GOULDS PUMPS

An ITT Brand

Installation, Operation and Maintenance Instructions

CHEMBASE PLUS

TABLE OF CONTENTS

Questions?

Please contact your local Goulds Pumps representative.

SECTION 1. 0 INTRODUCTION

This Installation, Operation, and Maintenance Instructions manual contains instructions and guidelines for the installation of the Goulds Pumps ChemBase*Plus*™ baseplate.

It is extremely important that this entire guideline be reviewed *prior* to installation and handling of the baseplate. This is important for both safety and reliability purposes.

SECTION 2.0 – SAFETY CONSIDERATIONS

The Goulds ChemBase*Plus*™ baseplate has been designed and packaged for safe handling and installation. It is very important to review the contents of this manual before removing the baseplate from its shipping skid. Goulds shall not be liable for physical injury, damage caused by failure to observe the instructions for installation and handling in this manual.

Please make special note of the following general precautions as listed below:

1. **Do not remove the ChemBase*Plus*™ from its shipping skid until you are ready to lift it onto its foundation.**
2. **Do not subject the ChemBase*Plus*™ to rough handling or unnecessary hammer shock.**
3. **Do not attempt to lift the ChemBase*Plus*™ by any means other than that which is described in this manual.**
4. **Do not hammer shock or use other impact loading techniques to adjust the positioning of the ChemBase*Plus*™. Do not pry against the motor mounting blocks when moving the motor during shaft alignment.**
5. **Do not tighten the anchor bolt nuts until you have verified that the ChemBase*Plus*™ is properly supported.**
6. **Do not attempt to transport, handle or install a ChemBase*Plus*™ when ambient temperature is below -0° F.**
7. **Do not operate a pump installed on a ChemBase*Plus*™ at process fluid temperatures in excess of 290° F.**

SECTION 3.0 - GENERAL OVERVIEW

3.1 WARRANTY STATEMENT

All due care is taken in producing the Goulds line of baseplates and complimentary accessory items. Goulds warrants to provide equipment that meet Goulds' standards and specifications, but not to be suitable for any particular application. No warranty is made concerning the use of the materials or finished goods, in the Purchaser's application. All design considerations and acceptance of the Goulds products for use in the Purchaser's applications are the Purchaser's sole responsibility. In no case will Goulds be responsible for more than supplying replacement products.

3.2 APPLICATION

The polymer composite material used in the manufacture of the Goulds ChemBase*Plus*™ has been formulated for application in a broad range of corrosive fluid handling services. However, this material does not offer universal corrosion resistance. Goulds highly recommends that the Corrosion Guide in Appendix I be reviewed prior to specifying or installing a ChemBase*Plus*™ baseplate.

The ChemBase*Plus*™ is also suitable for application in a wide range of fluid process temperatures, specifically, -45° F to 290° F or ambient temperature ranges between -20° F to 140° F. For temperature boundaries exceeding these recommended limitations, contact Goulds for assistance in determining acceptability of a specific application.

3.3 STORAGE / HANDLING

Goulds' normal packaging is designed to protect the ChemBase*Plus*™ during shipment. The ChemBase*Plus*™ should be covered with dark plastic sheathing or heavy tarpaulin to prevent UV degradation of the top surface. NOTE: it is common for dark pigmented polymer concrete to bleach or gray when exposed to sunlight. This is normal and expected. This color change is only a visual change in the color of the top gel-coat surface and does not compromise the mechanical or corrosion integrity of the product. Water trapped adjacent to our protective plastic sheathing can cause non-harmful water stains on the ChemBase*Plus*™.

! CAUTION !

*It is extremely important to observe proper handling procedures during transport and installation of the ChemBase*Plus™*. While the polymer composite material is constructed of inherently high strength materials, subjecting it to impact or bending loads through rough handling or improper lifting or mounting may result in irreparable damage to the baseplate as well as potential damage to the mounted equipment or put personnel at risk of injury*

Leave the ChemBase*Plus*™ strapped to its wooden shipping pallet until installation is ready to occur. If the ChemBase*Plus*™ is to be stored in an outdoor location, cover the base completely with some weather resistant material as noted above.

! WARNING !

Do not stand the ChemBasePlus™ on end to make more efficient use of storage space. Severe personal injury or death as well as possible permanent damage to the ChemBasePlus™ may result should it tip over.

LIFTING

Trained personnel should only perform lifting. Pumps and motors typically have integral lifting eyebolts. These are intended for use of the individual units only. Do not use these features to lift a ChemBase*Plus*™/ Pump and Motor Assembly.

ChemBase*Plus*™ Baseplates With No Mounted Equipment

! WARNING !

Only install eyebolts in the factory installed threaded leveling inserts for lifting the baseplate without any equipment mounted to the ChemBasePlus™. Never rely on any other insert for lifting as this practice may induce excessive loading on the inserts, which they were not designed to withstand.

Remove the straps that secure the ChemBase*Plus*™ to the wooden pallet. Slip two slings underneath the baseplate between the pallet cross members as shown in **Figure 1.** Slings should positioned to allow for safe, even lifting. Raise the ChemBase*Plus*™ slightly off the pallet and verify that it suspends reasonably level and that the slings are not subject to slipping out of position.

! WARNING !

Be sure to keep hands and feet out from under the baseplate during these steps to prevent injury.

FIGURE 1
ChemBase*PLUS™ *with no mounted equipment

Should the slinging appear unstable, set the baseplate back down on the pallet and reposition the slings for more stable condition. After satisfactory slinging has been achieved, the baseplate may be hoisted onto its foundation. Slowly lower the baseplate over the foundation using care to engage the anchor bolts in the holes provided. Place shims or wedges under the baseplate at a minimum of four locations to allow for removal of the slings.

ChemBase*Plus*™
Baseplates With Installed Equipment:

Pump only installed:
Remove the straps that hold the ChemBase*Plus*™ to the wooden pallet. Install a sling around the pump suction nozzle using a choker hitch pulled firmly tight. Install an additional sling around the motor end of the ChemBase*Plus*™ using a basket hitch as shown in **Figure 2**.

FIGURE 2 - *Pump only Installed*

Pump and motor installed:
Remove the straps that hold the ChemBase*Plus*™ to the wooden pallet. Install a sling around the pump suction nozzle and around the outboard end of the motor frame using choker hitches pulled firmly tight as shown in **Figure 3**. The motor sling should be positioned so the weight is not carried through the motor fan housing.

FIGURE 3 - *Pump and motor installed*

SECTION 4.0 – INSTALLATION

4.1 GENERAL DESCRIPTION OF THE ChemBase*Plus*™

The Goulds ChemBase*Plus*™ is a solid polymer composite baseplate that is manufactured to conform to ASME/ANSI B73.1M-2012 and custom versions. The Goulds ChemBase*Plus*™ has been designed to provide a solid and rigid foundation under the pump and its respective motor, whereby, serving the purpose of maintaining sound alignment between them. The ChemBase*Plus*™ has been made available in two basic types:

- Foundation-mounted (grouted design – **Figure 4**)

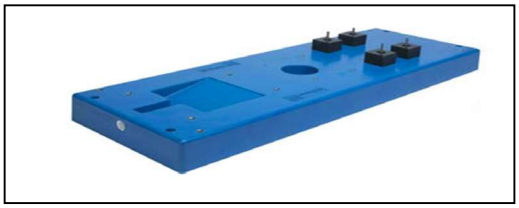

FIGURE 4 – *Foundation-Mounted*

- Stilt-Mounted (free standing – **Figure 5**)

FIGURE 5 – *Stilt Mounted*

The Foundation-mounted style utilizes grout to add rigidity to the structure. Because the ChemBase*Plus*™ by nature offers a homogenous solid design with excellent rigidity, the base may also be utilized successfully without full grout support. The Stilt-mounted style base offers a freestanding rigid foundation void of any additional grouting needs without sacrificing on reliability. The ChemBase*Plus*™ will maintain alignment of all mounted equipment as designed when either grouted or used in a free float or Stilt-mounted arrangement.

The ChemBase*Plus*™ performs the proper function of a reliable baseplate foundation for a pump and motor. Those basic functions are as follows:

1) To provide adequate rigidity to assure the base/pump/motor assembly can be shipped and installed without incurring damage due to twisting/deformation and to withstand the operating loads of the given assembly. The solid structure of the ChemBase*Plus*™ offers superior damping to vibration associated with the rotating pump/motor assembly.

2) To provide a flat mounting surface for the pump and motor assembly. The ChemBase*Plus*™ product is designed to hold .002” flatness per lineal foot specification. The aforementioned flatness specifications are measured across the diagonal corners of the baseplate top surface. These excellent flatness specifications are achieved by the superior Epoxy Resin Aggregate Material utilized in the construction of these baseplates.

3) To allow the end user to perform final field alignment to their respective tolerance standards.

4.2 MOTOR MOUNTING SYSTEM

The Goulds ChemBase*Plus*™ utilizes as standard the polymer block mounting system. This system is comprised of corrosion resistant polymer composite mounting blocks, which offer superb flatness. Motor mounting blocks incorporate a counter-bore / jam nut feature for secure attachment to the ChemBase*Plus*™

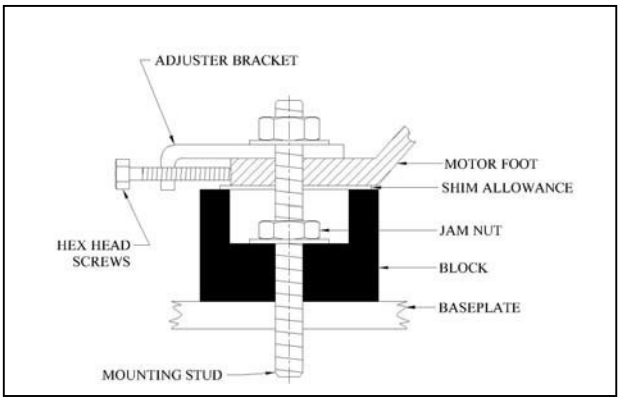

FIGURE 6

Optional Bi-Directional motor adjusters provide both axial and transverse motor adjustment. The top mounted adjusters assist with precise shaft alignment when critical tolerances are trying to be achieved, as they do not disturb indicator equipment.

4.3 FOUNDATON MOUNTED BASEPLATES

Note: If applicable, remove old baseplate including any protruding structures that may interfere with the ChemBase*Plus*™. Rough up floor/foundation mounting surface if epoxy grout will be installed. Epoxy grout will adhere directly to ChemBase*Plus*™ bottom/side surface as supplied.

1) The baseplate should be positioned as close to the liquid supply source as possible. There should be an adequate amount of space for personnel to install, operate and maintain the pump/motor assembly. As mentioned above, the result of the grouted in baseplate should offer excellent rigidity and dampen any vibration associated with the operating pump/motor assembly.

2) Using the recommended slinging procedures shown in **Figures 2 and 3**, hoist the ChemBase*Plus*™ unit off its shipping pallet.

3) Lower the ChemBase*Plus*™ into position over the foundation. Proceed to engage the anchor bolts in the four holes provided. As seen in **Figure 7**, protective sleeves should be placed over the anchor bolts and extend above the grout level to prevent grout adhesion to the bolts and allow the anchor bolt to move freely.

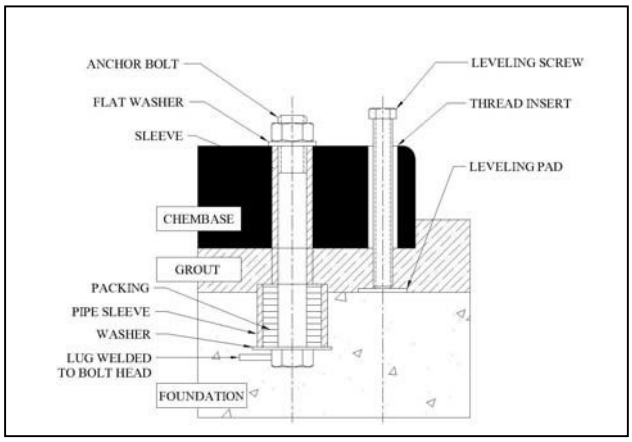

FIGURE 7

4) The baseplate assembly should be properly leveled. It is suggested to utilize the pump suction and discharge flanges as reference points for leveling purposes. If the ChemBase*Plus*™ is equipped with the recommended optional leveling screw, install the leveling screws and thread them far enough onto the leveling pad to provide the desired underneath grouting clearance. Leveling pad resting under each leveling screws is highly recommended to eliminate stress and to provide a reinforced surface for leveling. It may be helpful to smooth the general surface area to allow the leveling pad to sit flat. Care should be taken not to place the baseplate in stress. It is not recommended to hold either end of the base in place by tightening anchor bolts and force the pump or motor into alignment by twisting the baseplate. Bases exceeding 54" (137cm) may include additional mid/center leveling locations. It is imperative to use these locations to eliminate potential center sag on certain designs. Strongly suggest running leveling screws well past bottom of base and carefully applying wax to leveling screws to allow for their eventual removal.

5) If the ChemBase*Plus*™ is not equipped with leveling screws, shim under the baseplate to bring the discharge flange into proper level. Never stress the baseplate under any condition to bring the assembly into the desired level. Bases exceeding 54" (137cm) should include additional mid/center shimming. It is imperative to use these locations to eliminate potential center sag. Hold off bolting the pump's flanges until the baseplate is completely installed. Proper practice is to shim under all baseplate anchor bolt locations including the centers if exceeding 54" (137cm). Apply wax to shims to allow for their eventual removal.

6) Install the flat washers and nuts to the anchor bolts and snug them down (hand tighten only) but do not torque them at this point.

7) Alignment should now be done in accordance with procedures identified in Appendix IV.

8) The baseplate should now be properly grouted. Use care to prevent pockets/voids that can trap water and potentially cause damage during freezing. Grout the baseplate in accordance with the grout manufacturer's recommended procedures. Mask off areas not intended to be grouted. Good procedure is to utilize a non-shrinking grout material. Pour or trowel the grout into the desired area until the proper level is obtained. Immediately wipe away any spills, as this must be done before the grout sets. Allow at least two days for the grout to cure.

9) Check for voids after the grout has properly cured. Remove the forms and withdraw the leveling screws or shims used for leveling. Remove the masking from all surfaces.

10) Fill the leveling screw holes with a flexible sealer. Use care to prevent pockets/voids that can trap water and potentially cause damage during freezing.

11) Lubricate the anchor bolt threads and tighten the nuts to a torque of 15 ft./lbs. (20 N/M). The grout performs a chemical/ mechanical bond to the ChemBase*Plus*™ bottom surface while the anchor bolts perform a less value.

12) Connect piping to the flanges of the pump. Assure that no adverse piping loads are transmitted to the pump flanges. Perform a final alignment check for verification that there are no significant piping loads.

13) Final alignment of the pump/motor assembly should now be brought into the tolerances as specified in Appendix IV.

14) It is possible that a realignment will be deemed necessary should the temperature of the process conditions cause suspect thermal expansion of the piping.

4.4 STILT-MOUNTED BASEPLATES

As mentioned previously, the ChemBase*Plus*™ is inherently rigid due to its thickness of construction. The result is a baseplate that can be stilt mounted while not sacrificing on reliability. The pump/motor alignment techniques for Goulds' Stilt-Mounted baseplates follow the same methodology of the grouted in baseplates. The key difference revolves around the way the baseplate is leveled.

! CAUTION !

ChemBasePlus™ baseplates are not designed to be stilt mounted without utilizing an "H" steel support bracket.
Stilt mounted ChemBasePlus™ baseplates are not designed to support static piping loads. Ensure that the suction and discharge piping are supported individually. Failure to do so may result in equipment damage.

1) The Stilt-mounted baseplate is set on a flat surface with no anchor bolts needed.

2) The baseplate is leveled by using the nut stilt adjuster kit with H-Bracket. Refer to **Figures 8 and 9** for suggested assembly instructions.

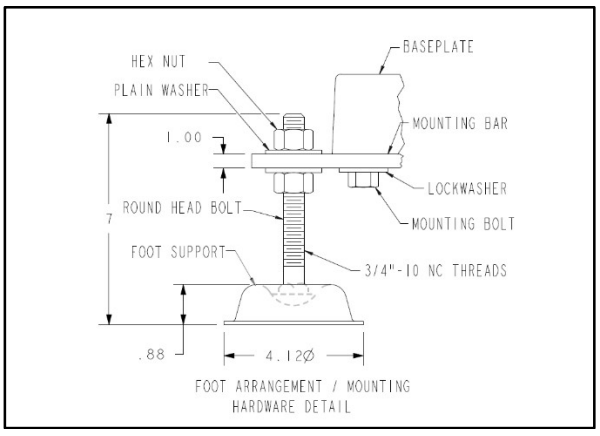

FIGURE 8

3) Mount the required steel H-bracket to the bottom of the ChemBase*Plus*™ utilizing the four bottom inserts and HCScrews provided. Use caution as it is easiest and safest to accomplish this step without equipment mounted to the base. Flipping the base can aid in installation.

4) Put the ChemBase*Plus*™ on a support above the foundation floor. Make sure there is enough space between the ChemBase*Plus*™ and foundation floor to install the stilts.

5) Install the lower part of the four stilt assemblies. Screw the lower nuts onto the stilts and set the lower nuts to the correct height. The correct height depends on the required distance between the foundation floor and the ChemBase*Plus*™. Install a washer on each lower nut.

6) Install the stilt assemblies into the H-bracket anchor holes from below and install a washer onto each stilt. Fasten the stilt assemblies with the upper nuts by hand.

7) Lower the ChemBase*Plus*™ so that the stilts fit into the foundation cups.

8) Level the ChemBase*Plus*™ and make the final height adjustments by loosening the upper nuts and adjusting the lower nuts. When the ChemBase*Plus*™ is level, tighten the top nuts.

9) At this point, follow the steps as listed above (Steps 12, 13, and 14) for grouted baseplates.

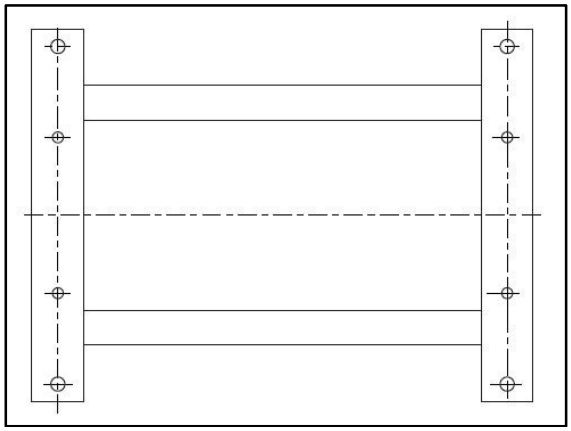

FIGURE 9

APPENDIX I

ChemBase*Plus*™ *Corrosion Guide – Zanite® Plus / Novolac*

Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF	Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF
Acetaldehyde	S	S	Aromatic Solvents	R	R
Acetate Solvents	S	-	Arsenic Acid	S	-
Acetic Acid up to 12%	S	S	Ascorbic Acid	S	-
Acetic Acid >12%	N	N	Ash Slurry	R	-
Acetic Anhydride	S	-	Asphalt – Emulsified	R	-
Acetone -100%	R	R			
Acetylene	S	-			
Acids, Dilute Inorganic	R	R	Barium Chloride	S	-
Acrylic Acid	S	S	Barium Hydroxide	S	-
Acrylonitrile	S	-	Barium Nitrate	S	-
Adipic Acid	S	-	Barium Sulfate	S	-
Aldehydes	S	S	Beer	R	R
Aliphatic Hydrocarbons	R	R	Benzeldhyde	N	S
Allyl Alcohol	S	-	Benzene	R	R
Allyl Chloride	S	S	Benzene Hexzchloride	R	R
Alum, Ammonium	R	R	Benzene Sulfonic Acid	R	R
Alum Solution	S	-	Black Liquor Sulfate <50%	R	-
Aluminum Chloride	R	R	Bleach Liquor	R	R
Aluminum Sulfate	R	R	Borated Water <12%	S	-
Aluminum Potassium Sulfate	R	R	Boric Acid	R	R
Amines	R	R	Bromine Water	S	S
Amino Benzoic Acid	S	-	Bunker C Fuel Oil	S	-
Ammonia -10%	R	R	Butyl Acetate	R	R
Ammonia - 25%	S	S	Butyl Alcohol	S	-
Ammonia Anhydrous	S	-	Butylaldehyde	N	-
Ammonium Carbamate	S	-	Butyric Acid	S	-
Ammonium Carbonate	S	-			
Ammonium Chloride	S	S			
Ammonium Bicarbonate	R	R	Calcium Bisulfite	R	-
Ammonium Bifluoride	R	R	Calcium Carbonate	S	-
Ammonium Hydroxide	S	-	Calcium Chlorate	R	R
Ammonium Nitrate	S	S	Calcium Chloride	R	R
Ammonium Phosphate	S	R	Calcium Hydroxide	R	R
Ammonium Stearate	S	-	Calcium Hypochlorite	R	R
Ammonium Sulfate	S	R	Calcium Nitrate<40%	S	-
Amyl Acetate	R	R	Calcium Phosphate<10%	S	-
Amyl Alcohol	R	R	Calcium Sulfate	S	-
Amyl Chloride	R	R	Cane Sugar	R	-
Aniline	N	N	Carbon Bisulfide	R	R
Antimony Tri-Chloride	R	R	Carbon Tetrachloride	R	R
Aromatic Hydrocarbons	R	R			

Key: R: Fully resistant to complete immersion or prolonged contact
S: Fully resistant to splash, spill, and frequent occasional contact
N: Not recommended based on available data
-: Validated results not available

Note: Coupons available upon request for evaluation in specific applications

Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF	Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF
Carbonic Acid	N	-	Dowtherm A/G/H/LF	-	-
Caustic Soda	R	R			
Caustic Potash	R	R			
Chlorinated Solvents	S	S	Ethanol	R	-
Chlorine Dioxide -15%	R	R	Ethers	R	R
Chlorine Solution	S	S	Ethyl Alcohol – 96%	R	R
Chlorine Gas	R	R	Ethyl Benxene	S	-
Chlorobenzene	S	S	Ethyl Sulfate	S	-
Chloroform	S	-	Ethylenediamine	N	S
Chlorosulfonic Acid, Dilute	R	R	Ethylene Dichloride	S	S
Chromic Acid up to 20%	R	R	Ethylene Glycol	R	R
Chromic Acid >20%	N	S			
Citric Acid - 20%	R	R			
Citric Acid - 50%	S	R			
Copper Acetate<20%	S	-	Fatty Acids	R	R
			Ferric Chloride	R	R
Copper Chloride	R	R	Ferric Hydroxide	S	-
Copper Sulfate	R	R	Ferric Nitrate	S	S
Corn Oil	R	-	Ferric Sulfate	R	R
Corn Syrup	R	-	Fluosilic Acid up to 30%	R	R
Cotton Seed Oil	R	-	Formaldehyde - 10%	R	R
Creosote	S	-	Formaldehyde - 37%	S	S
Crude Oil	S	-	Formic Acid	S	R
Cutting Oil	S	-	Freon	S	-
Cyclohexane	R	-	Fuel Oil	S	-
Cyclohexanol -100%	R	R			
Cyclohexanone - 100%	R	R			
			Gasoline	R	R
			Glucose	R	-
Detergents	R	R	Glycerin	R	R
Dextrose	R	-	Glycerol	R	R
Diacetone Alcohol	S	-	Green Sulfate Liquor		
Dibutyl Phthalate	S	R			
Dichlorobenzene	S	-			
Dichloroethylene	S	-			
Diesel Fuel	S	-			
Diethyl Ether	R	R			
Diethylenetriamine -10%	S	S			
Dimethyl Formamide	S	-			
Dimethyl Phthalate	S	S			
Dioxane	N	N			

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Heptane	N	-	Methanol	S	-
Hexane	S	-	Methyl Alcohol	S	S
Hydrobromic Acid up to 50%	R	R	Methyl Chloride	R	-
Hydrochloric Acid up to 20%	R	R	Methylene Chloride	R	R
Hydrochloric Acid >20%	R	R	Methyl Ethyl Ketone	S	S
Hydrocyanic Acid	S	R	Mineral Oil	R	R
Hydrofluoric Acid	S	S	Mineral Spirits	S	-
Hydrogen Peroxide - Dilute	S	S	Motor Oil	R	R
Hydrogen Sulfide	S	S	Muratic Acid	S	-
Hypo Solution	R	R			
Hypochlorous Acid	S	R			
Hexylene Glycol	R	R	Nickel Chloride	R	R
			Nickel Sulfate	R	R
			Nitric Acid up to 30%	S	R
Iodine	S	S	Nitric Acid up to 50%	S	R
Isopropyl Acetate	S	-	Nitric Acid - (70%)	S	S
Isopropyl Alcohol	S	-	Nitrobenzene - 100%	N	N
Kerosene	R	R	Oil – Mineral / Petroleum	R	R
Ketones	S	S	Oleic Acid	S	R
			Oxalic Acid	S	R
Lactic Acid - Dilute	R	R			
Lime Slurry	S	-	Palmitic Acid	S	-
Linseed Oil	R	R	Pectin Liquor	S	-
Lithium Chloride	S	-	Petroleum Oil	S	-
Lithium Hydroxide	S	-	Phenol	N	N
			Phosphoric Acid	R	R
			Phthalic Acid	S	-
Magnesium Chloride	R	R	Phthalic Anhydride	S	-
Magnesium Hydroxide	S	-	Potassium Carbonate	R	R
Magnesium Nitrate	S	-	Potassium Chloride	R	R
Magnesium Sulfate	R	R	Potassium Dicromate	S	S
Maleic Acid	S	-	Potassium Hydroxide – 40%	S	S
Maleic Anhydride	S	R	Potassium Nitrate	S	S
Mercuric Chloride	S	S	Potassium Phosphate	S	-
Mercurous Nitrate	S	S	Potassium Silicate	S	-
			Potassium Sulfate	S	-

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Note: Coupons available upon request for evaluation in specific applications

Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF	Chemical	Zanite® Plus Rating 100ºF	Novolac Rating 100ºF
Seawater	R	R	Tannic Acid	R	R
Sewage	R	-	Tartarnic Acid	R	R
Soda Ash	R	-	Tetrachloroethane	N	S
Sodium Acetate	R	-	Tetroethylene Pentamine	R	R
Sodium Bisulfate	R	R	Titanium Dioxide		
Sodium Bichromate	R	R	Toluene Sulfonic Acid	S	R
Sodium Carbonate	R	R	Toluene	N	R
Sodium Chlorate	R	R	Transmission Fluid	R	-
Sodium Chloride	R	R	Trichloriacetic Acid	N	-
Sodium Hydroxide up to 50%	R	R	Trisodium Phosphate – 15%	R	R
Sodium Hydroxide >50%	S	S	Turpentine	N	S
Sodium Hypochlorite	S	S			
Sodium Methoxide	S	S	Urea	R	R
Sodium Nitrate	R	R	Urine	R	R
Sodium Sulfate	R	R			
Sodium Sulfide	R	-			
Sodium Sulfite	R	-	Vegetable Oil	R	-
Sodium Triphosphate – 5%	R	R	Vinegar	R	R
Sodium Trisulfate	S	R	Vinyl Acetate	S	
Soybean Oil	R	-	Vinyl Chloride	S	
Steric Acid	R	R			
Stanic Chloride	R	R	Whiskey	R	-
Styrene	N	N	White Liquor	R	-
Sulfamic Acid	R	R	Wine	R	-
Sulfur Dioxide	R	R	Xylene	N	R
Sulfuric Acid 20% or less	R	R			
Sulfuric Acid 75% or less	S	R	Zinc Chloride	S	S
Sulfuric Acid >93%	N	R	Zinc Nitrate	S	-
			Zinc Phosphate Solution>20%	S	-
			Zinc Sulfate	S	S

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APPENDIX II

Insert Guide

The following guide is to assist with the field installation of inserts if there is a need to replace a damaged thread or to install a new insert into a custom location. In order to achieve a successful installation the following procedures are recommended:

! WARNING !

Qualified personnel using suitable drilling equipment and wearing proper PPE should only perform field installations. Personnel should be sure to use a facemask to prevent inhalation of silica dust as the ChemBase*Plus*™ *casting is penetrated during drilling operations. If MSDS specifications are required, contact your local Goulds representative. Also, be sure to utilize protective eyewear while performing any drilling operation. Nitrile gloves are recommended to protect skin from misplaced epoxy.*

1. It is recommended to utilize a carbide-tip or diamond-core drill bit to perform drilling procedure. Please refer to Table 1 for drill bit size recommendation. We suggest providing a hole diameter that will allow ample space to install the insert yet still maintain a snug fit as to not need too much filler epoxy resin.

Table 1
Hole Drill Size Recommendation

Insert Size	Drill Size*
1/4” – 20	1.00 in.
5/16” – 18	1.00 in.
3/8” – 16	1.00 in.
1/2” – 13	1.25 in.
5/8” – 11	1.25 in.
3/4” – 10	1.50 in.
7/8” - 9	1.75 in.
1” - 8	1.75 in.

***NOTE:** Drill size listed above is minimum — increasing the hole diameter by an extra 0.125” may assist in allowing for any hole location variances established by installer. Goulds recommends the verification of the insert dimensions prior to drilling any installation holes.*

2. Drill approximately 3/8” deeper than the overall length of the insert.

3. Drill the new hole (**Figure 1**) or drill out the damaged insert taking care not to enlarge or elongate the hole into which the new insert will be installed. Remove all dust and metal particles from the drilled hole using a shop vacuum or compressed air.

FIGURE 1

4. It is critical that perpendicularity in relation to the surface of the ChemBase*Plus*™ is maintained. Goulds prescribes two basic methods of insuring that the insert will achieve proper perpendicularity and are as follows:

a) Fabricate a template (i.e. constructed of plywood or metal) based off the number of inserts. The template should be designed to locate the holes off a reference point located on the respective drawing of the given baseplate (please contact your Goulds Pumps representative if you are in need of a particular drawing or consult factory). Fasten the insert to a stud with a nut on the top side of the template, include the provided nylon flat washer between the template and insert to ensure the insert is recessed below the top surface of the base when installed.

Prior to placing the template / insert assembly down on the baseplate as seen in **Figure 2**, proceed to step 5 for filling the hole with the proper amount of epoxy resin.

FIGURE 2

b). With the equipment elevated above the baseplate, fasten the provided nylon washer and insert to the bottom of the pump/motor hex bolt that is intended to mount the pump/motor assembly down to the baseplate. This will ensure the insert is recessed below the top surface of the base when installed.

5. Dispense epoxy resin material into the drilled hole (**Figure 3**) following the instructions provided – the two-part epoxy can be mixed together to activate in the hole. Make certain not to overfill the hole as excess material may spill over on to the top surface of the insert and down into the threads. Goulds recommends pre-filling the hole with epoxy to a level of approximately 50%. Now locate the template arrangement down over the epoxy-filled holes or lower the pump/motor assembly (if C-Flange motor is being used) or motor down into the epoxy filled holes (**Figure 4**). Check that all inserts are centered accordingly and allow the epoxy to harden. After the epoxy resin has hardened, remove the template or pump/motor assembly and top off the holes accordingly. Wipe away any excess material to keep the top surface clean.

FIGURE 3

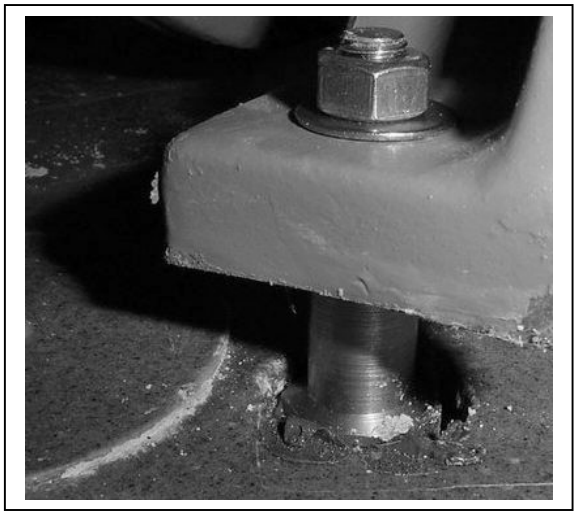

FIGURE 4

The baseplate in now ready to be installed or shipped. Do not exceed the recommended fastener torques as shown in Appendix III.

APPENDIX III

Recommended Fastener Torques

FASTENER STANDARD	FASTENER NOMINAL SIZE	RECOMMENDED TORQUE LB/FT (*)
S A E	1/4” - 20	6
	5/16” - 18	12
	3/8” - 16	20
	1/2” – 13	34
	5/8” - 11	66
	3/4” -10	118
	7/8” - 9	125
	1” - 8	125

(*) Includes typical allowances for fastener lubrications and coatings

Please be cautious not to exceed the recommended bolt torques as shown.

APPENDIX IV

Alignment

SET UP

1. Mount two dial indicators on one of the coupling halves (X) so they contact the other coupling half (Y) (Fig. IV-1).

2. Check setting of indicators by rotating coupling half X to ensure indicators stay in contact with coupling half Y but do not bottom out. Adjust indicators accordingly.

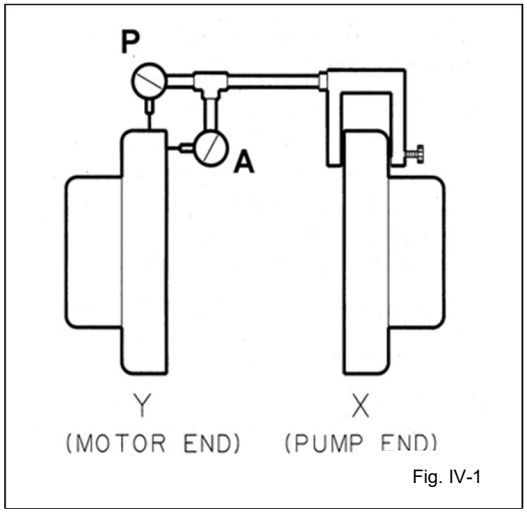

Fig. IV-1

MEASUREMENT

1. To ensure accuracy of indicator readings, always rotate both coupling halves together so indicators contact the same point on coupling half Y. This will eliminate any measurement problems due to runout on coupling half Y.

2. Take indicator measurements with driver feet hold-down bolts tightened. Loosen hold down bolts prior to making alignment corrections.

3. Take care not to damage indicators when moving driver during alignment corrections.

ANGULAR ALIGNMENT

A unit is in angular alignment when indicator A (Angular indicator) does not vary by more that .002" (.05 mm) as measured at four points 90° apart.

Vertical Correction (Top-to-Bottom)

1. Zero indicator A at top dead center (12 o'clock) of coupling half Y.

2. Rotate indicators to bottom dead center (6 o'clock). Observe needle and record reading.

3. **Negative Reading** - The coupling halves are further apart at the bottom than at the top. Correct by either raising the driver feet at the shaft end (add shims) or lowering the driver feet at the other end (remove shims), (Fig. IV-2).

   Positive Reading - The coupling halves are closer at the bottom than at the top. Correct by either lowering the driver feet at the shaft end (remove shims) or raising the driver feet at the other end (add shims).

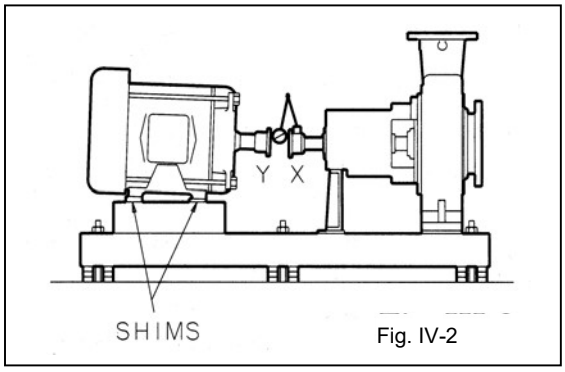

Fig. IV-2

4. Repeat steps 1-3 until indicator A reads .002" (.05 mm) or less.

Horizontal Correction (Side-to-Side)

1. Zero indicator A on left side of coupling half Y, 90° from top dead center (9 o'clock).

2. Rotate indicators through top dead center to the right side, 180° from the start (3 o'clock). Observe needle and record reading.

10) **Negative Reading** - The coupling halves are further apart on the right side than the left. Correct by either sliding the shaft end of the driver to the left or the other end to the right.

Positive Reading - The coupling halves are closer together on the right side than the left. Correct by either sliding the shaft end of the driver to the right or the other end to the left (Fig. IV-3).

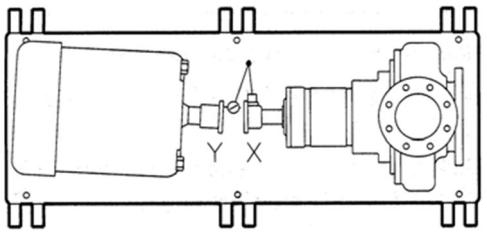

Fig. IV-3

11) Repeat steps 1 through 3 until indicator A reads .002" (.05 mm) or less.

12) Re-check both horizontal and vertical readings to ensure adjustment of one did not disturb the other. Correct as necessary.

PARALLEL ALIGNMENT

A unit is in parallel alignment when indicator P (parallel indicator) does not vary by more than .002" (.05 mm) as measured at four points 90° apart at operating temperature. Note the preliminary vertical cold setting criteria, Table 1.

Vertical Correction (Top-to-Bottom)

1. Zero indicator P at top dead center of coupling (12 o'clock) half Y (Fig. IV-1).

2. Rotate indicator to bottom dead center (6 o'clock). Observe needle and record reading.

3. **Negative Reading** - Coupling half X is lower than coupling half Y. Correct by removing shims of thickness equal to half of the indicator reading under each driver foot.

   Positive Reading - Coupling half X is higher than coupling half Y. Correct by adding shims of thickness equal to half of the indicator reading from each driver foot (Fig. IV-4).

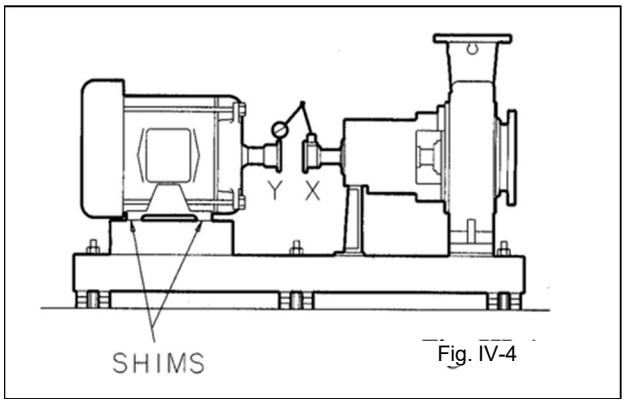

Fig. IV-4

NOTE: *Equal amounts of shims must be added to or removed from each driver foot. Otherwise, the vertical angular alignment will be affected.*

4. Repeat steps 1 through 3 until indicator P reads within .002" (.05 mm) or less when hot, or per Pump IOM - Table 1 when cold.

Horizontal Correction (Side-to-Side)

1. Zero indicator P on the left side of coupling half Y, 90° from top dead center (9 o'clock).

2. Rotate indicators through top dead center to the right side, 180° from the start (3 o'clock). Observe needle and record reading.

3. **Negative Reading** - Coupling half Y is to the left of coupling half X. Correct by sliding driver evenly in the appropriate direction (Fig. IV-5).

   Positive Reading – Coupling half Y is to the right of coupling half X. Correct by sliding driver evenly in the appropriate direction.

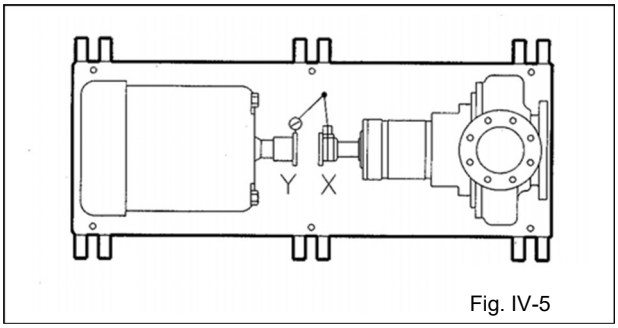

Fig. IV-5

4. Repeat steps 1 through 3 until indicator P reads .002" (.05mm) or less.

5. Re-check both horizontal and vertical readings to ensure adjustment of one did not disturb the other. Correct as necessary.

COMPLETE ALIGNMENT
A unit is in complete alignment when both indicators A (angular) and P (parallel) do not vary by more than .002” (.05 mm) as measured at four points 90° apart.

Vertical Correction (Top-to-Bottom)

1. Zero indicators A and P at top dead center (12 o’clock) of coupling half Y.

2. Rotate indicator to bottom dead center (6 o’clock). Observe the needles and record the readings.

3. Make corrections as outlined previously.

Horizontal Correction (Side-to-Side)

1. Zero indicators A and P on the left side of coupling half Y, 90° from top dead center (9 o’clock).

2. Rotate indicators through top dead center to the right side, 180° from the start (3 o’clock). Observe the needle, measure and record the reading.

3. Make corrections as outlined previously.

4. Recheck both vertical and horizontal readings to ensure adjustment of one did not disturb the other. Correct as necessary.

NOTE: *With experience, the installer will understand the interaction between angular and parallel and will make corrections appropriately.*