Technical Datasheet

AR 800

Acrylate gel for structure leak seal

Description

AR 800 is a super low viscosity, hydrophilic acrylate resin that produces an elastomeric gel with variable set times. This three-component product is used for leak sealing and soil consolidation. In wet or dry conditions, the weight of gel increases or decreases in a reversible manner. **Verified NSF/ANSI Standard 61 compliant** for contact with potable water.

AR 800
Solution of acrylate monomers

Primeset TEA
Liquid activator to vary the set time

Primeset SP
Powder initiator added to water

Advantages

The variable set time range is long–from minutes to more than an hour–and is adjustable in the field. The resin remains fluid until polymerization, allowing for excellent penetration. Ideal for geotechnical use in humid environments, sandy soil.

Applications

- Mainline and lateral sewer grouting
- Curtain grouting
- Water control in tunneling operations
- Soil treatment and stabilization
- Crack injection water stop
- Tunnels (subway, water, utility, etc.)
- Storm sewers and box culverts
- Below-grade parking decks
- Manholes
- Retaining walls

Technical information

Properties will vary depending upon site conditions, application method, mixing method and equipment, material temperature, and curing conditions.

Typical Properties - Cured	50% Water Dilution	75% Water Dilution
Appearance	White flexible gel	White flexible gel
Consistency	Soft silicone gel	Cooked egg white

Solubility	Insoluble in water, kerosene, gasoline. Gel swells slightly in presence of water.
Permeability	Substantially impermeable to water (5x10-9 cm/sec). Stable in 100% humidity.
Shrinkage	Shrinking occurs upon dehydration
Chemical Resistance	Resistant against bacteria, fungi, and chemicals found in sewer systems

AR800	
Appearance	Amber in colour
Density	1.20 kg/L
Solids content	39-41%
Specific Gravity	1.2
Boiling Point	93°C
Solubility in water	100%

AR800 Grouting Solution	50% Water Dilution	75% Water Dilution
Viscosity	10-15 cps	1-3 cps
Density	1.10 kg/L	1.07 kg/L
pH	6.0-7.5	
Stability	24 hours	

Primeset SP - Sodium Persulfate	
Specific Gravity	2.6
Solubility in water	43% by wt. @ 25°C
pH	6.0-8.0
Primeset TEA-Triethanolamine	
Specific Gravity	1.10

A USL Company

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Mixing Ratio

AR 800 INITIAL WATER CONTENT AND SUBSEQUENT CHANGES

We recommend the initial concentration of AR 800 be 50% or 25%. This will produce a gel with the following consistency:

- 50% concentration Soft silicone rubber
- 25% concentration Soft cooked egg white

The majority of sealing, grouting and consolidation applications may be achieved with a concentration of 25%. This reduces overall cost and provides the lowest viscosity possible for permeation into cracks and soil.

When immersed in water, the unconfined gel can absorb up to two times its own weight, expanding slightly. Humid conditions allow the gel to remain relatively constant. In the absence of water, the gel shrinks slowly without cracking. These dimensional changes are reversible and do not degrade the gel.

The AR 800 system may be treated as a 1:1 by volume two-component system after premixing AR 800 with Primeset TEA and premixing Primeset SP with water. These two premixes may then be mixed at a ratio of 1:1.

In order to prepare a 25% concentration the AR 800 premix is made by diluting the AR 800 with 100% water and then adding TEA. The second premix is made with SP adding to water. These premixes may then be mixed 1-1.

25% concentration

AR 800 premix

- 5 Litres AR 800
- 5 Litres water
- TEA % addition to obtain desired set time

Water premix

- 10 Litres of water
- SP % addition (equal to TEA%) to obtain desired set time

In order to prepare a 50% concentration the AR 800 premix is made directly by adding TEA. The second premix is made with SP adding to water. These premixes may then be mixed 1:1.

50% concentration

AR 800 premix

- 5 Litres AR 800
- TEA % addition to obtain desired set time

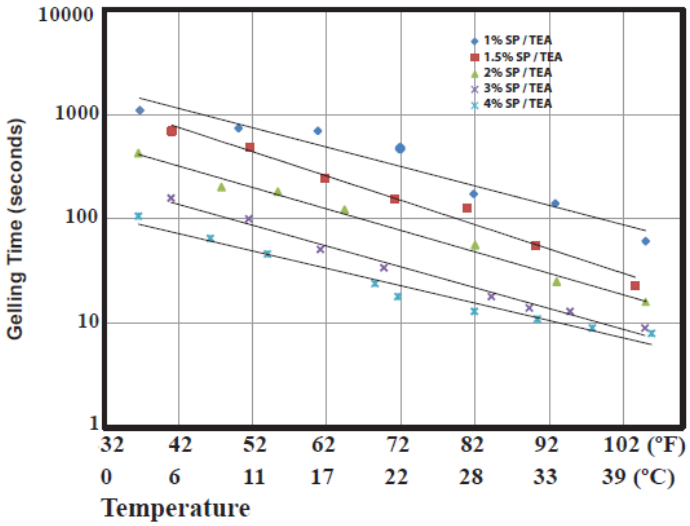
Water premix

- 5 Litres of water
- SP % addition (equal to TEA%) to obtain desired set time

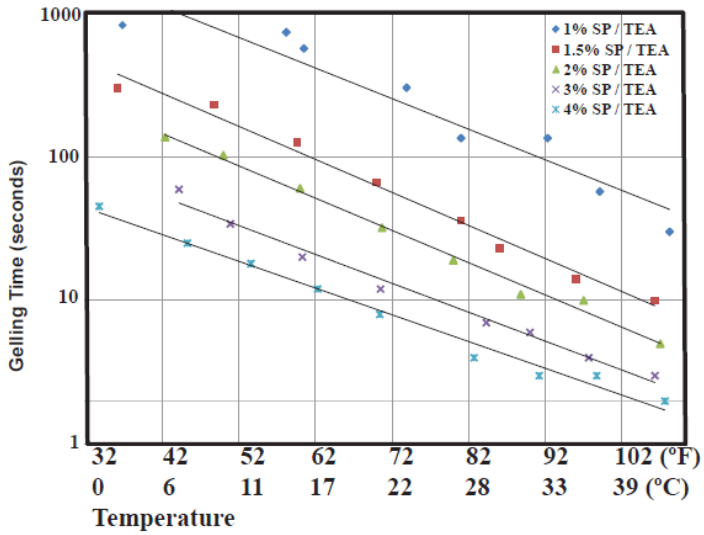
TEA and SP Addition Levels

The Primeset TEA and Primeset SP is added to the AR 800 and water respectively for the purpose of controlling the set time of the gel. This level should be kept between 1% and 4% of each tank's liquid volume depending upon the set time desired. The set time is influenced by a number of factors including TEA/SP concentration, water dilution level and temperatures. The following chart provides expected set times for TEA/SP addition levels at various water dilutions and temperatures.

Expected set time at 25% concentration:



Expected set time at 50% concentration:



Mixing

After determining the desired dilution and set time, the premix formulations can be finalized and prepared. In order to make the premixes you will need appropriate size plastic mixing containers, a mixer, a scale and appropriate amounts of AR 800, TEA and SP.
It will also be useful to know the following:
5 Litres of AR 800 weighs 6 kg
5 Litres of water weighs 5 kg

Premix formulation examples
(can be scaled up or down as necessary):

Example 1

Require 300 Litres of 25% concentration AR 800 with a 4 minute gel at 22°C (1.5% TEA and SP from chart). *Note: In order to obtain 1.0% multiply by .01, 2.0% multiply by .02, etc.*
Formulation:

A tank	**B tank**
AR 800/TEA premix	Water/SP premix
75 Litres AR 800 (80 kg)	150 Litres water (150 kg)
75 Litres water (75 kg)	1.72 kg SP
1.9 kg TEA	

You may use the set time charts to approximate gel times at different temperatures. As the data confirms, slower set times will result at lower temperatures and faster set times will result at higher temperatures. Note that the temperature of the premixes is often different than the application area. There are other variables that can affect set times, so once you determine the TEA/SP levels to get the set time you desire, we recommend making a small test batch to confirm set times. We recommend using the fastest set time possible that still allows the application technique chosen.
Preparation:
The AR 800 premix is prepared by first adding 75 Litres of water to the mixing tank followed by 75 Litres of AR 800 and then mix. While you are mixing, add 1.9 kg of TEA and thoroughly mix – completing the AR 800 premix preparation. The water/SP premix is prepared by adding 150 Litres of water to a second plastic mixing tank. The SP is a white crystal and dissolves in the water readily. While mixing, add 1.72 kg of SP to the water and continue to mix until the SP is fully dissolved – completing the water/SP premix. The AR 800 premix and water/SP premix can now be mixed 1-1 obtaining a cooked egg white consistency setting up in 4 minutes at 22°C.

Example 2

Requires 100 Litres of 50% concentration AR 800 with a 1 minute gel at 22°C (2.0% TEA and SP from chart). *Note: In order to obtain 1.0% multiply by .01, 2.0% multiply by .02 etc*
Formulation:

A tank	**B tank**
AR 800/TEA premix	Water/SP premix
50 Litres AR 800 (60kg)	50 Litres water (60kg)
0.91 kg TEA	0.76 kg SP

Preparation: The AR 800 premix is prepared by first adding 50 Litres of AR 800 to the mixing tank. While you are mixing, add 0.91 kg of TEA and thoroughly mix – completing the AR 800 premix preparation. The water/SP premix is prepared by adding 50 Litres of water to a second plastic mixing tank. The SP is a white crystal and dissolves in the water readily. While mixing you should add 0.76 kg of SP to the water and continue to mix until the SP is fully dissolved – completing the water/SP premix. The AR 800 premix and water/SP premix can now be mixed 1:1 obtaining a soft silicone consistency setting up in 60 seconds at 22°C.

Before final 1:1 mixing we recommend mixing a few grams of AR 800/TEA and water/SP premix to confirm gelling in the desired time frame. If the gelling time needs to be shortened, using the chart as a guide, additional TEA and SP may be added to shorten the desired set time. If the set time is too fast then, using the chart as a guide. Note that equal dilutions are required on the AR 800 and water/ SP premix. Also, the 25% concentration AR 800 premix will require diluting with a 50/50 blend of AR 800/water.

We recommend only preparing the amount of premix which will be used immediately. However, the AR 800 premix is stable for 24 hours when kept cool, sealed and covered. The premixes are stable for a few days when kept below 25°C. Avoid exposure to sunlight.

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Application

AR 800 gel can be dispensed or injected using either a single-component pump or a dual-component fixed, all stainless steel ratio pump depending upon the application method of choice.
In order to use a single-component pump the AR 800 and SP/water premixes must be thoroughly mixed at a 1:1 ratio. You should only mix as much material as you can use at the set time prepared. We suggest a longer set time be prepared when using a single dispensing pump as this allows a greater working time. You must also allow time to flush out your pump before gelling or risk setting up your pump rendering it inoperable. Do not use pumps made of copper or aluminum.
A two-component pump mixing system allows for shorter gel times. The AR 800 and water/SP premixes are pumped separately through a mixer and then into the application area. The set time of the gel must allow complete penetration of the area, cleaning out of the mixing head/tube and possibly cleaning of the supply tube. An appropriate dual-pump mixing machine must be selected, which allows the pressure and flow rate for the application. The technical service personnel at Prime Resins can help you with the appropriate selection. Again, do not use pumps made of copper or aluminum. Use all stainless steel pump and fittings.

All equipment used should be thoroughly flushed with water prior to the gel time. This is critical for mixing equipment and pumps. Allowing the material to gel in a pump may result in the loss of the pump.

Handling

Materials should be mixed or stored in stainless steel or plastic containers (polyethylene or polypropylene).

Warning: Prolonged exposure to UV, sunlight and elevated temperatures above 29°C will cause solidification of the product.

Warning: Do not let Primeset TEA and Primeset SP come into contact with one another prior to field mixing. A poisonous gas may result. Components should be stored separately from each other. We recommend transporting them separately to avoid mixing in case of a vehicular accident.

Warning: Primeset TEA and Primeset SP are incompatible with aluminium. Do **not** use aluminium equipment, pump components, mixing containers or utensils. Pump and all fittings must be stainless steel.

Packaging

Pack sizes: AR 800 25L pails & 200L drums (acrylic monomers)
Primeset TEA 25L units (triethanolamine)
Primeset SP 25L units (sodium persulfate)

Storage

Store in dry environment between 4-27°C.

The shelf life is 18 months from date of manufacture when stored correctly in unopened containers

Limitations

Cold temperatures will slow down reaction time and increase viscosity. Use at temperatures above 4°C.
Material that is off ratio or not mixed thoroughly will not cure to full strength and may remain tacky.

Health & Safety

Product Safety Data Sheets (SDS) are available from Nufins. SDS sheets are provided to help customers satisfy their safe handling, use and disposal needs as well as assist with any conformance requirements made locally by health and safety regulations.

SDS are continually updated to provide the latest information to our customers. We therefore recommend contacting our head office to obtain the most recent and accurate SDS before handling and using any product.

Technical Support

Through our technical department and laboratories we can offer a comprehensive service to specifiers and contractors. Technical contacts are available to provide further information and arrange demonstrations.

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