ShinEtsu
SE Tylose GmbH & Co. KG

Your Best Partner

Tylose®
for Paints

Tylose® for Paints

There are many reasons why Tylose is an important component in water based paints for ceilings, walls and facades. Application of paint should be smooth and easy, whilst spatter must be kept to a minimum. To achieve these attributes only a small amount of Tylose is necessary. Depending on the system being used, a concentration of 0.2 % – 0.5 % is typically required. The choice of Tylose types depends on the application and requirements. The most commonly used Tylose types in coating materials are Tylose HS and Tylose H.

Application Properties

The following properties of Tylose are essential for the optimisation of coating materials:

- Thickening / Adjustment of consistency
- Water retention
- Function as a protective colloid
- Binding power

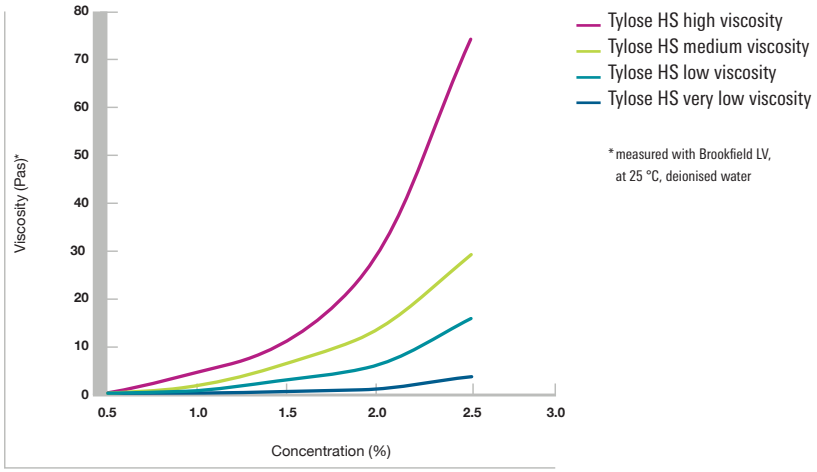
The inclusion of Tylose can improve the following properties of dispersion paints:

- Rheological properties such as levelling and spattering
- Storage stability
- Open time
- Hiding power
- Film formation

Thickening / Adjustment of Consistency

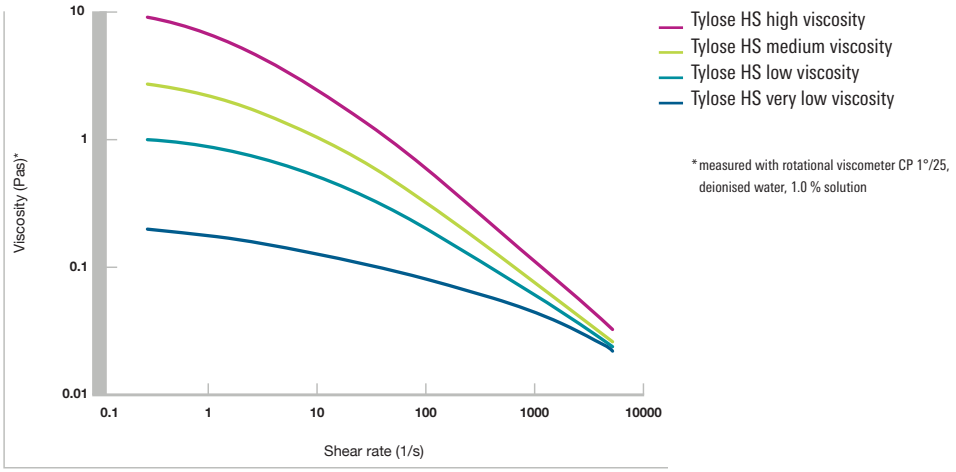
Technically, the most important property of Tylose® is its capability to increase the viscosity of liquids and thus to act as a thickener. The thickening effect of Tylose strongly depends on its concentration (depicted in the diagram below). Furthermore, the influence of the degree of polymerisation (shown in the form of different viscosity levels) on the thickening effect of Tylose can be clearly seen. With all other parameters constant, the viscosity of Tylose solutions increases with an increasing viscosity level.

Influence of the concentration on the thickening effect of Tylose



Aqueous solutions of Tylose show a pseudoplastic effect (shear thinning), which means with an increase in shear rate, the viscosity of the solutions declines. This pseudoplasticity is specific to each Tylose type and the respective viscosity of the grade. High viscosity Tylose grades have a stronger shear thinning effect than those of low viscosity, which is shown in the diagram below.

Pseudoplastic behaviour of Tylose

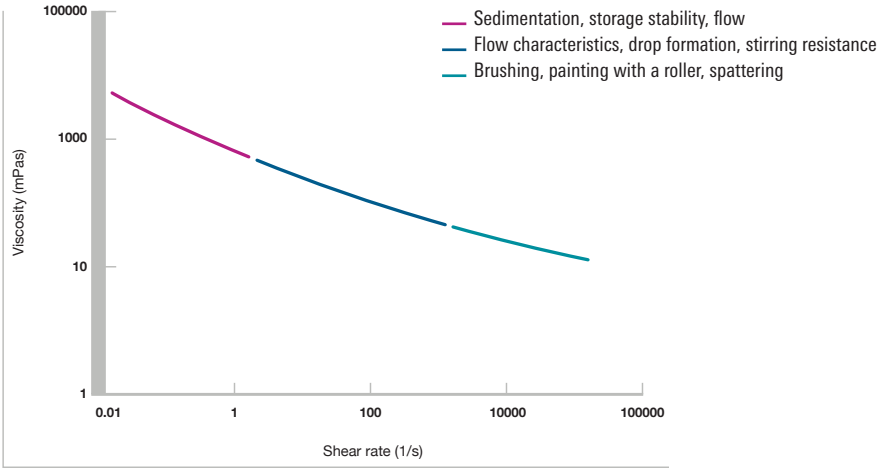


*measured with rotational viscometer CP 1°/25, deionised water, 1.0 % solution

Tylose® ensures the required consistency for application by providing a certain rheological profile or flow property. This makes the application of paint easy. The amount of Tylose as well as its viscosity determines the viscosity level and leads to optimal application properties. During application, a decreasing viscosity with increasing shear stress is desirable. The pseudoplasticity serves to optimise application properties of the coating system with respect to rolling, brushing resistance and spattering behaviour. For interior paints with low spattering the use of hydrophobic modified Tylose is recommended. Through the associative thickening effect with the binder, the viscosity at high shear rates will be increased, thus reducing the spatter.

The correlation of the rheology profile of a paint and the application properties are shown in the diagram below.

Because of its thickening effect in coatings, Tylose acts as a stabiliser for the dispersed components. The formation of serum, i.e. the tendency to precipitate displayed by insoluble components such as pigments and fillers etc., is slowed down or even stopped completely. As a result, the coating material is protected against slow sedimentation of its components and is also stable during storage.



Water Retention

An important property of Tylose® is its pronounced water retention capability. It prevents the water from penetrating into the absorbing substrate too quickly which results in a better adhesion to the substrate. To the greatest possible extent, the water will be retained in the coating material during drying.

A uniform film formation is ensured and incipient cracking is avoided. Particularly in formulations with high pigment volume concentration, the water retaining effect of Tylose ensures sufficient open time for application.

Adequate water retention in paints depends mainly on the concentration and viscosity level as well as on the type and temperature of the substrate.

Function as Protective Colloid

Coating materials are predominantly dispersions of pigments and fillers in an aqueous medium. Tylose acts as a protective colloid by preventing the agglomeration of the solid particles. This leads to a better storage stability and easier agitation of the paint. Due to its molecular structure and its specific properties, Tylose is a highly effective protective colloid. It is widely used in other application fields, such as polymerisation, to avoid the coagulation of the polymer.

Binding Power

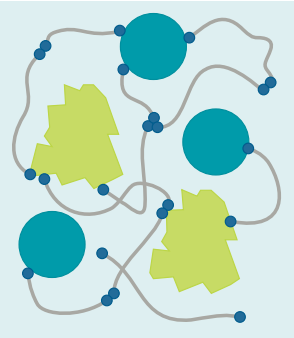
Especially in distempers, Tylose acts as a binder by combining the solid particles and binding them to the substrate. Tylose has strong adhesive power, good dry binding power and dry adhesion. For these reasons, Tylose ensures a good adhesion between the coating and substrate.

Tylose HX – hydrophobically modified HEC

Function of hydrophobically modified HEC in Paints

Hydrophobically modified HEC (hmHEC) includes a small amount of hydrophobic side chains along the HEC molecule. The effect of this hydrophobic modification is an associative thickening effect, which means there is an interaction between binder and cellulose ether. This leads to a structure that increases the viscosity compared to standard HEC and avoids a very strong decrease of viscosity at high shearing. → low spattering effect.

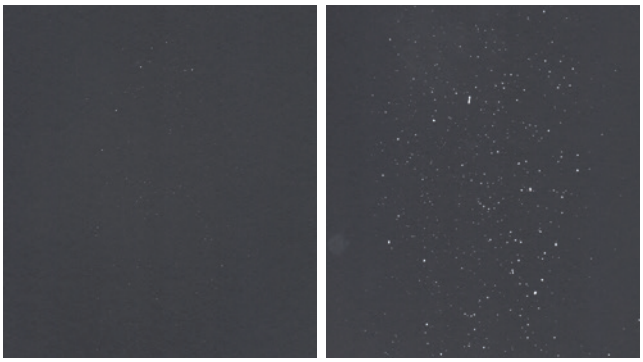
SE Tylose recommends the following HX grades:
Tylose HX 6000 YG4 Plus (low viscosity hmHEC) and
Tylose HX 500 T (high viscosity hmHEC)



Tylose HX 6000 YG4 Plus
Typical application field: **high quality paints**
Typical viscosity (1% solution): **550 mPas;** Typical dosage: **0.4-0.6%**

Main application property in high quality paints:
Reduced spattering

Further application properties in high quality paints:
Improved levelling, improved gloss, high pigment compatibility, high biostability



Tylose HX 6000 YG4 Plus | Standard HEC

Tylose HX 500 T
Typical application field: **cost effective, high PVC interior paints**
Typical viscosity (1% solution): **10000-16000 mPas;** Typical dosage: **0.2-0.3%**

Application properties in high PVC paints: **High efficiency, improved spattering compared to high viscosity standard HEC, good levelling, high pigment compatibilty, high biostability**

Recommended Tylose® Products for Coating Materials

Tylose grades	Viscosity	Delayed solubility	Applications										
	Viscosity ca. (mPas)		Interior Paints	Solid Paints	Exterior Paints	Silicone Resin Paints	Tinters	Powder Paints	Silicate Paints	Limewash Paints	Cement Paints	Distempers	Paint-stripping Pastes
Tylose HS													
Tylose HS 250 YG4	330 (2,0 %) *1	●	■										
Tylose HS 6000 YP2	5200 (2,0 %) *1	●	■	■			■	■	■				
Tylose HS 15000 YP2	1200 (1,0 %) *1	●	■	■	■	■	■		■				
Tylose HS 30000 YP2	2000 (1,0 %) *1	●	■		■	■			■				
Tylose HS 60000 YP2	3000 (1,0 %) *1	●	■										
Tylose HS 100000 YP2	4500 (1,0 %) *1	●	■		■								
Tylose HS 200000 YP2	5700 (1,0 %) *1	●	■										
Hydrophobically modified HEC													
Tylose HX 6000 YG4 Plus	550 (1,0 %) *1	●	■		■	■							
Tylose HX 500 T	14000 (1.0 %) *1	●	■		■								
Tylose MH													
Tylose MH 2000 YP2	2700 (1,9 %) *2	●	■					■		■	■	■	
Tylose MH 6000 YP4	6700 (1,9 %) *2	●						■		■	■	■	
Tylose MH 15000 YP4	13000 (1,9 %) *2	●		■	■								
Tylose MH 30000 YP4	23000 (1,9 %) *2	●	■		■	■							
Special grades													
Tylose MB 60000 P2	31000 (1,9 %) *2												■

■ recommended
*1 Brookfield LV, 25 °C, deionised water
*2 Brookfield RV, 20 °C, water 20 °dH (German hardness)

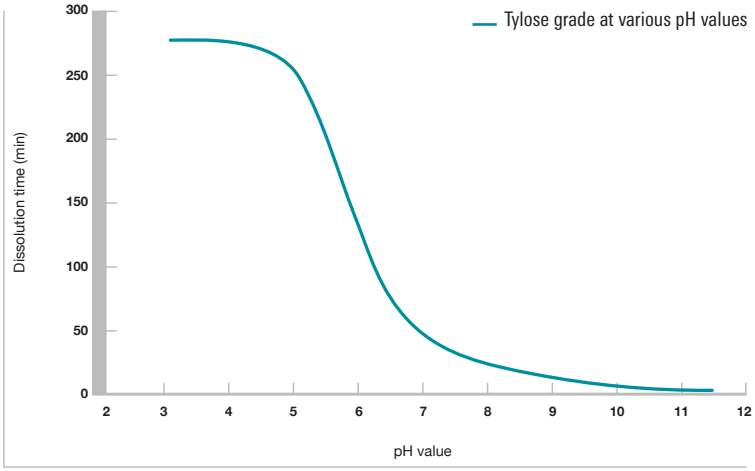
Nomenclature of Tylose®

Example: Tylose HS 30000 YP2

HS		30000		YP2	
	Chemical composition and type of etherification		**Viscosity level**		**Particle size distribution and chemical refinement**
	Type of ether				
M	Methyl	100000	The viscosity level is based on Hoeppler: 2 % solution of the commercial product with 5 % moisture content, 20 °C, 20 °dH (German hardness)	Y	Delayed solubility*
H	Hydroxyethyl	60000			
X	Hydrophobic modification	30000			
		15000			**Particle size**
		10000			
		6000			
	Degree of etherification	1000		G4	Granules (< 500 µm)
				P2	Powder (< 180 µm)
B	Higher etherification			P4	Fine powder (< 125 µm)
S	Tylose HS: biostable				

***Delayed solubility**
Tylose products with delayed solubility are denoted with an additional 'Y'. Delayed solubility Tylose grades can easily be suspended in pH neutral water without forming any lumps. Adjusting the pH to alkaline values can eliminate the delayed solubility. Please note that the pH value should be adjusted after the Tylose is completely dispersed. Raising the pH before dispersion results in lumps.

Dissolution time of a delayed solubility



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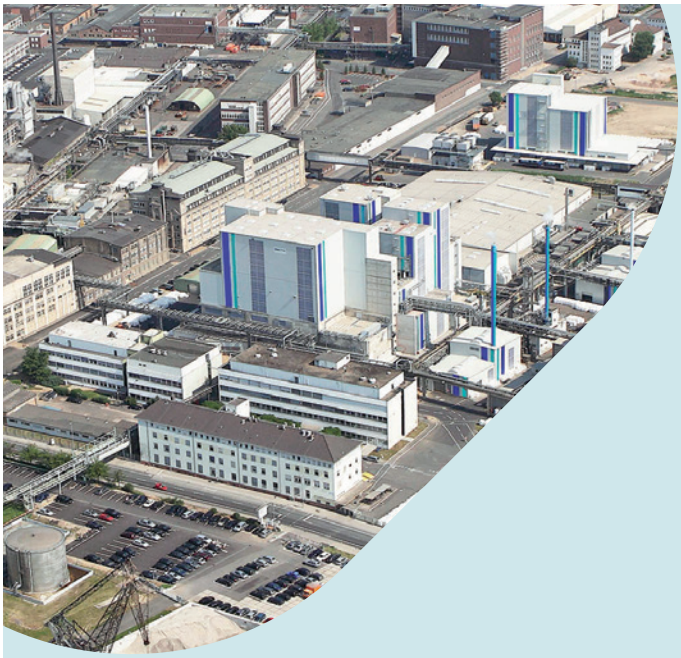

About us

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.

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Applications

- Building Materials
- Paints
- Ceramics
- Polymerisation
- Personal Care
- Home Care
- Oilfield
- Others

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