

Aqualast® HYP605 Chlorosulfonated Polyethylene Emulsion

Description

LORD Aqualast® HYP605 chlorosulfonated polyethylene emulsion offers broad latitude in formulating waterborne adhesives and coatings. It is also used as a modifier to enhance the flexibility and adhesion properties of many anionic emulsions.

Aqualast HYP605 emulsion can be used as an adhesive in pressure sensitive packaging and permanent adhesive formulations. It can also be used to formulate coatings for flexible substrates, protective coating and temporary or removable coating.

Features and Benefits

Environmentally Friendly – cleans up with water; no VOC content; non-flammable.

Broad Temperature Range – resists cracking and peeling when exposed to low temperatures; no loss of properties after exposure to moderately high temperatures.

Environmentally Resistant – resists the effects of exposure to outdoor environments; maintains physical and mechanical properties after aging.

Chemically Resistant – withstands exposure to a wide variety of industrial chemicals; provides excellent barrier against water and oil in industrial and commercial applications.

Crosslinkable – gains improved physical and mechanical properties when crosslinked with traditional curatives.

Versatile – compatible with a variety of anionic emulsions.

Application

Mixing – Stir emulsion slowly and thoroughly before using. Use low shear and stainless steel open impeller centrifugal pumps for pumping raw Aqualast HYP605 emulsion or emulsion compounds. Moyno pumps or special wide tolerance gear pumps can also be used. Piston pumps should be avoided as the internal shear associated with these pumps may cause polymer coagulation and destabilize the emulsion.

Typical Properties*

Appearance	White Liquid
Viscosity, cps @ 25°C (77°F) Brookfield LVT Spindle 3, 12 rpm	1000-3000
Solids Content by Weight, %	49-51
pH	5-7
Water Absorption, % After 24 hr, ASTM D 471	12.9
Mechanical Stability, % Coagulum after 1800 sec, ASTM D 1417	0

*Data is typical and not to be used for specification purposes.

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Formulating – Prior to mixing Aqualast HYP605 emulsion with other emulsions or pigments, adjust the pH of Aqualast HYP605 emulsion to neutral (6.5 to 7.0) with ammonium hydroxide or a dilute solution of sodium hydroxide. Stabilize the pH of the emulsion with 1-2%, by weight, of magnesium stearate.

- With Curatives

Use conventional metal oxide and sulfur donor cure systems to cure films of Aqualast HYP605 emulsion. The high reactivity of sulfonyl chloride crosslinking sites of Aqualast HYP605 emulsion allows a wide choice of practical curing systems. Cured adhesives are more resistant to chemicals, weather and aging than uncured adhesives.

The following tables exhibit the typical properties gained by using curative systems.

Table 1 - Uncured Aqualast HYP605 Emulsion Average Physical Properties*

Physical Property	Unaged	Aged 7 days, 70°C (158°F)
Elongation, % ASTM D 412	763	776
Tensile Strength, psi ASTM D 573	338	274
Tear Resistance, lb/in ASTM D 412	50.2	–
Flex Resistance, cycles to break ASTM B 813	2850	–

*Cast film without curative, dried 30 min @ 153°C (307°F).

Table 2 - Cured Aqualast HYP605 Emulsion Average Physical Properties**

Physical Property	Unaged	Aged 7 days, 70°C (158°F)
Elongation, % ASTM D 412	409	357
Tensile Strength, psi ASTM D 573	709	1005
Tear Resistance, lb/in ASTM D 412	76.18	–
Flex Resistance, cycles to break ASTM B 813	3800	–

** Cast film compounded with curative, dried 30 min @ 153°C (307°F).
Curative formulations based on: Aqualast HYP605 - 100 parts; magnesia - 15 parts; sulfur - 1 part; TMTD - 2 parts.

- With Thickeners

Use cellulosic, alginate, or polyvinyl alcohol to adjust the viscosity of Aqualast HYP605 emulsion compounds. The choice of thickener depends on rheological and performance requirements. Dissolve the thickener in water, then add emulsion compounds.

Acrylic emulsion thickeners such as Acrysol™ ASE-60 do not require dilution. They are, however, only effective in alkaline systems.

- With Fillers/Pigments

Add fillers to reinforce or extend Aqualast HYP605 emulsion. The best results are achieved when the fillers are predispersed in water using high shear mixing equipment. Slowly add the predispersed filler to Aqualast HYP605 emulsion using low speed, low shear mixing equipment to minimize foaming or entrapped air. Mix thoroughly to ensure a complete and uniform mixture. Suggested fillers include:

Carbon Black	Talcs
Titanium Dioxide	Calcium Carbonates
Diatomaceous Earths	Clays
Silicas	Factice

Silicas and minute particle size talcs require adding a dispersant when using conventional mixing equipment. When using large quantities of dry undispersed fillers, add dispersants such as Tamol™ 731, Darvan® 1 or Daxad 30 to the emulsion.

- With Foam Control Additives

The following antifoamers (foam inhibitors) and defoamers (foam breakers) are effective in Aqualast HYP605 emulsion compounds:

Foamaster® VL	Foamaster® VF
Colloid 680	Colloid 987

Colloid 840 and Colloid 999 are effective as both defoamers/antifoamers. They are effective over a period of several hours after being added.

Avoid non-ionic agents which contain moderately long hydrophobic groups and short hydrophilic groups (i.e., octyl alcohol and hexylene glycol). These defoamers can destabilize the emulsion, especially if subjected to high shear.

*Acrysol and Tamol are trademarks of The Dow Chemical Company.
Darvan is a trademark of R.T. Vanderbilt Co., Inc.
Foamaster is a trademark of Cognis Group.*

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- With Emulsions and Latices

Most anionic emulsions and latices are compatible with Aqualast HYP605 emulsion.

Blending is best accomplished by adjusting the pH of Aqualast HYP605 emulsion to that of the corresponding emulsion or latex. The resulting properties are a combination of the individual properties of each product. Due to varying degrees of compatibility, it is not possible to predict the exact properties for a given blend.

The following types of elastomer emulsions are compatible with Aqualast HYP605 emulsion:

Polyvinylidene Chloride	Nitrile
Vinyl Acetate-Acrylic	Natural Rubber
Chloroprene	Acrylic
Polyvinyl Acetate Homopolymer	
Carboxylated Styrene-Butadiene	

Hydrocarbon resin emulsions (aliphatic and aromatic hydrocarbon resins) are compatible with Aqualast HYP605 emulsion. Adhesives made from blends of these resin emulsions with Aqualast HYP605 emulsion will have modified properties of strength, clarity, tack, and hardness. The most effective blend ratios are 60-90 parts, by dry weight, of Aqualast HYP605 emulsion to 10-40 parts resin.

Shelf Life/Storage

Shelf life is six months from date of shipment when stored in original, unopened container.

Use the entire container upon opening. Airborne contaminants are likely to induce bacterial growth in partial containers that are opened and re-closed.

Cautionary Information

Before using this or any LORD product, refer to the Material Safety Data Sheet (MSDS) and label for safe use and handling instructions.

For industrial/commercial use only. Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

Values stated in this technical data sheet represent typical values as not all tests are run on each lot of material produced. For formalized product specifications for specific product end uses, contact the Customer Support Center.

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