

Terraset[®] System

Sodium Silicate-Based Chemical Grout System

Uses

Terraset[®] grout is a low-viscosity, chemical grout system used for ground consolidation and stabilization of foundations and footings located on fine to medium sands. Other important uses include control of water inflow into shafts and tunnels during excavation, pre-grouting of TBM/EPBM tunnel headings, formation of impervious grout curtains to contain pollution by hazardous waste, and cut-off walls into alluvial deposits at dam sites. The Terraset[®] system comprises Terraset[®] Part A Sodium Silicate Grout and Terraset[®] Part B Hardener.

Advantages

- **Adaptable** – Mix concentrations allow project-specific formulation; low viscosity enables maximum strata penetration, minimal product waste.
- **Chemical Resistivity** – Unaffected by acids, alkalis, salts and hydrocarbons; resistant to fungi, bacteria and hydrocarbons.
- **Low Viscosity** – 2 to 5 cps enables maximum permeation into fine sands and fine cracks.

Description

The Terraset[®] System is a complete process consisting of two components:

Terraset[®] Part A Sodium Silicate Grout (50 gal)
Terraset[®] Part B Hardener (5 gal)

Both parts are completely water soluble. On a volume basis, the amount of Terraset[®] Part B hardener needed ranges from 10% to 15% based on the sodium silicate concentration. The higher hardener concentration gives the most durable gels. Gel time of the mixed grout solution is approximately 12 minutes at 70°F. Terraset[®] Part B hardener obtains predictable gel

times over a wide range of temperatures when mixed with Terraset[®] Part A sodium silicate. The resulting gels are homogenous, dense and well structured.

Shelf Life

The shelf life of Terraset[®] Part B Hardener is one year in cool, dry conditions. Note: Terraset[®] Part A Sodium Silicate must be protected from freezing and should be monitored regularly for thickening that may take place.

Instructions for Use

Batch Method

Batch mixing permits only one predetermined gel time to be used for each batch. The mixing tank can be steel or plastic and should be fitted with a good agitator. Tank capacity should be related to the pumping rate and selected gel time to ensure the entire batch of Terraset[®] grout is dispensed within the established gel time.

To batch mix:

1. Add the required volume of water to the mixing tank. (See Table 1 Batch System.)
2. Start the agitator, then add the appropriate volume of Terraset[®] Part B Hardener. Continue stirring for a few minutes
3. Add the correct amount of Terraset[®] Part A Sodium Silicate to Terraset[®] Part B Hardener. Normal grout concentrations fall between 40% and 70%. Typically the grout concentration used is 50% by volume. In order to achieve practical working strengths, silicate concentrations of less than 30% are not recommended.
4. Terraset[®] grout is now ready for injection. Continue stirring the grout mixture throughout the grouting operation. (See Table 1 Batch System.)

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Metering System

The metering method typically allows a more convenient way of mixing and pumping Terraset[®] than with the batch system. As described above, in one tank, water is blended with Terraset[®] Part B Hardener. In another tank, Terraset[®] Part A Sodium Silicate is also blended with water to lower the viscosity. A metering pump is then used to bring the two liquids together at the end of the discharge line, sending the combination through a static mixer at the injection point. (See Figure 1 Metering System.)

Packaging

Component	Container	Volume
Terraset [®] Part A Sodium Silicate	55 gal drum	50 gal
Terraset [®] Part B Hardener	5 gal pail	5 gal
	55 gal drum	50 gal

Figure 1 Metering System

(The convenience of the metering system over the batch method is illustrated in Figure 1.)

Figure 1 illustrates a layout using two variable speed positive displacement pumps feeding into a mixing chamber, located just before the point of injection. Terraset[®] Part A Sodium Silicate is blended with water in Tank TA1. This effectively cuts the viscosity of the base grout and ensures efficient mixing with the Terraset[®] Part B Hardener in the mixing chamber. Terraset[®] Part B Hardener is blended with water in tank TA2.

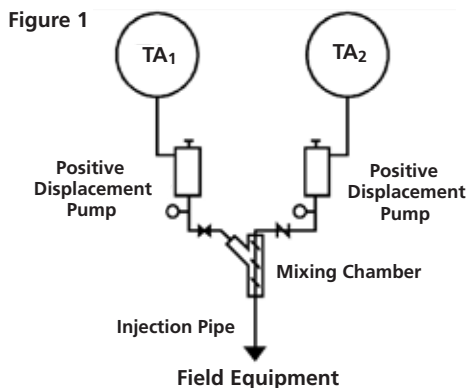


Table 1 Batch System

Grout make-up for different tank volumes

Prepare the grout in the following sequence:

1. Add the required volume of water to the mixing tank.
2. Start the agitator, then add Terraset Part B Hardener.
3. Continue stirring for a few minutes.
4. Allow it to be thoroughly mixed, then add the requisite amount of Terraset[®] Part A Sodium Silicate.

Terraset[®] grout is now ready for injection. Continue stirring the grout mixture throughout the grouting operation.

Tank Volume	Percent Terraset [®] Grout	Gallons Terraset [®] Part A	Gallons Terraset [®] Part B	Gallons Water
10 Gallons	30	3	0.3	6.7
	40	4	0.4	5.6
	50	5	0.5	4.5
	60	6	0.6	3.4
	70	7	0.7	2.3
20 Gallons	30	6	0.6	13.4
	40	8	0.8	11.2
	50	10	1.0	9.0
	60	12	1.2	6.8
	70	14	1.4	4.6
30 Gallons	30	9	0.9	20.1
	40	12	1.2	16.8
	50	15	1.5	13.5
	60	18	1.8	10.2
	70	21	2.1	6.9
40 Gallons	30	12	1.2	26.8
	40	16	1.6	22.4
	50	20	2.0	18.0
	60	24	2.4	13.6
	70	28	2.8	9.2
50 Gallons	30	15	1.5	33.5
	40	20	2.0	28.0
	50	25	2.5	22.5
	60	30	3.0	17.0
	70	35	3.5	11.5

Minova Americas

150 Carley Court
Georgetown, KY 40324 USA

Phone 800 520 6621

Fax 502 863 1374

Email sales.info@minovaint.com

Web www.minovaamericas.com



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