



Chemical Grouts & Polyurethanes

Industrial Strength Repair for Leaking Concrete & Masonry Structures



FIVE STAR

Specified by the World's Best™

Which Type Should You Choose?



POLYURETHANE GROUTS

For our purposes, there are many options for repairing leaks in concrete structures. One of the excellent repair methods is the use of polyurethane chemical grouts that react with water. Polyurethane grout can either bond with concrete to form a watertight, permanent seal or to become rigid, filling voids and acting as a stabilizer. Chemical grouts are used in sewers, manholes, tanks, vaults, tunnels, and many other applications.

Studies show that 40% of groundwater infiltration in sewer systems enters through manholes, requiring structural rehabilitation usually involving a spray, hand-applied or cured in place lining system. Groundwater infiltration must be eliminated prior to the lining installation. Existing leaks in manholes are often treated by applying a quick-set hydraulic cement which stops the leak. This temporary patch allows water to remain within the primary structure and can lead to a weakened bond or the failure of the lining system. Both hydrophilic and hydrophobic chemical grouts will seal leaks in all types of concrete structures.

HYDROPHILIC AND HYDROPHOBIC CHEMICAL GROUTS

It is vital to understand the basic differences in hydrophobic and hydrophilic chemical grouts since it is crucial in making the correct choice of repair materials.

Hydrophilic – Latin (hydro)=water and (philic)=affinity.

Hydrophilic chemical grouts can produce either closed cell foam or a non-cellular gel when mixed with water. When activated, foams expand in volume between 5–8 times. The volume of gel produced is relative to the ratio of water mixed with resin during installation. Hydrophilic Gels can shrink after cure in the absence of water. Hydrophilic chemical grout likes water and is able to bond to wet surfaces tenaciously; water-scavenging agents that seek out water as they react and allow the resin to work its way into water filled pores that exist in wet concrete surfaces. Hydrophilic chemical grouts are flexible and resilient after full cure and will allow movement to occur in the structure without damaging the seal or bond.

Hydrophobic – Latin (hydro)=water and (phobic)=fear.

Hydrophobic chemical grouts require a catalyst that is blended into the resin prior to installation. The dosage of catalyst added to the resin controls the reaction time and the volume of foam produced. Hydrophobic resins have an aggressive expansion. Hydrophobic chemical grouts repel water after activation. When injected into a wet crack or joint hydrophobic resins can trap water in the pores of the wet concrete. Hydrophobic chemical grout is low viscosity and permeates loose and non-consolidated soils readily.

USES — WATER CUT-OFF • SOIL STABILIZATION • CRACK SEALING (MOVING/NON-MOVING) • MEMBRANE GROUTING • JOINT SEALANT • SEWER GROUTING • PERMEATION SEALING (WATER/GAS) • MANHOLE SEALING • GROUT WATER CONTROL • EARTH RETENTION • UNDERPINNING • SINK HOLE STABILIZATION



Advanced Technology From Advanced Thinking™

Five Star[®] Poly Water Cut Hydrophobic

This product is a solvent-free and phthalate-free polyurethane prepolymer for single-shot injection.

For use in: Injection resin for water cut-off in concrete, masonry structures and sandy soils; including presence of strong seepage or gushing water.

Safe

- No phthalate-based plasticizers
- Harmless to the environment
- Solvent-free Hydrophobic Polyurethane Prepolymer
- Easier and less expensive shipping – no HAZMAT

Resistant to Chemicals

- Mild acids
- Most organic solvents
- Biological
- Gases and chemicals typically found in standard commercial structures and soil

Easy Application

- Controlling accelerator dosage (from 2% to 10%) allows for a variety of changing site conditions
- No harsh solvent odor
- Easily injected using single component injection equipment

Industry Leading Applications

- Designed for water cut off and the sealing of gushing water leaks of high pressure and volume
- Fills voids, openings, cracks or joints in and around concrete structures, rock fissures and sandy soils



Five Star® PolyFlex Gel Hydrophilic

This product is a free gel forming, phthalate-free, polyurethane prepolymer.

For use in: Injection resin for water cut-off in concrete, masonry structures including presence of strong seepage or gushing water.

Safe

- No phthalate-based plasticizers
- Non-flammable
- Harmless to the environment
- Solvent-free Hydrophilic Gel Forming Polyurethane Prepolymer
- Easier and less expensive shipping – no HAZMAT

Resistant to Chemicals

- Fungi, gases and chemicals found in soil and sewer effluent
- Biological attack

Easy Application

- Cured by reaction with water
- Dispersible and hydrophilic polymer
- Controlling water-to-resin ratio allows the applicator to react to a variety of changing site conditions
- No unpleasant odors
- Easily injected using single or two-shot injection technique

Industry Leading Applications

- Designed for the sealing of water leaks even when strong seepages or gushing water is encountered in concrete and masonry structures.
- Recommended for precast and brick manholes, sanitary and storm sewer pipe underground utilities and municipal services and waste water treatment plants.
- In the range from 500% to 700% these stable gelatinous masses are used for packer-type sewer grouting to economical stabilization applications.



Five Star® PolyFlex SLV Hydrophobic

This product is a solvent-free, phthalate-free, polyurethane prepolymer for single-shot injection.

For use in: Low viscosity injection resin for water cut-off in concrete, masonry structures and sandy soils, even when strong seepages or gushing leaks are encountered.

Safe

- No phthalate-based plasticizers
- Non-flammable
- Harmless to the environment
- Solvent-free Hydrophobic Forming Polyurethane Prepolymer
- Easier and less expensive shipping – no HAZMAT

Resistant to Chemicals

- Mild acids
- Most organic solvents
- Biological attack
- Gases and chemicals typically found in standard commercial structures and soil

Easy Application

- Controlling accelerator dosage (from 2% to 10%) allows for a variety of changing site conditions
- Very low viscosity—designed for very tight joints and hairline cracks
- Easily injected using single-shot injection

Industry Leading Applications

- Designed for water cut-off even when strong seepages or gushing leaks are encountered in concrete, masonry structures and sandy soils.
- Appropriate for sealing leaks through very tight joints and hairline cracks
- Designed for most industry applications including additional performance ability for gas and wind leakages, crack sealing-moving, sealing expansion joints, sewage pipe grouting and manhole grouting.



Five Star® Crack Repair SLV

This product is a specially formulated, very low viscosity, 2-component hybrid polyurethane. It is a rapid curing concrete repair material perfect when minimal down time is required. Its low viscosity offers deep penetration into hairline cracks for a structural repair.

Crack Injection for Concrete & Masonry Structures

For Buildings: Foundation rehabilitation, ground improvement and underpinning

For Plants: Deep foundation load transfer, foundation rehabilitation and ground improvement

Primary Advantage

The addition of aggregate makes a quality spall repair product that is ready for grinding and open to traffic in less than 1 hour. It is a solvent free system that can be used in temperatures between 0°F to 115°F (-18 to 46°C).

Primary Application

- Self-leveling for road surfaces and industrial floor repair

General Uses

- Used to fill interior/exterior hairline cracks
- Spall repair by mixing with aggregate
- Industrial floor repair applications receiving heavy duty vehicle traffic
- Parking lots and concrete bridge repair

Unique Benefits

- Seals cracks free of debris and provides a continuous surface for weight loading
- Repaired cracks or spalls can be opened to traffic in approximately 60 minutes at 77°F (25°C)
- Self leveling, low viscosity system
- 100% solvent free system with zero VOC content
- Can be mixed with aggregate for smaller repairs
- Repairs can be covered with a solvent based stain or paint for aesthetics. In exterior applications, Five Star® Crack Repair SLV may develop a greenish tint from UV exposure. The product is black when initially mixed then turns light gray upon curing in interior repairs.

Note: This product is highly sensitive to moisture before and during application only.



What Are Polyurethanes?

As a company, Five Star Products, Inc. continually seeks innovation in its products and expertise. With that stated, our new line of Polyurethane Grouts gives us cause to honor the result of one man's genius, Prof. Dr. Otto Bayer. Regardless of the diverse transformations of polyurethane such as, liquid coatings and paints, tough elastomers, rigid insulation, soft flexible foam, elastic fiber or as an integral skin, its underlying chemistry is the work of Dr. Bayer.

Dr. Otto Bayer (1902-1982) is known as the “father” of the polyurethanes industry for his invention of the basic diisocyanate polyaddition process. Polyurethanes are formed by reacting a polyol (an alcohol with more than two reactive hydroxyl groups per molecule) with a diisocyanate or a polymeric isocyanate in the presence of suitable catalysts and additives. Because a variety of diisocyanates and a wide range of polyols can be used to produce polyurethane, a broad spectrum of materials can be produced to meet the needs of specific applications.

Polyurethane's origin dates back to the beginning of World War II, when it was used as a replacement for rubber. The versatility of the new organic polymer and its ability to substitute for scarce materials spawned a wide range of applications. During World War II, polyurethane coatings were impregnated in paper, in the manufacturing of mustard gas resistant garments and high-gloss finishes on airplanes. Its chemical and corrosion-resistant coatings were applied to protect metal, wood and masonry. Polyurethane coatings went on to be custom formulated for specific applications on an industrial scale. By the mid-50's, polyurethanes were found in coatings and adhesives, elastomers and rigid foams. By the late-50's comfortable cushioning flexible foams were commercially available. Once low-cost polyether polyol flexible foams were available it opened the door to modern upholstery and automotive applications.

Today you will find polyurethanes in virtually everything we touch—desks, chairs, cars, clothes, footwear, appliances, beds as well as the insulation in walls and roof and moldings in homes and buildings.

About Five Star® Products

Since 1955, Five Star Products, Inc. has responded to the global need for precision machinery grouting, concrete repair, corrosion prevention and waterproofing products worldwide. Our products are in use by many of the world's most recognized names and in some of the most challenging environments in the industrial, infrastructure and marine markets.

No matter where and when you require, we can provide you with Five Star® Machinery Grouts, Structural Concrete® Repair Products, Epoxy Adhesives and Waterproofing materials. Our extensive global presence also includes project specification assistance, on-site technical service and product availability to all points globally.

The Five Star® product line includes high-performance machinery grouts, concrete repair and restoration products, including nuclear safety applications, chemical resistant coatings, waterproofing, and marine pile and column repair products. Five Star Products operates seven manufacturing facilities, all of which adhere to a strict quality control system conforming to the ISO 9001-2008 standard.

We serve a broad range of industries throughout the world, including oil and gas transmission, refinery, chemical processing, pulp and paper, mining and metals, heavy industry and infrastructure. Our dedicated engineering and research teams provide the technical expertise and creative know-how to assist you with innovative solutions to all of your grouting and concrete repair requirements.

For confidence and performance, always specify Five Star® products.

FIVE STAR PRODUCTS, INC.
60 Parrott Drive
Shelton, CT 06484-4733 USA
Phone: +1 203-336-7900
Fax: +1 203-336-7930
Tech Support: 1-800-243-2206

FiveStarProducts.com

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GROUTS**

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**Five Star®
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**Five Star®
CONCRETE REPAIR**

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**Five Star®
CHEMICAL GROUTS
& POLYURETHANES**

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WATERPROOFING**



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