



# ST-524

## *POLY-FOAM* INJECTION RESIN



### INTRODUCTION

Stratathane ST-524 Poly-Foam is a hydrophobic two component, flexible polyurethane resin based on MDI in combination with high-value polyether polyols. ST-524 Poly-Foam reacts with water and sets into a flexible closed-cell foam. ST-524 is mixed with ST-525 at the work site to form a single injection material whose reaction time is governed by the concentration of ST-525 in the blend.

The ST-524/525 mix reacting with water forms an inert barrier which is essentially unaffected by acids, gasses, and micro-organisms usually found in soil or the leak area. A minimum of reaction water is needed but larger amounts can be accommodated through displacement.

ST-524 is useful for a wide range of water control applications, including formation of grout curtains, stabilization of water-bearing soils, and sealing of cracks and joints in concrete, buildings, dams, and utility vaults.

**ST-524 has NSF 61 approval for potable water contact and carries the Underwriters Laboratories UL seal.**

ST-524 is injected directly from the can into the leak using either a single or a plural component high pressure pump. When 20 parts of ST-524 react with one part of water, the resulting mixture expands and quickly fills the leak path with an elastic seal that stops water entry but allows crack movement to protect against stress transfer. Concrete repaired with ST-524 will usually not crack again.

Stainless steel fittings are recommended but not strictly required because the ST-524/525 blend is only mildly corrosive. Cleanup of solidified material in the system, however, is often accomplished with caustic cleaning compounds, making stainless steel advisable.

The low-viscosity ST-524 mixture is easily injected. Once cured, its impermeability makes it an effective water shut-off system. The permeability of soil grouted with ST-524 depends on how well its voids are filled with grout. Values in the 10-5 cm/sec range should be obtained using ASTM Constant Head Permeability Test Method D-2434.

### REACTION

A two stage reaction takes place when ST-524 comes in contact with water. The mixture first expands and quickly thickens. Then, as it cures, ST-524 solidifies into a strong impermeable water barrier in just minutes. Unrestrained ST-524 foam expands up to ten times its starting volume. However, a dense material is preferred for most applications. Greater density is obtained by controlling grout placed relative to void space and static head pressure.

The two stage reaction takes place continuously during injection as product exits the packer. Initial penetration is facilitated by the low viscosity of the mixture. After reaction begins, the expansive mixture pressure induces some further penetration of the grout zone depending on the amount of static head pressure. ST-524 creates a seal which is impervious to water yet is able to tolerate freeze-thaw, wet-dry cycling, extrusion, and compression.

### CURE

The reaction and set time of ST-524 resin is a function of both temperature and the concentration of ST-525 in the blend. The following table shows the effect of ST-525 at different weight percentages at a temperature of 20C.

ST-525 WT %	CREAM TIME (SECONDS)	TACK FREE (MINUTES)
1.0	100	25.0
2.0	70	14.0
3.0	40	7.0
6.0	35	3.2
10.0	29	3.0



## PHYSICAL CONSTANTS

The primary physical constants for the ST-524 system are shown in the table which follows.

	ST-524	ST-525
Appearance	Pale Yellow	Greyish Liquid
Specific Grav	1.08 20 C	0.995 at 20 C
Viscosity	500 cps 25 C	25 cps at 25 C
Flash Point	>385 C	130 C

The low viscosity of the ST-524 Resin blend allows good penetration into cavities and cracks. After curing, water pressure will not affect the ST-524 resin seal at heads usually encountered in crack injection repair work. It has no preset "pot life" and does not cure as long as water or moisture vapor are not available to start the cure cycle.

## TENSILE AND ELONGATION

Test samples were prepared by putting the reacting mixture into a plastic pressure mold and capping the opening. This procedure (per ASTM D-638) resulted in a closed-cell foam with a density of about 30 pounds per cubic foot as compared to a free rise density of about 6 pounds per cubic foot. Measured tensile strength was about 6 psi at 67% elongation. The samples subsequently showed no water absorption after 4 hour immersion. Flammability tests of the same samples showed that combustion self-extinguished when the flame source was removed.

To prevent condensation from forming on the liquid or in the can, the temperature of the ST-524 should be adjusted to match the ambient temperature of the work area. Protect uncured resin during application from exposure to water, moisture vapor, and direct sunlight.

## CLEANUP

Cleanup of ST-524 is accomplished with a solvent or with a solvent and a cleaner used in sequence. The preferred solvent is ST-590 Kleen-Purge and the recommended cleaner is ST-522 Veri-Kleen Grout Cleaner. Use ST-590 for the liquid resin and ST-522 for solidified resin.

For heavy cleaning, push out ST-590 with ST-522 Veri-Kleen Grout Cleaner and follow the instructions for its use. Do not allow ST-590 or ST-522 to remain in the system for long periods. Properly dispose of used cleaning materials and do not reuse if contaminated or resin-loaded. See the pump manuals and the Technical Data Sheet for ST-522 and ST-590 for more information.

## ENVIRONMENTAL

ST-524 is essentially non-toxic in its cured form, with an LD50 (rat) in excess of 5000 mg/kg. Freezing either the cured or uncured material is not harmful to the product and may prolong the shelf life of the uncured resin in an unopened container. At temperatures below 5 C, crystallization may occur but is reversible without damage to the material by indirectly warming and gently mixing the product.

Stratathane ST-524 contains no measurable amount of TDI as performed by the Modified Analysis for Diisocyanates. ST-524 is non-flammable, non-carcinogenic, and non-corrosive as defined by 40 CFR and as described in the *NIOSH Pocket Guide for Hazardous Materials*.



## STATEMENT

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