

# Personal Care

## Tylose Cellulose Ethers

## Scheme of Nomenclature for Tylose H ... (PHA) Grades

Trade name	Chemistry	Viscosity grade	Non retarded	Delayed solubility	Particle size	Special quality
<b>Tylose</b>	<b>H</b>	<b>4000</b>	<b>(N)</b>	<b>(Y)</b>	<b>G4</b>	<b>(PHA)</b>



H = hydroxyethyl ether  
HS = hydroxyethyl ether, biostable



viscosity grade in mPa-s (cps) based on Hoesppler falling ball viscometer, 1.9 %, 20 °C



N = Non retarded grade; without glyoxal



Y = retarded grade for technical applications; reversibly crosslinked with glyoxal



P2 = powder (< 180 µm)  
G4 = granular (< 500 µm)



PHA = highly purified pharmaceutical quality

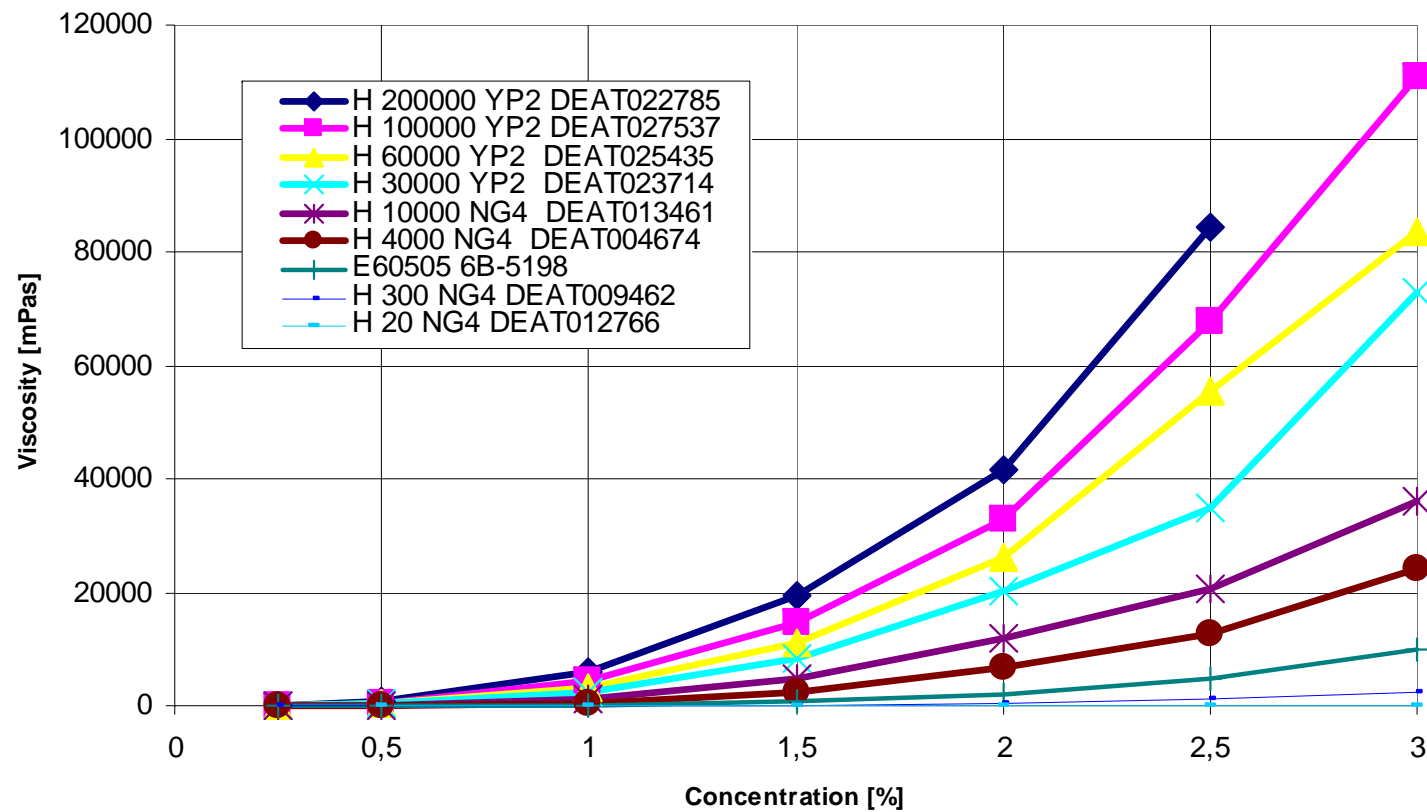
## Typical Tylose® H Grades for Personal Care Application

Trade name	Viscosity grade <sup>1)</sup> ca. [mPas]	Viscosity range <sup>2)</sup> as specified [mPas]	Form supplied
Hydroxyethyl cellulose (HEC)			
Tylose H 10 NG4	10	80 – 150 (4.75 %)	Granules, non delayed
Tylose H 20 NG4	20	40 – 80 (2.85 %)	Granules, non delayed
Tylose H 300 NG4	300	400 – 700 (1.90 %)	Granules, non delayed
Tylose H 4000 NG4	4000	4500 – 6500 (1.90 %)	Granules, non delayed
Tylose H 10000 NG4	10000	8000 – 11000 (1.90 %)	Granules, non delayed
Tylose H 10000 P2	10000	8000 – 11000 (1.90 %)	Powder, readily soluble
Tylose H 30000 YP2	30000	16000 – 21000 (1.90 %)	Powder, delayed solubility
Tylose H 60000 YP2	60000	22000 – 27000 (1.90 %)	Powder, delayed solubility
Tylose H 100000 YP2	100000	4200 – 5500 (1.00 %)	Powder, delayed solubility
Tylose H 200000 YP2	200000	5600 – 6800 (1.00 %)	Powder, delayed solubility
Pharma grade			
Tylose H 20 P2 PHA	20	15 – 28 (2.00%)	Powder, non delayed
Tylose H 300 G4 PHA	300	400 – 700 (1.90%)	Granules, non delayed
Tylose H 4000 G4 PHA	4000	4500 – 6500 (1.90%)	Granules, non delayed
Tylose H 30000 P2 PHA	30000	16000 – 21000 (1.90%)	Powder, non delayed
Tylose H 100000 P2 PHA	100000	28000 - 35000 (1.90%)	Powder, non delayed

1) Hoesppler falling ball viscometer, 1.9 % absolutely dry, 20°C, 20°GH

2) Brookfield RV, (concentration in %) absolutely dry, 20°C, 20°GH

# Viscosity Curves



## Formulation Advantages of Tylose<sup>®</sup> H Grades

- **Viscosity modifier**
  - „Ecological“ - thickner, pseudoplastic character
- **Compatible with**
  - Range of surfactants, polyethylene glycol, cationic ingredients etc.
- **Stabilization**
  - Emulsion stabilizer
- **Binding**
  - Of powdered products
- **Low eye irritation**
  - Pearl lustre effect



## Typical Applications

<b>Application</b>	<b>Properties used</b>	<b>Preferred grades</b>
Toothpaste	Viscosity modifier, binding	Tylose H 4000 NG4, Tylose H 4000 G4 PHA, Tylose H 10000 NG4, Tylose H 10000 P2
Permanent-wave preparations	Viscosity modifier	Tylose H 4000 NG4, Tylose H 4000 G4 PHA, Tylose H 10000 NG4
Shampoos, rinses	Viscosity modifier, stabilization	Tylose H 10000 NG4, Tylose H 100000 P2 PHA
Deodorants, liquid soap	Viscosity modifier, stabilization	Tylose H 4000 NG4, Tylose H 4000 G4 PHA, Tylose H 10000 NG4
Beauty-care preparations	Binding, viscosity modifier, stabilization	Tylose H 4000 NG4, Tylose H 4000 G4 PHA, Tylose H 10000 NG4

## Tylose® H Grades in Personal Care

- **Toothpaste**
- **Hair Care Products**
  - Conditioners, rinses, hair colors, curling lotions and pre-softening gels
- **Skin Care Products**
  - Body lotions, sun care lotions, liquid soaps, deodorants, facial cleansers
- **Cosmetic Preparations**
  - liquid makeup, powdered makeup, mascara



## Toothpaste - 1

### Components (e.g. Cream Toothpaste)

- **Abrasives (40 – 50 %)**
  - Silicon dioxide, silicas
  - Mechanical removal of stains
- **Humectants (20 – 25%)**
  - Glycerine, sorbitol, polyethylene glycol, xylitol
  - Retain moisture when the toothpaste is exposed to air
- **Thickener (1.0 – 1.5%)**
  - Tylose<sup>®</sup> H 4000 NG4, Tylose<sup>®</sup> H 10000 P2, Tylose<sup>®</sup> H 10000 NG4



## Toothpaste - 2

### Components (e.g. Cream Toothpaste)

- **Detergents/surfactants (1.0 – 1.5%)**
  - Reduce the surface tension on the tooth surface (useful at dental plaque)
- **Fluorides (< 1.0%)**
  - Reduce caries by 30 – 50%
- **Flavour (0.5 – 2.0%)**
- **Preservative (< 0.5%)**
- **Special additive (1 – 10%)**
- **Water (to 100%)**

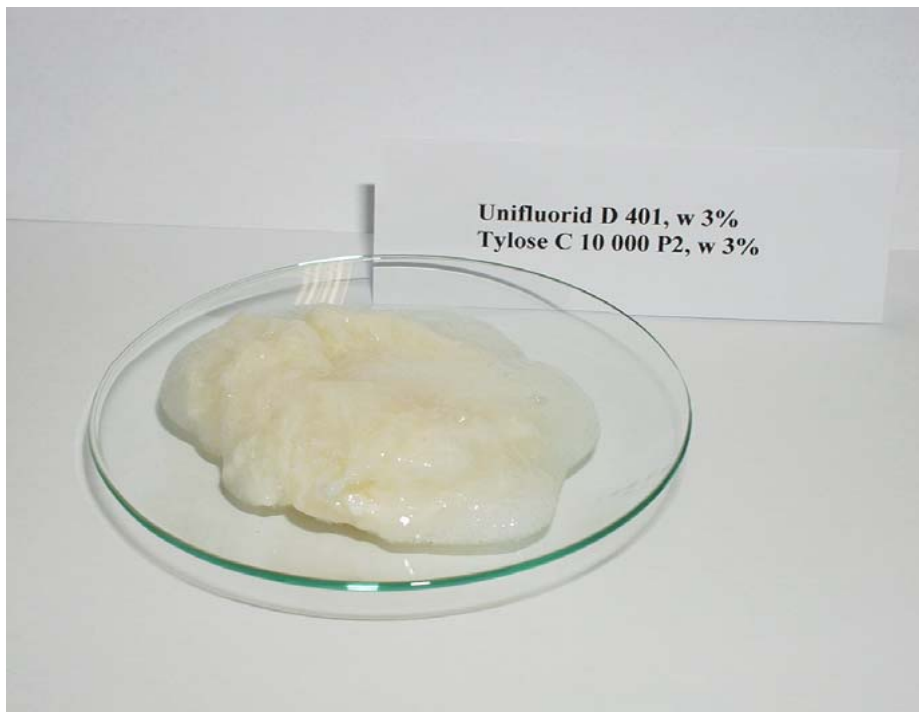


## Advantage Tylose<sup>®</sup> H (HEC) in Comparison to CMC in Toothpaste Formulation - 3

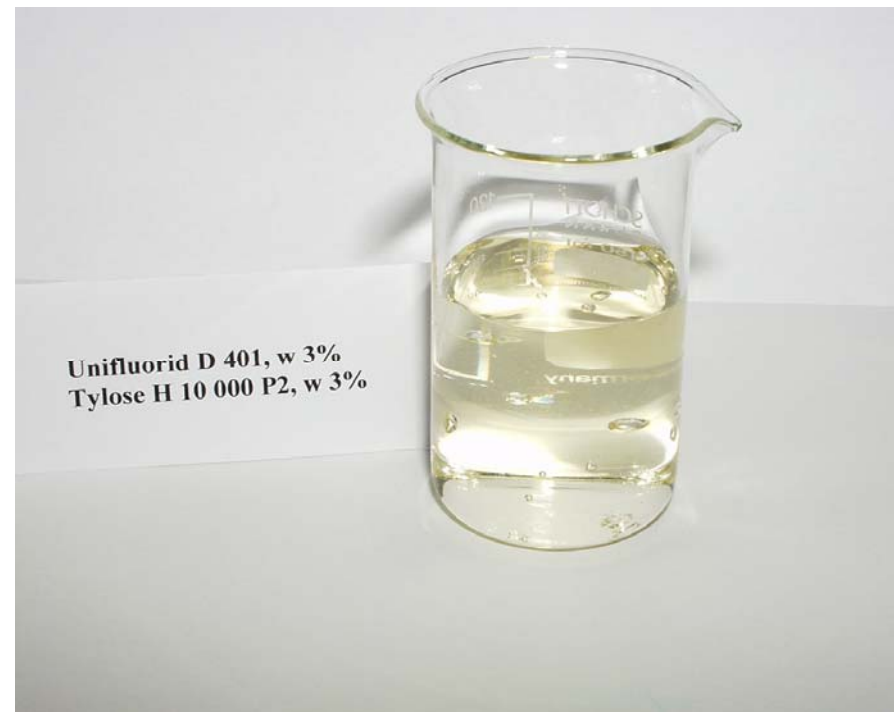
- **High compatibility with**
  - Range of surfactans,
  - Polyethylene glycol,
  - Anti-microbial cationic ingredients (e.g. ammonium compounds, chlorohexidine)
  - Unifluorid D-401
  - Calcium carbonate as abrasive
- **Easier tube filling**
- **Sharper cut off**



## Advantage Tylose® H (HEC) in Comparison to CMC in Toothpaste Formulation - 4



Unifluorid with CMC



Unifluorid with Tylose® HEC

## Tylose® H in Hair Conditioners, Rinse and Shampoo

- **Pseudoplastic character of the solution**
- **Pearl lustre effect**
- **Stability of the formulations**
- **Excellent thickening effect, permits formulations varying in viscosity from liquid to gel**
  - **For conditioner and rinse: high viscosity HEC**
    - Tylose® H 100000 P2 PHA
  - **For shampoo: medium viscosity HEC**
    - Tylose® H 10000 NG4

## Tylose® H in Hair Colors

- **High compatibility with**
  - A variety of dye types (e.g. oxidative, acid, dispers)
  - Carrier systems
- **A combination of a low and medium range viscosity Tylose® H grade is recommended**
  - Combination stabilize the suspension of dyes in a formulation
  - Control the application on the hair



## Tylose<sup>®</sup> H in Curling Lotion and Pre-softening Gel

- **High compatibility with**
  - Salts
  - Thioglycolic acid
- **Ability to thicken under highly alkaline conditions**
- **Tylose<sup>®</sup> H keeps the hair moist during permanent wave processing**
- **By adjusting the concentration and viscosifying grade the viscosity can increase from a lotion to a gel**
- **Tylose<sup>®</sup> H 4000 NG4, Tylose<sup>®</sup> H 10000 NG4**



## Tylose<sup>®</sup> H in Body Lotions

- **Stabilize the emulsion system**
- **Tylose<sup>®</sup> H grades are non-irritating to the skin**
- **The skin gets smoothness**



## Tylose<sup>®</sup> H in Facial Cleansers

- **Low irritation potential**
- **High compatibility with mild surfactants**
- **The film-forming property can aid in providing a protective layer to the skin**



## Tylose H<sup>®</sup> in Sun Care Lotions

- **Stabilize the emulsion system**
- **Film-forming properties can promote the uniform deposition of UV absorbers**



## Tylose® in Liquid Makeups

- **Suspend solids in water solutions (most notably in oil-free systems)**
- **Low to medium viscosity grades are suggested since maximum suspension properties are achieved without a large increase in the viscosity of the product**
- **Polymeric film provides a feeling of smoothness**
- **Non-irritation to the skin, ideal for hypoallergenic products**



## Tylose® H in Powdered Makeups

- **Binder**
- **Keep the powder on the skin**
- **Promotes uniform deposition of color**



## Tylose<sup>®</sup> H in Mascaras and Eyliners

- **Binder**
- **Water solubly,**
  - **allows for easy removal when desired**
  - **But withstand normal wear, humidity and tears**
- **Tylose<sup>®</sup> H 4000 NG4**

## Guide Formulation Creamrinse clear

Recipe	Parts by Weight
<b>A</b> Cetrimonium Chloride <i>Cetyl trimethyl ammonium chloride (a.s. 29%)</i>	5.00
Behentrimonium Chloride <i>Alkyl trimethyl ammonium chloride (a.s. 80%)</i>	1.00
Cocamine Oxide <i>Alkyl dimethyl amine oxide (a.s. 30%)</i>	6.00
<b>B</b> Water	36.30
<b>C</b> <b>TYLOSE® H 10000 NG4</b> <i>Hydroxyethylcellulose</i>	1.20
<b>D</b> Water	50.00
<b>E</b> Fragrance	0.50
Dyestuff solution	q.s.
Preservative	q.s.
<b>F</b> Citric Acid	q.s.

q.s.: quantum sufficit (as much as necessary)  
a.s.: active substance

### Procdedure:

1. Dissolve [C] well in [D].
2. Stir the components of [A] into [B];  
stir until clear while heating to about 75°C.
3. Cool [2] down to room temperature.
4. Add [3] to [1] and stir until clear.
5. Add the components of [E] one after another  
into [4].
6. Finally adjust the pH with [F].

## Guide Formulations

Number	Product	Remarks
K0001	Liquid soap	with pearl lustre effect
K0002	Liquid body care	with pearl lustre effect
K0003	Antiperspirant	Roll-on
K0004	Antiperspirant Water	
K0005	Liquid soap	clear
K0006	Antiperspirant Gel	
K0007	Baby shampoo	WAS 10% clear
K0008	Creamrinse	
K0009	Creamrinse	
K0010	Creamrinse	
K0011	Creamrinse	with pearl lustre effect
K0012	Creamrinse	with pearl lustre effect
K0013	Creamrinse	with pearl lustre effect
K0014	Creamrinse	with pearl lustre effect
K0015	Creamrinse	with pearl lustre effect
K0016	Creamrinse	clear

Number	Product	Remarks
K0017	Creamrinse	clear
K0018	Creamrinse	clear
K0019	Creamrinse	clear
K0020	Creamrinse	clear
K0021	Creamrinse	with pearl lustre effect
K0022	Leave on hair tips	clear
K0023	Creamrinse	
K0024	Toothpaste	gel
K0025	Mouthwash	gel
K0026	Mouthwash	with astrigent
K0027	Creamrinse	with pearl lustre effect
K0028	Creamrinse	with pearl lustre effect
K0029	Leave on for hairends	clear
K0030	Mascara	
K0031	Toothpaste	opaque cream
K0032	Toothpaste	