FLOWSERVE

Polyshield®

Baseplate and Foundation System

Bulletin PS-90-2c† (E)

FLOWSERVE

Pump Supplier To The World

Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.

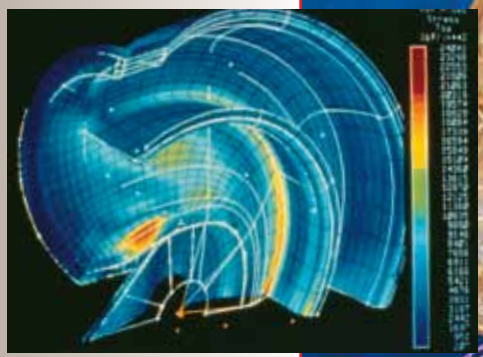
Pumping Solutions
Flowserve is providing pumping solutions which permit customers to continuously improve productivity, profitability and pumping system reliability.

Market Focused Customer Support
Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.

Dynamic Technologies
Flowserve is without peer in the development and application of pump technology, including:
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

Broad Product Lines
Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:
- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty



Polyshield® Polymer Baseplate and Foundation System

The Flowserve Polyshield Baseplate and Foundation System is the superior solution for cost effective, high performance pump installation combining, in one complete unit, the traditional baseplate and formed concrete foundation for pump-driver sets. During installation and commissioning the system delivers very high quality results and significant time and money savings.

The Polyshield baseplate and foundation system can be combined with a wide variety of pump designs, including:

- ANSI and ISO metallic and non-metallic
- Foot- and frame-mounted general industrial
- Foot-mounted between bearing
- ISO 13709/API 610

Applicable market segments include:

- Chemical
- Hydrocarbon processing
- Power generation
- Water resources
- Oil and gas production and other various industrial markets

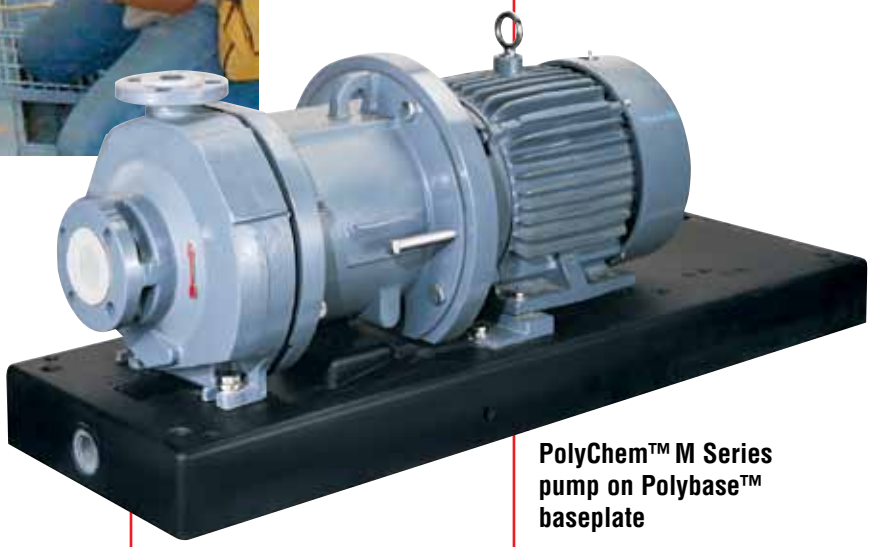
Benefits of Selecting the Polyshield Baseplate and Foundation System

- Time savings
  - Quick installation time
  - Reduces time span from receipt at jobsite to commissioning
- Cost savings
  - Reduces total installed cost
  - Dramatically minimizes field rework necessary to meet specifications
- Better performance and reliability
  - Improved MTBPM
  - Reduced vibration
  - Improved corrosion resistance
- Single structure
  - One-piece construction
  - Flat mounting surfaces
  - One-piece motor mounting block

Complementary Products

- Solid polymer concrete Polybase™ baseplates
  - ANSI standard design
  - ISO standard design
- Polymer concrete Polybase™ baseplate with added structural support for improved rigidity
- Pre-grouted fabricated steel ISO 13709/API 610 baseplate for mounting on a custom flat top foundation
- Type E PIP (Process Industry Practices) RESP 002 compliant baseplates

Polyshield installation at a Louisiana chemical plant



PolyChem™ M Series pump on Polybase™ baseplate

® Polyshield is a registered trademark.

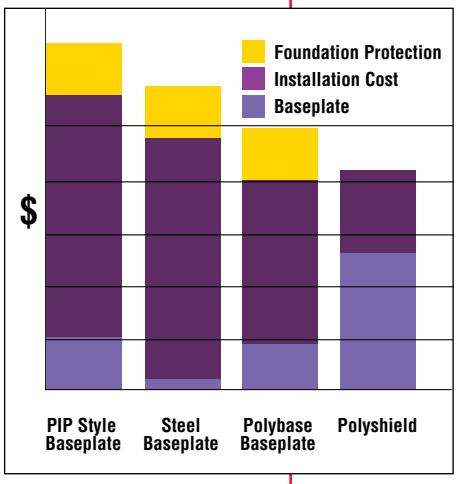
FLOWSERVE

Polyshield Polymer Baseplate and Foundation System

Reduces Installation Cost

Improves Pump Reliability

Total Installed Cost Comparison



Time Savings compared with the use of metallic baseplates results from:

- Installation typically reduced from 1-2 weeks to 2 days
- 70-80% reduction of required craft man-hours

Ease of Installation results in lower total installed cost compared with conventional fabricated steel baseplates

Polyshield Replaces:

- Foundation
  - – Eliminates concrete, brick linings and coatings
- Anchor bolts
- Separate baseplate
- Grouting system

Measurable Installation Savings

- Use of fewer skilled craftsmen
- One-time fill with concrete
- Minimal edge forming
- Less alignment issues
- 1½ to 2 day installation time
- Alignment locked in
- Use of regular 200 bar (3000 psi) concrete in place of expensive epoxy grouts
- Reduced number of steps required to complete installation. Eliminates the need:
  - – To re-form and pour a separate foundation, including anchor bolt systems
  - – To remove pump-driver sets prior to securing baseplate to foundation
  - – To pour concrete or epoxy grout into the baseplate cavities
  - – To check for voids, with repairs as necessary
  - – For extensive adjustments to baseplate for coplanar flatness of pump and driver mounting pads
- Minimal rework issues
- Avoidance of expensive acid brick foundations
- No need for sandblasting of baseplate to assure proper bonding

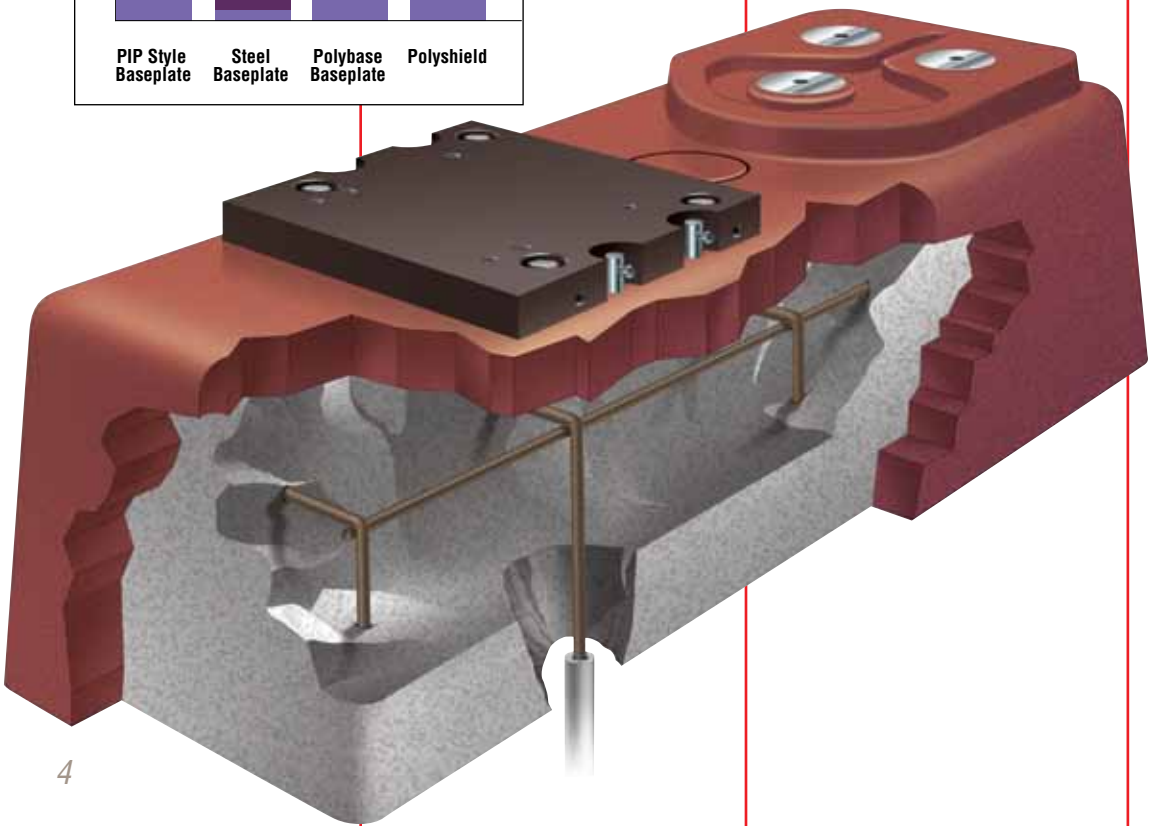
Reduced Life Cycle Cost results from higher unit performance in the form of:

- High vibration dampening characteristics
  - – Longer seal, bearing and coupling life
  - – Longer MTBPM
- Less maintenance of baseplate and foundation
  - – No paint peeling
  - – No baseplate or foundation deterioration

Polyshield Standard Features

- Standard 316 SS inserts
- 304 SS Polyadjust system to ease alignment
- Available in heights from 356 mm (14 in)
- Choice of three polymer materials based on the type of fluid pumped and the chemical environment
- One-piece removable polymer motor block
- Self-venting design with grout hole and plug
- Integral drip basin
- Standard fill - 200 bar (3000 psi) concrete
- Alloy inserts offered in 316 SS, Alloy 20, Hastelloy C®
- CPVC (Chlorinated Polyvinyl Chloride) drain connection

® Hastelloy is a registered trademark of Haynes International

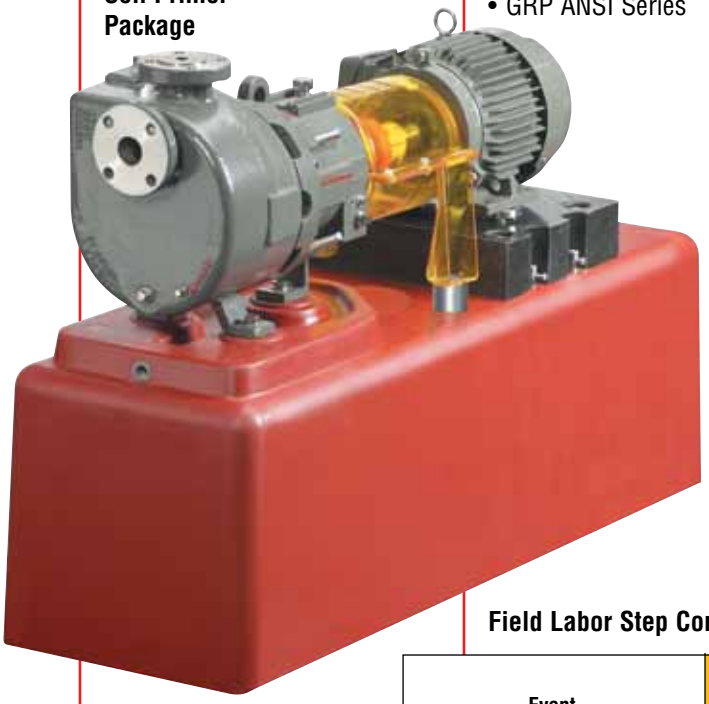


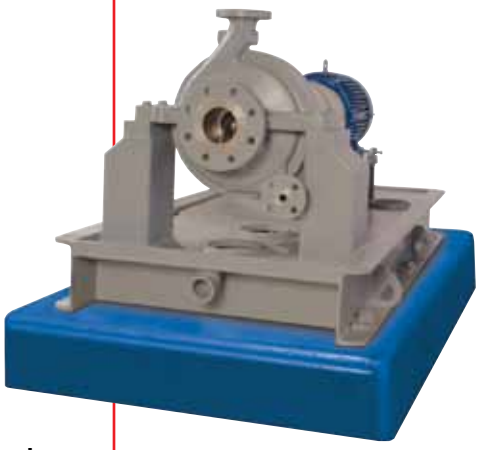
Chemical Resistance Against Aggressive Liquids
- Inorganic acids
- Dilute organic liquids
- Alkalines
- Organic solvents

Non-metallic Pump Packages Polyshield, due to its superior corrosion resistance, is well suited for use with the following non-metallic ANSI and ISO pumps:
- PolyChem™ M & S
- PolyChem F & L
- GRP ANSI Series

ISO 13709/API 610 Centerline-Mounted Pumps can be combined with custom flat top foundations to provide the benefits of a sealed foundation and a quick turnaround installation for:
- Conventional grout-in-place fabricated metal or cast baseplates
- Pre-grouted fabricated metal baseplates

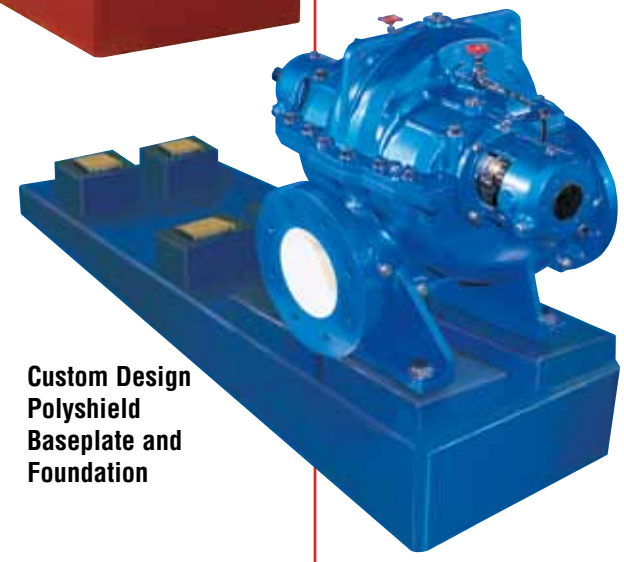
Self Primer Package





Polyshield with Mark 3 Vertical In-Line

ANSI, ISO and Other Foot-mounted Pumps to 750 kW (1000 hp) and larger, and temperatures to 260°C (500°F) and higher are natural candidates for utilizing the Polyshield system.



Custom Design Polyshield Baseplate and Foundation

Field Labor Step Comparison

Event	All Metallic Baseplates		Polyshield Baseplate and Foundation System
	Non-Grouted	Pre-Grouted	
1 Roughen paving	◆	◆	
2 Dowel paving and set rebar	◆	◆	◆
3 Pour pump foundation	◆	◆	
4 Roughen foundation top	◆	◆	
5 Clean/seal anchor bolt sleeves	◆	◆	
6 Inspect/prepare pump base	◆	◆	
7 Set base to centerline	◆	◆	
8 Level base or Polyshield	◆	◆	◆
9 Check alignment	◆	◆	◆
10 Set form base	◆	◆	◆
11 Pour first lift	◆	◆	◆
12 Cleanup	◆	◆	◆
13 Pour second lift	◆		
14 Cleanup	◆		
15 Check for voids	◆		
16 Check levelness	◆	◆	◆
17 Seal Polyshield foundation			◆
18 Remove forms	◆	◆	◆
19 Remove jackbolts	◆	◆	
20 Fix voids in baseplate	◆		
Number of Discrete Steps	19	15	9
Craft Man-Hours Required	103	74	23
Installation Time**	**13 Days**	**7 Days**	**2 Days**

**Exclusive of curing time

Actual results reported by a major chemical company

Technical Data

Technical Specifications

- Basic Structure
  - One grout hole 125 mm (5 in) to 150 mm (6 in) with grout hole plug
  - Minimum of 4 octagonal internal recesses to serve as mechanical grout locking keys
  - Sloping internal walls to provide self-venting characteristic
- Temperature
  - Process fluid temperatures to 150°C (300°F) with polymer mounting pads
  - Process fluid temperatures to 260°C (500°F) with alloy mounting pads
- Flatness
  - Coplanar flatness of 0.005 in/ft with polymer mounting pads
  - Coplanar flatness of 0.002 in/ft with alloy mounting pads
  - Parallel flatness of 0.015 in/ft between pump and motor mounting surface
- Motor Block
  - Solid one-piece polymer motor mounting block
  - Four 304SS transverse motor block adjusters
- Catch Basin
  - Integral catch basin designed under pump, complete with 15 mm (1/2 in) or 20 mm (3/4 in) NPT connection

Installation Steps

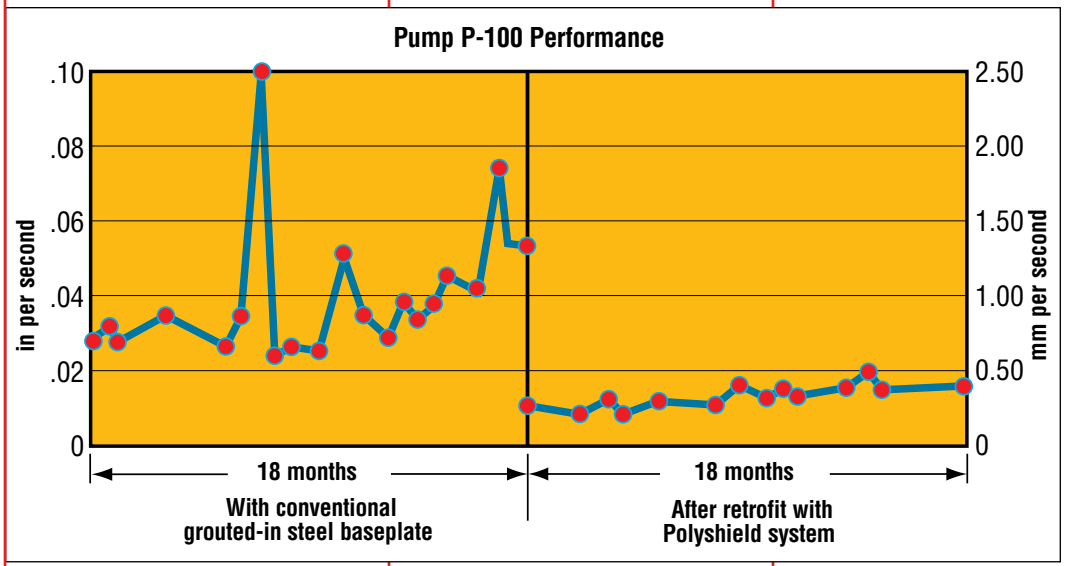
Install rebar cage.

Lower Polyshield over rebar cage.

Install bottom edge forms.

Pour regular 200 bar (3000 psi) concrete.

Vibration Dampening Record



● Actual results reported by a major chemical company

Global Engineered Services and Support

Total Cost Reduction

Asset Management

Product Life Cycle

Performance Re-rates

Site Diagnostics

Repair Services

Energy Management

Spare Parts

Maintenance Contracts

Materials Upgrades

Turnkey Services

Field Repairs

Installation

Project Supervision

Commissioning

Equipment Upgrades

Condition Monitoring

Systems Analysis

Field Machining

Service Dedication
Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrates its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services fully understands the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.

Strength of Experience, Commitment to Excellence
Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Engineered Services is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar™ asset management software, Engineered Services tracks performance and supports improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

Business Partner
Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.

Flowserve… Supporting Our Customers With The World's Leading Pump Brands

FLOWSERVE®

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