

CMC & PAC - Drilling Fluid Additives

During the drilling of exploration and production wells for oil & gas and water, CMC (Carboxymethyl Cellulose) & PAC (Polyanionic Cellulose) as being drilling fluid additives are used for two primary functions; to form a filter cake at the borehole wall in order to minimize the water loss and to control the rheology of the fluid system.

Drilling fluids are mainly water based or solvent based, today due to environmental and operational concerns most drilling wells are operated with water based drilling fluids. As CMC and PAC are water soluble polymers, they are used in water based drilling fluids as mud performance increasing additives.



CMC and PAC added to the base mud by various preparation processes depending on the aimed achievement. After preparation of the fluid, the drilling mud is pumped from the mud tanks on the platform down the drill pipe, while cooling and lubricating the drilled bits by exiting the drill string from nozzles. Then the fluid rises upwards between the drill string and the formation wall, carrying the drilled solids to the surface. As long as the fluid's technical properties allow, the same process repeated after purifying the fluid.

In order to maintain such a proper fluid circulation along the well, CMC and PAC are used to control and manage the rheological properties of the fluid.

It is important that water loss to the soil along side the borehole would be kept under control as it has a direct effect on well production and operation efficiency. Due to water retention abilities of CMC & PAC, the fluid minimizes the loss of water to the soil by suspending it. It is also essential to form a thin filter cake in order to prevent stuck pipe incidents.





Apart from above two main functions, CMC & PAC;

- ◆ Provides shale inhibition by preventing well bore against collapse due to their film forming properties.
- ◆ Improves the cooling and lubricating properties of the drilling fluid.
- ◆ Helps protect the thermal and biological stability of the fluid.

CMC and PAC are biodegradable environmentally friendly non-toxic compatible drilling fluid additives which increase the performance of the fluid in order to properly carry out its functions

USK Brand CMC & PAC Products for Drilling

Product Codes	Product Classifications
■ USK – 20 PH	CMC LV
■ USK – 5000 SH	CMC EHV
■ USK – 100 BY	PAC LV Technical grade
■ USK – 200 SD	PAC LV Purified grade
■ USK – 20.000 S	PAC R Purified grade

Depending on the conditions of the well bore, desired achievement/efficiency and physical/chemical properties of the drilling mud, these products are either alone or in combination used with others in order to get the highest performance from the drilling itself.





■ USK – 20 PH CMC LV

DESCRIPTION USK – 20 PH is a Technical Grade Low Viscosity Sodium Carboxymethyl Cellulose (CMC LV) meeting the drilling industry standards API Spec 13A Section 9 and OCMA DFCP-2.

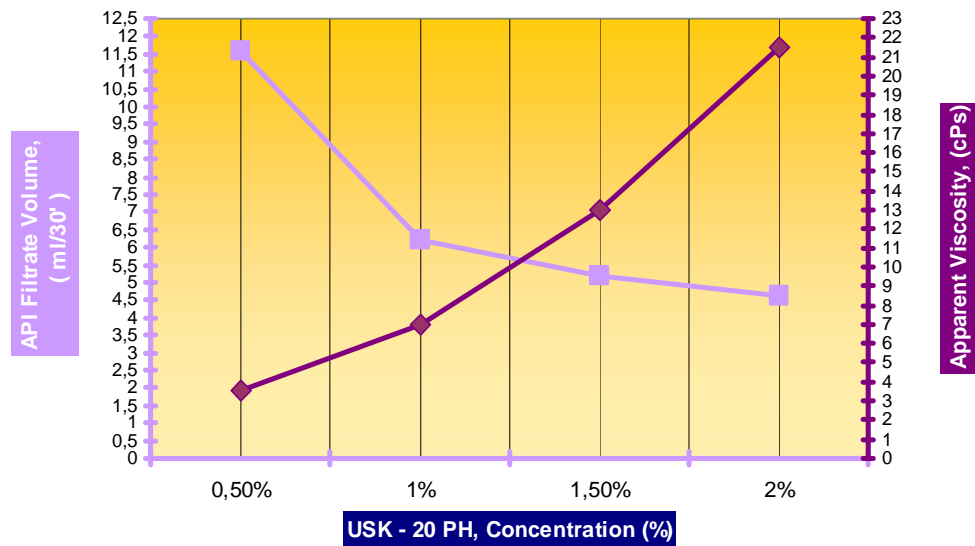
TYPICAL PROPERTIES

Appearance	Free Flowing White to Creamish Powder
Moisture %	max. 10
pH (1%)	7 – 11,5

FUNCTION USK – 20 PH functions as a fluid loss control agent without substantially increasing the viscosity. It also helps reducing erosion behavior of the mud by forming a thin filter cake.

FEATURES USK – 20 PH is an economic and effective API fluid loss reducer applicable in Fresh water, Sea water and Salt Saturated water fluid systems. Its unique characteristic is its High Degree of Substitution which ensures its efficiency. It is compatible with other drilling fluid additives.

USK - 20 PH PERFORMANCE as per OCMA DFCP-2



MIXING USK – 20 PH should be added to the solution by using high speed conventional mixers at a uniform rate and slowly in order to avoid lumping or fish eye formation and delayed dispersion.

HANDLING USK – 20 PH is non toxic for environment and not a dangerous material for transport regulations. The product is packed in 25kg moisture proof kraft paper bags and should be stored cool indoors.



■ **USK – 5000 SH CMC EHV**

DESCRIPTION USK – 5000 SH is a Technical Grade Extra High Viscosity Sodium Carboxymethyl Cellulose (CMC EHV) meeting the drilling industry standards API Spec 13A Section 10.

TYPICAL PROPERTIES

Appearance	Free Flowing White to Creamish Powder
Moisture %	max. 10
pH (1%)	7 – 11
Bulk Density (g/L)	500 - 700

FUNCTION USK – 5000 SH functions as a viscosifier while controlling the fluid loss and providing shale inhibition. Due to its rheology control properties on the fluid system, increased drill solids transport capacity is obtained as a sufficient yield. It also helps the fluid suspending mud weighting agents by encapsulating them.

FEATURES USK – 5000 SH is an economic and effective viscosifier applicable in Fresh water, Sea water and Salt Saturated water fluid systems. It helps reducing friction pressure and builds a protective colloid on the surface of the drilling well wall. The product is resistant to bacterial degradation and compatible with other drilling fluid additives.

PERFORMANCE

Viscosity (cPs), at 600 rpm		
	Deionized Water	min. 30
	40 g/L Salt Water	min. 30
	Saturated Salt Water	min. 30
Fluid Loss (ml)		max. 10

MIXING USK – 5000 SH should be added to the solution by using high speed conventional mixers at a uniform rate and slowly in order to avoid lumping or fish eye formation and delayed dispersion.

HANDLING USK – 5000 SH is non toxic for environment and not a dangerous material for transport regulations. The product is packed in 25kg moisture proof kraft paper bags and should be stored cool and dry indoors.



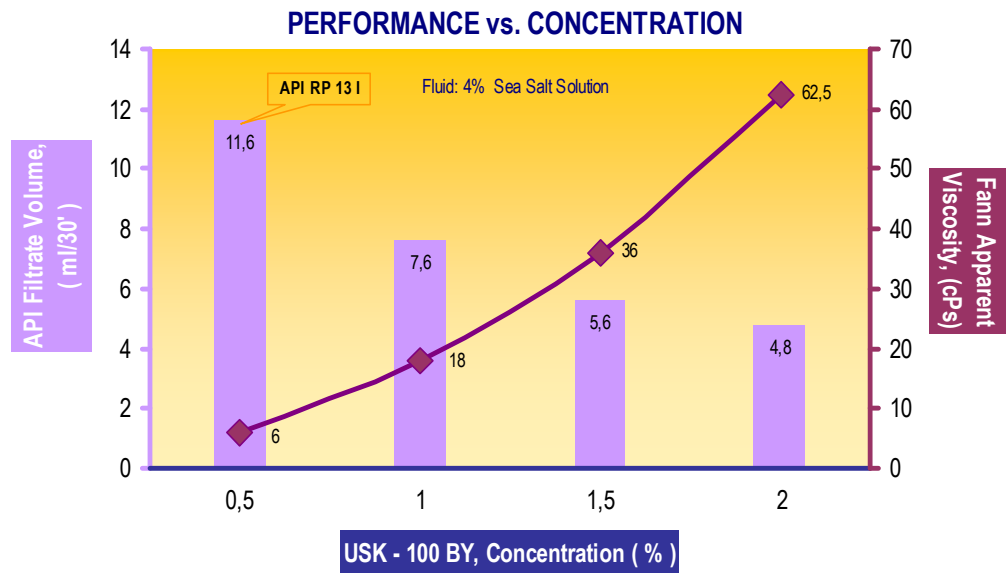
■ USK – 100 BY PAC LV Technical grade

DESCRIPTION Being classified as Polyanionic Cellulose Low Viscosity grade (PAC LV) by the industry, USK - 100 BY is a low molecular weight water soluble anionic polymer of Technical Grade Carboxymethyl Cellulose, tailored for use in water based fluid systems where no additional viscosity increase is desired. It is designed as per API RP 13 I & ISO 13500:2006.

TYPICAL PROPERTIES	Appearance	Free Flowing White to Creamish Powder
	Moisture %	max. 10
	pH (1%)	7 – 11

FUNCTION The primary function of USK - 100 BY is to reduce and control the API filtration rate while stabilizing the rheology of the mud without substantially increasing the viscosity regime of the fluid system. It also provides shale inhibition as a protective colloid and improves the filtercake quality and stability between the wellbore and the formation.

FEATURES Its unique characteristic is its High Degree of Substitution which ensures its efficiency even at low concentrations. It is compatible with other drilling fluid additives and applicable in dispersed or non dispersed, Fresh water, Sea water and Salt Saturated water fluid systems.



MIXING USK – 100 BY should be added to the solution by using high speed conventional mixers at a uniform rate and slowly in order to avoid lumping or fish eye formation and delayed dispersion.

HANDLING USK – 100 BY is non toxic for environment and not a dangerous material for transport regulations. The product is packed in 25kg moisture proof kraft paper bags and should be stored cool indoors.



■ USK – 200 SD PAC LV Purified grade

DESCRIPTION

Being classified as Premium Quality Polyanionic Cellulose Low Viscosity grade (PAC LV Pure) by the industry, USK – 200 SD is a low molecular weight water soluble anionic polymer of Purified Grade Carboxymethyl Cellulose, tailored for use in water based fluid systems where no additional viscosity increase is desired. It is designed as per API RP 13 I & ISO 13500:2006.

TYPICAL PROPERTIES

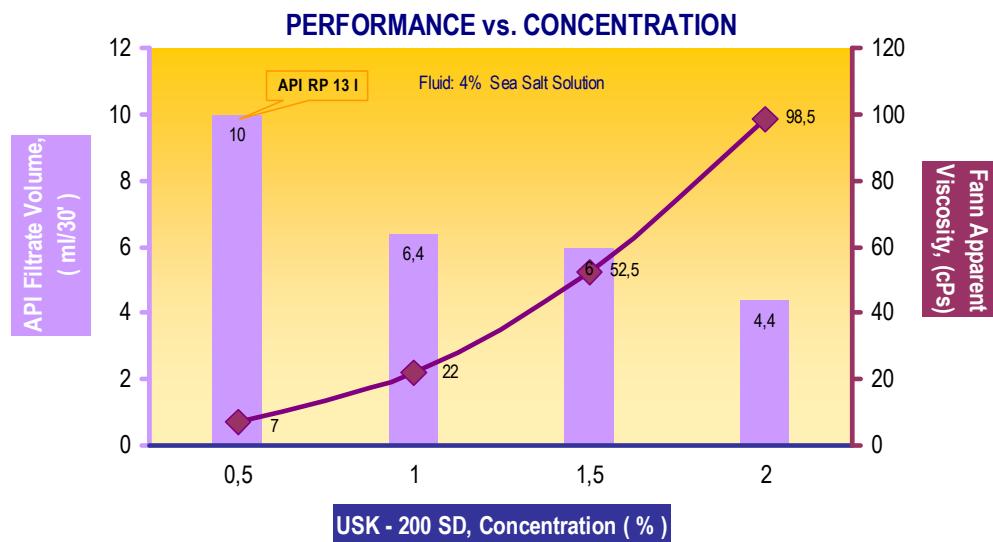
Appearance	Free Flowing White to Creamish Powder
Moisture %	max. 10
pH (1%)	6,5 – 8

FUNCTION

The primary function of USK – 200 SD is to reduce and control the API filtration rate while stabilizing the rheology of the mud without substantially increasing the viscosity regime of the fluid system. It also provides shale inhibition as a protective colloid and improves the filtercake quality and stability between the wellbore and the formation.

FEATURES

Its unique characteristic is its High Degree of Substitution which ensures its efficiency even at very low concentrations. It is compatible with other drilling fluid additives and applicable in dispersed or non dispersed, Fresh water, Sea water and Salt Saturated water fluid systems. USK – 200 SD might be recommended for use in high temperature and high pressure surroundings.



MIXING

USK – 200 SD should be added to the solution by using high speed conventional mixers at a uniform rate and slowly in order to avoid lumping or fish eye formation and delayed dispersion.

HANDLING

USK – 200 SD is non toxic for environment and not a dangerous material for transport regulations. The product is packed in 25kg moisture proof kraft paper bags and should be stored cool indoors.



■ USK – 20.000 S PAC R Purified grade

DESCRIPTION

Being classified as Premium Quality Polyanionic Cellulose High Viscosity grade (PAC R Pure) by the industry, USK – 20.000 S is a high molecular weight water soluble anionic polymer of Purified Grade Carboxymethyl Cellulose, tailored for use in water based fluid systems for increasing viscosity and controlling filtration. It is designed as per API RP 13 I & ISO 13500:2006.

TYPICAL PROPERTIES

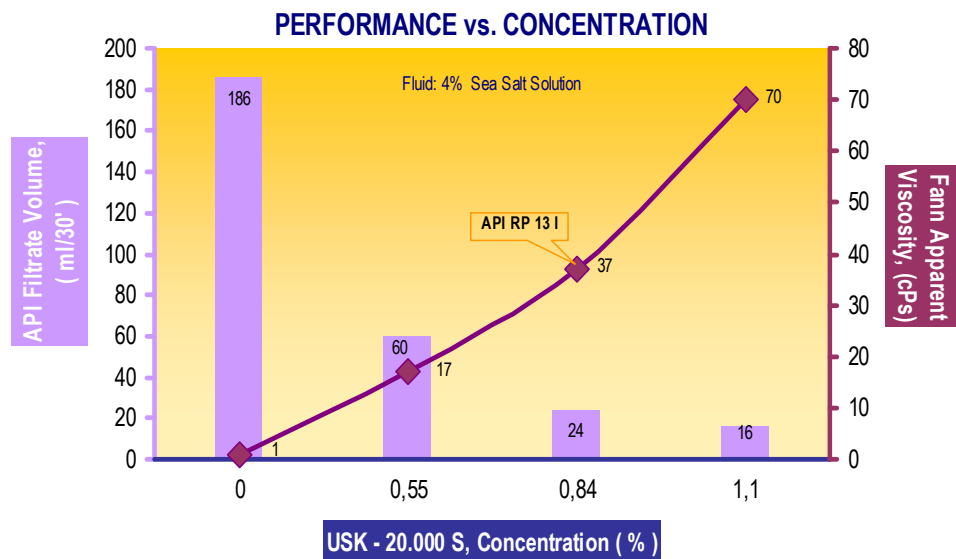
Appearance	Free Flowing White to Creamish Powder
Moisture %	max. 10
pH (1%)	6,5 – 8

FUNCTION

The primary function of USK – 20.000 S is to improve the viscosity of the drilling fluid to the desired degree while controlling the water loss. By adding the product increased Apparent Viscosity and Yield Point is obtained, subsequently better and higher drill solids transfer capacity is established. It also provides shale inhibition as a protective colloid and improves the filtercake quality and stability between the wellbore and the formation.

FEATURES

USK – 20.000 S is an efficient viscosifier even at low concentrations applicable in Fresh water, Sea water and Salt Saturated water fluid systems. The product is resistant to bacterial degradation and compatible with other drilling fluid additives. USK – 20.000 S might be recommended for use in high temperature and high pressure surroundings.



MIXING

USK – 20.000 S should be added to the solution by using high speed conventional mixers at a uniform rate and slowly in order to avoid lumping or fish eye formation and delayed dispersion.

HANDLING

USK – 20.000 S is non toxic for environment and not a dangerous material for transport regulations. The product is packed in 25kg moisture proof kraft paper bags and should be stored cool indoors.

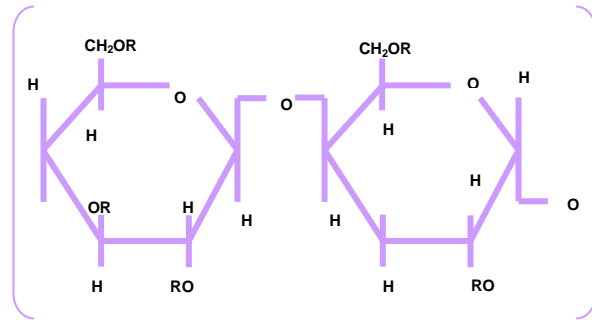
Established in 2001, Ugur Seluloz Kimya is the manufacturer of both Technical Grades and Purified Grades of Carboxymethyl Cellulose (CMC) and Polyanionic Cellulose (PAC), located in Turkey, serving to markets worldwide. Ugur Seluloz Kimya is ISO 9001:2000 certified.

CARBOXYMETHYL CELLULOSE (CMC)

Carboxymethyl Cellulose (CMC) is a water soluble anionic polymer derived from naturally occurring cellulose; cotton linter pulp or/and wood pulp, produced by reacting alkali cellulose with monochloroacetic acid.

CMC is

- Biodegradable
- Cold/Hot water soluble
- Non-toxic
- Physiologically inert
- Odourless



chemical structure of CMC

APPLICATIONS & FUNCTIONS

- DETERGENTS
- DRILLING FLUIDS
- MINERAL FLOTATION
- WATER BASED PAINTS
- ADHESIVES
- CERAMICS
- TEXTILE SIZING & PRINTING
- PAPER SIZING & COATING
- FOOD
- WELDING ELECTRODES
- ANTI-REDEPOSING
- FLUID LOSS CONTROL
- WATER RETENTION
- THICKENING
- BINDING
- FILM FORMING
- SIZING
- COATING
- STABILIZING
- PROTECTIVE COLLOID

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