.5 |
| 11 | 8 | 1003020 | Bolts, Cylinder Mounting | SHCS 1.0-8x4.0 |
| 12 | 8 | 1003019 | Bolts, Guard Guide Attachment Rear | SHCS 1.0-8x3.25x3.25 |
| 13 | 5 | | Bolts, Guard Guide Attachment Front | SHCS 1.0-8x3.5x2.5 |
| 14 | 8 | | Nuts, Guard Guide Attachment | Stover Nut 1.0-8 |
| 15 | 4 | 221001 | Grease-zerk | Straight 1/8" NPT |
| | 1 | 120861 | Combined Clamp Manifold | |
| 16 | 1 | 120933 | Clamp Manifold C102 | |
| 17 | 1 | 120877 | Check Valve | CKCB-XEN |
| 18 | 2 | 100053 | Straight Fitting, #6 JIC to #6 ORB | FITT2S-06M06R |
| 19 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 20 | 2 | | 90 Elbow Fitting, #6 JIC to #6 ORB, Double Long | FITT2L-06M06R000-00X |
| 21 | 4 | 130645 | Straight Fitting, #6 JIC to #8 ORB | FITT2S-06M08R |

*Included in Seal Kit

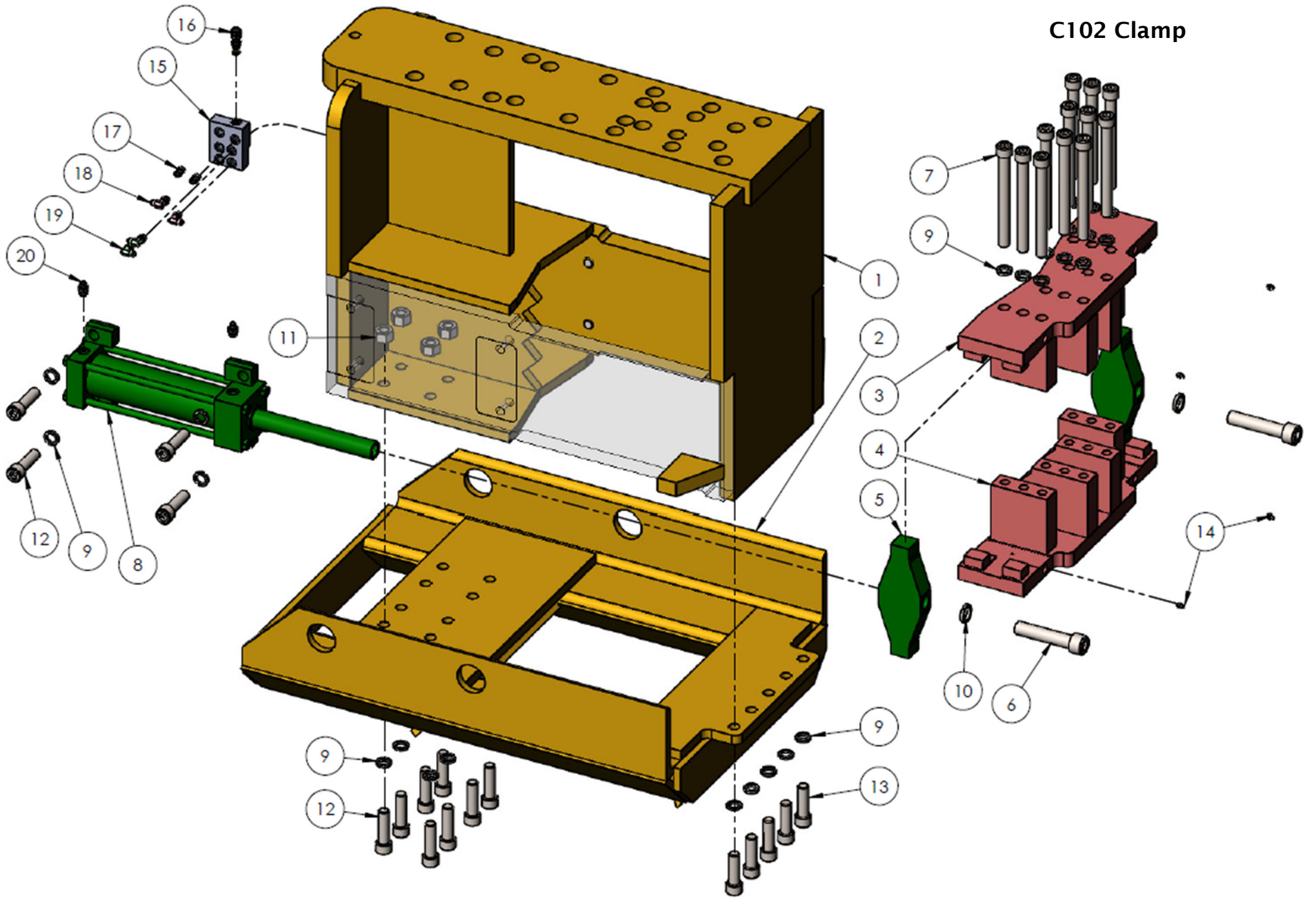
Model 20
Hybrid Clamp



C102 Clamp

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|---|-----------------------------|
| 1 | 1 | 810879 | Clamp Body Assembly | |
| 2 | 1 | 120865 | Guard Guide | |
| 3 | 1 | 120867 | Inside Moveable Jaw | |
| 4 | 1 | 120869 | Outside Moveable Jaw | |
| 5 | 2 | 120871 | Cross Head | |
| 6 | 2 | | Bolts, Arm Mount | SHCS 1.25-12x6.0 |
| 7 | 12 | 140731 | Bolts, Moveable Jaw | SHCS 1-8x9.5 |
| 8 | 2 | 120859 | Georgia-Yates Hydraulic Cylinder | Yates H6A-N4.0x12x1.75T4S11 |
| | | 1000432 | *Seal Kit and Replacement Gland | GHC-HH-PRG-017 |
| 9 | 33 | 1003063 | Lockwashers, Common | HCLW 1" |
| 10 | 2 | 1003065 | Lockwashers, Arm Mount | HCLW 1.25" |
| 11 | 8 | 400051 | Hex Nut, Guard Guide Mount | HHNUT 1.0-8 |
| 12 | 13 | 140145 | Bolts, Guard Guide Mount Rear | SHCS 1.0-8x3.5 |
| 13 | 8 | 1003018 | Bolts, Guard Guide Mount Front | SHCS 1.0-8x3.0 |
| 14 | 4 | 221001 | Grease-zerk | Straight 1/8" NPT |
| | 1 | 120861 | Combined Clamp Manifold | |
| 15 | 1 | 120933 | Clamp Manifold C102 | |
| 16 | 1 | 120877 | Check Valve | CKCB-XEN |
| 17 | 2 | 100053 | Straight Fitting, #6 JIC to #6 ORB | FITT2S-06M06R |
| 18 | 2 | 130057 | 90 Elbow Fitting, #6 JIC to #6 ORB | FITT2L-06M06R |
| 19 | 2 | | 90 Elbow Fitting, #6 JIC to #6 ORB, Double Long | FITT2L-06M06R000-00X |
| 20 | 4 | 130645 | Straight Fitting, #6 JIC to #8 ORB | FITT2S-06M08R |

*Included in Seal Kit

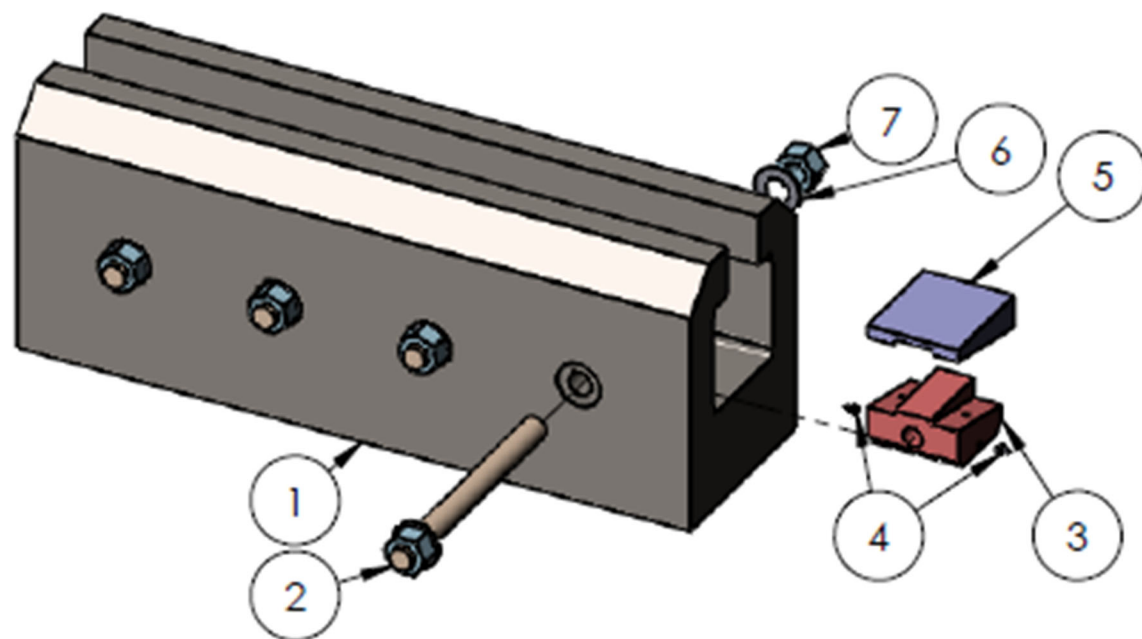


C102 Clamp

Caisson Beam Adaptor

| Item | Quantity | APE Number | Description | Manufacturer Information |
|------|----------|------------|-------------------------------------|--|
| 1 | 1 | 1004820 | Caisson Beam Adaptor Body | |
| 2 | 4 | 124211A | Caisson Wedge Screw Welded Assembly | |
| 3 | 4 | 250102 | Wedge, Male Half, Bronze | |
| 4 | 8 | 221001 | Grease-zerk | Straight 1/8" NPT |
| 5 | 4 | 250105 | Wedge, Female Half, Steel | |
| 6 | 4 | 120111 | 1.25" H S Flat Washer | Fastenal 33124, 1/8" thick, plain F436 |
| 7 | 4 | 124212 | Wedge Screw End Nut | 1.25"-5 ACME Hex Nut |

Caisson Beam Adaptor



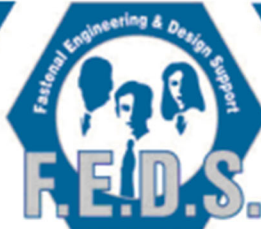
Seal Kits

| New Style Model 3/6 | | Hybrid 20 Clamp | |
|--|-----------------|--|-----------------|
| Kit #205210A | Quantity | Kit #1000432 | Quantity |
| 2-236 O-Ring | 1 | GHC-HH-PRG-017 Combined Gland/Seals | 1 |
| 8-236 O-Ring Backup | 1 | Model 80 Caisson Clamp | |
| 2500-2000-375B | 1 | Kit #810227 | Quantity |
| Custom Bronze Filled Ring with PTFE | 1 | AN Wiper SH959-41 | 1 |
| W125-03375-0250 | 1 | Parker BR 3120 4500 Rod Seal | 1 |
| Model 20 Sheet Clamp | | TP060 Piston T-Seal Buna-N | 1 |
| Kit #208010 | Quantity | W2-7000-500 Piston Bearing | 2 |
| 568-238 O-Ring CMPD N-7002 | 1 | 2-261 O-Ring 90 Duro | 1 |
| 568-248 O-Ring CMPD N-7002 | 2 | 8-261 Backup | 1 |
| 568-345 O-Ring CMPD N-7002 | 2 | 2-140 O-Ring 90 Duro | 1 |
| 80-248 Contoured Backup | 1 | Model 400 Sheet | |
| 80-345 Contoured Backup | 1 | Kit #1002262 | Quantity |
| Wear Ring 612-500-100 | 2 | 2-458 Gland O-Ring | 1 |
| Wear Ring 8000-68B | 1 | 8-458 Gland O-Ring Backup | 1 |
| DT-4000 Wiper U-1003 | 1 | P-50014000-750 Deep Polypak | 1 |
| PS1850-80 Bronze PTFE w/ Energizer | 1 | 15" OD x 1.0" Wide x 1/8" Thick Bronze Filled Teflon Wear Ring | 1 |
| Model 50, 150, 200 Sheet AND Model 100, 200 Caisson | | 10" OD x 1.0" Wide x 1/8" Thick Bronze Filled Teflon Wear Ring | 1 |
| Kit #1003614 | Quantity | D010000 10" Rod Wiper Slotted | 1 |
| AN Wiper SH959-53 | 1 | P-50010000-750 Deep Polypak | 1 |
| 250-06.000-375B Lubrithane Polyseal | 1 | Model 126 Sheet Clamp | |
| Wear Guide 06250-050-125 | 1 | Kit #810515 | Quantity |
| 568-367 O-Ring CMPD F-7001 | 1 | 2-269 O-Ring 90 Duro | 1 |
| 80-367 Contoured Backup | 1 | 0.5Wx7.00IDx0.12 | 1 |
| PS1850-128 Bronze PTFE w/ Energizer | 1 | TR-056 Rod T-Seal Buna-N | 1 |
| Wear Guide 08000-0750-125 | 1 | TP-064 Piston T-Seal Buna-N | 2 |
| 568-356 O-Ring CMPD F-7001 | 1 | 912-8000-500 | 2 |
| Model 20, 25, 32 Wood Clamp | | 2-261 O-Ring 90 Duro | 1 |
| Kit #221022 | Quantity | Model 196 Sheet Clamp | |
| 568-246 O-Ring N70 | 1 | Kit #810473 | Quantity |
| 80-246 Contoured Backup | 2 | 568-261 N90 | 1 |
| 250-04.500-375B-PO Lubrithane Polyseal | 1 | Wear Ring 612-1000-050 | 2 |
| 80-363 Contoured Backup | 1 | Wear Ring 612-725-050 | 1 |
| 568-363 O-Ring N70 | 1 | PS1850-160 Bronze PT | 1 |
| Wear Ring 612-700-100 | 2 | TP-069 T-Seal Buna/N | 2 |
| Wear Ring 8000-76E | 2 | TR-056 T-Seal, 2 Backups | 1 |
| AN-41-SH Urethane AN Wiper | 1 | | |
| TFE-R-7000 Teflon | 1 | | |

| Model 50, 150 Sheet Clamps | | Model 100 Caisson Clamp | |
|--------------------------------|-----------------|--------------------------------|-----------------|
| Kit #1007377 | Quantity | Kit #1007378 | Quantity |
| SHCS 1.25"-12x4.0" Long | 8 | HCLW 1.25" | 8 |
| HCLW 1.25" | 8 | SHCS 5/8-11x4.0" Long | 2 |
| SHCS 1.0"-8x9.0" Long | 2 | HCLW 5/8" | 2 |
| HCLW 1.0" | 6 | SHCS 1.25-12x4.0" Long | 8 |
| SHCS 1.0"-8x3.0" Long | 4 | Grease-zerk, Straight 1/8" NPT | 5 |
| SHCS 1.5"-6x3.5" Long | 8 | Model 80 Caisson Clamp | |
| HCLW 1.5" | 8 | | Quantity |
| Grease-zerk, Straight 1/8" NPT | 1 | SHCS 5/8-11x2.75" Long | 2 |
| SHCS 5/8-18x1.0" Long | 12 | H.S. Flat Washer 1.25" | 4 |
| Model 200 Sheet Clamp | | Grease-zerk, Straight 1/8" NPT | 3 |
| | Quantity | SHCS 1/2-13x1.25" Long | 2 |
| SHCS 1.5-6x3.5" Long | 10 | HCLW 1/2" | 4 |
| HCLW 1.5" | 10 | SHCS 1.0-8x4.0" Long | 8 |
| SHCS 1.25-12x4.0" Long | 8 | HCLW 1.0" | 8 |
| HCLW 1.25" | 8 | SHCS 1/2-13x1.5" Long | 2 |
| SHCS 1.0-8x3.0" Long | 4 | Pointed Set Screw 1/2-13x1.0" | 1 |
| SHCS 1.0-8x9.0" Long | 2 | Model 200 Caisson | |
| HCLW 1.0" | 6 | | Quantity |
| Grease-zerk, Straight 1/8" NPT | 1 | Kit #1007379 | |
| SHCS 5/8-18x1.0" Long | 12 | SHCS 1.25-12x4.0" Long | 8 |
| Model 400 Sheet Clamp | | HCLW 1.25" | 8 |
| | Quantity | SHCS 0.625-11x4.25" Long | 2 |
| SHCS 5/8-18x1.75" Long | 15 | HCLW 0.625" | 2 |
| SHCS 1.0-18x5.0" Long | 30 | Grease-zerk, Straight 1/8" NPT | 7 |
| HCLW 1.0" | 40 | Model 20 Sheet Clamp | |
| SHCS 1.0-8x11.0" Long | 2 | | Quantity |
| SHCS 1.0-8x3.0" Long | 8 | SHCS 1.0-8x3.0" Long | 14 |
| Jaw Pin | 1 | SHCS 1.0-8x9.0" Long | 2 |
| Grease-zerk, Straight 1/8" NPT | 1 | HCLW 1.0" | 16 |
| | | SHCS 1/2-13x5.5" Long | 12 |

Bolt Kits

Torque and Tension Requirements



Torque-Tension Relationship for ASTM A574 Socket Head Cap Screws

| Nominal Dia (in.) | Unified Coarse Thread Series | | | | | | Fine Thread Series | | | | | |
|----------------------|------------------------------|--|------------------------|----------------------|----------------------|----------------------|---------------------|--|------------------------|----------------------|----------------------|----------------------|
| | threads per inch | Tensile Stress Area (sq. in.) | Clamp Load (lbs) | Tightening Torque | | | threads per inch | Tensile Stress Area (sq. in.) | Clamp Load (lbs) | Tightening Torque | | |
| | | | | K = 0.15 (ft-lbs) | K = 0.16 (ft-lbs) | K = 0.20 (ft-lbs) | | | | K = 0.15 (ft-lbs) | K = 0.16 (ft-lbs) | K = 0.20 (ft-lbs) |
| 1/4 | 20 | 0.0318 | 3341 | 10 | 11 | 14 | 28 | 0.0364 | 3819 | 12 | 13 | 16 |
| 5/16 | 18 | 0.0524 | 5505 | 22 | 23 | 29 | 24 | 0.0581 | 6097 | 24 | 25 | 32 |
| 3/8 | 16 | 0.0775 | 8136 | 38 | 41 | 51 | 24 | 0.0878 | 9222 | 43 | 46 | 58 |
| 7/16 | 14 | 0.1063 | 11162 | 61 | 65 | 81 | 20 | 0.1187 | 12465 | 68 | 73 | 91 |
| 1/2 | 13 | 0.1419 | 14899 | 93 | 99 | 124 | 20 | 0.1600 | 16795 | 105 | 112 | 140 |
| 5/8 | 11 | 0.2260 | 22883 | 179 | 191 | 238 | 18 | 0.2560 | 25916 | 202 | 216 | 270 |
| 3/4 | 10 | 0.3345 | 33864 | 317 | 339 | 423 | 16 | 0.3730 | 37762 | 354 | 378 | 472 |
| 7/8 | 9 | 0.4617 | 46751 | 511 | 545 | 682 | 14 | 0.5095 | 51584 | 564 | 602 | 752 |
| 1 | 8 | 0.6057 | 61332 | 767 | 818 | 1022 | 14 | 0.6799 | 68839 | 860 | 918 | 1147 |
| 1 1/8 | 7 | 0.7633 | 77282 | 1087 | 1159 | 1449 | | | | | | |
| 1 1/4 | 7 | 0.9691 | 98123 | 1533 | 1635 | 2044 | | | | | | |
| 1 3/8 | 6 | 1.1549 | 116932 | 2010 | 2144 | 2680 | 12 | 1.0729 | 108636 | 1697 | 1811 | 2263 |
| 1 1/2 | 6 | 1.4053 | 142282 | 2668 | 2846 | 3557 | 12 | 1.3147 | 133115 | 2288 | 2440 | 3051 |
| 1 3/4 | 5 | 1.8995 | 192320 | 4207 | 4487 | 5609 | 12 | 1.5810 | 160079 | 3001 | 3202 | 4002 |
| 2 | 4.5 | 2.4982 | 252945 | 6324 | 6745 | 8432 | | | | | | |

Clamp load calculated as 75% of the proof load for socket head cap screws as specified in ASTM A574.

Torque values calculated from formula $T=KDF$, where

K = 0.15 for "lubricated" conditions, K = 0.16 "as-received" and K = 0.20 for "dry" conditions

D = Nominal Diameter

F = Clamp Load

UNDERSTANDING ISO CODES

The ISO cleanliness code is used to quantify particulate contamination levels per milliliter of fluid at 3 sizes 4µ[c], 6µ[c], and 14µ[c]. The ISO code is expressed in 3 numbers (ie 19/17/14). Each number represents a contaminant level code for the correlating particle size. The code includes all particles of the specified size and larger. It is important to note that each time a code increases the quantity range of particles is doubling.

| ISO 4406 Chart | | |
|----------------|--------------------------|-----------------|
| Range Code | Particles per milliliter | |
| | More than | Up to/including |
| 24 | 80000 | 160000 |
| 23 | 40000 | 80000 |
| 22 | 20000 | 40000 |
| 21 | 10000 | 20000 |
| 20 | 5000 | 10000 |
| 19 | 2500 | 5000 |
| 18 | 1300 | 2500 |
| 17 | 640 | 1300 |
| 16 | 320 | 640 |
| 15 | 160 | 320 |
| 14 | 80 | 160 |
| 13 | 40 | 80 |
| 12 | 20 | 40 |
| 11 | 10 | 20 |
| 10 | 5 | 10 |
| 9 | 2.5 | 5 |
| 8 | 1.3 | 2.5 |
| 7 | 0.64 | 1.3 |
| 6 | 0.32 | 0.64 |

Sample 1 (see photo 1)

| Particle Size | Particles per ml* | ISO 4406 Code range | ISO Code |
|---------------|-------------------|---------------------|----------|
| 4µ[c] | 151773 | 80000~160000 | 24 |
| 6µ[c] | 38363 | 20000~40000 | 22 |
| 10µ[c] | 8229 | | |
| 14µ[c] | 3339 | 2500~5000 | 19 |
| 21µ[c] | 1048 | | |
| 38µ[c] | 112 | | |

Sample 2 (see photo 2)

| Particle Size | Particles per ml* | ISO 4406 Code range | ISO Code |
|---------------|-------------------|---------------------|----------|
| 4µ[c] | 492 | 320 ~ 640 | 16 |
| 6µ[c] | 149 | 80 ~ 160 | 14 |
| 10µ[c] | 41 | | |
| 14µ[c] | 15 | 10 ~ 20 | 11 |
| 21µ[c] | 5 | | |
| 38µ[c] | 1 | | |

Photo 1

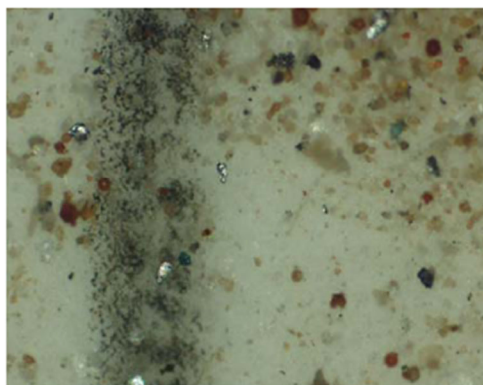


Photo 2



TARGET ISO CLEANLINESS CODES

When setting target ISO fluid cleanliness codes for hydraulic and lubrication systems it is important keep in mind the objectives to be achieved. Maximizing equipment reliability and safety, minimizing repair and replacement costs, extending useful fluid life, satisfying warranty requirements, and minimizing production down-time are attainable goals. Once a target ISO cleanliness code is set following a progression of steps to achieve that target, monitor it, and maintain it justifiable rewards will be yours.

Set the Target.
The first step in identifying a target ISO code for a system is to identify the most sensitive on an individual system, or the most sensitive component supplied by a central reservoir. If a central reservoir supplies several systems the overall cleanliness must be maintained, or the most sensitive component must be protected by filtration that cleans the fluid to the target before reaching that component.

Other Considerations
Table 1 recommends conservative target ISO cleanliness codes based on a several component manufacturers guidelines and extensive field studies for standard industrial operating conditions in systems using petroleum based fluids. If a non-petroleum based fluid is used (i.e. water glycol) the target ISO code should be set one value lower for each size (4 μ[c]/6μ[c]/14μ[c]). If a combination of the following conditions exists in the system the target ISO code should also be set one value lower:

- Component is critical to safety or overall system reliability.
- Frequent cold start.
- Excessive shock or vibration.
- Other Severe operation conditions.

Recommended* Target ISO Cleanliness Codes and media selection for systems using petroleum based fluids per ISO4406:1999 for particle sizes 4μ[c] / 6μ[c] / 14μ[c]

| | Pressure | Media | Pressure | Media | Pressure | Media |
|---------------------------------|------------|---------------|----------|---------------|------------|---------------|
| | < 140 bar | βx[c] = 1000 | 212 bar | βx[c] = 1000 | > 212 bar | βx[c] = 1000 |
| | < 2000 psi | (βx = 200) | 3000 psi | (βx = 200) | > 3000 psi | (βx = 200) |
| Pumps | | | | | | |
| Fixed Gear | 20/18/15 | 22μ[c] (25 μ) | 19/17/15 | 12μ[c] (12 μ) | - | - |
| Fixed Piston | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) | 17/15/12 | 7μ[c] (6 μ) |
| Fixed Vane | 20/18/15 | 22μ[c] (25 μ) | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Variable Piston | 18/16/13 | 7μ[c] (6 μ) | 17/15/13 | 5μ[c] (3 μ) | 16/14/12 | 7μ[c] (6 μ) |
| Variable Vane | 18/16/13 | 7μ[c] (6 μ) | 17/15/12 | 5μ[c] (3 μ) | - | - |
| Valves | | | | | | |
| Cartridge | 18/16/13 | 12μ[c] (12 μ) | 17/15/12 | 7μ[c] (6 μ) | 17/15/12 | 7μ[c] (6 μ) |
| Check Valve | 20/18/15 | 22μ[c] (25 μ) | 20/18/15 | 22μ[c] (25 μ) | 19/17/14 | 12μ[c] (12 μ) |
| Directional (solenoid) | 20/18/15 | 22μ[c] (25 μ) | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Flow Control | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Pressure Control (modulating) | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) | 17/15/12 | 7μ[c] (6 μ) |
| Proportional Cartridge Valve | 17/15/12 | 7μ[c] (6 μ) | 17/15/12 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) |
| Proportional Directional | 17/15/12 | 7μ[c] (6 μ) | 17/15/12 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) |
| Proportional Flow Control | 17/15/12 | 7μ[c] (6 μ) | 17/15/12 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) |
| Proportional Pressure Control | 17/15/12 | 7μ[c] (6 μ) | 17/15/12 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) |
| Servo Valve | 16/14/11 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) | 15/13/10 | 5μ[c] (3 μ) |
| Bearings | | | | | | |
| Ball Bearing | 15/13/10 | 5μ[c] (3 μ) | - | - | - | - |
| Gearbox (industrial) | 17/16/13 | 12μ[c] (12 μ) | - | - | - | - |
| Journal Bearing (high speed) | 17/15/12 | 7μ[c] (6 μ) | - | - | - | - |
| Journal Bearing (low speed) | 17/15/12 | 7μ[c] (6 μ) | - | - | - | - |
| Roller Bearing | 16/14/11 | 7μ[c] (6 μ) | - | - | - | - |
| Actuators | | | | | | |
| Cylinders | 17/15/12 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) | 15/13/10 | 5μ[c] (3 μ) |
| Vane Motors | 20/18/15 | 22μ[c] (25 μ) | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Axial Piston Motors | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) | 17/15/12 | 7μ[c] (6 μ) |
| Gear Motors | 20/18/14 | 22μ[c] (25 μ) | 19/17/13 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Radial Piston Motors | 20/18/15 | 22μ[c] (25 μ) | 19/17/14 | 12μ[c] (12 μ) | 18/16/13 | 12μ[c] (12 μ) |
| Test Stands, Hydrostatic | | | | | | |
| Test Stands | 15/13/10 | 5μ[c] (3 μ) | 15/13/10 | 5μ[c] (3 μ) | 15/13/10 | 5μ[c] (3 μ) |
| Hydrostatic Transmissions | 17/15/13 | 7μ[c] (6 μ) | 16/14/11 | 5μ[c] (3 μ) | 16/14/11 | 5μ[c] (3 μ) |

*Depending upon system volume and severity of operating conditions a combination of filters with varying degrees of filtration efficiency might be required (i.e. pressure, return, and off-line filters) to achieve and maintain the desired fluid cleanliness.

| Example | ISO Code | Comments |
|--------------------------|-----------------------------------|--|
| Operating Pressure | 156 bar, 2200 psi | |
| Most Sensitive Component | Directional Solenoid | 19/17/14 recommended baseline ISO Code |
| Fluid Type | Water Glycol | 18/16/13 Adjust down one class |
| Operating Conditions | Remote location, repair difficult | Adjust down one class, combination |
| | High Ingression rate | 17/15/12 of critical nature, severe conditions |

REFERENCE / NOTES

All information given in this manual is current and valid per the information available at the time of publication. Please check the updated revision date.

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