

PRINTEX[®] zeta A – high performance low CMA specialty carbon black for pipe applications

Technical Information 1456



The global trend of rapid urbanization and the demand for materials and services in these urban regions are increasing the necessity for infrastructure developments. Availability of drinking water, gasoline, natural gases, and communication services are such needs among others. Installation of pressure pipes to transport such goods and conduit pipes to provide essential services is aimed at addressing this growing need. Especially polyolefin pipes rise up a challenge in novel types of polymer fillers with lowest possible CMA (compound moisture absorption).

Orion Engineered Carbons produces specialty carbon black by means of several process technologies:

furnace black, gas black according to the Degussa gas black process, LAMP BLACK and thermal black processes. With our technical capabilities and expertise, we are able to provide the market with functional specialty carbon black having suitable chemical and physical properties.

Tailored to particular needs arising from high-end applications in the polymer pipe industry, Orion is in distinguished position to advise their prospects best suitable specialty carbon black out of the entire product line. Hence Orion Engineered Carbons created a novel low CMA p-type of specialty carbon black showing all the necessary attributes shown in table 1.

PRINTEX® zeta A – Our solution for low CMA pipe applications

Table 1

Key performance requirements for specialty carbon black in pipe applications

CBP attributes Pipe key requirements	Good dispersibility	Low sulfur impurities	Pellet quality & integrity	Purity	CBP particle morphology
Excellent UV protection	•			•	•
Excellent surface smoothness	•		•	•	•
Low organoleptic effects		•		•	
Low compound viscosity	•		•		•
Ease of handling and processing	•		•		•

PRINTEX® zeta A was developed to be used particularly in pressure pipes for water and gas supply to impart highest

protection from exposure to UV radiation to ensure long-term durability of such pipes.

Table 2

Typical values of PRINTEX® zeta A for pipe applications

Parameter	Method	Unit	PRINTEX® zeta A	PRINTEX® alpha A	PRINTEX® P A
OAN	ASTM D 2414	ml/100g	99	100	102
BET	ASTM D 6556	m ² /g	77	105	120
STSA	ASTM D 5816	m ² /g	74	84	96
Particle size	TGZ-3	nm	≤25	20	20
Sulphur content	ASTM D 1619	%	≤0.08	≤0.1	≤0.1
pH value	ISO 787-9		9	8.7	10
Volatile matters at 950°C	DIN 53552	%	0.7	0.5	0.5
Moisture absorption (40% CBP PELD)	Internal method (100days@75% rel. humidity)	%	<0.5	0.7	0.9
Blackness value	DIN 55979	M _v	239	240	245
Ash content	ASTM D 1506	%	0.02	≤0.02	≤0.1

Numerous pipe specifications and regulations govern the choice of specialty carbon black. These qualities are typically in line with global requirements derived from internationally applied standards for drinking water pipes

and for supply of gaseous fuels, but also from most challenging specifications compiled by "PE 100+ association" for instance.

Special attributes of PRINTEX® zeta A for pipe applications

- If low compound moisture absorption (CMA) is on a too high level this may lead to trouble during pipe extrusion process or while welding of the pipe ends. Potential defects, e.g. voids in the final pipe, can also cause premature breakdown of the pipe, for example at raised pressure.
- PRINTEX® zeta A is in conformity with EU regulation No. 10/2011 (EFSA conformity).
- PRINTEX® zeta A is showing a very low sulphur content.
- Good surface smoothness of the pipe walls is an important request on construction design. Surface roughness and flow resistance are expected to be as low as possible to allow an excellent flow of transported fluids.
- Melt flow rate (MFR) is an important parameter as it needs to be well balanced. On the one hand high MFR is desired for low energy consumption and high throughput at the same time, on the other hand lower MFR is beneficial for low sagging effect while producing large diameter pipes.
- Microscopic dispersion of specialty carbon black is essential for achieving best possible performance. Excellent dispersion guarantees expected long service life and prevents from early failure. Micro dispersion is typically tested according to ISO 18553 "press out test".
- UV protection is one of the most important effects caused by specialty carbon black in polymer pipes. The right balance between average primary particle size or specific surface area respectively, as well as dispersibility leads to an optimum UV- and weathering resistance and protects pipes from premature failure.
- Organoleptic effects may have negative influence on smell odour as well as taste of drinking water which is conveyed in pressure pipes. Very low impurities and especially a low sulphur level is necessary to meet organoleptic requirements best possible.

Regulatory compliance

Specialty carbon black from Orion Engineered Carbons comply with most global regulatory requirements including EFSA, CONEG, REACH, etc. Rigorous quality standards are followed during the production, handling and storage of these grades. The products are supported by an extensive and competent sales, technical and customer support staff around the world. For additional details and to verify compliance with specific regulations, please contact us.

Quality standards

Orion follows rigorous quality procedures and standards during production, handling and storage of specialty carbon black to ensure that the product consistently meets the requirements for these applications.



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