



***I.O.M.
Installation,
Operation and
Maintenance***

Polyshield®



*This IOM is preliminary and
should not be used outside
of North America.*

Bulletin P-90-2003 (A)

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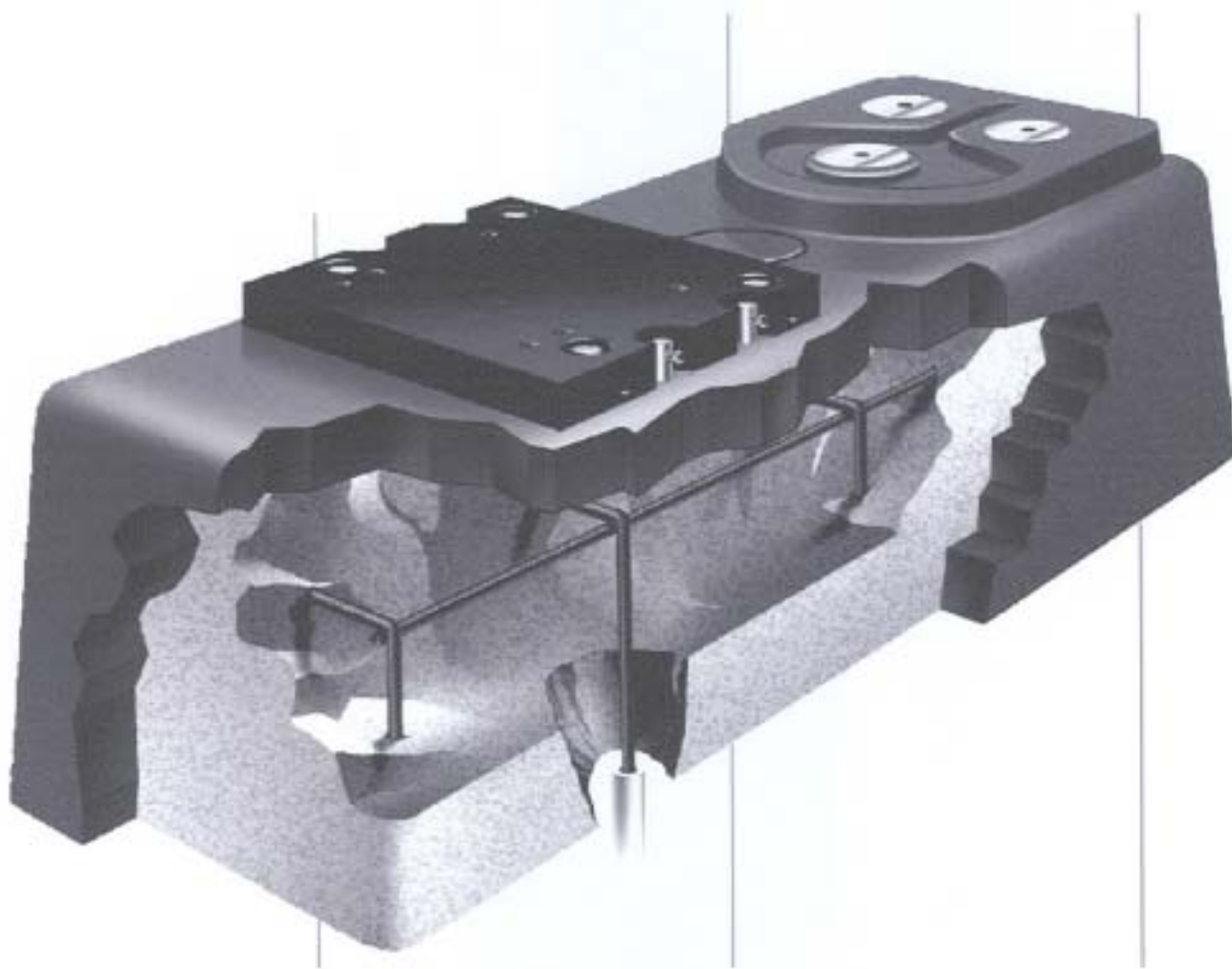
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Section 1.0 INTRODUCTION

This bulletin contains instructions and guidelines for the installation, operation, and maintenance of the Polyshield (combination baseplate and foundation).

It is extremely important that the Polyshield Installation, Operation and Maintenance Instructions are thoroughly read prior to installation of the Polyshield.

This is important for safety, for proper performance of the Polyshield and the rotating equipment mounted on the unit, and for maximum Mean Time Between Planned Maintenance (MTBPM).



Section 2.0 SAFETY CONSIDERATIONS

The Polyshield has been designed and packaged for safe handling and installation. It is very important that these procedures be read in its entirety prior to removing the Polyshield from its shipping pallet. Polyshield shall not be liable for physical injury, damage or delays caused by failure to observe the instructions for installation, operation and maintenance contained in this document.

Paying constant attention to safety is always extremely important. However, there are often situations that require special attention. These situations are indicated throughout this book by the following symbols.

DANGER

Danger – Immediate hazards which **WILL** result in severe personal injury or death.

WARNING

Warning – Hazards or unsafe practices which **COULD** result in severe personal injury or death.

CAUTION

Caution – Hazards or unsafe practices which **COULD** result in minor personal injury or property damage.

Several important general precautions are listed below:

1. *DO NOT REMOVE THE POLYSHIELD FROM ITS SHIPPING PALLET UNTIL YOU ARE READY TO HOIST IT ONTO ITS LOCATION.*
2. *DO NOT SUBJECT THE POLYSHIELD TO ROUGH HANDLING OR UNNECESSARY MECHANICAL SHOCK.*
3. *DO NOT ATTEMPT TO LIFT THE POLYSHIELD BY ANY MEANS OTHER THAN THAT WHICH IS PRESCRIBED IN THESE PROCEDURES.*
4. *DO NOT USE HAMMER BLOWS OR OTHER IMPACT LOADING TO ADJUST THE POSITIONING OF THE POLYSHIELD.*
5. *DO NOT PRY AGAINST THE POLYSHIELD MOUNTING BLOCK WHEN MOVING THE MOTOR DURING SHAFT ALIGNMENT.*
6. *DO NOT ATTEMPT TO TRANSPORT, HANDLE, OR INSTALL A POLYSHIELD WHEN AMBIENT TEMPERATURE IS BELOW -50°F (-45°C).*
7. *DO NOT OPERATE A PUMP INSTALLED ON A POLYSHIELD AT PROCESS FLUID TEMPERATURES IN EXCESS OF 300°F (150°C) WITH POLYMER MOUNTING PADS AND 500°F (260°C) WITH ALLOY MOUNTING PADS UNLESS PRIOR APPROVAL FROM POLYSHIELD IN WRITING.*

NOTE: ALWAYS COORDINATE REPAIR ACTIVITY WITH OPERATIONS PERSONNEL, AND FOLLOW ALL PLANT SAFETY REQUIREMENTS AND APPLICABLE SAFETY AND HEALTH LAWS/REGULATIONS.

Section 3.0 Overview

3.1 WARRANTY STATEMENT

The warranty on your Polyshield is provided in a statement which was sent with the Order Acknowledgment. Please call your Polyshield Sales Office or Distributor/Representative for a copy of this warranty statement.

3.2 DESCRIPTION

The Polyshield represents the best available technology in pump/driver nonmetallic mounting systems. The product has been designed and engineered to offer superior performance and long life at minimal installed cost. Polyshield Baseplate and Foundation Systems create time savings, cost savings and better performance and reliability. The Polyshield replaces the foundation, anchor bolts, separate baseplate and epoxy grout systems. The Polyshield ease of installation results in lower total installed cost. These measurable savings also result in reduced Life Cycle Cost.

A properly installed Polyshield will give years of maintenance-free service and will aid in efforts to maximize mean time between planned maintenance (MTBPM) of the equipment which it supports.

CAUTION

Observance of proper handling procedures during installation is extremely important to prevent damage to the Polyshield. While polymer concrete possesses inherent high strength, subjecting it to impact or bending loads through rough handling or improper lifting or mounting may result in irreparable damage to the Polyshield as well as damage to the mounted equipment or injury to personnel.

3.3 APPLICATION

The polymer concrete material used in the manufacture of the Polyshield has been formulated for application in a wide range of corrosive fluid handling services. The material is not, however, universally corrosion resistant. A comprehensive corrosion guide is available under Bulletin PCC-400a (B). It is strongly recommended that this bulletin be reviewed prior to specifying or installing a Polyshield product.

The Polyshield is also suitable for application in a wide range of fluid process temperatures, specifically, -50°F to 300°F (-45°C to 150°C). Depending on the configuration of the pump that is to be mounted on the Polyshield, fluid process temperature in excess of 300°F (150°C) may be permissible. Contact your Flowserve's representative for assistance in determining acceptability of a specific application.

3.4 STORAGE

This section addresses the storage procedures for the Polyshield only. When storing Polyshield and pump assemblies, it is important that the proper storage procedures for the pump be observed as well. Refer to the I.O.M. for the particular brand of pump that is mounted on your Polyshield product.

Polyshield normal packaging is designed to protect the Polyshield during shipment and handling from the time it is manufactured at the factory to installation at the end user's jobsite. If the Polyshield is to be stored for a period of time prior to installation, it is recommended that the following procedures be followed:

- Leave the Polyshield strapped to its wooden shipping pallet.
- Place the pallet on a solid, dry, level surface in a location where the Polyshield cannot be struck by passing fork trucks, falling objects, etc. Make sure the pallet does not rock.
- Do not stack heavy objects on top of the Polyshield.
- If the Polyshield is to be stored in an outdoor location, cover the Polyshield completely with a tarpaulin or dark plastic sheeting to prevent UV degradation of the surface.
NOTE: UV degradation (bleaching) of the polymer concrete is the normal result to exposure to sunlight. This phenomenon is purely a visible change in the color of the material, which in no way compromises the performance or corrosion resistance characteristics of the Polyshield.

WARNING

Do not attempt to stand a Polyshield on its end to make more efficient use of storage space. Neither the Polyshield nor the strapping that holds the Polyshield to its wooden pallet have been designed for vertical storage. Severe personal injury or death, as well as irreparable damage to the Polyshield may result if the unit tips over.

3.5 LIFTING POLYSHIELD UNITS AND PUMP ASSEMBLIES

CAUTION

Polyshield units should be transported via fork truck to the area of their intended installation on the wooden pallets on which they were shipped. Never transport a Polyshield unit over a long distance or over rough terrain while suspended from slings.

Figure 1



Only trained personnel should do lifting. Pumps and motors often have integral lifting eyes or eye bolts. These are intended for use in lifting the individual pieces of equipment. Do not use these features to lift a Polyshield pump assembly.

LIFTING POLYSHIELD WITH NO MOUNTED EQUIPMENT:

Remove the metal shipping straps that hold the Polyshield unit to the wooden pallet. Slings should be positioned under each end of the Polyshield unit. (See Figure 1).

! WARNING

Do not install eyebolts in the Polyshield thread inserts for the purpose of lifting the unit. This practice imposes lateral loads on the inserts, which they were not designed to withstand.

Figure 2

Lift the Polyshield unit a few inches off the pallet and verify that it hangs reasonably level and that the slings are not prone to slipping out of position.

! WARNING

Keep hands and feet out from under the Polyshield unit during these steps.

If the sling appears to be unstable set the Polyshield unit back on the pallet and reposition the slings.

After satisfactory slinging has been achieved, the Polyshield unit may be hoisted onto its foundation. Take care not to bump the unit against fixed objects or induce any unnecessary shock loads. Lower the unit slowly over the foundation using care to center the unit over the rebar cage. Leveling of each Polyshield

unit can be accomplished with shim packs or optional level bars with leveling screws (two level bars required) to allow easy level of the Polyshield shell unit. If shim packs are used under the Polyshield unit, we recommend a minimum eight total shims or (4) locations on each side to allow for the removal of the slings. Twelve (12) total shim locations or six (6) shim locations each side are required for Polyshield units exceeding 6 ft in length.

LIFTING POLYSHIELD WITH INSTALLED EQUIPMENT:**Pump and motor installed:**

Remove the metal shipping straps that hold the Polyshield unit to the wooden pallet. Slip two slings under the two lifting metal straps on each end of the Polyshield unit (see Figure 2). Slings should be positioned approximately above and inside the length of two bindings. This procedure is recommended for all pumps up to a maximum pump weight of 1000 lbs (450kgs). All motors up to a 449T NEMA (or 315 IEC) frames may be installed while mounted. Motor frame sizes larger than 449T NEMA (or 315 IEC) should be removed during locating and installation of the Polyshield units. Check to see that the pump suction nozzle does not interfere with the lifting sling. If the pump creates interference, it should be removed. Lift the Polyshield a few inches off the pallet and verify that it hangs reasonably level and that the slings are not prone to slipping out of position.

After satisfactory slinging has been achieved, the Polyshield may be hoisted onto its foundation. Take care not to bump the unit against fixed objects or induce any unnecessary shock loads. Lower the unit slowly over the foundation using care to center the unit over the rebar cage. Leveling of each Polyshield unit can be accomplished with shim packs or optional level bars with leveling screws (two level bars required) to allow easy level of the Polyshield shell unit (see Figure 3). If shim packs are used under the Polyshield unit, we recommend a minimum eight total shims or (4) locations on each side to allow for the removal of the slings. Twelve (12) total shim locations or six (6) shim locations each side are required for Polyshield units exceeding 6 ft in length.

Figure 3

Section 4.0 INSTALLATION

4.1 GENERAL DESCRIPTION OF THE POLYSHIELD

The Polyshield is a solid, polymer concrete foundation and baseplate shell that is manufactured in versions that conform to accommodate ASME/ANSI B73.1 and ISO 2858 metallic and non-metallic pumps, foot and frame mounted general industry pumps, foot mounted between bearing pumps, API 610 and other pump designs.

Polyshield units are manufactured in standard primary sizes with integral catch basins and removable motor mounting blocks.

Metallic thread inserts are provided in the mounting surface for the particular combination of pump and motor that the Polyshield is intended. The metallic thread inserts on the pump end are available in 316SS (18.8 CrNi stainless steel), Alloy 20 (A744, CN-7M) and Hastelloy C 276 (A494, CW-6M). Multiple motor insert patterns are also available to accommodate more than one NEMA frame size. The standard thread insert material for the motor end is 316SS (18.8 CrNi stainless steel).

Optional alloy pads are available instead of metallic inserts when requirements call for 0.002 in/ft (0.17 mm/m) and/or process temperatures between 301°F (150°C) and 500°F (260°C).

4.2 GENERAL DESCRIPTION OF THE POLYADJUST MOTOR BLOCK ADJUSTER SYSTEM

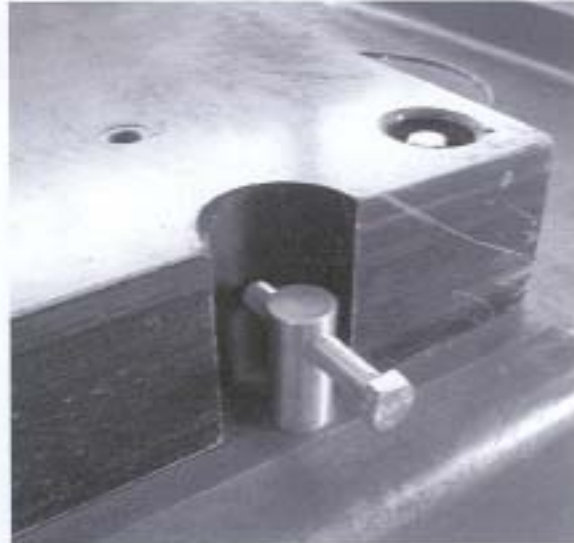
Figure 4



The Polyshield utilizes as standard the unique Polyshield Polyadjust motor mounting system (Figure 4). This system is comprised of a one-piece polymer concrete motor mounting block having surface flatness and parallelism equivalent to machine steel blocks. The Polyadjust motor mounting block system incorporates the Polyloc Transverse Jack Bolt system. The Polyloc system provides transverse motor adjustment. The side-mounted adjusters allow for shaft alignment to critical tolerances with minimal disturbance of indicators. The adjusters

make contact with a solid motor mounting block, not the foot of the motor. Please loosen the hex nuts securing the motor block to the shell, prior to turning adjuster bolts against the motor block.

Figure 5



4.3 POLYSHIELD INSTALLATION PROCEDURES (NEW CONSTRUCTION)

TOOLS FOR INSTALLATION

Hammer drill with proper size bit
Worm gear saw with diamond blade (if required)
Rebar cutters (new installation)
Concrete mixer
Concrete vibrator
Lifting device (for placing Polyshield)
Hand tools
Chipping hammer
Pressure washer or abrasive blast rig as required
Epoxy adhesive (for setting rebar into concrete slab – New installation)
Rebar tie wire
Fast set cement

1. Remove laitance and form grease and oil from area where the Polyshield will be located using mechanical means, abrasive blasting, or water blasting. Remove any loose debris including fins, aggregate, or any protruding objects around the perimeter of the area where the Polyshield will rest.
2. Measure the outside dimensions of the Polyshield and subtract 8 in from both the width and length to determine the rebar maximum dimension thus providing clearance from the side of the walls of the Polyshield. Refer to the Rebar Cage drawing for ANSI Polyshield.

3. Drill holes in the existing slab a minimum of 4 in deep for doweling in the vertical rebar rods allowing a minimum of 1 in clearance from the top of the interior of the Polyshield. Space the rebar rods on 12-in centers. Remove dust and debris from dowel holes and fill with epoxy adhesive for anchoring the rebar.
 4. Allow the epoxy adhesive to cure, and then install horizontal rebar rods, tying in place with wire.
 5. Place the Polyshield over the rebar cage, making adjustments for proper elevation, orientation relative to piping centerlines. A qualified millwright should field verify proper position of the pump mounting pads relative to the centerline of the suction piping. Leveling of each Polyshield unit can be accomplished with shim packs or optional level bars with leveling screws (two level bars required) to allow easy leveling of the Polyshield shell unit. If shim packs are used under the Polyshield unit, we recommend a minimum eight total shims or (4) locations on each side to allow for the removal of the slings. A minimum of twelve (12) total shim locations or six (6) shim locations each side are recommended for Polyshield units exceeding 6 ft in length.
 6. Check and verify the dimensions again before the grouting procedure begins.
 7. A standard 3000 psi concrete mix is recommended for filling the Polyshield in new construction.
 8. Seal around the outside bottom perimeter of the Polyshield with an edge board secured to the flooring or a fast setting hydraulic cement. Two brand name hydraulic cements are:
 - Water Plug Hydraulic Cement*
 - Dam-It Non shrink Hydraulic Cement*
 9. Pour the concrete mixture through the grout fill port on the top of the Polyshield using a concrete vibrator to ensure proper flow of the concrete. Do not over vibrate as excessive vibrating leads to larger aggregate settling which will result in a weak mix.
 10. Pour the concrete to the bottom edge of the grout fill port.
 11. Remove any loose debris from around edges of the grout fill port.
 12. Seal grout fill port with grout port plug and Polyshield Seal Kit provided.
 13. Install pump, motor, and attach lines.
3. Clean and level area around the existing foundation where the Polyshield will rest.
 4. Prior to installing the new Polyshield, the ANSI pump and NEMA motor may be mounted and prealigned. Place Polyshield over existing prepared concrete foundation making adjustments for proper elevation and orientation relative to piping centerlines. Leveling of each Polyshield unit can be accomplished with shim packs or optional level bars with leveling screws (two level bars required) to allow easy leveling of the Polyshield shell unit. If shim packs are used under the Polyshield unit, we recommend a minimum eight total shims or (4) locations on each side to allow for the removal of the slings. A minimum of twelve (12) total shim locations or six (6) shim locations each side are recommended for Polyshield units exceeding 6 ft in length. Major elevation changes can be accomplished by sawing off the bottom perimeter of the Polyshield, using a standard worm-gear drive saw equipped with a diamond blade. A qualified millwright should field verify proper position of the pump mounting pads relative to the piping centerlines.
 5. Check and verify elevation and orientation again prior to commencement of grouting procedure.
 6. Seal around the outside bottom perimeter of the Polyshield with an edge form board secure to the flooring or a fast setting hydraulic cement. Two brand name hydraulic cements are:
 - Water Plug Hydraulic Cement*
 - Dam-It Non shrink Hydraulic Cement*
 7. Grouting of the Polyshield as a repair technique for existing damaged foundations requires the use of a cementitious non-shrink grout.
 - Manufacturers of recommended grout fill materials for Retrofits:*
 - Quickcrete Concrete Mix no. 1101 Coarse*
 - Use of cementitious grout ONLY if 50% pea gravel by volume is added*
 - Do Not use epoxy grout*
 8. Mix the non-shrink grout according to manufacturer's specifications. Cementitious non-shrink grouts are extended by adding 50% by volume of 3/16-in diameter pea gravel to the mix. Pour the grout to the bottom edge of the grout fill port on top of the Polyshield using a concrete vibrator to ensure proper flow of the grout. Do not over vibrate as excessive vibrating leads to larger aggregate settling which will result in a weak mix.
 9. After the grout has achieved its initial set, usually within eight hours depending upon ambient temperature, remove any loose debris from around the edges of the grout fill port.
 10. Seal grout fill port with grout port plug and Polyshield seal kit.
 11. Install pump, motor, and attach lines.

4.4 POLYSHIELD INSTALLATION PROCEDURE (RETROFIT CONSTRUCTION)

1. Remove existing pump, motor, and baseplate.
2. Remove damaged concrete from existing foundation by pneumatic chipping gun until existing rebar is exposed with a nominal 1/2 in clearance between existing rebar and existing concrete foundation. Check clearance between exposed concrete foundation and internal walls of the Polyshield. Allow at least 2 in of clearance between the Polyshield internal wall and exposed concrete foundation.

APPENDIX A

POLYSHIELD® SEALING KIT EPOXY NOVOLAC (EN) INSTRUCTIONS (Supplied with Novolac Polyshields)

Each Kit contains:

Polyshield EN Resin
Polyshield EN Hardener
Stir Sticks
Latex Gloves
Instruction Sheet
MSDS Material Safety Data Sheet

Application Instructions:

The Polyshield EN Sealing Kit (see Figure 6) is intended for use in (1) bonding the plug into the grout hole at the top of the combo and (2) sealing and providing chemical resistance barrier around the perimeter of pump pad.

Figure 6



1. All surfaces to be bonded should be thoroughly cleaned and should be free of dust, oils and contaminants. Sand surfaces to be bonded prior to use.
2. Pour Polyshield EN Hardener into the Polyshield Resin can. Mix well with stir stick for about two minutes.
3. Apply to properly prepared surface by stir stick or putty knife.
4. Use MEK, Xylene solvents for cleaning tools and equipment and for lightly brushing surface to provide a smooth finish.

CAUTION

Safety Precautions:

Resin and hardener components may be irritating to the eyes and skin on contact. Vapors may cause irritation of eyes and respiratory tract. Area must be ventilated. Wear protective clothing including gloves. For detailed safety information refer to the Material Safety Data Sheets of these products.

APPENDIX B

POLYSHIELD® SEALING KIT VINYL ESTER (VE) INSTRUCTIONS (Supplied with Vinyl Ester Polyshields)

Each Kit contains:

Polyshield VE Resin
Polyshield VE Hardeners #1
Stir Sticks
Latex Gloves
Instruction Sheet
MSDS Material Safety Data Sheet

Application Instructions:

The Polyshield VE Sealing Kit (see Figure 7) is intended for use in (1) bonding the plug into the grout hole at the top of the combo and (2) sealing and providing chemical resistance barrier around the perimeter of pump pad.

Figure 7



1. All surfaces to be bonded should be thoroughly cleaned and should be free of dust, oils and contaminants. Sand surfaces to be bonded prior to use.
2. Pour Polyshield VE Hardener #1 into the Polyshield VE Resin can. Mix well with stir stick for about two minutes.
3. Apply to properly prepared surface by stir stick or putty knife.
4. Use MEK, Xylene solvents for cleaning tools and equipment and for lightly brushing surface to provide a smooth finish.

CAUTION

Safety Precautions:

Resin and hardener components may be irritating to the eyes and skin on contact. Vapors may cause irritation of eyes and respiratory tract. Area must be ventilated. Wear protective clothing including gloves. For detailed safety information refer to the Material Safety Data Sheets of these products.

Shelf Life and Storage:

Store resin and hardener in their unopened containers in a dry cool place away from open flames, heat or sources of ignition. Shelf life is limited to 60 days if stored in a cool, dry location.

Polyshield Seal Kits provide enough sealant for installation of two units. Polyshield® Seal Kits are shipped with each two units or with single unit shipments.

Figure 8



APPENDIX C

Fastener Nominal Size	in	Nm	Recommended Torque ¹	
			lb.-ft	Nm
	1/4	6.4	6	8
	5/16	7.9	6	8
	3/8	9.6	10	15
	7/16	11.0	18	24
	1/2	12.7	27	37
	5/8	15.9	53	72
	3/4	19.1	94	127
	7/8	22.3	152	206
	1	25.4	228	309

Note: Fastener standard is SAE.

Caution: Use of proper length fasteners is important. Do not allow the fastener to bottom out in the insert.

¹Torque values shown for SAE fasteners are based on dry threads at 75% of proof load for ASTM307 Grades A and B (SAE Grade 1) fasteners.

For lubricated, plated, or PTFE coated threads, use 75% of torque values shown.

APPENDIX D

FIELD PATCHING PROCEDURE FOR MINOR DAMAGE

Note: The instructions given below are for cosmetic repair of accidental chips in the NON-STRUCTURAL AREAS of a Polyshield. DO NOT attempt to use this procedure to repair structural damage, i.e., cross-sectional fractures or damage to the loading-bearing areas in the immediate vicinity of threaded inserts or alloy mounting pads. Do not attempt to make repairs when ambient temperature is below 20° (-6°C).

Please contact Polyshield for all major damage. A cosmetic patch kit is available from Flowserve for repair of defects no larger than 25 cubic inches (400 cubic centimeters) in volume (approximate). Defects larger than this should not be repaired without first consulting Polyshield. The patch kit consists of a one pint (473 ml) can of patching compound and a glass vial of the corresponding volume of catalyzing agent, along with detailed instructions and appropriate Material Safety Data Sheets (MSDS). The basic patching procedure steps are as follows:

1. Prepare the area to be repaired by removing any loose or extraneous material from the fracture surface with a wire brush and/or suitable scraper.
2. If the fracture surface has been contaminated with oil or other foreign substance, flush the surface thoroughly with acetone or ethyl acetate. Dry the surface completely using oil-free, dry compressed air.
3. Open the can and pour in the entire contents of the vial. Mix thoroughly using a suitable stirring tool (i.e., putty knife, screwdriver, etc.) If convenient, pour the mixture out onto a mortarboard or similar clean surface and spread out to ensure a full 30-minute pot life.
4. Spread the mixture over the area to be patched using a putty knife. The material may be tooled to produce the desired surface shape. NOTE: Once the material is catalyzed, you will have no more than 30 minutes of working life before the material begins to stiffen.
5. Allow the patch to cure undisturbed for a minimum of two hours. The material may be ground or sanded and, if desired, painted after it has achieved full cure. NOTE: This minimum cure time is based on application at room temperature 70°F (21°C). Application at lower temperatures will require longer cure times. Allow an additional two hours for each 10°F (5°C) reduction in ambient temperature.

The technical data furnished is true and accurate to the best of our knowledge. However, no express or implied warranties of merchantability or of fitness for purpose is given or implied. Liability, if any, is limited to repair or replacement of products (but not including removal or installation of replacement products), and Structural Preservation Systems, Inc. shall not be liable for any incidental or consequential damages which may arise from use of this product.

Polyshield® is a registered trademark, U.S. Patent Nos. 65651, et. al, apply