

## How to formulate with Surfynol® Surfactants

Surfynol surfactants are a line of unique performance additives. These products provide a multitude of benefits in applications such as coatings, inks, pigment manufacture and dispersion, dyes, paper coatings, adhesives, agricultural chemicals, metalworking lubricants and oilfield chemicals.

Surfynol 104 surfactant – the “core” of the product line – is a white, waxy solid, nonionic acetylenic diol. For ease of handling, Surfynol 104 surfactant is available in eight solvent solutions and in powdered form on a solid support. In addition to Surfynol 104 surfactant solvent blends, other members of the Surfynol surfactant product line include ethoxylated analogs (Surfynol 420, 440, 2502, 465, 485 and 485W surfactants) and the Surfynol DF110D, DF-110L and MD20 defoamers.

The benefits brought to water-based formulations containing Surfynol surfactants include: improved wetting (due to reduced surface tension), defoaming/deaerentraining, reduced viscosity and improved color development. The efficiency of Surfynol additives as surface tension reducers and defoamers stem in part from their limited solubility in water (see Table 1).

When formulated into systems, Surfynol surfactants are most often used at levels well above their solubility limitations in pure water. Use levels can range from 0.05 to 3% due to the following:

- Surfactant-based systems containing micelles can solubilize Surfynol surfactants.
- Surfynol surfactants in heterogeneous systems, such as dispersions and latexes, will be absorbed at the interface between the continuous and discontinuous phase.

Therefore, in order to ensure that Surfynol surfactants are properly incorporated into systems, the following should be considered and adhered to when appropriate:

- Maintain adequate agitation and allow mix times of at least 15-30 minutes.

- In a formulation or mix procedure, add Surfynol surfactants last, especially after other surface active materials have been added. This will allow the maximum rate of dissolution or dispersibility of Surfynol surfactants into the system. However, if addition of a Surfynol surfactant causes an undesirable viscosity rise, try adding the Surfynol surfactant as early as possible in the formulation.
- Viscosity can act as a barrier to surfactant incorporation. Therefore, add system components that will tend to lower viscosity before adding Surfynol surfactants. Add any viscosity increasing ingredients after mixing Surfynol surfactants into the formulation. Also, maintain an elevated system temperature, provided that this will not have a deleterious effect on the system. This will assist in the incorporation of the surfactant.
- Utilize a liquid version of the appropriate Surfynol surfactant wherever possible. If 100% active Surfynol 104 surfactant (melting point 45°C) or Surfynol DF-110 defoamer (melting point 60°C) is necessary, it should be melted before use. Surfynol surfactants should never be added in the solid form due to the difficulty of incorporation.
- Optimal concentration levels should be determined by running a ladder study.

### Handling

- It is recommended to use the product in rotation on a first-in-first-out basis.
- The product should be stored under dry and clean conditions at room temperature in its original packing, away from heat. In the event of accidental freezing, thaw gently and warm product to 40°C and stir to ensure consistent performance. Make a drawdown of a sample on a glass slide and examine for granules. If found, do not use.

Table 1

Product	Water Solubility (25°C; wt. %)
Surfynol 104 Surfactant	0.10%
Surfynol 440 Surfactant	0.12%
Surfynol 2502 Surfactant	0.32%
Surfynol DF-110L Defoamer	0.05%
Surfynol MD20 Defoamer	0.003%

If you have specific formulating questions, please contact Customer Services at tel:+31-30-285-7100

### **For more information**

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