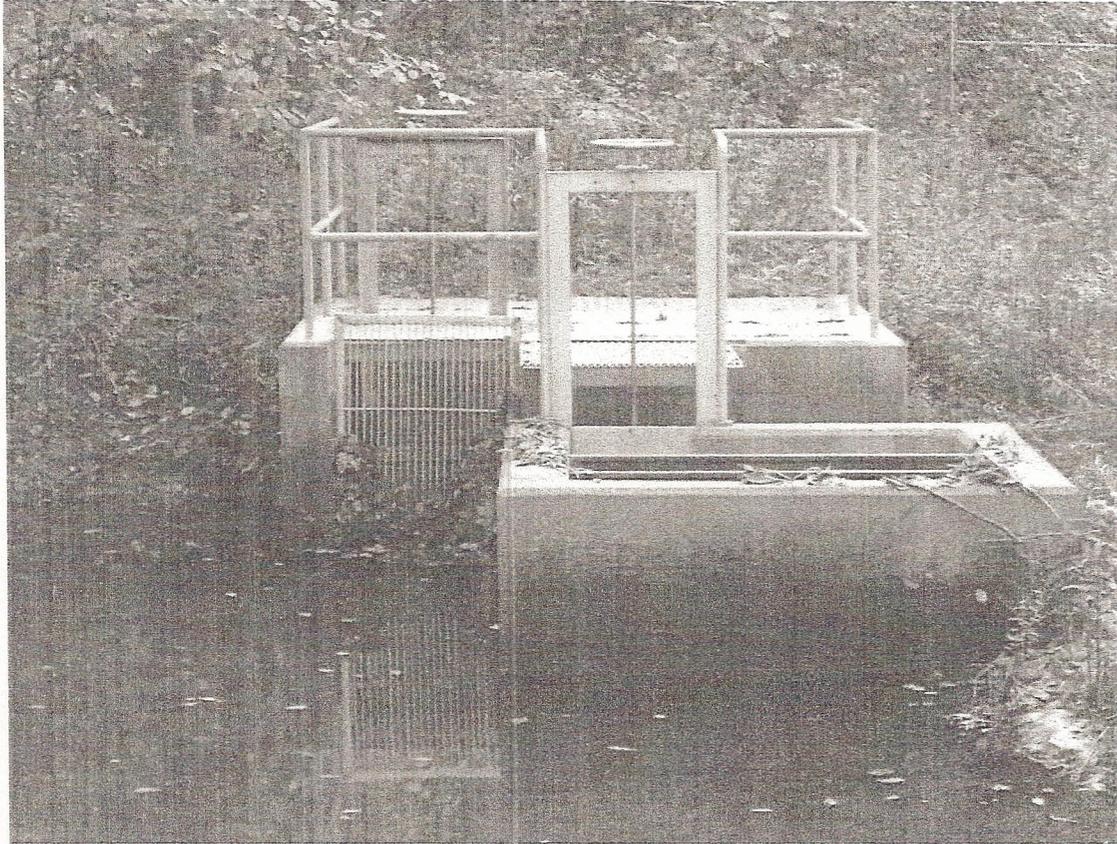


Cyclone Screen Installation, Operation & Maintenance Manual



AYLESWORTH CREEK ACID MINE DRAINAGE NEUTRALIZATION SCREENING FACILITY

PWTech Proj No CY-PA-08-011

CYCLONE SCREEN
MODEL CY150
SERIAL NO 52
MANUFACTURE DATE – APRIL 2009

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1. INTRODUCTION

This manual describes the model CY150 that is installed in CSO Regulator #1 in Moosic, PA. The screen has 6 mm apertures.

2. OPERATING DESCRIPTION

The Cyclone screen is a fine screen that operates unattended and is self powered. The screen is a perforated plate that is the wall of a cylinder, and it spins on a radial axis, powered by the screened water flow onto a water wheel inside the screen. The screen is self cleaning, by the shearing action of the screen as it moves through the water. The screen and the water wheel are connected to a common axle so that as water passes through the screen is falls into the water wheel which in turn provides the motive power to spin the axle and the attached screen cylinder.

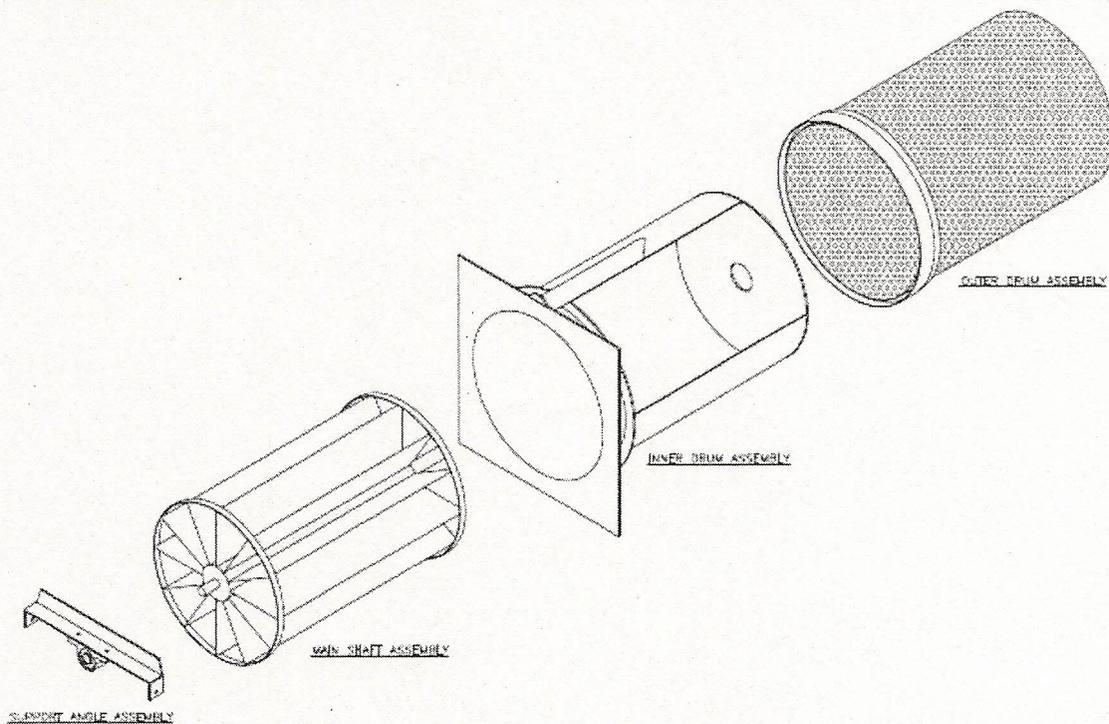


FIGURE 2-1
CYCLONE MAIN COMPONENTS

The screen cylinder and the water wheel are separated by a solid cylinder which provides a combination of the structure that supports the cantilevered water wheel and screen cylinder, as well as providing a flow control weir. This solid cylinder is a stainless steel can with one quadrant of the cylinder cut out, with the open quadrant oriented between either 9:00 and 12:00 o'clock or 12:00 and 3:00 o'clock. Thus, no

flow passes through the screen or into the water wheel until the level outside the screen has risen above the centerline of the screen.

The capacity of the screen increases as the level over the weir rises. In this installation, as in most, the top of the screen is set at the elevation of the emergency overflow weir, or slightly below, so that the full capacity of the screen (150 l/sec = 5.3 cfs = 3.42 mgd) is reached when the level rises to the top of the screen. Under this full flow condition, all of the flow is passing through the $\frac{1}{4}$ of the screen cylinder that is in alignment with the opening in the solid cylinder. During the other $\frac{3}{4}$ rotation the screen is being cleaned and the solids removed from the screen are dispersed back into the bulk of flow in the sewer.

3. INSTALLATION

The Cyclone Screen comes ready to mount either onto a weir plate or onto a concrete weir wall, as shown in the photos below.

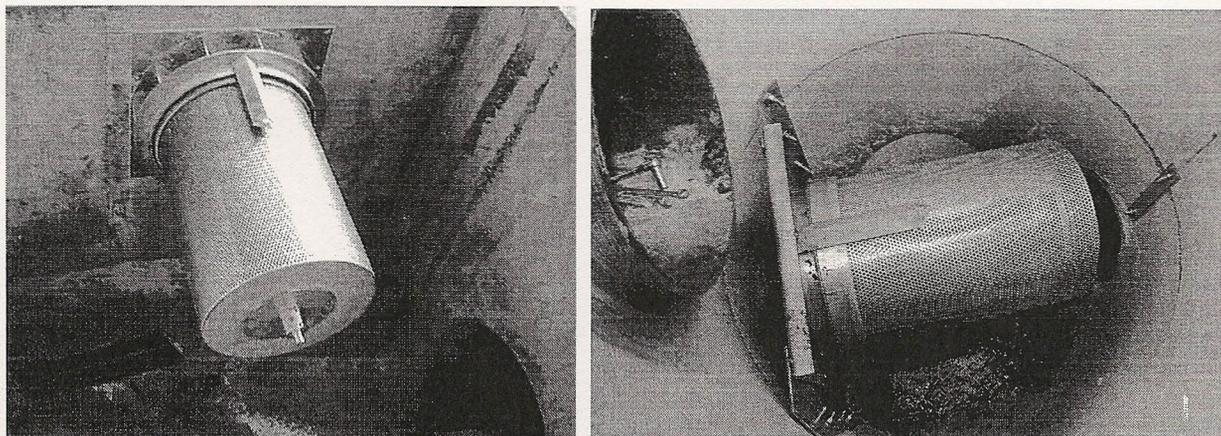


FIGURE 3-1 TYPICAL INSTALLATIONS

Note that the cyclone on the left is mounted over a round core through the weir wall, giving an emergency overflow that is well above the point at which the Cyclone achieves its rated flow rate. On the right the mounting plate is extended a few inches above the screen, giving an emergency overflow path when the screen has achieved its rated capacity. Mechanical wedge anchors used for mounting onto concrete walls are $\frac{1}{2}$ "x3-1/2"-13 NC stainless steel, with washers and lock-washers. When a mounting plate is bolted onto a stainless steel weir plate as on the right, the weir plate is held in place with the same $\frac{1}{2}$ " wedge anchors, and the mounting plate is bolted to a matching pattern on the weir plate with $\frac{1}{2}$ "x1-1/4" to 1-1/2" -13 NC bolt sets (bolts, nuts, washers and lock-washers).

All Cyclone screens are built with lifting arms that provide a balanced point of lifting for the screens. This allows the screens to be lifted and moved into position for anchoring or fastening, as seen in the photo in Figure 3-2.



FIGURE 3-2
BALANCED CYCLONE SCREEN
JUST PRIOR TO INSTALLATION

A few precautions and recommendations are offered for installation:

1. Before beginning, make sure that the screen is free turning. This can be checked either with the opening face down on the ground, or with the screen suspended from its lifting arm. There is felt seal between the perforated screen canister and the front plate that gives a faint brushing sound when the cyclone is turned. After an energetic 'spin' of the screen cylinder it should continue to turn for at least another $\frac{1}{2}$ turn before the friction brings it to rest. If this fails to occur, check the adjustments (see Section 6.2, Maintenance – Adjustments below).
2. Check mounting elevations. The project drawings should show the elevation at which overflow first occurs – the centerline of the screen (the center of shaft) should be mounted at that elevation.
3. The bearings are sealed, pre-greased stainless steel, which should be good for the life of the screen. They do have a grease zert on them in case there are gases in the sewer that can dissolve into and degrade the grease over time.
4. When mounting the screen to the weir wall, whether concrete or metal, it is easiest to put in the bolts in the top corners first and fix the screen in place, then snug up the bolts to hold the screen in place, and then proceed to install

the other anchors and or bolt sets, before removing the tension on the lifting arm.

5. A tube of caulk is provided with each screen to seal between the mounting plate on the screen and the weir wall surface. This is important if mounting onto an old wall or a wall that is warped or unusually rough. The main thing is to not leave any gaps through which water can flow, or it could gradually erode or corrode the mounting plate.

4. NORMAL OPERATING PROCEDURES

In normal operation the screen will begin to rotate with even a trickle of flow through the screen. As the level on the outside of the screen rises the rotating velocity increases. When the level rises above approximately mid-way in the open quadrant the spinning velocity ceases to increase but more of the flow begins to flow off of the blades of the water wheel before they reach a vertical point. The screen is still operating properly.

Any backwater on the screen will reduce the rotating velocity. With surcharging of the exit path there is resistance to the continued movement of the wheel blades through the water, which adds to the shear forces that have to be overcome to rotate the screen cylinder. However, the screen may still provide sufficient cleaning shear to keep the screen clean and operating, depending on the loading of screenings in the foul stream.

There is no need for manual attention to the screen during operation, other than from a routine maintenance point of view.

5. TROUBLE SHOOTING

Trouble shooting these screens is easy – they either turn or they don't. If the installation is too deep to reach with a hand or foot to give the screen cylinder 'a spin', the flow from a garden hose provides sufficient flow to make a properly working screen rotate. There are only about 4 things that could conceivably cause a screen to fail to rotate, two of which have been experienced.

1. The set screw that holds the screen cylinder in place on the end of the shaft could be missing, allowing the water wheel to spin without turning the screen.
2. The screen cylinder or the water wheel could slip out of alignment and bind on the stationary cylinder. (This has only occurred during transport – see section 6.2 – Adjustment, below for discussion.)



3. One or more of the bearings could fail or lose its lubrication, causing excess friction that will keep the shaft assembly from rotating. (This has never been observed in any installed unit.)
4. Debris can become lodged between the rotating screen cylinder and the stationary drum. This was reported one time, and the space between the two drums was increased so that it is larger than the opening in the screen.

If the screen does become blinded or partially covered with trash and debris it can be easily washed off with a water spray applied during a few rotations of the screen.

6. MAINTENANCE

Maintenance will consist of one of the following activities, which should be followed in the order shown:

1. Visual inspection for screen blinding or leakage of chemically-deteriorated grease from the visible (front) bearing.
2. Spin the screen cylinder manually or with a water spray to determine if there is any restriction to rotation.
3. Clear any blockage between the screen and the static drum.
4. Flush the screen to remove any trash and debris.
5. Grease the bearings if any indication of chemical attack on the outer bearing.
6. Adjust the outer (screen) or the main shaft to eliminate excess friction between rotating and static parts.
7. Replace bearings.

6.1 SCHEDULES

During the first 3 months after installation, the initial step (visual inspection) should be followed after each storm that produces an overflow event. After the first 3 months a quarterly inspection is sufficient. If problems are seen at any inspection, the maintenance activities should be processed in order until any problem is identified and corrected. Maintenance items 1 through 4 can be done in the field without removing the Cyclone Screen. If there is a problem with leakage of degraded grease from the front bearing, it should be greased as indicated. Any following inspections should focus especially on deterioration of the back bearing, and if necessary remove the screen and replace both bearings.



6.2 ADJUSTMENTS

Two adjustments are possible on the Cyclone screen to reduce friction and free the perforated screen drum for rotation.

6.2.1 Screen Drum Position. The first is the position of the perforated screen relative to a rib on the solid drum. This is shown in Figure 6-1 below.

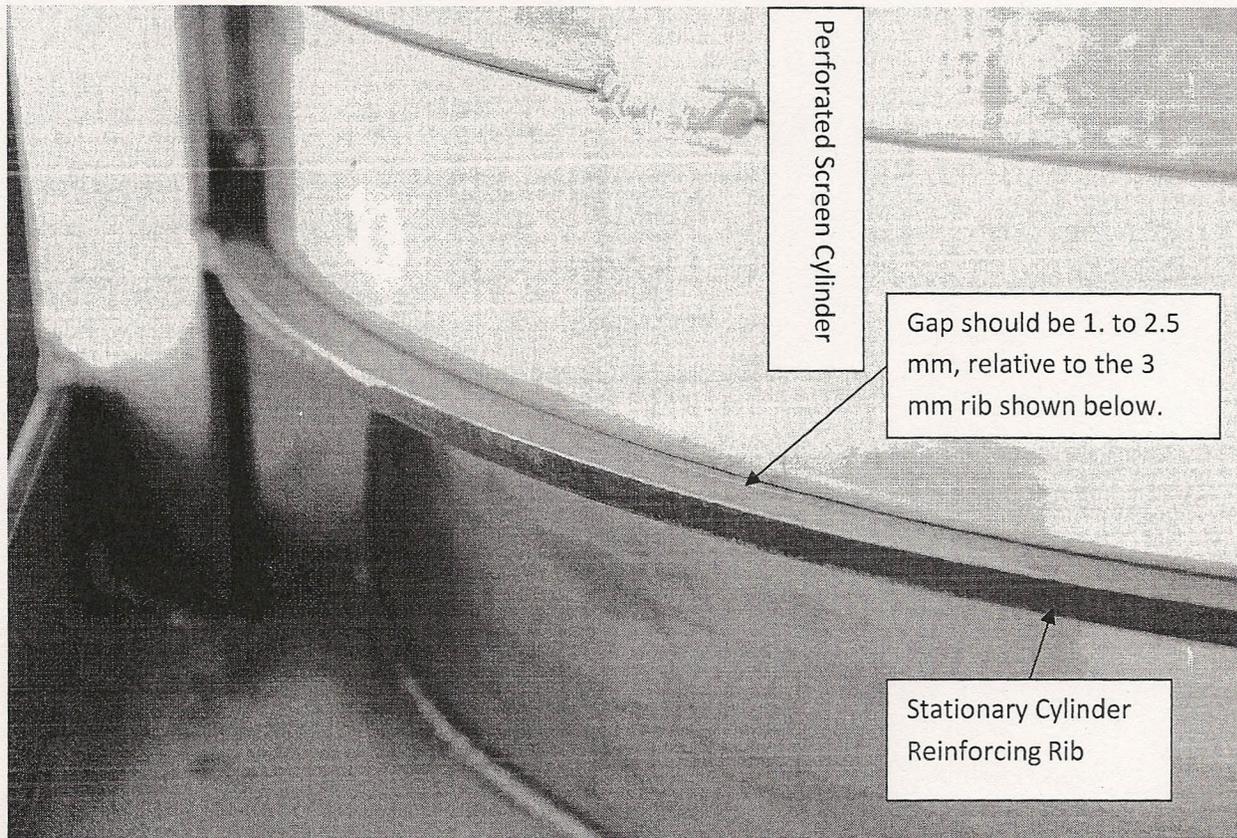
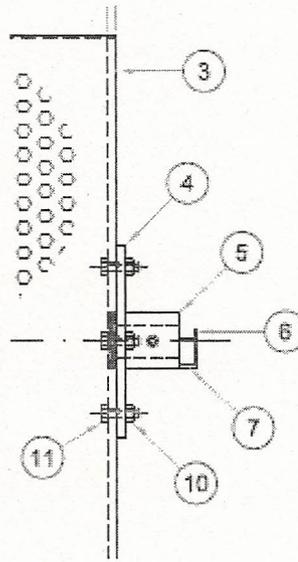
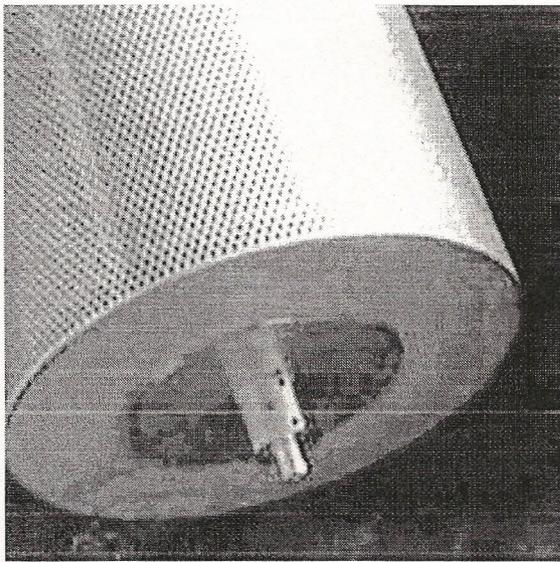


Figure 6-1
Gap – Perforated (rotating screen) and Reinforcing Rib

This gap is adjusted with adjustment screws on the end of the outer drum end shaft assembly, shown in Figure 6-2. The drawing doesn't show the threaded adjustment screw that the end shaft assembly is centered on, or the adjustment nuts. The photo shows this screw and two of the three adjustment nuts. To move the screen relative to the stationary drum, remove the outer nut, then back off the middle nut and adjust the inner nut (inside the adjustment piece end plate (piece 6 in Figure 6-2)) to provide the desired gap of 1 to 2.5 mm. When in the proper position, tighten the nuts on both sides of the end plate and then tighten down the lock nut on the end of the shaft.



- 3. End Wall of Perforated Drum
- 4. Perforated Drum Outer Plate
- 5. Outer Plate Boss
- 6. Adjustment Piece End Plate
- 7. Adjustment Piece Boss
- 10. Lock Nut
- 11. Screw

Figure 6-2
 Adjustment Details – Screen Drum

6.2.2 – Water Wheel Position. The water wheel is part of the main shaft assembly and is placed between the end walls of the stationary cylinder. The water wheel is held in between the end walls by lock screws on the bearings on either shaft-wall connection. This can be clearly seen on the outlet wall of the Cyclone screen, but is essentially duplicated on the inside wall.

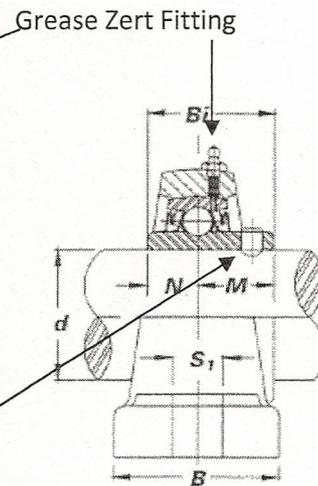
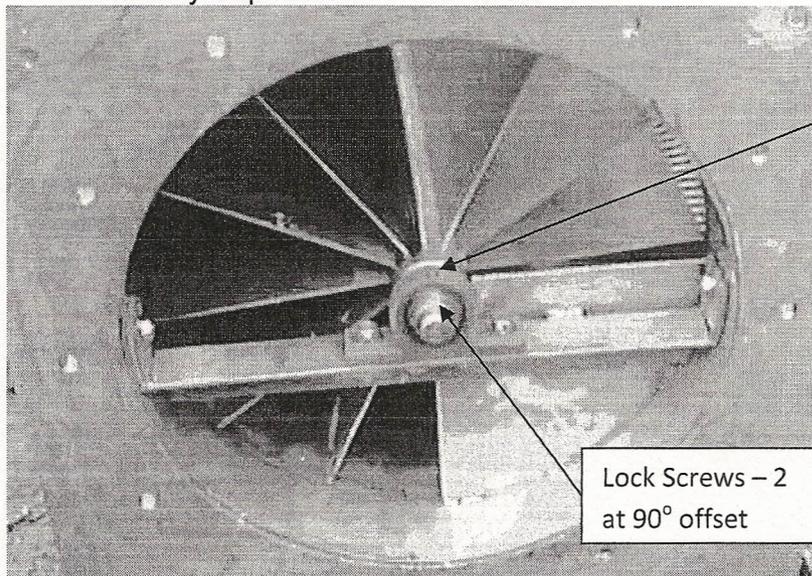


Figure 6-3
 Shaft Bearing Adjustment

Should the water wheel begin to bind on either end of the stationary cylinder, adjustments are made by removing the outer cylinder (perforated screen) to get access to the back bearing. This is done as follows.

1. Remove the adjusting nuts on the end of the perforated screen end shaft.
2. Remove the lock screw from the adjustment piece boss.
3. You can now turn the perforated screen and pull up on it, and it will slide up off of the shaft, leaving both ends of the main shaft and the bearings accessible.
4. Loosen both lock screws (allen head screws) on both bearings, and adjust the space so that there is approximately equal spacing at both ends between the water wheel arms and the cylinder end walls.
5. Tighten the lock screws. Reinstall the perforated screen, the lock screw on the perforated screen adjustment boss, and then adjust the spacing between the screen and the stationary screen rib.
6. Check for free rotation of the screen again, and then the screen is ready to re-install.

7. STANDARD WARRANTY

On next page.

8. APPENDICES

- 8.1 ASSEMBLY DRAWINGS (5 pages)
- 8.2 WEIR PLATE DRAWING (1page)
- 8.3 BEARING CUT SHEETS (2 pages)
- 8.4 LIFTING EYE-BOLT CUT SHEET (2 pages)

LIMITED LIABILITY WARRANTY

Item 1 - LIMITATION OF LIABILITY

The only warranty which Process Wastewater Technologies LLC ('PWT') makes is that warranty which is set forth in the sale Terms and Conditions and further detailed below:

THE GOODS SPECIFIED UNDER AGREEMENT WITH PWT ARE PROVIDED 'AS IS' AND PWT DOES NOT MAKE ANY OTHER EXPRESS WARRANTIES OR ANY IMPLIED WARRANTIES WITH RESPECT TO THESE GOODS AND/OR RELATED SERVICES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR USE.

In addition, PWT does not assume and expressly disclaims any liability for (i) any SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES which anyone may suffer as a result of the sale, delivery, service, use or loss of use, of any goods and/or services provided by PWT, or (ii) any charges or expenses of any nature which are incurred without the express written consent of PWT. In particular, PWT does not warrant that any goods provided are free from any claim of any third person by way of infringement or the like, and PWT expressly disclaims any liability for any claim of infringement or the like that may result from the sale, delivery, service, use or loss of use of any goods and/or services provided by PWT.

PWT's obligations under this warranty are expressly limited to the repair or replacement of any part or parts that are proved to the satisfaction of PWT to have failed prematurely or because of a fault in workmanship or materials.

PWT's total liability under this warranty or in connection with any claim involving any goods or services is expressly limited to the purchase price of the goods and/or services in respect of which damages are claimed.

Item 2. DEFECTS WARRANTY

PWT warrants that the goods manufactured by PWT shall be free from defects in material and workmanship for the shorter period of: (i) eighteen (18) months from the date of delivery, or (ii) twelve (12) months from the date of substantial completion and putting the specified goods into service. PWT's liability under this warranty or in connection with any other claim relating to goods manufactured and delivered by PWT is limited to the repair, or at PWT's option, the replacement or refund of the purchase price, of any product or parts or components which are returned to PWT freight prepaid, and which PWT determines, in its discretion, are defective in material and workmanship. Products or parts or components thereof which are repaired or replaced by PWT will be returned to the Buyer freight collect.

Item 3. PRODUCTS OF OTHER MANUFACTURERS

PWT makes no warranty with regard to any products not manufactured by PWT, including but not limited to electrical components or equipment and other prime movers.

Item 4 – TYPES OF DAMAGES AND CLAIMS FOR WHICH PWT IS NOT RESPONSIBLE.

The following non-exclusive list of items are specifically not covered by the PWT Standard Limited Warranty, and, in the event of their occurrence, will render the PWT Defects Warranty null and void:

- defects which are caused by improper installation, improper or abnormal use or operation, or improper storage or handling;
- defects caused by the failure of the Buyer or User to perform and log normal preventative maintenance;
- Defects caused by the use of replacement parts not approved in writing by PWT;
- Defects caused by repairs by persons not authorized in writing by PWT;
- Defects caused by modifications or alterations made by the Buyer or User;
- Any damage to the PWT product while it is in the possession of the Buyer or User.

Item 5 – EQUIPMENT SAFETY PARAMETERS

With respect to operation of the equipment, it is the responsibility of the Buyer to define and provide any safety device(s) or associated safety device(s) (other than that which is ordinarily furnished by PWT) which may be necessary and/or required, and to establish safety procedures and operational instructions to safeguard the operator(s) during normal operations, maintenance, cleaning, or any use of the equipment whatsoever, and to subsequently ensure that the equipment is operated in conformance with all applicable safety procedures, laws, regulations and instructions.

It is also the responsibility of the buyer to enforce all safety regulations and operational instructions and to maintain the equipment in a safe condition (e.g., guards in place, warning, caution and/or important labels affixed; electrical boxes secure; interlocks operational; etc.). In particular, all warning, caution, and/or important labels must be maintained in a readable condition, and if necessary, replaced with new labels.

Additionally, as the nature of the equipment does not always make it possible to fully prevent operator access to rotating components, maintenance or cleaning of any nature must not be performed on the equipment without first disconnecting all power.

Item 6 – OPERATOR SAFETY COMPLIANCE

Buyer warrants and agrees that because it has sole control over equipment, it shall be solely responsible for safety compliance. Operator access and use of equipment, and full compliance with all provisions of the Operator Safety section of PWT Instruction Manuals are essential and the user's responsibility; the provisions of that section being expressly incorporated herein.

Corrosion Resistant Bearing & Housing Solutions

Bearing Insert Options

SUC - Stainless Steel

The most common solution for hostile chemical wash down applications, IPTCI's SUC series is composed of the following:

| | |
|-----------------------|-----------------------|
| Balls & Rings | 440 Stainless Steel |
| Set Screws | 304 Stainless Steel |
| Slinger & Seal Frame | 302 Stainless Steel |
| Retainer | 302 Stainless Steel |
| Seal | Silicone Rubber |
| Lubrication | H-1 Food Grade Grease |
| Operating Temp. Range | -10° F to 250° F |



SUC3R - Stainless Steel

Dimensionally identical to the SUC series, SUC3R is made with specially produced stainless rings and can be used in extremely hostile chemical environments where 440 stainless is not suitable. As this material differs from 440 in its performance characteristics, please contact IPTCI for application analysis.

SSER - Stainless Steel ER Style

With the same component composition of SUC, SSER is designed to keep your cylindrical applications turning in corrosive environments. Also see black oxide ER bearings.



CUC - Hard Chrome Coated

Highly effective for intermediate wash down applications, CUC can dramatically extend bearing life beyond that of other coated bearing products. CUC inserts are composed of the following:

| | |
|-----------------------|-----------------------|
| Rings | Hard Chrome Coated |
| Balls | 440 Stainless Steel |
| Set Screws | 304 Stainless Steel |
| Slinger & Seal Frame | 302 Stainless Steel |
| Retainer | 302 Stainless Steel |
| Seal | Silicone Rubber |
| Lubrication | H-1 Food Grade Grease |
| Operating Temp. Range | -10° F to 250° F |



BUC - Black Oxide

A popular choice for mildly corrosive applications. Also see Black Oxide ER and Black Oxide High Temperature HUC bearings.



Housing Options

304 Stainless Steel

Stainless steel housings are generally the most effective solution for highly corrosive applications. They do not experience the same flaking, cracking, deformation or discoloration issues associated with other corrosion resistant housing materials. They are virtually unaffected by scrapes and can easily handle significant radial loads.



To reduce residual contaminants, IPTCI stainless housings are made with extremely smooth surfaces and have solid bases and backs. Many styles are also available with end caps.

316 Stainless Steel

A frequently requested choice for certain chemical environments. 316 is available on a made to order basis.

Thermoplastic

Where proven corrosion resistance must be balanced with more favorable economics, IPTCI's thermoplastic housings are an excellent choice, and can be assembled with any insert in our catalog.



IPTCI's thermoplastic housings are off-white in color and made from glass reinforced PBT resin. Along with excellent chemical resistance, this high performance grade plastic offers very favorable mechanical, thermal and electrical properties. Also, compared with other types of plastics, IPTCI thermoplastic is very resistant to moisture absorption. Operating temperature range is -10° F to 210° F.

Like our stainless steel housings, IPTCI thermoplastic housings are made with extremely smooth surfaces and have solid bases and backs. All sleeves, bushings and grease fittings used in our thermoplastic units are made from 300 series stainless steel.

Nickel Plated

Used with stainless, hard chrome coated, or black oxide inserts, IPTCI's copper nickel chrome housings are a common choice when the housing requires mild to intermediate corrosion protection.



End Caps

For additional protection from contamination, or for increased personnel safety, many of IPTCI's stainless and thermoplastic housings are available with plastic end caps.

Additional technical information, pg. 84 - 89.

TECHNICAL INFORMATION

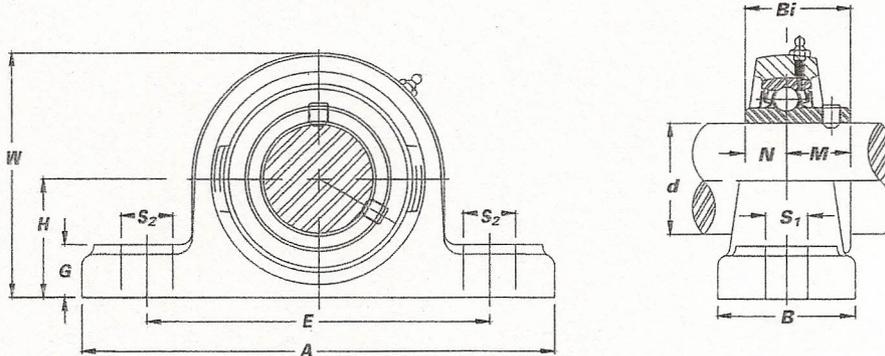
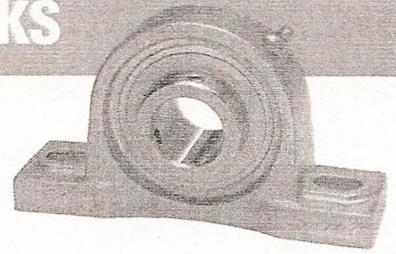
SUCSP Pillow Blocks



B-type seals

All Stainless Steel

- B-type seals
- Sizes 1/2" - 1 1/2" available with end caps — "Cap Ready"

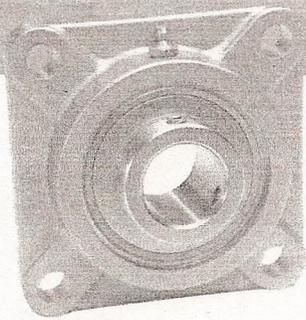


| Unit No. | Shaft Dia. | | Dimensions (in./mm) | | | | | | | | | | Bolt Used (in.) | Bearing No. | Housing No. | Weight (lbs.) | List Price | List Price *Cap Ready | |
|--------------|------------|--------|---------------------|---------|---------|---------|----------------|----------------|--------|---------|--------|--------|-----------------|-------------|-------------|---------------|------------|-----------------------|--------|
| | d (in.) | d (mm) | H | A | E | B | S ₁ | S ₂ | G | W | Bi | N | | | | | | | M |
| SUCSP 201-8 | 1/2 | 12.7 | 1 1/16 | 5 | 3 3/4 | 1 1/2 | 1 1/16 | 7/16 | 19/32 | 2 1/16 | 1.2205 | 0.5000 | 0.7205 | 3/8 | SUC 201-8 | SP 204 | 1.8 | 99.74 | 118.66 |
| SUCSP 202-10 | 5/8 | 15.9 | 33.3 | 127 | 95 | 38 | 17 | 11 | 15 | 65 | 31.0 | 12.7 | 18.3 | 1/2 | SUC 202-10 | SP 204 | 1.8 | 99.74 | 118.66 |
| SUCSP 204-12 | 3/4 | 19.0 | 1 1/16 | 5 | 3 3/4 | 1 1/2 | 1 1/16 | 7/16 | 19/32 | 2 1/16 | 1.2205 | 0.5000 | 0.7205 | 3/8 | SUC 204-12 | SP 204 | 1.6 | 95.69 | 113.37 |
| SUCSP 204 | 20 | 33.3 | 33.3 | 127 | 95 | 38 | 17 | 11 | 15 | 65 | 31.0 | 12.7 | 18.3 | 1/2 | SUC 204 | SP 204 | 1.6 | 99.03 | 117.06 |
| SUCSP 205-14 | 7/8 | 22.2 | 1 1/16 | 5 15/32 | 4 1/8 | 1 1/2 | 1 1/16 | 1/2 | 3/8 | 2 3/4 | 1.3386 | 0.5630 | 0.7756 | 3/8 | SUC 205-14 | SP 205 | 2.1 | 108.17 | 127.80 |
| SUCSP 205 | 25 | 36.5 | 36.5 | 139 | 105 | 38 | 17 | 13 | 16 | 70 | 34.0 | 14.3 | 19.7 | 1/2 | SUC 205 | SP 205 | 2.1 | 111.96 | 131.90 |
| SUCSP 205-16 | 1 | 25.4 | 1 1/16 | 5 15/32 | 4 1/8 | 1 1/2 | 1 1/16 | 1/2 | 3/8 | 2 3/4 | 1.3386 | 0.5630 | 0.7756 | 3/8 | SUC 205-16 | SP 205 | 2.1 | 108.17 | 127.80 |
| SUCSP 206-18 | 1 1/8 | 31.8 | 1 11/16 | 6 13/32 | 4 3/4 | 1 27/32 | 1 3/16 | 9/16 | 1 1/16 | 3 15/64 | 1.5000 | 0.6260 | 0.8740 | 1/2 | SUC 206-18 | SP 206 | 3.3 | 162.06 | 198.60 |
| SUCSP 206 | 30 | 42.9 | 42.9 | 163 | 121 | 47 | 21 | 14 | 18 | 84 | 38.1 | 15.9 | 22.2 | 1/2 | SUC 206 | SP 206 | 3.3 | 167.73 | 205.06 |
| SUCSP 206-19 | 1 3/8 | 35.1 | 1 11/16 | 6 13/32 | 4 3/4 | 1 27/32 | 1 3/16 | 9/16 | 1 1/16 | 3 15/64 | 1.5000 | 0.6260 | 0.8740 | 1/2 | SUC 206-19 | SP 206 | 3.3 | 162.06 | 198.60 |
| SUCSP 206-20 | 1 1/4 S | 31.8 | 1 11/16 | 6 13/32 | 4 3/4 | 1 27/32 | 1 3/16 | 9/16 | 1 1/16 | 3 15/64 | 1.5000 | 0.6260 | 0.8740 | 1/2 | SUC 206-20 | SP 206 | 3.3 | 162.06 | 198.60 |
| SUCSP 207-20 | 1 1/4 | 35.1 | 1 7/8 | 6 17/32 | 5 | 1 29/32 | 7/8 | 3/16 | 3/4 | 3 11/16 | 1.6890 | 0.6890 | 1.0000 | 1/2 | SUC 207-20 | SP 207 | 4.2 | 191.66 | 238.23 |
| SUCSP 207-21 | 1 3/8 | 35.1 | 47.6 | 166 | 127 | 48 | 22 | 14 | 19 | 94 | 42.9 | 17.5 | 25.4 | 1/2 | SUC 207-21 | SP 207 | 4.2 | 224.15 | 253.55 |
| SUCSP 207-22 | 1 3/8 | 35.1 | 47.6 | 166 | 127 | 48 | 22 | 14 | 19 | 94 | 42.9 | 17.5 | 25.4 | 1/2 | SUC 207-22 | SP 207 | 4.2 | 191.66 | 238.23 |
| SUCSP 207 | 35 | 47.6 | 47.6 | 166 | 127 | 48 | 22 | 14 | 19 | 94 | 42.9 | 17.5 | 25.4 | 1/2 | SUC 207 | SP 207 | 4.2 | 198.37 | 245.89 |
| SUCSP 207-23 | 1 1/2 | 38.1 | 1 15/16 | 7 1/4 | 5 3/8 | 2 | 7/8 | 3/16 | 25/32 | 3 15/16 | 1.9370 | 0.7480 | 1.1890 | 1/2 | SUC 207-23 | SP 207 | 4.2 | 191.66 | 238.23 |
| SUCSP 208-24 | 1 1/2 | 40 | 1 15/16 | 7 1/4 | 5 3/8 | 2 | 7/8 | 3/16 | 25/32 | 3 15/16 | 1.9370 | 0.7480 | 1.1890 | 1/2 | SUC 208-24 | SP 208 | 5.4 | 224.83 | 286.12 |
| SUCSP 208 | 40 | 49.2 | 49.2 | 184 | 136 | 51 | 22 | 14 | 20 | 100 | 49.2 | 19.0 | 30.2 | 1/2 | SUC 208 | SP 208 | 5.4 | 232.70 | 295.15 |
| SUCSP 209-27 | 1 11/16 | 45 | 2 1/8 | 7 1/2 | 5 3/4 | 2 1/16 | 1 3/16 | 13/32 | 25/32 | 4 7/32 | 1.9370 | 0.7480 | 1.1890 | 1/2 | SUC 209-27 | SP 209 | 5.8 | 255.03 | N/A |
| SUCSP 209-28 | 1 3/4 | 45 | 54.0 | 190 | 146 | 52 | 21 | 15 | 20 | 107 | 49.2 | 19.0 | 30.2 | 1/2 | SUC 209-28 | SP 209 | 5.8 | 255.03 | N/A |
| SUCSP 209 | 45 | 54.0 | 54.0 | 190 | 146 | 52 | 21 | 15 | 20 | 107 | 49.2 | 19.0 | 30.2 | 1/2 | SUC 209 | SP 209 | 5.8 | 263.95 | N/A |
| SUCSP 210-31 | 1 15/16 | 50 | 2 1/4 | 8 | 6 1/4 | 2 5/16 | 1 9/16 | 23/32 | 1/8 | 4 1/2 | 2.0315 | 0.7480 | 1.2835 | 5/8 | SUC 210-31 | SP 210 | 7.0 | 305.51 | N/A |
| SUCSP 210 | 50 | 57.2 | 57.2 | 203 | 159 | 59 | 24 | 18 | 22 | 114 | 51.6 | 19.0 | 32.6 | 5/8 | SUC 210 | SP 210 | 7.0 | 316.21 | N/A |
| SUCSP 210-32 | 2S | 50 | 57.2 | 203 | 159 | 59 | 24 | 18 | 22 | 114 | 51.6 | 19.0 | 32.6 | 5/8 | SUC 210-32 | SP 210 | 7.0 | 305.51 | N/A |
| SUCSP 211-32 | 2 | 50.8 | 2 1/2 | 8 17/32 | 6 1/8 | 2 7/8 | 1 9/16 | 23/32 | 1/8 | 4 15/16 | 2.1890 | 0.8740 | 1.3150 | 5/8 | SUC 211-32 | SP 211 | 8.8 | 446.97 | N/A |
| SUCSP 211-35 | 2 3/16 | 50.8 | 63.5 | 217 | 174 | 60 | 24 | 18 | 22 | 125 | 55.6 | 22.2 | 33.4 | 5/8 | SUC 211-35 | SP 211 | 8.8 | 446.97 | N/A |
| SUCSP 212-39 | 2 7/16 | 50.8 | 2 3/4 | 9 15/32 | 7 11/32 | 2 1/2 | 1 | 25/32 | 1 | 5 3/8 | 2.5630 | 1.0000 | 1.5630 | 5/8 | SUC 212-39 | SP 212 | 11.2 | 575.34 | N/A |
| SUCSP 212 | 50.8 | 69.8 | 69.8 | 240 | 187 | 64 | 25 | 20 | 25 | 137 | 65.1 | 25.4 | 39.7 | 5/8 | SUC 212 | SP 212 | 11.2 | 575.34 | N/A |

*Cap Ready mounted units include a specially grooved housing and a plastic end cap.

SUCSP PILLOW BLOCKS

SUCSF 4-Bolt Flange Units

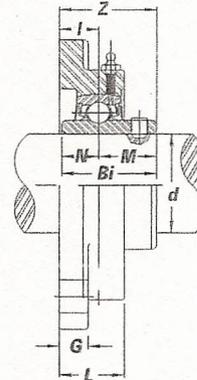
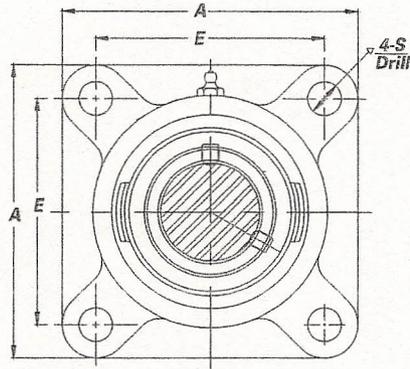


All Stainless Steel

- B-type seals
- Sizes 1/2" - 1 1/2" available with end caps — "Cap Ready"



B-type Seal



| Unit No. | Shaft Dia. | | Dimensions (in.) (mm) | | | | | | | | | | Bolt Used (in.) | Bearing No. | Housing No. | Weight (lbs.) | List Price | List Price * Cap Ready |
|--------------|------------|--------|-----------------------|-------|--------|--------|----------|--------|---------|--------|--------|--------|-----------------|-------------|-------------|---------------|------------|------------------------|
| | d (in.) | d (mm) | A | E | I | G | L | S | Z | Bi | N | M | | | | | | |
| SUCSF 201-8 | 1/2 | | 3 3/8 | 2 1/2 | 1 9/32 | 7/16 | 1 | 7/16 | 1 5/16 | 1.2205 | 0.5000 | 0.7205 | 3/8 | SUC 201-8 | SF 204 | 1.8 | 99.74 | 118.66 |
| 202-10 | 5/8 | | 86 | 64 | 15 | 11 | 25.4 | 11 | 33.3 | 31.0 | 12.7 | 18.3 | | 202-10 | SF 204 | | 99.74 | 118.66 |
| SUCSF 204-12 | 3/4 | | 3 3/8 | 2 1/2 | 1 9/32 | 7/16 | 1 | 7/16 | 1 5/16 | 1.2205 | 0.5000 | 0.7205 | 3/8 | SUC 204-12 | SF 204 | 1.6 | 95.69 | 113.37 |
| 204 | | 20 | 86 | 64 | 15 | 11 | 25.4 | 11 | 33.3 | 31.0 | 12.7 | 18.3 | | 204 | SF 204 | | 99.03 | 117.06 |
| SUCSF 205-14 | 7/8 | | 3 3/4 | 2 3/4 | 5/8 | 1/2 | 1 1/16 | 2 3/64 | 1 13/32 | 1.3386 | 0.5630 | 0.7756 | 3/8 | SUC 205-14 | SF 205 | 2.1 | 108.17 | 127.80 |
| 205 | | 25 | 95 | 70 | 16 | 13 | 27 | 11.5 | 35.7 | 34.0 | 14.3 | 19.7 | | 205 | SF 205 | | 111.96 | 131.90 |
| 205-16 | 1 | | | | | | | | | | | | | 205-16 | SF 205 | | 108.17 | 127.80 |
| SUCSF 206-18 | 1 1/8 | | | | | | | | | | | | | SUC 206-18 | | | 162.06 | 198.60 |
| 206 | | 30 | 4 1/4 | 3 1/4 | 4 5/64 | 1/2 | 1 1/32 | 3 3/64 | 1 19/32 | 1.5000 | 0.6260 | 0.8740 | 7/16 | 206 | SF 206 | 2.9 | 167.73 | 205.06 |
| 206-19 | 1 3/16 | | 108 | 83 | 18 | 13 | 31 | 13 | 40.2 | 38.1 | 15.9 | 22.2 | | 206-19 | SF 206 | | 162.06 | 198.60 |
| 206-20 | 1 1/4 S | | | | | | | | | | | | | 206-20 | SF 206 | | 162.06 | 198.60 |
| SUCSF 207-20 | 1 1/4 | | | | | | | | | | | | | SUC 207-20 | | | 191.66 | 238.23 |
| 207-21 | 1 9/16 | | | | | | | | | | | | | 207-21 | SF 207 | 3.8 | 224.15 | 253.55 |
| 207-22 | 1 3/8 | | 4 1 9/32 | 3 3/8 | 3/4 | 1 9/32 | 1 1 1/32 | 3 3/64 | 1 3/4 | 1.6890 | 0.6890 | 1.0000 | 7/16 | 207-22 | SF 207 | | 191.66 | 238.23 |
| 207 | | 35 | 117 | 92 | 19 | 15 | 34 | 13 | 44.4 | 42.9 | 17.5 | 25.4 | | 207 | SF 207 | | 198.37 | 245.89 |
| 207-23 | 1 7/16 | | | | | | | | | | | | | 207-23 | SF 207 | | 191.66 | 238.23 |
| SUCSF 208-24 | 1 1/2 | | | | | | | | | | | | | SUC 208-24 | SF 208 | 4.9 | 224.83 | 286.12 |
| 208 | | 40 | 130 | 102 | 21 | 15 | 36 | 14 | 51.2 | 49.2 | 19.0 | 30.2 | 1/2 | 208 | SF 208 | | 232.70 | 295.15 |
| SUCSF 209-27 | 1 11/16 | | | | | | | | | | | | | SUC 209-27 | SF 209 | 5.4 | 255.03 | N/A |
| 209-28 | 1 3/4 | | 5 13/32 | 4 1/8 | 5 5/64 | 5/8 | 1 1/2 | 5/8 | 2 1/16 | 1.9370 | 0.7480 | 1.1890 | 3/8 | 209-28 | SF 209 | | 255.03 | N/A |
| 209 | | 45 | 137 | 105 | 22 | 16 | 38 | 16 | 52.2 | 49.2 | 19.0 | 30.2 | | 209 | SF 209 | | 263.55 | N/A |
| SUCSF 210-31 | 1 9/16 | | | | | | | | | | | | | SUC 210-31 | SF 210 | 5.9 | 305.51 | N/A |
| 210 | | 50 | 5 5/8 | 4 3/8 | 5 5/64 | 5/8 | 1 9/16 | 5/8 | 2 3/32 | 2.0315 | 0.7480 | 1.2835 | 3/8 | 210 | SF 210 | | 316.21 | N/A |
| 210-32 | 2 S | | 143 | 111 | 22 | 16 | 40 | 16 | 54.6 | 51.6 | 19.0 | 32.6 | | 210-32 | SF 210 | | 305.51 | N/A |
| SUCSF 211-32 | 2 | | | | | | | | | | | | | SUC 211-32 | SF 211 | 8.1 | 446.97 | N/A |
| 211-35 | 2 3/16 | | 6 3/8 | 5 1/8 | 6 3/64 | 2 3/32 | 1 1 1/16 | 4 3/64 | 2 5/16 | 2.1890 | 0.8740 | 1.3150 | 5/8 | 211-32 | SF 211 | | 446.97 | N/A |
| | | | 162 | 130 | 25 | 18 | 43 | 17 | 58.4 | 55.6 | 22.2 | 33.4 | | 211-35 | SF 211 | | 446.97 | N/A |
| SUCSF 212-39 | 2 1/8 | | | | | | | | | | | | | SUC 212-39 | SF 212 | 10.0 | 575.34 | N/A |
| | | | 175 | 143 | 29 | 18 | 48 | 17 | 68.7 | 65.1 | 25.4 | 39.7 | | 212-39 | SF 212 | | 575.34 | N/A |

*Cap Ready mounted units include a specially grooved housing and a plastic end cap.



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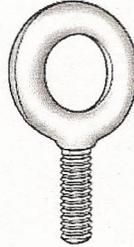
Optional Accessories
More...

Eyebolt, Lift W/O Shoulder, 1/2-13x3 9/16

Fasteners > Bolts > Eyebolts

Eyebolt, Lifting Without Shoulder, Forged 316 Stainless Steel, Plain Finish, 1/2-13 In Thread Size, 1 1/2 In Thread Length, 1 1/2 In Shank Length, 1 3/16 In Eye Inside Dia, 2 1/16 In Eye Outside Dia, 3 9/16 In Overall Length, 2600 lb Working Load Limit

Grainger Item # 5ZA85
 Price (ea.) \$28.20
 Brand APPROVED VENDOR
 Mfr. Model # 5ZA85
 Ship Qty. 1
 Sell Qty. (Will-Call) 1
 Ship Weight (lbs.) 0.4
 Usually Ships** Today
 Catalog Page No. 2695



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Primerless Threadlocker 2760 (TM), 10 ml
 Grainger Item #: 1LLP6
 Price (ea.): \$17.16
 Brand: LOCTITE

Qty.

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| Type | | | | | | | |
| Material | | | | | | | |
| Finish | | | | | | | |
| Thread Size | | | | | | | |
| Thread Length | | | | | | | |
| Shank Length | | | | | | | |
| Eye Inside Dia. | | | | | | | |
| Eye Outside Dia. | | | | | | | |
| Overall Length | | | | | | | |
| Working Load Limit (Lb.) | | | | | | | |

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