

# 1. APPLICATION OF POLLOCEL®

## 1.1. CHEMISTRY OF CLEANING SUPPLIES

An additive for the production of laundry powders, soaps, cleaning pastes, etc., which functions as a protective colloid, does not allow the dirt to resettle on the fabric.

## 1.2. CONSTRUCTION

Used as one of the components in manufacturing wallpaper adhesives, as a thickener of emulsion paints, as well as an additive for powder coating, cement mortars and fillers in which it plays the role of a plasticiser and delays the setting time.

## 1.3. FOUNDING

Functions as a binder for making moulding and core compounds.

## 1.4. AGRICULTURE

Due to good film-forming properties and easy biodegradation, it is used for seed coating.

## 1.5. OFFICE SUPPLIES

It is used as a binder of mass for the production of pencils and chalk for writing.

## 1.6. TEXTILES

It performs the role of a thickener when making size for weaving looms.

## 1.7. BRIQUETTING

It is a binder for the bonding of carbonic liquids during the production of briquettes.

## 1.8. CERAMICS

In ceramic mass it plays the role of a thickener, plasticiser and additive; it improves the smoothness of enamel.

# 2. APPLICATIONS POLOFIX®

## 2.1 POLOFIX® LV

It is used to lower the filtration and stabilise the viscosity of the drilling rigs.

## 2.2 POLOFIX® HV

It is used to lower the filtration and increase the lightness of the drilling rigs.

## 1. BRIEF HISTORICAL OVERVIEW

The production of sodium salt carboxymethylcellulose (CMC) branded "Glikocel" was launched at the "Pronit" Chemical Plant in 1960.

Initially, glikocel was produced only in the form of wet flocs and was used as an aid in the preparation of drilling muds.

In 1973 dry CMC production has been launched, extending its application mainly to the detergent industry and the production of wallpaper adhesives.

In order to distinguish the product produced by CMC S.A. from other ones under the name glikocel on the market, and due to the cancellation of the existing obligatory industrial branch standard the name had been changed.

## 2. CONSTITUTION OF CELLULOSE AND CARBOXYMETHYL CELLULOSE / CMC /

Cellulose is a natural, long-chain linear polymer in which each single cell within the chain contains 3 reactive hydroxyl groups.

The molecular structure of cellulose is shown in Figure 1

CMC is a product of chemical modification of cellulose and belongs to the group of its ethers. This modification consists in converting the insoluble high molecular weight polysaccharide (cellulose) into a water-soluble form which is a new polymer of ionic character. Transformation into a soluble form is achieved by replacement of the hydrogen atoms of the hydroxy groups of the cellulose with the substituent -CH<sub>2</sub>COONa

The structure of CMC and the molecular formula are presented in fig. 2

fig. 1 STRUCTURE OF CELLULOSE

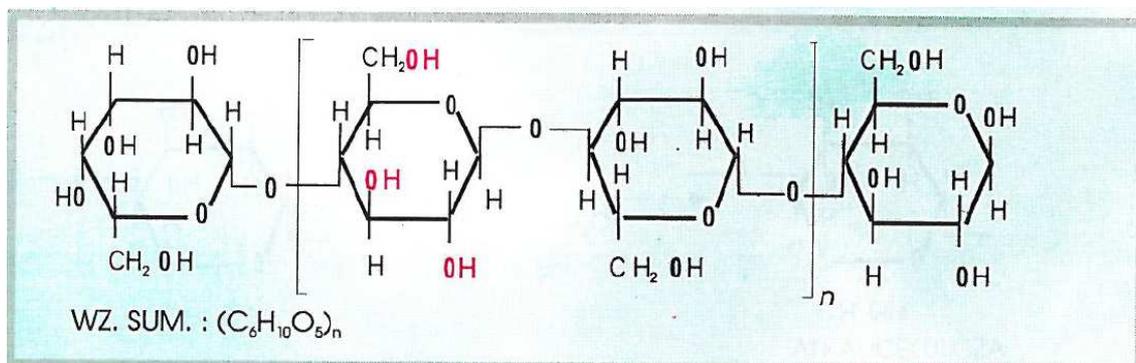
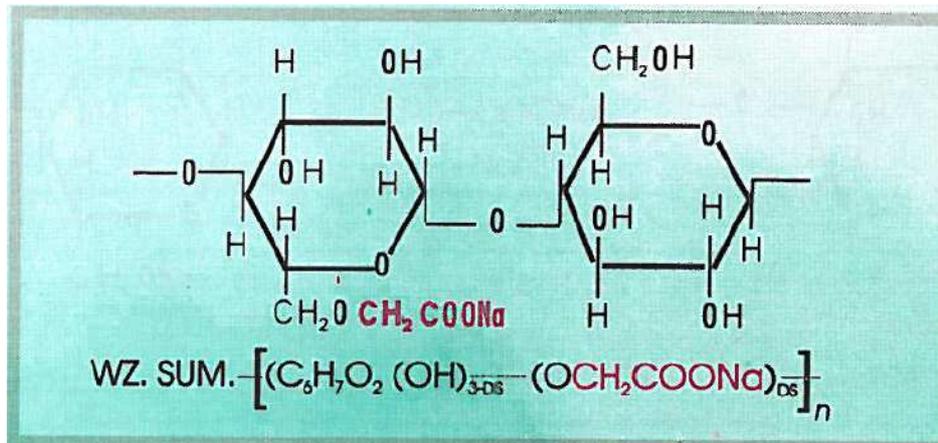


Fig. 2. THE STRUCTURE OF CARBOXYMETHYL CELLULOSE



n - degree of polymerisation - determines viscosity

DS - degree of substitution - determines solubility.

The degree of substitution determines how much hydrogen from the cellulose hydroxyl groups on average with reference to one cell were substituted by the group - CH<sub>2</sub>COONa

Figure 2 represents the product with a degree of substitution 0,5 / in the whole chain, on average every second cell is substituted. At DS = 1, each cell of the cellulose chain had one hydrogen atoms replaced by a group as above. Maximum DS. = 3. In practice, satisfactory results are given by DS products = 0.5-1.2.

3. **USED CHEMICAL NAMES:** carboxymethylcellulose, sodium carboxymethylcellulose, sodium salt of cellulose glycolic acid.

4. **USED ABBREVIATIONS:** CMC, KMC, CMC-Na, KMC-Na

5. **CMC FUNCTIONS:**

- protective colloid
- thickening agent,
- emulsion and suspension stabiliser,
- binding and adhesive agent,
- film-forming agent

6. **COMPANY PROFILE OF CMC S.A.**

POLLOCEL® - Technical CMC for a variety of applications in 25 assortments differentiated by physicochemical properties

POLOFIX® - technical and modified CMC, special for geological drilling, meeting the requirements of the international standard API produced in two assortments (LOW and HIGH COVER).

## 7. OBTAINING

The process of producing technical CMC is based on the etherification reaction appropriately activated by sodium hydroxide (so-called alkalicellulose) when using monochloroacetic acid (MCA-Na) as an etherifying agent.

Figure 3 CELLULOSE ALKALISATION

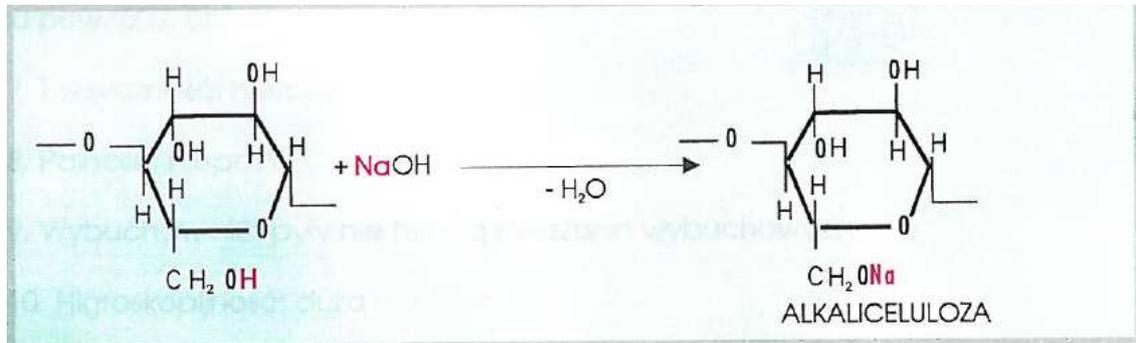
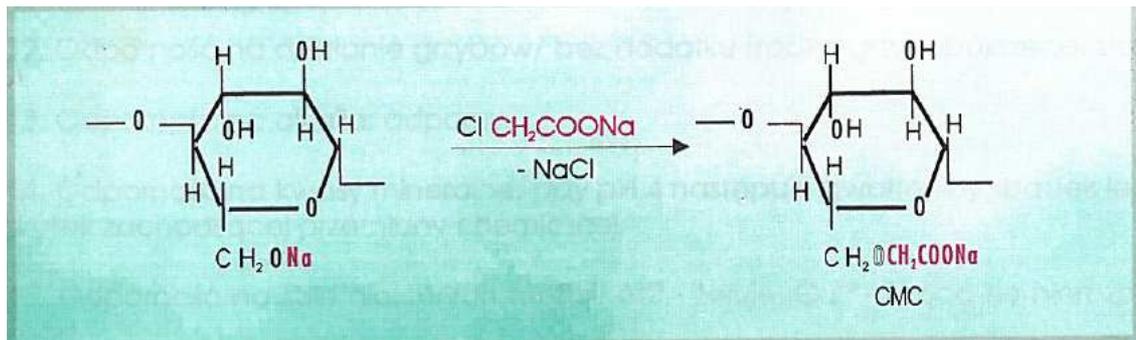


Fig. 4 ALKALI CELLULOSE ETHERIFICATION



The competitive reaction happening during the etherification which lowers the effective yield of the etherifying agent is the hydrolysis of the sodium salt of monochloroacetic acid to sodium glycolate:



In CMC with technical level of purity, the by-products produced during the etherification reaction, i.e. sodium glycolate and sodium chloride, are not removed and remain as constituents of the finished product.

## PRODUCT CHARACTERISTICS OF POLLOCEL<sup>®</sup>

1. Form: powder with grain size less than 1mm
2. Colour: white or slightly creamy
3. Bulk density: 0.4-0.6 kg / dm<sup>3</sup>
4. Water solubility: good
5. Solubility in organic solvents: Not soluble
6. Solubility in alcohol-water mixture: Not soluble at alcoholic strength of more than 60% by volume.
7. Toxicity: non-toxic
8. Flammability: Non-combustible
9. Explosion: dusts do not form explosive mixtures
10. Hygroscopicity: large
11. Character of membrane after evaporation: rigid
12. Antifungal resistance / no fungicide additive: poor
13. Resistance to alkali: resistant
14. Resistance to mineral acids: At Ph4 there is a sharp decrease in viscosity as a result of an occurrent chemical transformation
15. Resistance to salts of some metals: Al + 3 - gels, Cu + 2 - the insoluble residue disappears

**TABLE 1. USED SYMBOL OF POLLOCEL®**

## SPECIFICATION

A	11,0-12,0	pH
C	9,3-10,0	
N	7,0-9,0	
S	0,5-0,7	Degree of substitution
W	0,71-1,0	
Without digital symbol	58	Active substance in dry product in%
1	60	
2	67	
Type 10	5-20	Viscosity types and viscosity compartments 2% r-ru (mPas)
Type 30	21-40	
Type 60	41-70	
Type 90	71-110	
Type 170	150-180	

**EXAMPLE OF MARKING**

1.POLLOCEL® AW / 60 - marks a product with pH = 11.0-12.0

degree of substitution = 0.71-1.0

active agent = min.58% dry

viscosity = 41-70 mPas

2. POLLOCEL<sup>®</sup> CS-2/30 - marks a product with Ph = 9.3-10.0

degree of substitution = 0.5 - 0.7

subst. active = min.67%

viscosity = 21-40 mPas

**Table 2. Physiochemical properties of manufactured POLLOCEL<sup>®</sup> assortments**

SPECIFICATION	AS-1	AS -2	CS – 2*	NS-2*	AW*	CW*	NW*
CMC content - Na (%) of commercial product min.	54	60	60	60	52	52	52
CMC content - Na (%) in dry product min.	60	67	67	67	58	58	58
	11,0-12,0	11,0-12,0	9,3-10,0	7,0-9,0	11,0-12,0	9,3-10,0	7,0-9,0
pH 2% of water at 20 degrees C	0,5-0,7				0,7-1,0		
Content of NaCl (%) max.	18				20		21
Moisture content (%) max	10						
Viscosity types, viscosity ranges (mPas)	Type-10* (3-20), Type 30(21-40), Type 60(41-70), Type 90 (above 70)						
Grinding (mm), max	1,0						

\* assortment produced on order of the Customer

## POLLOCEL® AS – 1

**POLLOCEL® AS-1** is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® AS-1** due to good bonding and film forming properties, it is used as an adjunct for the production of detergents, cleaning and washing pastes, and for foundry and construction industries.

### PRODUCT CHARACTERISTICS

**POLLOCEL® AS-1** is a white to light cream powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by an average degree of substitution. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min .....	54
2. Content of CMC - Na in dry product (%) min .....	60
3. Degree of substitution .....	0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)	
Type 10 .....	3-20
Type 30 .....	21-40
Type 60 .....	41-70
Type 90 .....	over 70
5. Moisture content (%) max .....	10
6. Sodium chloride content (%) max .....	18
7. pH2% of aqueous solution .....	11-12
8. Grinding (mm) max .....	1.0

### PACKING

**POLLOCEL® AS - 1** is packed in 20 kg multi - layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® AS-2

**POLLOCEL® AS-2 - 2** is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® AS-2** due to good colloid protection, binding thickening, film forming properties, it is primarily used as an adjunct in domestic detergents (powders, cleaning pastes, etc.), as well as in other areas such as construction, casting, ceramics, briquette production, production of pencils, writing chalks, and seed coating.

### PRODUCT CHARACTERISTICS

POLLOCEL® AS-2 is a white to slightly cream white powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by an average degree of substitution and increased content of pure CMC - Na, contains less free alkali compared to Pollocel® AS - 1. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min .....	60
2. Content of CMC - Na in dry product (%) min .....	.67
3. Degree of substitution .....	0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)	
Type 10 .....	3-20
Type 30 .....	21-40
Type 60 .....	41-70
Type 90 .....	71- 110
Type 170 .....	.140-180
5. Moisture content (%) max .....	.10
6. Sodium chloride content (%) max .....	.18
7. pH2% water solution .....	.10.5-12.0
8. Grinding (mm) max .....	... 1.0

### PACKING

**POLLOCEL® AS - 2** is packed in 20 kg multi - layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® CS-2

**POLLOCEL® CS-2** is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® CS-2**, due to good colloidal, binding and thickening properties, is used in the laundry detergent industry, pencils production, writing chalk, and emulsion paints.

### PRODUCT CHARACTERISTICS

**POLLOCEL® CS -2** is a white powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by an average degree of substitution and reduced Ph, is practically free of sodium hydroxide. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min .....	60
2. Content of CMC - Na in dry product (%) min .....	.67
3. Degree of substitution .....	0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)	
Type 10 .....	3-20
Type 30 .....	21-40
Type 60 .....	41-70
Type 90 .....	pow.70
5. Moisture content (%) max .....	.10
6. Sodium chloride content (%) max .....	.18
7. pH2% water solution .....	.9,3- 10.0
8. Grinding (mm) max .....	... 1.0

### PACKING

**POLLOCEL® CS - 2** is packed in 20 kg multi - layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® NS-2

**POLLOCEL® NS-2** - is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® NS-2** is suitable for paper, ceramics, production of glue used for sticking labels, especially paper ones, emulsion paints, and textiles due to good binding, adhesive, thickening, and film forming properties.

### PRODUCT CHARACTERISTICS

**POLLOCEL® NS-2** is a white powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by average degree of substitution and neutral pH. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min ..... 60
2. Content of CMC - Na in dry product (%) min ..... .67
3. Degree of substitution ..... 0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)  
Type 10 ..... 3-20  
Type 30 ..... 21-40  
Type 60 ..... 41-70  
Type 90 ..... pow.70
5. Moisture content (%) max ..... .10
6. Sodium chloride content (%) max .....18
7. pH2% water solution ..... .7 - 9
8. Grinding (mm) max ..... ... 1.0

### PACKING

**POLLOCEL® NS - 2** is packed in 20 kg multi - layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® AW

**POLLOCEL® AW** - is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® AW** is particularly suitable for the founding industry for producing moulding and core compound, and in the production of dry paints due to its good bonding and film forming properties.

### PRODUCT CHARACTERISTICS

**POLLOCEL® AW** is a white to light cream powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by an average degree of substitution. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min ..... 52
2. Content of CMC - Na in dry product (%) min ..... .58
3. Degree of substitution ..... 0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)  
Type 10 ..... 3-20  
Type 30 ..... 21-40  
Type 60 ..... 41-70  
Type 90 ..... pow.70
5. Moisture content (%) max ..... .10
6. Sodium chloride content (%) max .....20
7. pH2% of aqueous solution ..... .11-12
8. Grinding (mm) max ..... ... 1.0

### PACKING

**POLLOCEL® AW** is packed in 20 kg multi-layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® CW

**POLLOCEL® CW** is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® CW** due to its good binding, adhesive, and thickening properties, it is used as an adjunct in production of paper, in leather industry as dressing in pastes and pore filler in finishing leather, as an adhesive for glueing paper, and as a thickener for emulsion paints.

### PRODUCT CHARACTERISTICS

**POLLOCEL® CW** is a light cream white powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by a high degree of substitution and low pH, practically free of sodium hydroxide. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min ..... 50
2. Content of CMC - Na in dry product (%) min ..... .58
3. Degree of substitution ..... 0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)  
Type 10 ..... 3-20  
Type 30 ..... 21-40  
Type 60 ..... 41-70  
Type 90 ..... pow.70
5. Moisture content (%) max ..... .10
6. Sodium chloride content (%) max .....20
7. pH2% water solution ..... .9.3 - 10.0
8. Grinding (mm) max ..... ... 1.0

### PACKING

**POLLOCEL® CW** is packed in 20 kg multi-layer paper bags. Another type of packaging is allowed upon prior arrangement.

## POLLOCEL® NW

**POLLOCEL® NW** is a technical sodium carboxymethylcellulose salt produced during the process of etherification of wood cellulose with the help of monochloric acid or its sodium salt.

### APPLICATION

**POLLOCEL® NW** due to its good binding, adhesive, and thickening properties, it is used as an adjunct in production of paper, in leather industry as sizing in pastes and pore filler in finishing leather, as an adhesive for glueing paper, and as a thickener for emulsion paints.

### PRODUCT CHARACTERISTICS

**POLLOCEL® NW** is a white to light cream powder with a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is characterised by average degree of substitution and neutral pH. It is produced in four types of viscosity.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content - Na in commercial product (%) min ..... 50
2. Content of CMC - Na in dry product (%) min ..... .58
3. Degree of substitution ..... 0.5-0.7
4. Viscosity of a 2% aqueous solution at 20 ° C. C (mPas)  
Type 10 ..... 3-20  
Type 30 ..... 21-40  
Type 60 ..... 41-70  
Type 90 ..... pow.70
5. Moisture content (%) max ..... .10
6. Sodium chloride content (%) max .....21
7. pH2% water solution ..... .7 - 9
8. Grinding (mm) max..... .. 1.0

### PACKING

**POLLOCEL® NW** is packed in 20 kg multi-layer paper bags. Another type of packaging is allowed upon prior arrangement.

## **RECOMMENDED POLLOCEL® RANGE FOR CERTAIN APPLICATION**

1. Domestic Chemistry: AS-1, AS-2, CS-2
2. Production of emulsion paints: CS-2, NS-2, CW, NW
3. Production of dry paints: AS-1, AS-2, AW
4. Ceramics: AS-2, NS-2
5. Paper production: AS-2, NW
6. Textiles: NS-2, NW
7. Casting: AS-1, AS-2, AW
8. Seed coating: AS-2, CS-2
9. Briquetting of coal dust: AS-1, AS-2
10. Production of chalk for writing: AS-2, CS-2
11. Production of pencils: AS-2, CS-2
12. Production of glue for sticking labels: NS-2, NW

## POLOFIX<sup>®</sup> LV

**POLOFIX<sup>®</sup> LV** is a low viscosity modified carboxymethylcellulose sodium salt (CMC) obtained during the etherification of wood cellulose with then help of monochloroacetic acid.

### APPLICATION

**POLOFIX<sup>®</sup> LV** is used to reduce the filtration and stabilise the viscosity of drilling fluids on fresh water and the ones on seawater and saturated brine. It works effectively with all concentrations of NaCl and KCl over a wide pH range and in the presence of Ca + 2 and Mg + 2 ions. It is stable to 140 degrees Celsius and is not susceptible to bacterial fermentation.

**POLOFIX<sup>®</sup> LV** is added in the amount of 10-20 kg/m<sup>3</sup> of drilling fluid depending on its type and salinity.

### PRODUCT CHARACTERISTICS

**POLOFIX<sup>®</sup> LV** is a white or light cream powder with a particle size less than 1mm and bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is well soluble in water and its solutions are characterised by low pH.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content in a completely dry product (%) min ..... ..59.0
2. Water content (%) max ..... ..10,0
3. pH of a 2% aqueous solution ..... ..7 - 9
4. Grinding (mm) max ..... ..1,0
5. Viscosity apparent in distilled water  
- according to API test spec 13A (mPas) max ..... 45
6. Filtration in saturated brine  
- according to API spec 13A (ml / 30 ') max ..... ..10

### PRODUCT MEETS API STANDARD REQUIREMENTSPACKING

### PACKING

**POLOFIX<sup>®</sup> LV** is packed in paper bags with multi-layer pads to protect against moisture. Unit size of one packaging is 20kg. Another type of packaging is allowed upon prior arrangement. The product can be made in bulk or on a pallet.

## POLOFIX<sup>®</sup> HV

**POLOFIX<sup>®</sup> HV** is a high molecular weight modified carboxymethylcellulose sodium salt (CMC) obtained during the etherification of wood cellulose with then help of monochloroacetic acid.

### APPLICATION

**POLOFIX<sup>®</sup> HV** is used to lower the filtration and increase the viscosity of drilling fluids. It works effectively in fresh water scrubbers and with various concentrations of NaCl and KCl over a wide pH range. It is stable to 140 degrees Celsius and is not susceptible to bacterial fermentation.

**POLOFIX<sup>®</sup> HV** is usually added in the amount of 10-30 kg / m<sup>3</sup> of scrubber depending on its type and salinity.

### PRODUCT CHARACTERISTICS

**POLOFIX<sup>®</sup> HV** is a white or slightly cream powder with a particle size less than 1mm and a bulk density of 0.4-0.6 kg / dm<sup>3</sup>. It is well soluble in water and its solutions are characterised by low pH.

### PHYSIOCHEMICAL PROPERTIES

1. CMC content in completely dry product (%) min ..... ..58.0
2. Water content (%) max ..... ..10,0
3. pH of a 2% aqueous solution ..... ..7 - 9
4. Grinding (mm) max ..... ..1,0
5. Apparent viscosity of 1.5% distilled water solution (mPas) min ... ..35

### PACKING

**POLOFIX<sup>®</sup> HV** is packed in paper bags with multi-layer pads to protect against moisture. Unit size of 20kg. Another type of packaging is allowed upon prior arrangement. The product can be made in bulk or on a pallet.

## ANALYTICAL METHODS OF CARBOXYMETHYL CELLULOSE

### 1. Determination of the content of the active substance.

Weigh approximately 1 g of POLLOCEL® with an accuracy of 0,0002 g, pour into a 250 ml beaker, add 10 ml of 1M of hydrochloric acid solution and mix with a glass rod for about 15 minutes. Then add 10 ml of distilled water and 3-5 drops of 0.1% phenolphthalein solution in ethyl alcohol and stir vigorously, titrate 1M with sodium hydroxide solution to the discolouration of the solution. Add about 3 drops of sodium hydroxide.

At the end of the titration, while stirring slowly pour in 160 ml of ethyl alcohol at a concentration of 96% vol. Leave the beaker for about 15 minutes. In order for the precipitated sediment to settle on the bottom of the beaker, the liquid over the sediment will be clear. The precipitate in the beaker should be decanted and then washed with two 50 ml portions of alcohol: transfer quantitatively to a crucible with G2 sintered glass bottom. Alcohol is filtered off under reduced pressure and its residue removed by evaporation in the open air (about 0.5 h)

Dry the crucible with the residue at 105 + 3 ° C for 1 h, cool in a desiccant with a drying agent and weigh quickly with an accuracy of 0,0002g / m 1 /. Calculate the content of the active substance in (%) is from the formula:

$$S_c = \frac{m_1}{m} * 100\%$$

wherein:

m - weighed amount of POLLOCEL®

m1 - mass of precipitated and dried residue (g)

### 2. Determination of degree of substitution.

Transfer quickly the residue from the S<sub>c</sub> mark not attached to the wall of the crucible (m<sub>2</sub>) to a calcined porcelain crucible and weigh with an accuracy of 0,0002 g. Calcine the crucible with the residue to 750-800 ° C in a muffle furnace for 1.5 hours until the ashes will have a bright colour without any dark inclusions. Cool the crucible with the ashes in a desiccator with the desiccant and weigh it (m<sub>3</sub>). Calculate the degree of substitution from the formula:

$$DS = \frac{70,292 * m_3}{23.0 * m_2 - 34,712}$$

wherein:

m<sub>2</sub> - mass of precipitated and dried roasted residue (g)

m<sub>3</sub> - mass of sediment after calcination (g)

The permissible difference between the results of the two determinations should not exceed 2%. The arithmetic average of two parallel determinations is the result of the final determination.

**3. Determination of moisture content.**

Weigh 3-5g of POLLOCEL® with an accuracy of 0.0002 g in a 50 mm diameter dry and weighed weighing vessel. Insert the weighed sample into the dryer and dry at 110 (±) 3 degrees C for 3 hours. Cool in a desiccant with a drying agent and weigh. Calculate water content (W) in% according to the formula:

$$W = \frac{m_1 - m}{m_1} * 100 \%$$

wherein:

m<sub>1</sub>- weight of the tested POLLOCEL® (g)

m - mass of the sample after drying (g)

The discrepancy between the results should not exceed 1%. The final result should be the average of two parallel determinations.

**4. Determination of sodium chloride content.**

Weigh out approximately 1 g of POLLOCEL® with an accuracy of 0.0002 g in a conical flask and dissolve in 50 ml of water and then neutralise with 1m of nitric acid, add 5 ml of 10% potassium chromate and titrate 0.1 m with silver nitrate till the occurrence of slightly brown coloration. Calculate the content of chlorides in percent conversion of NaCl with the formula:

$$\% \text{ NaCl} = \frac{0.5845 * V}{m}$$

wherein:

V - inertness 0.1 m AgNO<sub>3</sub>, used for titration (ml)

m - POLLOCEL® (g)

**5. Determination of viscosity of 2% aqueous solution.**

Weigh with an accuracy of 0,01 g POLLOCEL® (m) sample according to the formula:

$$m = \frac{800}{100-W}$$

Wherein:

#### W- moisture content

Pour about 100 ml of water into the tared on a general laboratory balance dish and pour in a weighed amount of POLLOCEL® and make up to 400 g with water. Insert the laboratory stirrer into the dish and mix at 1500 rpm for 2 hours. Fill Höppler's viscometer with the solution and measure the dropping time of the ball at 20 degrees C between the two extreme marks of the viscometer; the measurement should be made for at least two consecutive drops starting from the sixth.

Calculate viscosity with the formula:

$$M = kt (g-r)$$

Wherein:

t- time of falling the ball (sec)

g - weight of the ball (g / cm<sup>3</sup>)

r - specific gravity (g / cm<sup>3</sup>)

k - fixed balls

#### **6. PH determination**

Determine the pH of the 2% aqueous solution by using a pH meter with a combination electrode type: OSH - 10 - 00.