

PRODUCT NAME

AQUA LOC RESIN LV - GEL

MANUFACTURER

CGI International, LC
213 Linkside Circle
Ponte Vedra Beach, FL 32082

DESCRIPTION

Aqua Loc Resin LV is a methacrylate based hydrophilic chemical sealant designed to stop water intrusion through cracks in concrete by forming a gel deep inside the crack.

ADVANTAGES

- No acrylamides.
- Mixes with water and converts it to a solid gel in a controlled time period ranging from 5 seconds to 5 minutes.
- Operates in most 1:1 ratio liquid injection equipment. Inject at atmospheric pressure or with high pressure (up to 3500 psi).
- Resin with water like viscosity that due to forces of gravity or applied pressure, flows deep into concrete fissures and cracks where full polymerization occurs to form a solid gel.
- Flexible, elastic, with little odor.
- Prevents further rebar spalling and arrests rust.
- Non Flammable, non-toxic and non-explosive.
- Will not deteriorate in salt or wastewater.
- Environmentally safe. Will not promote growth of fungi, mold, or bacteria.

APPLICATIONS

Stops water leaks in concrete regardless of the amount of the leaking water. Dams, tunnels, sewers, manholes, foundations, bridges, roadways, ceilings; virtually any water leak in any concrete structure can be stopped.

MIXING PROCEDURES

In pure form resin, catalyst and accelerator are toxic. However, these chemicals are heavily diluted in water. The catalyst essentially assumes the properties of water when mixed properly. However, the use of rubber gloves, eye protection, and appropriate protective footwear is required at all times.

The setting time of the gel is based on the amount of accelerator (TEA) added. In order to achieve the optimum mixture, a ratio of 86 ml of accelerator is mixed with one gallon of Aqua Loc Resin LV. This is performed in one container (Container A). Similarly, in a separate container (Container B), a ratio of 140 grams of catalyst is mixed with one gallon of water. The contents of Container A should never come into contact with the contents of Container B so that polymerization does not occur prior to the injection. In particular, separate mixing utensils should be used for each container.

The setting time for the gel is directly related to the amount of accelerator (TEA) added. The amount of the catalyst (AP) is always kept constant.

If the air temperature is 65°F, the contents of Container A (resin & TEA) will react with the contents of Container B (Water and AP), to form a gel in approximately 40 seconds. This setting time is typical for most applications. If the air temperature is 86°F the above-mentioned content quantities will react in approximately 23 seconds. Consequently, the setting time decreases, as the temperature increases. If additional accelerator (TEA) is added at any given temperature, the setting time can further decrease.

PHYSICAL PROPERTIES

Uncured

RESIN

Appearance	Slightly syrupy aqueous solution
Color	Amber
Density	1.17 kg/l
Viscosity	Pure/ready to inject 15 cps/1.2 cps
Active/Solids	48%
Specific Gravity	0.93g/cm ³
Freezing Point	-22°F
Vapor Density	5.4 pure (air = 1)
Corrosiveness	Non-corrosive
Solubility in water	100%
Boiling Point	374°F in pure form

CATALYST

About 99% water plus 1% Additive of Ammonium Persulfate having pure properties as follows:

Physical State	Powder
Appearance	White
Solubility	800 G/L (200C)
Odor	Odorless
Flash Point	200°F
Moisture sensitive, can cause eye burns	

ACCELERATOR

About 1% mixed into the RESIN Trieththanolamine having pure properties as follows:

Physical State:	Liquid
Appearance	water-white
Specific Gravity	1.126
Solubility	100% soluble in H ₂ O
Odor	amine-like
Viscosity	590.5 cps
Freezing Point	72°F
Immerse container in hot water to thaw	
Boiling Point	635°F
Vapor Density	5.1
pH	10.5

SAFETY INFORMATION

Care must be taken when handling and mixing the chemicals, Aqua Loc Resin, TEA, and AP in their Pure forms. Workers handling these chemicals must wear eye protection, rubber gloves, and protective footwear. If any of these chemicals comes in contact with the skin, it should be washed off immediately. Should any of these chemicals come in contact with the eyes, immediately flush eyes generously with water and seek medical attention.

CONFINED SPACE SAFETY

Avoid prolonged breathing of the vapor that is released when the gel is formed. The smell has a distinct odor of ammonia. A small amount of this vapor is released when the chemicals in the two containers are combined to form the gel.

Use a blower and flexible duct to ventilate the bottom of manholes and all confined spaces. The gel is formed by an exothermic reaction when the chemicals from the two containers are mixed together. The heat produced by this chemical reaction is sufficient to burn the skin upon contact. Always wear gloves! In the event of an EMERGENCY call: CHEMTREC: 800-424-9300

WARRANTY INFORMATION

CGI International LC shall warrant the Aqua Loc Resin LV – Gel to maintain its integrity within the concrete structures. Under this warranty, CGI International's obligation shall be limited to the replacement of the defective product. CGI International cannot be responsible for the adverse effects that the environment may cause, i.e. structural issues, earth movements, erosion, adverse changes in the groundwater table, hydrostatic water pressure, flooding, etc. CGI International cannot be responsible for any defects in the product as a result of work performed by others within the concrete structures where the injection has taken place.

MATERIAL SAFETY DATA SHEETS

MSDS sheets can be downloaded from the CGI International, LC web site: www.cgiinternationallc.com
 Catalyst: CAS# 7727-54-0
 Accelerator: CAS# 102-71-6
 Aqua Loc LV Resin: CAS# 2807-47-2

CHEMICAL STABILITY (Aqua Loc Resin LV - Gel)

Test Method: A test sample of approximately 50 cm³ of Aqua Loc Resin LV was completely polymerized. Each test sample was kept at room temperature in one liter of the test liquid for a period of 42 days. The degree of discoloring, consistency, and dissolution were determined. The test piece was characterized as "stable" or "unstable". The results are presented below.

Test Liquid	Chemicals Used for Immersion Test	Evaluation
Gasoline, unleaded	Normal Vehicle Fuel	Stable
Diesel	Diesel and heavy heating oil	Stable
Toluol	Aromatic solvent	Stable
Xylol	Aromatic solvent	Stable
Methanol, 50% in water	Alcohols	Stable
Isopropanol, 50% in water	Alcohols	Stable
N-Methyl pyrrolidone	Nitrogen containing solvent	Stable
Ethyl acetate	Aliphatic esters	Stable
Methyl isobutyl ketone	Aliphatic ketones	Stable
Formaldehyde, 35% in water	Aldehydes	Stable
Acetic acid, 10% in water	Organic acids up to 10%	Stable
Sulfuric acid, 20% in water	Mineral acids up to 20%	Stable
Sodium Hydroxide, pH 11-12	Same as pH in concrete	Stable
Common salt 20% in water	Salt solutions up to 20%	Stable
Freeze and Thaw Cycles	12 hour cycles	Stable

AQUA LOC RESIN LV (Stabilized and prepared for injection)

PHYSICAL PROPERTIES	DESCRIPTION
Appearance	Slightly syrupy aqueous solution
Color	Amber —slightly opalescent
Odor	Slightly ester-like
pH	6,5 - 7
Active/Solid Matter - Percentage	48%
Density / Viscosity	0,044 lbs per cubic inch at 68° F
Pure	15 +/- cps
Ready to Inject	1-2 (Water is 1 cps)
Corrosiveness	Non-Corrosive
Flash Point	Non Applicable (an aqueous liquid)
Combustible Properties	Non-Combustible
Solubility in Water	Miscible in all applications
Stability	Stable under all conditions tested

AQUA LOC RESIN LV - GEL

PHYSICAL PROPERTIES	DESCRIPTION
Appearance	Translucent and sticky to the touch
Consistency	Firm and rubbery
Adherence	Very good adherent strength on hydraulic, metallic and plastic bases
Swelling in Water	150% to 200%
Desiccation in Air	Shrinking & hardening without water contact
Swelling/Desiccation Cycle	Reversible
Corrosiveness	Non-Corrosive
Solubility	Insoluble in water, kerosene, gasoline
Permeability	Impermeable to water/stable in 100% humidity
Tensile Strength	100 psi to 150 psi
Elongation	250% to 300%
Cohesive Rupture	Over 150 psi
Chemical Resistance	Resistant to bacteria, fungi, and all chemicals found in sewer systems for example

POLYMERIZATION

The polymerization of the Aqua Loc Resin LV takes place through a free radical process. The following tests have been conducted:

Radiation Test:

The conditions of the experiment were defined in order to reproduce the degradation of Aqua Loc Resin LV. The resin was injected into cracks on the walls of concrete tanks to a depth ranging from 42.5 cm to 80 cm. The tanks are one meter thick and store radioactive wastes. The injected gel must have a lifespan of at least 50 years. The test samples were exposed to radiation of up to 2000 hours. University testing concluded that radiation does not appear to cause significant damage to the resin, for the levels of radiation tested.

Application Tests:

Various tests were completed by the University that would be of interest or importance to the waterproofing industry. Some of these are listed below:

- Complete polymerization occurred when seawater and brackish water were mixed with the Aqua Loc Resin LV to form the gel.
- Various shaped containers were used, and the gel completely filled all sizes and shapes tested. This confirms that the gel can fill all concrete void volumes regardless of their shape and/or size.
- The gel withstood expulsion in a tube where over 80 bars of applied pressure were exerted.
- Aqua Loc Gel has a great dimensional stability in

temperature ranges to -22°F. During the period of one year, the University conducted the following experiment on a monthly basis. A sample stored at -22°F was gradually brought to room temperature, then cooled again to -22°F and restored in the freezer. No reduction in gel flexibility was observed upon each return to room temperature. Additionally, the gel sample did not exhibit any visible cracks.

- The recorded volume stability illustrates that there is no risk of concrete displacement either during the polymerization phase or during the freeze-thaw cycles.
- Dehydration is not very likely in the case of underground construction. The amount of water in the gel is regulated by the moisture content of the exterior environment. The dehydration rate is directly proportional to the amount of moisture in ground. This phenomenon is limited, since the evaporation surface is the exposed surface area of the wall crack, not the total surface area of the wall. Also, as soon as water (or water vapor) is reintroduced, 100% re-hydration occurs and the gel swells back to its original size and shape thus re-establishing all of its initial properties. This is independent of the number of dehydration and re-hydration cycles.
- The gel was elongated up to 60% of its original size with no signs of tearing.
- A gel sample in a closed container has retained its original shape over a seven-year period (this test is ongoing).

- Time to full polymerization (setting time) was tested within a time frame ranging from 15 seconds to one hour with optimal results.
- An eight-inch thick concrete test sample was cut in two pieces. The small internal cracks showed the Aqua Loc Gel traveled within the full depth of the cracks observed.

OTHER INFORMATION

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