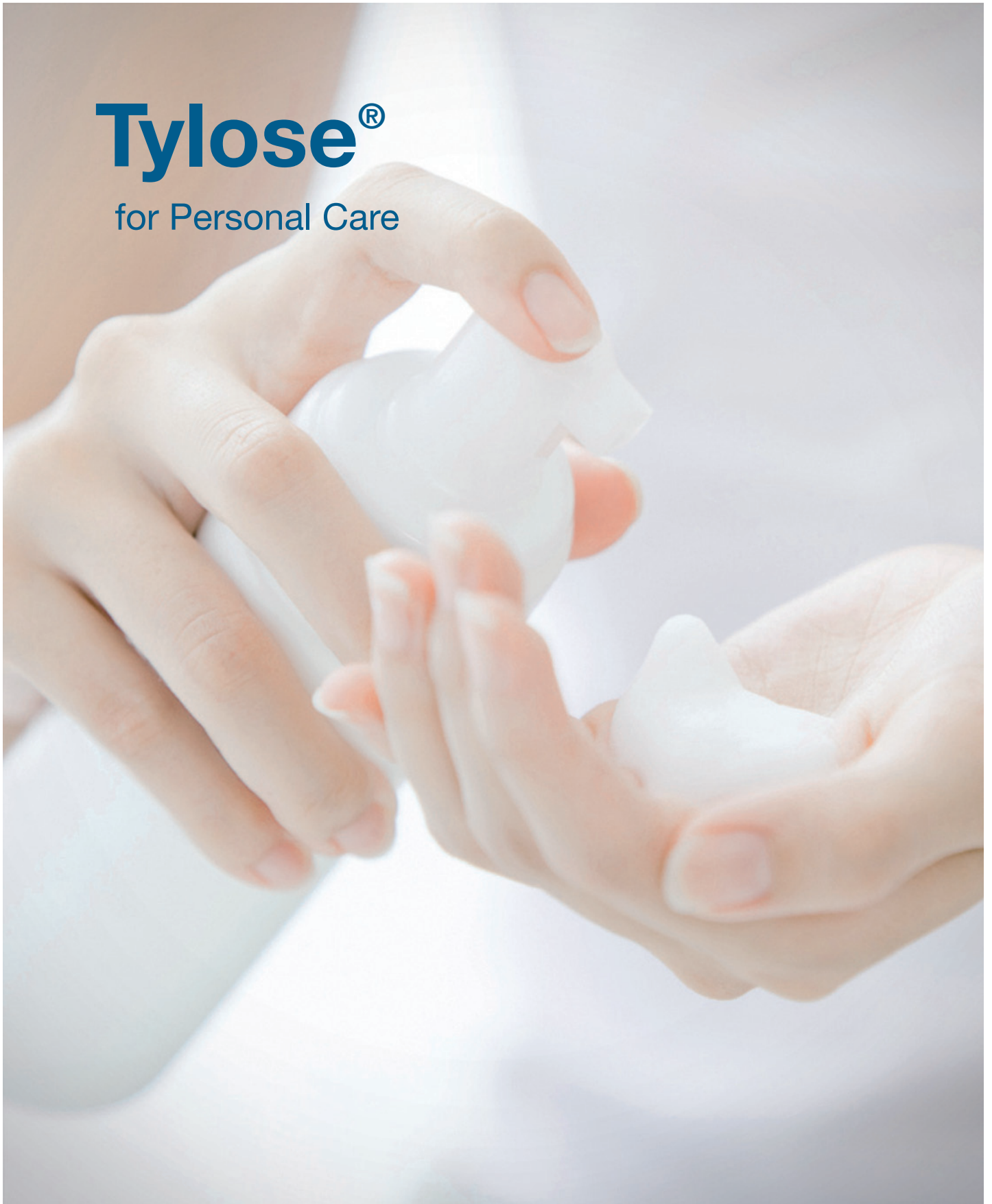


Tylose[®]
for Personal Care



Tylose® for Personal Care



Personal Care products include all areas of nurturing and decorative cosmetics. Nurturing cosmetics include hair care, skin care and oral hygiene. Decorative cosmetics include make-up, powders, eye shadow and mascara. In addition to the thickening effect, Tylose improves the foam stability of shaving foams, preserves moisture during a perm treatment, increases

the stickiness of adhesive creams, acts as a binder in powder make-ups, and eases the distribution of colouring agents in hair.

Being a physiologically harmless cosmetic additive, Tylose offers a multitude of applications in the field of personal care. Tylose hydroxyethyl cellulose (HEC) is our most widely used additive in the cosmetic field. Besides the ultra pure cosmetic types, our standard Tylose types can also be used.

Application Properties

For Personal Care the following properties of Tylose are particularly significant:

- **Thickening/Adjustment of consistency**
- **Stabilisation**
- **High compatibility with other raw materials such as surfactants**

The following INCI designations apply to Tylose grades, which can also be seen in the International Cosmetic Ingredient Dictionary and International Buyers' Guide.

Hydroxyethylcellulose (HEC)	(Tylose H and HS types)
Hydroxypropyl Methylcellulose (HPMC)	(Tylose MO, MOB, MOBS and MOBT types)
Methyl Hydroxyethylcellulose (MHEC)	(Tylose MH, MHB, MHS and MHBS types)

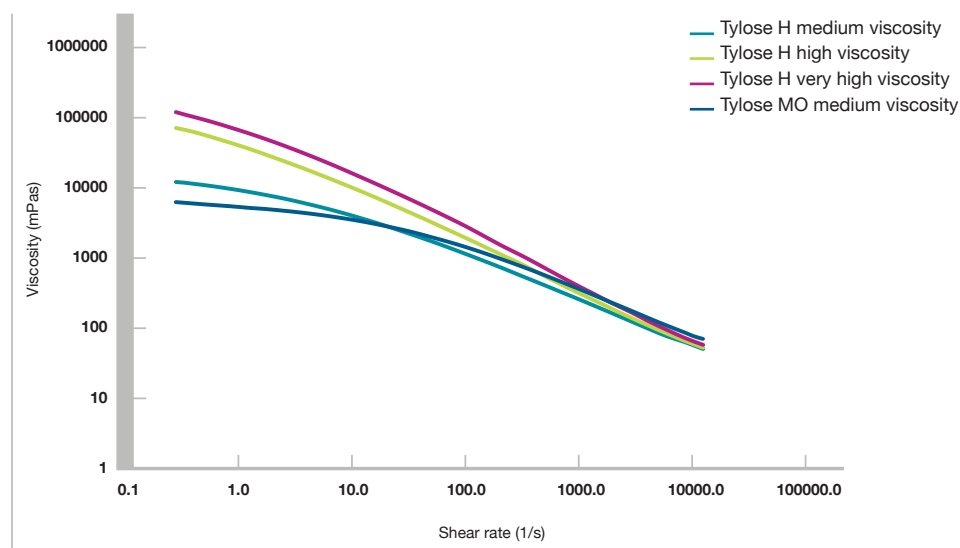
Thickening/Adjustment of Consistency

Tylose® can thicken and adjust the consistency of hair conditioners, hair gels, tooth-pastes and lotions.

The thickening effect of Tylose grades is dependent on the degree of polymerisation (DP) or the molecular weight and the concentration used. When using the same concentration, the viscosity of the solution increases with an increased degree of polymerisation. An increase in Tylose concentration gives a strong increase in viscosity.

Aqueous solutions of Tylose grades are shear thinning liquids. The viscosity is decreased by an increase in shear stress, and returns to its initial viscosity when the shear stress is removed. High viscosity Tylose grades have a stronger shear thinning effect than those of low viscosity, which is shown in the diagram below. The rheological profile varies depending on the Tylose type used, e.g. Tylose H or Tylose MO.

Viscosity curves



measured at 20 °C, water 20 °dH (German hardness), 1.9 % solution

Stabilisation



Emulsions are commonly used in the field of skin care. A finely distributed mixture of oil and water, two liquids which are normally immiscible, exists in an emulsion without any visible segregation. One liquid exists as little droplets distributed within the other liquid. Either water in oil emulsion (W/O emulsion) or oil in water emulsion (O/W emulsion) is possible depending on

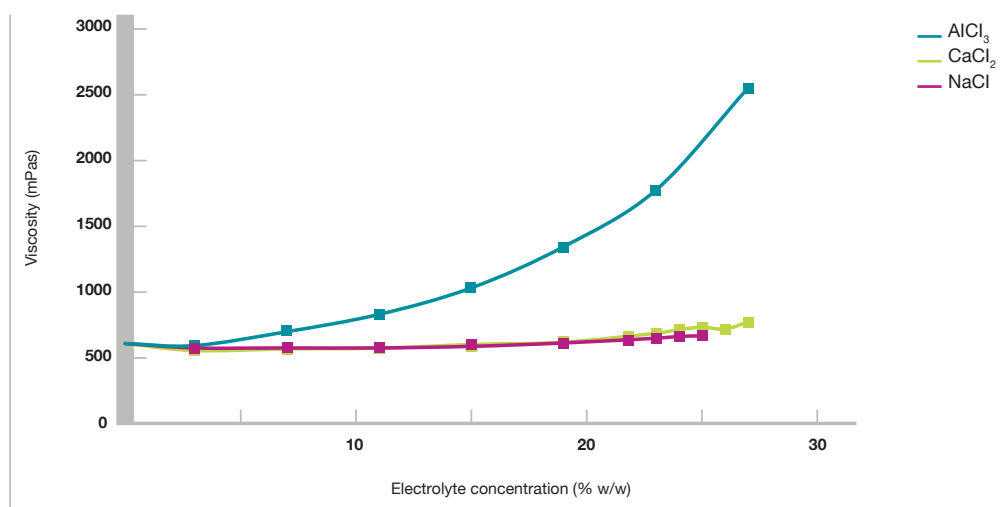
which phase the droplets are formed in. The preferred stabilisers for O/W emulsions are thickeners that act in the water phase. The surface activity of Tylose is low compared to tenside products. However, due to its thickening effect and colloidal protective properties, Tylose offers an important contribution to the stabilisation of the emulsion formed. The use of low to medium viscosity Tylose H types are preferable in this case.

High Compatibility

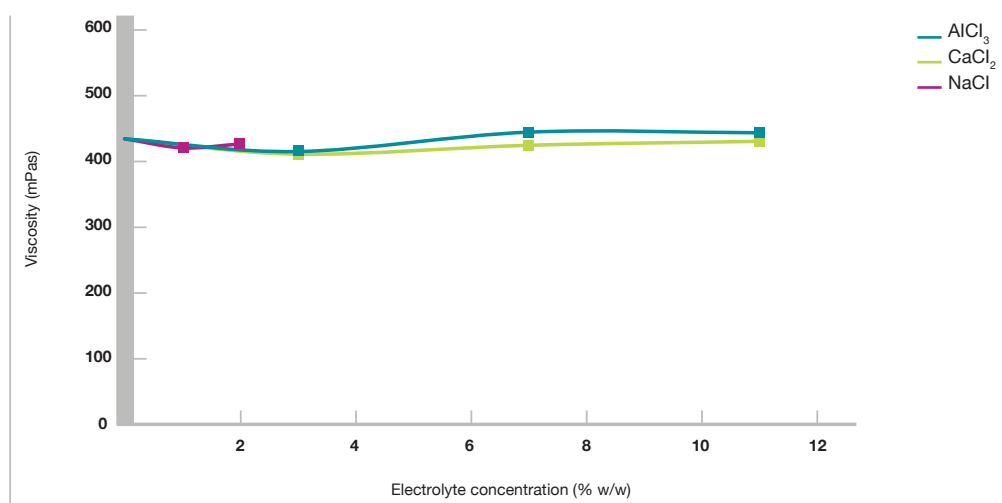
Non-ionic Tylose® H, MH, and MO types exhibit a good compatibility with numerous tensides. Furthermore, they are also compatible with many other raw materials such as starch, dextrin, gelatine, sorbitol and propylene glycol. Due to their chemical structure, Tylose grades exhibit good compatibility with electrolytes. Soluble phosphate, carbonate and

sulphate exhibit a stronger flocculating effect in higher concentrations than nitrate and chloride. The electrolyte compatibility of Tylose H grades with chlorides is generally higher than that of Tylose MO grades. In addition AlCl_3 gives a higher thickening effect with Tylose H grades (see diagram below).

Tylose H medium viscosity



Tylose MO medium viscosity

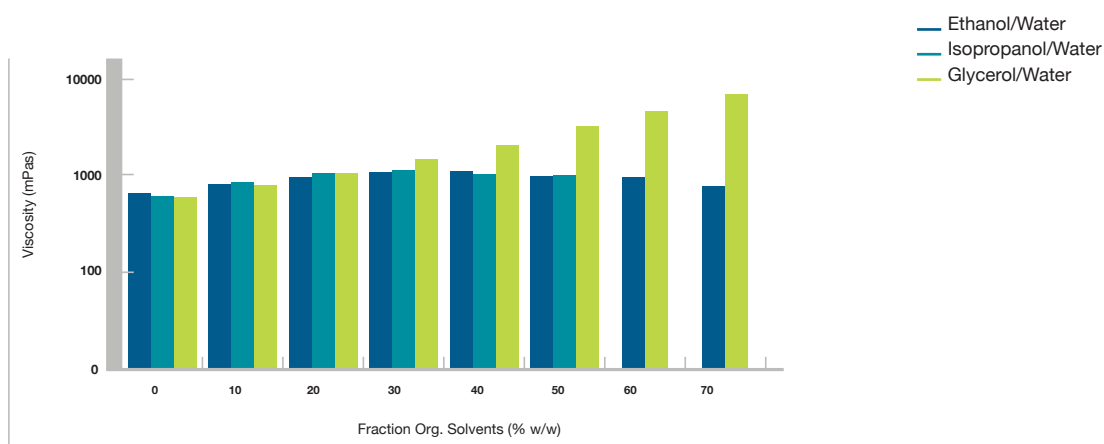


Tylose is initially dissolved in distilled water (1 % absolutely dry) and is subsequently mixed with the electrolyte while stirring.

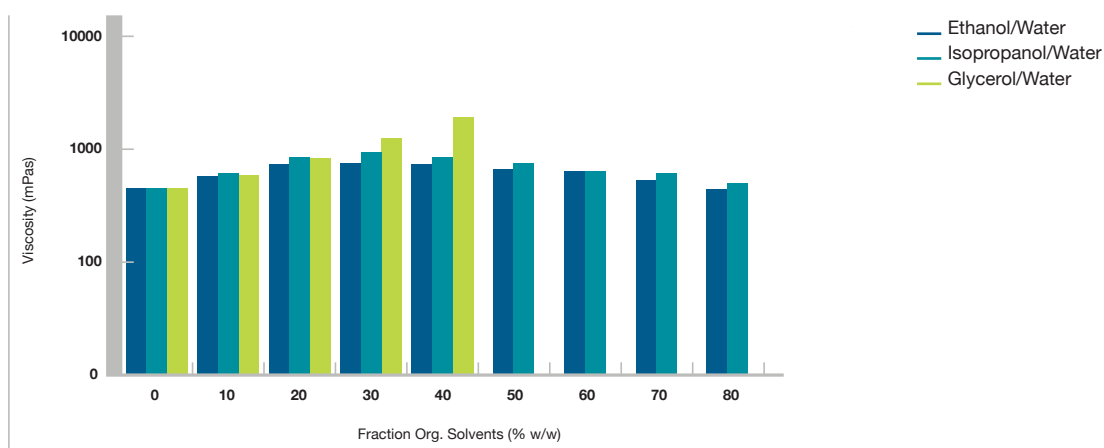


Although Tylose® is insoluble in most organic solvents, it exhibits relatively good solubility in water/organic solvent mixtures, such as water with ethanol, isopropanol or glycerol, even when relatively high fractions of the organic solvent are present. The following diagrams show the development of viscosity in water with ethanol, isopropanol and glycerol using Tylose H or MO grades.

Tylose H medium viscosity



Tylose MO medium viscosity



Tylose is initially dissolved in distilled water (1 % absolutely dry) and is subsequently mixed with the organic solvent while stirring.

Recommended Tylose® Products

Tylose Grades	Viscosity	Delayed Solubility		Applications												
				Rinses	Hair Conditioner	Shampoo	Hair Gel	Hair Colourants	Toothpaste	Body Lotion	Sun Care Products	Roll-on Deo	Mascara	Foundation (liquid)	Shaving Products	
	Viscosity ca. (mPas)															
Standard Tylose H/HS																
Tylose H 15 YG4	200 (5.0 %) ¹	●							■	■						
Tylose H 20 P2	300 (5.0 %) ¹	●					■		■	■				■		
Tylose H 300 NG4	550 (2.0 %) ¹						■			■	■	■	■	■		
Tylose H 4000 NG4	4500 (2.0 %) ¹						■	■	■	■	■	■	■			
Tylose H 10000 NG4	7000 (2.0 %) ¹					■		■	■	■						
Tylose H 10000 P2	7000 (2.0 %) ¹	●				■										
Tylose H 15000 YP2	1200 (1.0 %) ¹	●				■										
Tylose H 30000 YP2	2000 (1.0 %) ¹	●		■	■											
Tylose HS 30000 YP2	2000 (1.0 %) ¹	●		■	■											
Tylose H 60000 YP2	3000 (1.0 %) ¹	●		■	■											
Tylose H 100000 NP2	4500 (1.0 %) ¹		■	■		■										■
Tylose H 100000 YP2	4500 (1.0 %) ¹	●	■	■		■										■
Tylose HS 100000 YP2	4500 (1.0 %) ¹	●	■	■		■										■
Cosmetic Tylose H																
Tylose H 4070 NG4	4500 (2.0 %) ¹						■	■	■	■	■	■				
Tylose H 100070 NP2	4500 (1.0 %) ¹		■	■		■										■
Special Grades Tylose MO																
Tylose E 707002	4500 (2.0 %) ²															■
Tylose MO 4000 P4	4500 (2.0 %) ²															■

■ recommended

¹ Brookfield LV, 25 °C, deionised water

² Brookfield RV, 20 °C, water 20 °dH (German hardness)

Nomenclature of Tylose®

Example: Tylose H 4070 NG4

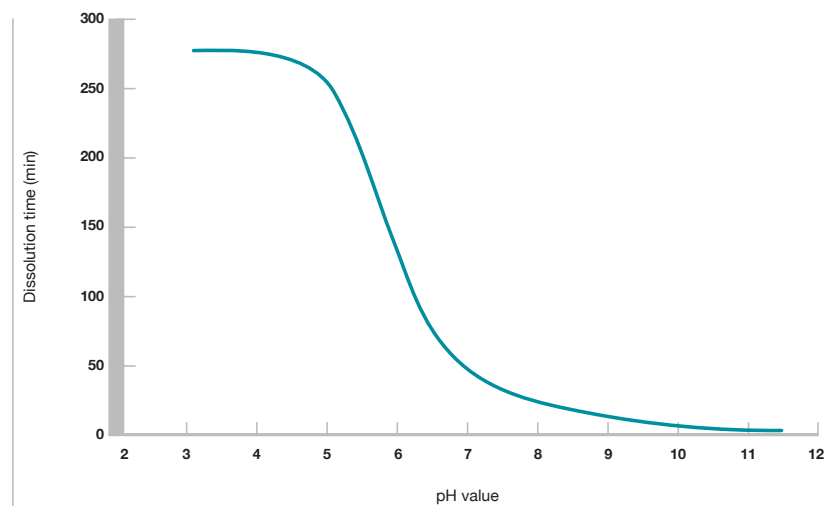
H		4070	NG4			
	Type of ether		Viscosity level			
M	Methyl	⋮	The viscosity level is based on Hoeppler: 2 % solution of the commercial product with 5 % moisture content, 20 °C, 20° dH (German hardness)	Y	Delayed solubility*	
H	Hydroxyethyl	60000		N	Non-delayed solubility products (only for Tylose H grades)**	
O	Hydroxypropyl	30000				
	Degree of etherification	15000				
		10000				
		6000			Particle size	
S	Special higher degrees of etherification, depending on the individual type of ether	4000			Granule types:	
		2000			G4	Granules (< 500 µm)
		200				Powder types:
		⋮			P2	Powder (< 180 µm)
		70	Highly purified cosmetic quality	P4	Fine powder (< 125 µm)	

*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.

**Tylose MO grades are not explicitly marked by "N", even if these products are "non-delayed solubility products".

Dissolution time of a delayed solubility Tylose grade at various pH values





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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

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