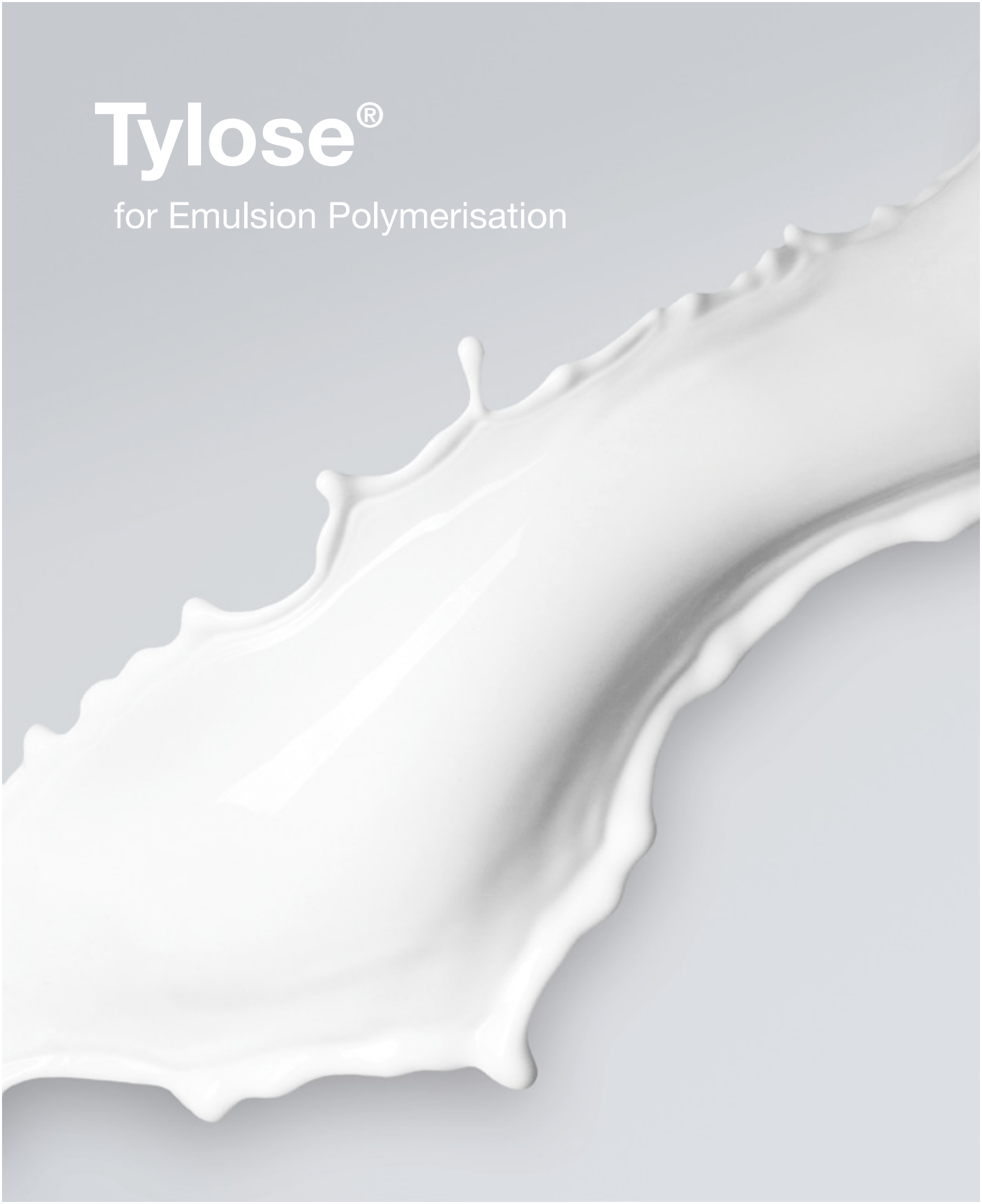
SE Tylose GmbH & Co. KG

Your Best Partner

Tylose®

for Emulsion Polymerisation



Product Information

Tylose® for Emulsion Polymerisation

Emulsion polymerisation is widely used for the production of aqueous polymer emulsions based on ethylene derived compounds. The variety of polymers is huge due to a large number of monomers which can be combined in different ratios.

Tylose HEC, however is typically used for the polymerisation of vinyl acetate, acrylic and vinyl acrylic copolymer latices, which are commonly applied as binders in paints, adhesives and concrete, as well as in many other applications.

Tylose HEC as Stabilising Agent for Emulsion Polymerisation

In the emulsion polymerisation process, Tylose plays an important role – it acts as protective colloid and prevents the emulsions from coalescence. This is achieved by the stabilisation of the emulsified polymer particles. Tylose molecules form hydrated shells surrounding the polymer droplets and thus inhibit their interaction. Tylose is adsorbed on as well as grafted to the polymer particles. The grafting in particular enhances the mechanical, chemical and physical stability of the latex and reduces undesired large particles, so called grit, to a minimum.
The extend of stabilisation is mainly dependent on the molar degree of substitution (MS) of the Tylose HEC, which represents the number of oxyethyl substituents per anhydroglucose unit of Tylose, and the concentration of Tylose. Generally, the higher the MS and concentration, the better is the stabilisation. However, if the concentration is too high, there can be destabilising effects due to crosslinking reactions of Tylose HEC with highly reactive acrylic compounds. As a consequence of this, with increasing amount of acrylic monomers in the reaction, the dosage of Tylose is recommended to be reduced and grades with a lower MS should be preferred. Typical concentrations of Tylose are 1 – 3 % by weight of monomers (BOM) in vinyl acetate and vinyl acrylic copolymers. In pure acrylic latices, 0.1 – 0.2 % of Tylose BOM is recommended.

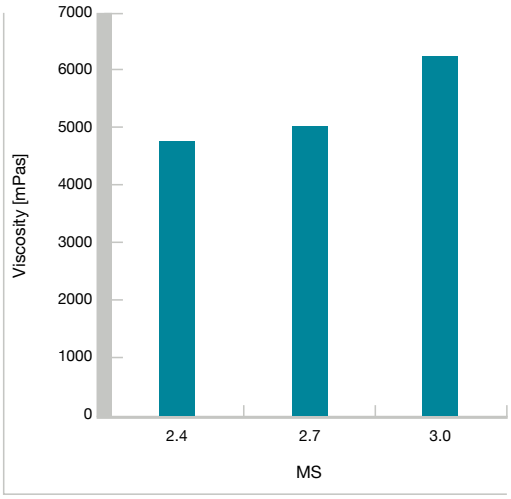
SE Tylose offers a broad range of grades of different viscosity levels and with different MS

Tylose Grades	Viscosity Range [mPas]*
Low viscosity H grades	
H 10 YG4	80 – 160 (5 %)
H 15 YG4	150 – 250 (5 %)
H 20 YG4	200 – 450 (5 %)
Medium to high viscosity H and HS grades	
H 200 YG4	200 – 300 (2 %)
HS 250 YG4	250 – 400 (2 %)
H 300 YP2	400 – 700 (2 %)
HS 30000 YP2	1500 – 2500 (1 %)
Special grade	
HA 40 YP2	40 – 90 (2 %)

*Brookfield LV, 25 °C, deionised water

Influence of Tylose® HEC on the Latex Viscosity

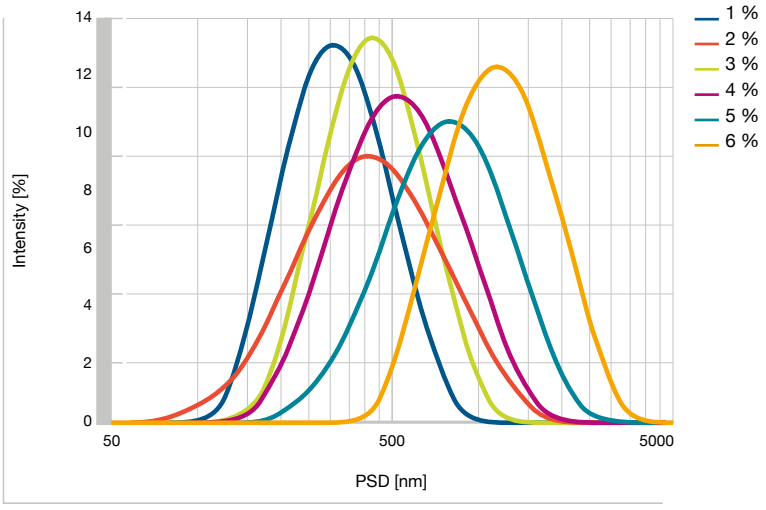
Besides the specific latex characteristics, such as particle size distribution and solids content, the latex viscosity also depends on the amount of grafted and dissolved HEC.
Most important in this regard is the Tylose concentration and the MS. A high MS encourages grafting reactions which lead to higher latex viscosities. Higher concentrations of Tylose HEC lead to higher grafting as well as to higher concentrations of dissolved Tylose.
Since acrylic monomers are more reactive than vinylic monomers towards grafting, the influence of Tylose on the viscosities of vinyl acrylic and homo acrylic emulsions is higher than on pure vinylic polymers.
The original viscosity level of Tylose, indicating its molecular weight, is a minor factor, since a significant part of HEC which is not grafted, undergoes a degradation process during the reaction.



Low shear viscosities of vinyl acetate butyl acrylate latices produced with Tylose HEC grades of different MS (2 % w/w BOM).

Influence of Tylose HEC on the Particle Size Distribution

The particle size distribution (PSD) influences important properties of the latex, such as stability and rheology which in turn affect the properties of the final product. For example the brightness of an architectural paint is highly dependent on the particle size distribution of the applied latex. The main factors of influence on PSD are the concentration and MS of Tylose used. Higher MS and higher concentrations of Tylose lead to higher PSD.



Particle size distribution (PSD by intensity) of vinyl acetate butyl acrylate latices produced with Tylose H 10 YG4 as protective colloid. Tylose with concentrations of 1 – 6 % w/w BOM measured with dynamic light scattering method.

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About us
SE Tylose GmbH & Co. KG is one of the major manufacturers of cellulose ethers world wide, supplied under the brand name Tylose®. Tylose is used in a wide variety of products and applications.

Applications
Building Materials
Paints
Oilfield
Personal Care
Home Care
Emulsion Polymerisation
Suspension Polymerisation
Ceramics
Pet Litter
Organo Soluble Applications
Others

03/2017