

## COSMOCLAY P1 COSMOCLAY P100 Thickening and suspending additives

**INCI Name:** Bentonite

### Characteristics

**Cosmo clay** have been created to meet the requirement of formulators belonging to different fields of the chemical industry, which share the usage of rheological controller for waterborne formulations.

**Cosmo clay** are thixotropic thickener and antissettling agents that form opaque gels in water. It prevents settling and liquid separation of liquid cleaners and detergents. **Cosmo clay** are stabilising agents of inorganic origin based on selected, purified and activated white bentonite clay with a high montmorillonite amount.

**Cosmo clay** activity is strictly correlated to his hydration capacity and to give rise to micronic and submicronic particles in dispersion, with a high specific surface. These elementary particles are responsible of the thixotropic, antissettling, absorbing and binding properties of the products. **Cosmo clay** contributes to create the "body" of the product to be formulated by the formation of an internal three-dimensional structure within which different particles and fillers may be incorporated.

### Viscosity and concentration

The addition of small quantity of this product (1-5%) is sufficient to produce the desired thixotropic effect. By itself in water, 4%wt permits the formation of homogeneous suspensions. Higher

percentages of the product permit the formation of solid or pasty cleaners.

The advantages of **Cosmo clay** compared to organic thickening agents include:

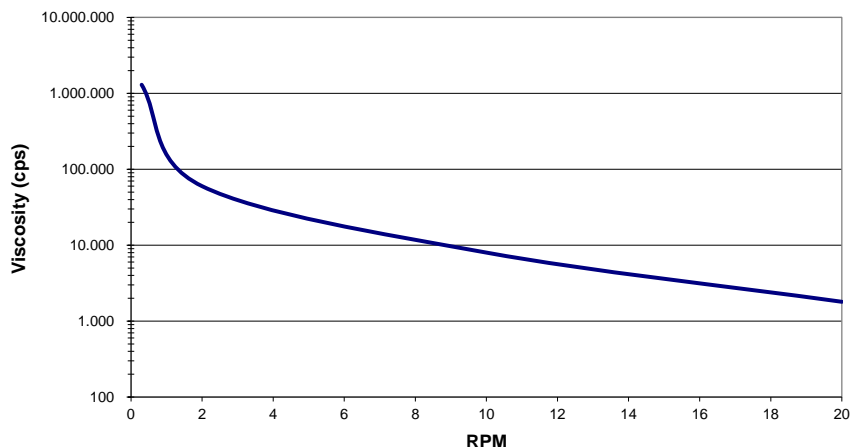
- high resistance to extreme chemical and physical conditions;
- excellent compatibility with all the ingredients of cleaners and detergents;
- less expensive.

The addition of polymeric thickeners however allows the formulator to obtain the best combination in terms of cost/efficiency.

**Cosmo clay** slurry shows a decreasing viscosity with increasing shear strength (see Fig.1, based on **Cosmo clay P1**), but promptly recovers its gel strength once a quite state is reached. This property is particularly appreciated in those formulations where the product has to show low resistance to mechanical forces when in use, but high antissettling and thickening properties in a quite state.

In hard surface cleansers, that contain large amounts of calcium carbonate as scouring agent, a percentage of 1-3%wt of **Cosmo clay** prevents settling of insoluble components and liquid separation.

Fig.1: BROOKFIELD VISCOSITY VS.SHEAR FORCE



## Advantages

- Reduce usage or total replacement of current cellulose thixotropes, with a reduction of prices;
- Temperature resistance;
- Resistance in a wide pH range (pH=4 - 13);
- Viscosity resistance even in reasonably hard waters (500 mg/l of CaCO<sub>3</sub>);
- Enzyme resistance and perfect compatibility with ionic and non ionic surfactants;
- Withstands oxidation and microbial degradation;
- Perfect compatibility with the environment;

## Applications

Due to their general use and versatility, is very difficult to mention all the application of **Cosmoclay** Here below we mention some production areas where bentonite has been exploited with success:

- in non-transparent liquid detergent formulations (dish-washing and washing machine liquid detergents);
- in pasty products for cleaning of hard surfaces (sanitary ceramics, metallic and non-metallic surfaces);
- in household products (oven cleaners, floor detergents,...)
- in personal care products (shampoos, liquid soaps, sun creams, deodorants, antiperspirants,...)
- in the organic/water emulsions as colloids protective of organic particles, as well as in solid and pasty formulations, often having active components which need to be released slowly into the environment;

## Incorporation Procedure

**Cosmoclay** will hydrate when added to water. To obtain maximum hydration and optimum performance in the shortest time, we suggest the following incorporation procedures:

- Apply a very energetic stirring to water in the mixing container.
- Add **Cosmoclay** powder to water gradually, in order to avoid lump formation;
- Continue to stir (minimum 20 minutes);
- Add other formula ingredients in the appropriate order

## Additional incorporation information

- Viscosity might increase gradually in the hours after the slurry preparation, so we advise to measure viscosity the time needed to obtain the ultimate viscosity value depends on the stirring efficacy.
- Stirring must be very energetic, in order to break the laminar structure of bentonite. The stirrer must be provided with blades, perpendicular to rotation axis. The higher is the rotation speed during dispersion, the quicker is the slurry formation and the lower is the time necessary to obtain final viscosity. The advised rotation speed is at least 1000 rpm.
- The final viscosity and thickening efficiency are not obtained until other formula ingredients are incorporated into the system

Table 1: Chemical-physical properties

Chemical-physical characteristics (typical value):		Cosmoclay P1	Cosmoclay P100
Moisture	[%]	8-12	8-12
Color (Hunterlab)	L	90.0	86 min
	a	- 0.3	-1 / +1
	b	+ 5.0	8 max
Cation exchange capacity	[meq/100g]	85	
Swelling capacity	[ml/2g]	35-40	45 min
Bulk density	[g/ml]	0.7-0.8	0.7-0.8
Dry residue over 325 mesh	[%]	3 max	3 max
Average particle size	[microns]	13-16	
Brookfields viscosity (4% dry)	[cps]	2,000-3,000	3,000-8,000

Chemical analysis (typical)	Cosmoclay P1 [%]	Cosmoclay P100 [%]
SiO <sub>2</sub>	60.50	57.46
Al <sub>2</sub> O <sub>3</sub>	21.50	22.82
TiO <sub>2</sub>	0.21	0.22
Fe <sub>2</sub> O <sub>3</sub>	2.80	2.60
P <sub>2</sub> O <sub>5</sub>	0.02	0.03
MnO	0.02	0.01
MgO	3.48	3.15
CaO	1.45	1.24
K <sub>2</sub> O	0.90	1.00
Na <sub>2</sub> O	3.68	3.95
L.O.I. (900°C)	7.04	7.51

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