

Cellulose ethers

Safe handling and processing - burning behaviour and explosion risk



Summary

This product information was issued by the CEFIC Cellulose Ether Sector Group in cooperation with all producers of Cellulose ether, and by EXAM BBG Prüf- und Zertifizier GmbH, Bochum, Germany. It serves to provide basic information on the burning behaviour and explosibility of CE.

To determine these characteristics, commercially available products were used that contain a < 63 µm particle size fraction, although these products also contain significant amounts of coarser fractions. This fine product fraction, however, is representative for the risk assessment of a dust explosion.

The moisture content has got an influence on the burning behaviour and explosibility. As mentioned above, the commercially available products were tested. The values of the explosion characteristics increase with decreasing water content. Products that are modified during their processing (e.g. mixing, grinding or drying), can significantly deviate from this representative fraction and must be examined separately.

Below, the results of the tests of the various products, provided by the participating producers of cellulose ethers, are summarised in table form. The data are selected in a way so as to render them representative of the products' respective class and therefore make them universally valid for the fire- and explosion-related assessment of these products.

To also cover the most critical conditions to be expected, the parameters were determined by testing dusts with a particle size of < 63 µm. Critical conditions can occur if, during processing, the degree of fineness of the cellulose ethers is altered or if it amounts to accumulation of fines (e. g. in deposits, due to abrasion, in the filter or after a grinding process). It must be taken into consideration that the safety-relevant parameters listed in table 1 are always some determined maximum values or, in parts, the upper value of a classification. This means that individual products of a product group can indeed have deviating lower values. In addition it is possible that there are certain products that have not been tested here and that have even more critical values. For this reason it is recommended to draw on the parameters of the dust actually present in the respective plant to provide a basis for the assessment of explosion protection concepts. Therefore, the values listed in the table can only be considered exploratory.

Cellulose Ethers are St 1 or St 2 products. Exam tested the cellulose ether safety characteristics according to DIN standards. Results of the safety characteristics tested in compliance with ASTM standards should deviate from the DIN results.

The following table shows the results of the burning behaviour and safety characteristics of the Cellulose ether.



Table 1: Safety-relevant parameters of cellulose ethers¹

Abbreviation of cellulose ether ²	Burning class ³	Glowing temperature	Autoselfignition temperature	LEL	p_{\max}	K_{st}	MIE ⁴	Ignition temperature
		°C	°C	g/m ³	bar	bar·m·s ⁻¹	mJ	°C
CMC and CMC technical	5	280	170	60	9	<200	>1000	360
EHEC	5	>450	120	30	10	<200	>10	420
HEC	5	280	120	30	10	<200	>10	460
EC	5	390	130	20	8	<200	>3	380
HPC	5	>450	230	30	10	<200	>3	420
HPMC / HEMC / MEHEC	5	>450	170	30	10	<300	>10	400
MC	5	300	170	30	10	<300	>10	380

¹ Test Results 1100/153/05 BVS-Hes/Pri, Bochum , January 2006

² Definition of terms

EC	Ethyl cellulose
MC	Methyl cellulose
CMC	Carboxy methyl cellulose
HEC	Hydroxyethyl cellulose
EHEC	Ethyl hydroxyethylcellulose
MEHEC	Methyl ethyl hydroxyethylcellulose
HPMC = MHPC	Hydroxypropyl methyl cellulose
HEMC = MHEC	Hydroxyethyl methyl cellulose
HPC	Hydroxypropyl cellulose

³ Burning Behaviour

No propagation of a fire	No ignition	BZ 1
	Brief ignition and rapid extinction	BZ 2
	Localized burning or smouldering without propagation	BZ 3
Propagation of a fire	Propagation of a smouldering fire	BZ 4
	Propagation of an open fire	BZ 5
	Very hefty, deflagration-like burn-off	BZ 6

⁴ The MIE was determined with inductivity



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