
Technical Information

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Sokalan® CP types

Sokalan CP 5

Sokalan CP 45

Sokalan CP 45 Powder

Sokalan CP 7

Sokalan CP 9

Sokalan CP 10

Sokalan CP 10 S

Sokalan CP 12 S

Sokalan CP 13 S

The Sokalan CP types are used as additives for low-phosphate and phosphate-free detergents. They inhibit incrustation and redeposition and boost detergency.

They are also employed as dispersing agents for organic and inorganic solids in water-treatment processes, etc.

Sokalan CP types

Chemical nature

Sokalan CP 5	Maleic acid-acrylic acid copolymer, sodium salt
Sokalan CP 45	
Sokalan CP 45 Powder	
Sokalan CP 7	

Sokalan CP 9	Maleic acid-olefin copolymer, sodium salt
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Sokalan CP 10 S	Modified polyacrylic acid
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Sokalan CP 10	Modified polyacrylic acid, sodium salt
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Sokalan CP 12 S	Maleic acid-acrylic acid copolymer
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Sokalan CP 13 S	Modified polyacrylic acid
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The Sokalan CP types are supplied in the form of clear or cloudy, yellowish liquids. Sokalan CP 45 is also supplied in the form of an off-white powder.

The most important properties of the Sokalan CP types are listed in the following table. All figures are averages for a representative sample of batches.

Properties of the Sokalan CP types

		Sokalan CP 5	Sokalan CP 45	Sokalan CP 45 Powder	Sokalan CP 7	Sokalan CP 9	Sokalan CP 10 S	Sokalan CP 10	Sokalan CP 12 S	Sokalan CP 13 S
Physical form		Liquid	Liquid	Powder	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Concentration* (Dried at 150°C until mass remains constant)	%	40	45	92	40	25	50	45	50	25
Water content (ISO 3733)	%	60	55	8	60	75	50	55	50	75
Average molar mass Mw	g/mol	70 000	70 000	70 000	50 000	12 000	4000	4000	3000	20 000
K Value		60	60	60	50	40	20	20	20	50
pH		8	4	–	8	10	1.5	8.5	1.5	2
Density (23°C)	g/cm ³	1.29	1.25	–	1.30	1.11	1.16	1.30	1.23	1.09
Bulk density (ISO 697)	g/l	–	–	350	–	–	–	–	–	–
Viscosity (23°C, Brookfield, 60 rpm)	mPa · s	2800	6900	–	1200	50	150	500	100	250
Calcium carbonate dispersing capacity at 23°C, pH 11	mg CaCO ₃ /g polymer	290	350	350	360	230	170	130	310	170
at 60°C, pH 11	mg CaCO ₃ /g polymer	280	340	340	400	230	120	90	310	100

* Drying time
– Liquids: 2 hours
– Powder: 16 hours

The above information is correct at the time of going to press. It does not necessarily form part of the product specification.

A detailed product specification is available from your local BASF representative.

Molar mass

The molar mass of the Sokalan CP types was determined by gel permeation chromatography (GPC) with aqueous eluents. The columns were calibrated with polystyrene sulphonates with a narrow molar mass distribution. Benoit's universal principle (J. Chim. Phys. 63 [1966], 1507) and physical data presented by Spatorico and Beyer (J. Appl. Polym. Sci. 19 [1975], 2933) were used to convert the results into units of molar mass for the sodium polyacrylate standard.

K value

The K value of a polymer is an indicator of its intrinsic viscosity, which is a guide to its degree of polymerization and its molar mass.

The K values of 1 % solutions were measured in all cases. Products with a pH of less than 7, such as Sokalan CP 10 S, were neutralized with caustic soda in advance.

Calcium carbonate dispersing capacity

The ability of the Sokalan CP types to inhibit incrustation is the result of their capacity to disperse sparingly soluble solids. A method derived from the Hampshire test, which was developed specifically for chelating agents, can be used to test the performance of dispersing agents in detergents. It consists of titrating a solution of dispersing agent against calcium acetate in the presence of an excess of carbonate ions until the solution becomes cloudy (F. Richter and E. W. Winkler, Tenside Detergents Vol. 24, No. 4 [1987], 213).

The results obtained for dispersing agents by this method are significantly lower in magnitude than those obtained in the Hampshire test, but the differences between different dispersing agents are more pronounced. The results correlate well with those obtained by measuring residual ash in washing trials, but minimal variations in the composition of detergents can affect the results obtained in practical tests.

Method

Dissolve 1.0 g of dispersing agent (100 % active) in 100 ml of distilled water and neutralize it. Add 10 ml of 10 % sodium carbonate solution and adjust the pH to 11. Then titrate the solution against a 0.25 mol/l calcium acetate solution, maintaining the pH and temperature at a constant level.

Applications

Laundry detergents

Legislation has been passed in many countries to reduce the amount of pentasodium triphosphate in laundry detergents or to eliminate it altogether, and voluntary agreements have been reached in other countries. The consequence has been a reduction in detergency and an increase in incrustation, the severity of which depends on the composition of the detergent, the type of fabric, the water hardness and the temperature. Precipitated salts from hard water are the main cause of incrustation. Polymers such as our Sokalan CP and Sokalan PA types can boost the performance of detergents by reducing incrustation, improving the whiteness of the wash and keeping soil redeposition to a minimum. They need to be added to detergents at rates of 1–3 %.

The best polymer for a given application can only be determined in practical trials, because the effectiveness of our Sokalan CP types is determined to a very large extent by the type of formulation in which they are employed.

Cleaners

Polymeric dispersing agents such as our Sokalan CP types are very effective in formulations for dishwasher detergents. They help to boost detergency, and they prevent soil and the salts contained in hard water from being deposited on the dishes and the interior of the dishwasher.

Sokalan CP 5 and Sokalan CP 45 are very effective in formulations of this type.

Water treatment

The salts contained in hard water tend to form a hard scale on the floors and walls of vessels and in heat exchangers, pipes and nozzles, etc. Sokalan CP 10 and Sokalan CP 10 S are particularly effective against this type of scale.

Sokalan CP 9 is an effective dispersing agent for rust and other suspended particulate matter in water circuits. It keeps the solids finely divided, preventing them from coalescing to form scale.

Please consult our Technical Information leaflets on the individual products in the Sokalan CP range for further details.

Sokalan CP 5 Sokalan CP 45 Sokalan CP 7

These three products from the Sokalan CP range are mainly employed in laundry detergents. Sokalan CP 7 is particularly effective in detergents that contain sodium carbonate.

Sokalan CP 9 Sokalan CP 10 Sokalan CP 10 S

Sokalan CP 9 is a versatile dispersing agent for use in aqueous solutions and in mixtures of water and organic solvents.

Sokalan CP 10 and Sokalan CP 10 S are polyacrylates with a low molar mass. They are manufactured by a special polymerization process. They perform very well in aqueous media, and they are particularly effective for dispersing inorganic solids. They help to inhibit the formation of scale by hard-water salts.

Sokalan CP 9 can be employed as a stabilizer in emulsion and solution polymerization processes and as a dispersing agent for hard-water salts.

Sokalan CP 12 S

Sokalan CP 12 S is particularly effective for inhibiting scale formed by calcium and magnesium salts. It is mainly used in institutional laundry detergents that contain high proportions of sodium carbonate. It is also used to disperse pigments, fillers and other finely divided inorganic solids in water and in cooling circuits, etc.

Sokalan CP 13 S

Sokalan CP 13 S has a high dispersing capacity for hard-water salts, and it is stable in the presence of sodium hypochlorite.

It is mainly used in formulations for dishwasher detergents that contain hypochlorite and in detergents and cleaners for the brewery, dairy and food-processing sectors.

Processing

Polymers can precipitate in solutions with a high electrolyte content. Careful attention needs to be paid to their stability in individual formulations.

Safety

We know of no ill effects that could have resulted from using the Sokalan CP types for the purpose for which they are intended and from processing them in accordance with current practice. According to the experience that we have gained over many years and other information at our disposal, the Sokalan CP types do not exert any harmful effects on health, provided that they are used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in our Safety Data Sheets are observed.

Handling

All contact with the eyes and prolonged contact with the skin should be avoided. Safety glasses should be worn when handling these products in their concentrated form.

Further details are given in our safety data sheets

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.

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