

Synthalen[®] W400

Thickening and Suspending Agent

Chemical and physical characteristics (*)

Chemical Name	Acrylic copolymer in emulsion
INCI NAME	Acrylates Copolymer
Appearance	Milky liquid
Polymer content (%)	29-31
pH (as is)	2.0-3.5
Viscosity as is (mPa·s) (Brookfield RV, 20 rpm, 25°C)	max 100

Viscosity (mPa·s) of neutralized dispersions (pH 7, NaOH)
(Brookfield RV, 20 rpm, 25°C)

% Dispersion	Viscosity		Spindle
	Min.	Max	
5.0	4,000	7,000	4

(*) Typical values not qualified for quality control purpose

Applications

SYNTHALEN W400 is an anionic acrylic copolymer supplied as a low viscosity o/w emulsion.

Its water dispersions, when neutralized, are characterized by medium viscosity, high yield value and clarity in a large range of pH (see Fig. 1 and 2), and show typical pseudoplastic behaviour. In water the polymer starts to swell at pH 6. In the presence of other components such as surfactants, the viscosity builds up at lower pH. Fig.3 shows the viscosity and yield value behaviour vs. pH of a composition containing 10% of sodium laureth sulfate and 2% of cocoamidopropyl betaine thickened with SYNTHALEN W400.

Its immediate dispersion, clarity and good compatibility with surfactants make SYNTHALEN W400 the ideal polymer for the formulation of surfactant systems, especially when high suspending ability is required. Many types of insoluble ingredients are easily suspended and stabilized including:

- Beads and capsules
- Polyethylene
- Walnut shell
- Luffa
- Pumice
- Pearlizing and opacifying agents
- Pigments
- Zinc pyrithione

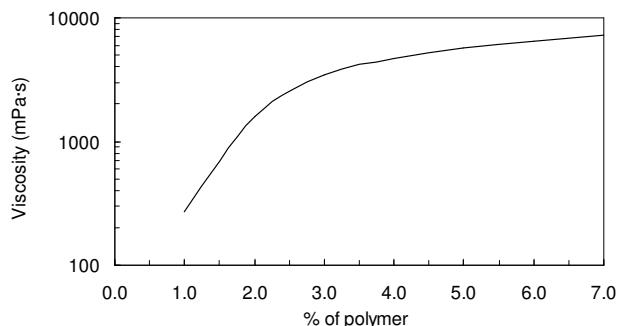
SYNTHALEN W400 also aids in the stabilization of insoluble silicones and other insoluble liquids, such as oils, vitamins, fragrances, in surfactant systems. For example, milky and creamy shower gels, characterized by a high degree of whiteness and good emolliency, can be prepared using this polymer together with a variety of oils (dimethicone, cyclomethicone, avocado oil, macadamia oil, sunflower oil, vitamin E, etc.).

Therefore it is suitable for formulating clear fluid gels as well as for stabilizing oil-in-water emulsions.

Thanks to its resistance to alkali, SYNTHALEN W400 can be used in hair styling products and in any formulation where a high pH is required.

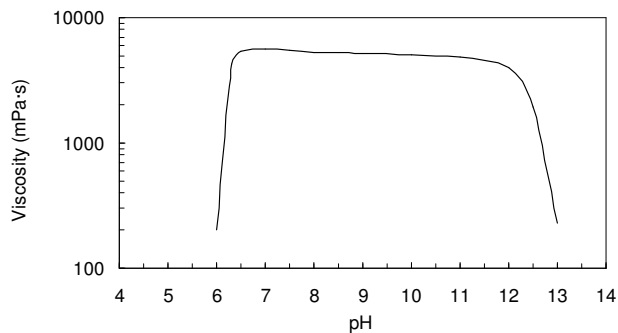
Normal percentage of use is between 1 and 10 % depending on type of formulation and final desired viscosity.

Figure 1 - Viscosity vs. polymer concentration



Water dispersion neutralized to pH 7 with NaOH

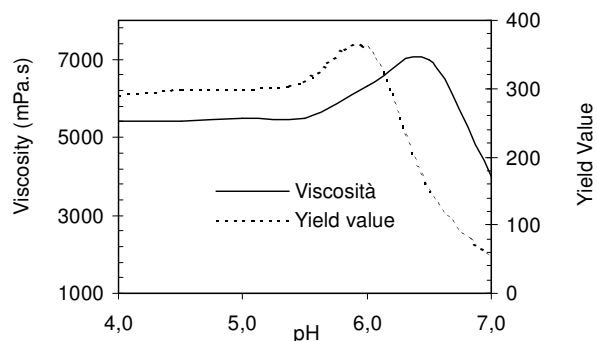
Figure 2 - Viscosity vs. pH of polymer dispersion



5% water dispersion

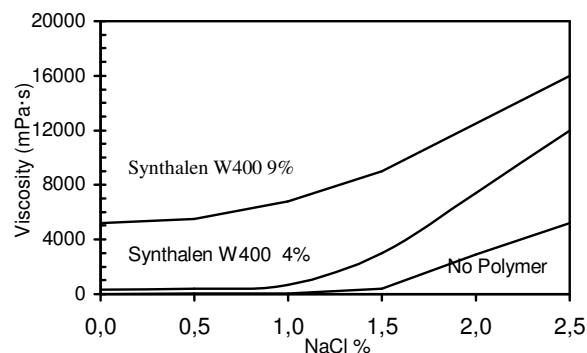
The information contained in this data sheet is based on our present and best knowledge. However we make no warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular use or purpose. Consequently the product must be tested by the user according to his needs and his production and application conditions and purposes. Neither do we assume any responsibility for infringement of third parties patent rights that may arise from the use of the product. For industrial use only.

Figure 3 - Viscosity vs. pH of the composition containing NaLES and CAPB



SYNTHALEN W400 works in synergy with surfactant thickeners (such as Cocamide DEA, Cocamide MEA, Cocamide MIPA, PEG-120 Methyl Glucose Dioleate, Sodium Chloride, PEG-18 Glyceryl Oleate/Cocoate, etc.) and with salts as well. Then, if additional thickening is required, a combination of the polymer with these surfactants and/or with NaCl can be used. In Figure 4, the effect of the addition of NaCl to a surfactant-based formulation containing or not containing SYNTHALEN W400, is reported. Particularly, this graph depicts the effect of NaCl on the viscosity of a surfactant composition (10% of NaLES and 2% of CAPB).

Figure 4 - Viscosity vs. NaCl content



While NaCl alone is able to thicken certain systems at higher concentrations (>1.5 %), the combination of the two thickeners works at a lower concentration of salt and it is able to impart excellent suspending properties to these compositions. It is important to underline that the addition of electrolytes generally decreases the clarity of polymer-

containing compositions. However, in the case of SYNTHALEN W400, the addition of moderate amounts of NaCl causes a negligible loss of clarity.

Use

When SYNTHALEN W400 is added to water the dissolution is instantaneous and after neutralization with an appropriate base, a clear gel is formed.

Turbulent agitation should be avoided to prevent trapping of air that would be difficult to remove from the finished product. Suitable neutralizing agents are inorganic bases (such as NaOH, KOH, NH₄OH) or organic amines (such as TEA, AMP, AMPD). It is advisable to add strong bases previously diluted into water at a concentration not higher than 10%.

In the case of emulsions SYNTHALEN W400 can be added during any step of the production process.

The addition of electrolytes can cause a drop of viscosity; this is particularly evident with salts of bi- and trivalent cations.

In normal conditions, gels prepared with SYNTHALEN W400 neither prevent nor promote the growth of microorganisms; Therefore the addition of a suitable preservative system is advisable.

UV rays can cause loss of viscosity in SYNTHALEN W400 gels. The addition of water-soluble UV-absorbers, such as UVASORB S5 (Benzophenone-4), can help for preventing polymer degradation.

Toxicological information

SYNTHALEN W400 is not known to be dangerous to health if hygienic measures usual in the chemical industry are taken into account.

Transport, storage and handling

Labelling: product not classified as hazardous according to international transport regulations.

Avoid contact with skin, eyes and mucous membranes. In case of contact, wash immediately with plenty of water. Store in the original closed containers at room temperature (5-30°C). Protect from frost.

Due to the characteristic phenomenon of a film formation over the surface of the product, it is advisable not to leave drums "open" after using.

For further information please refer to safety data sheet.