kwark®

Starting formulation for insulating paints

Kwark® is a high performance silica aerogel material developed and produced by Enersens. This innovative filler is ideal for those seeking high thermal performances and high-value-added products, thanks to an insulating, sustainable, lightweight and fire resistant additive. Kwark®'s powders bring that way exceptional properties enabling to formulate high performance insulating paints and coatings.

Kwark® – Internal insulating coating

EASY TO USE, EASY APPLICATION

- ✓ Improve the thermal comfort
- ✓ Anti-condensation effect
- ✓ Energy saving
- ✓ Prevent thermal bridges
- ✓ Prevent corrosion under insulation

Kwark XP100

Kwark® XP100 is a high performance silica aerogel powder developed and produced by Enersens. This innovative powder is ideal for those looking to develop high thermal performance coatings and present the following key values:

- ✓ Thermal conductivity: 0.013 W/(m.K) at 20°C
- ✓ Operating temperature: -195°C to 450°C
- ✓ Particle size: from 10 to 100 µm
- ✓ Apparent density: 40 to 60 kg /m3
- ✓ Porosity: 95%
- ✓ Surface chemistry: hydrophobic

Formulation guidelines

To ensure good dispersion of the Kwark powder and achieve high coating performances, we recommend that you use the following type of compounds and additives:

1. Resin: low MFFT / high flexibility / no coalescing agent / low viscosity
2. Dispersing agent: High Molecular Weight to avoid penetration into the pores
3. Powders:
    i. Pigment : Low thermal conductivity and high opacity
    ii. SocalP2: Low thermal conductivity combined with good paint properties
4. Process: Kwark XP100 to beaded in post-addition

High performance insulating paint

Formula		Raw Material
No.	**Dosage [wt%]**	
1	**11.7**	WATER
2	**2.98**	DISPERSING AGENT *Solution of an ammonium salt of an acrylate copolymer*
3	**0.14**	THICKENER *Associative cellulosic polymer, nonionic water-soluble polymer*
4	**0.1**	RHEOLOGY MODIFIER *Solvent-free, nonionic associative polymer solution*
5	**0.1**	PH-ADJUSTER *Water based, solvent free and silicone based*
6	**0.7**	DEFOAMER *Silicone-free, polymer based*
7	**0.2**	BIOCIDE *Preparation of methylisothiazolone and formaldehyde donor*
8	**14.7**	PIGMENT *Zirconia and alumina treated rutile titanium dioxide pigment*
9	**4.6**	BRIGHTNESS, OPACITY AND WET SCRUB FILLER *Fine precipitated calcium carbonate*
10	**58.4**	BINDER *Styrene-acrylic copolymer, without solvents, coalescing agents or plasticizers*
11	**6.4**	**INSULATING FILLER** **Kwark XP100**

Mixing steps

To ensure good dispersion of the Kwark powder and achieve high coating performance, we recommend that you use the following type of compounds and additives and respect this order of addition:

1. First add the water and the thickner and stir at 1m/s for 3 minutes
2. Add the neutralizing agent and stir at 1m/s for 5 minutes until the viscosity increases
3. Add 0.4% defoamer, then the dispersing agent and the biocide
4. Add the brightness, opacity and wet scrub filler, then grind at 8m/s for 30 minutes
5. After grinding add the binder, then Kwark XP100 and the remaining 0.3% of defoamer and stir at 4m/s for 5 minutes
6. Finally add the rheology modifier and stir at 4m/s for 5 minutes

Performance Characteristics

Thermal conductivity (W/(m.K))	0.0605
Density	0.76
Gloss @60°	4.5
Spatter resistance	10
Wet-scrub (µm)	11.08
Hiding power (at 8 m²/L)	92.54
Lelling	9

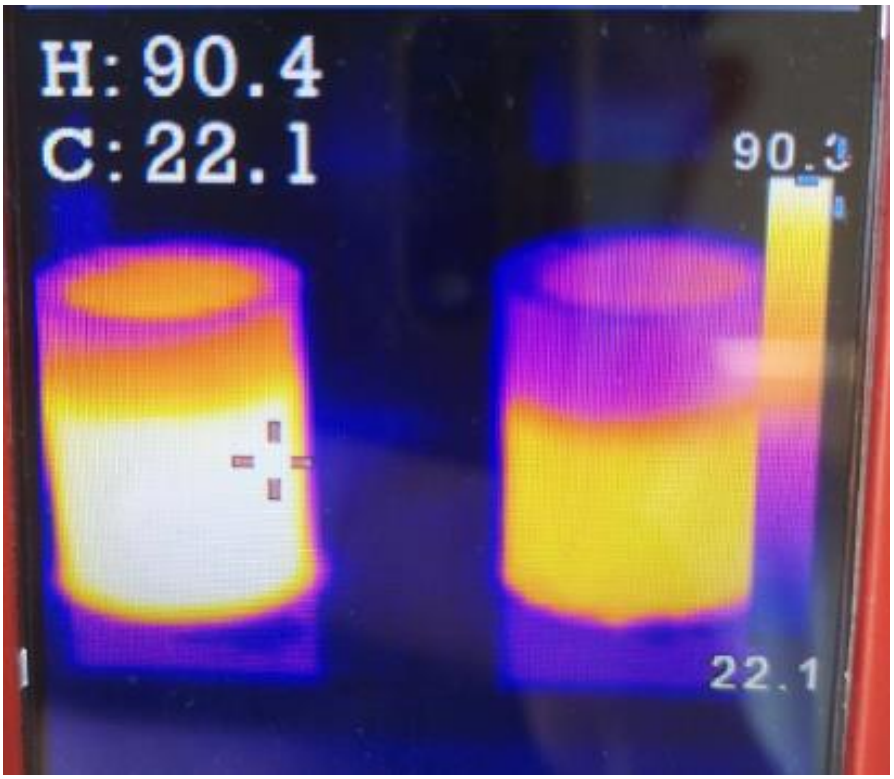
Insulation test

THERMAL IMAGING

Thermal imaging of 2 painted buckets containing boiling water:

- Left: Classic paint, DFT 300 Microns, Surface T°: 90,4°C (194,72°F)
- Right: Insulating paint with 6,4% Kwark, DFT 300 Microns, Surface T°: 80,1°C (176,18°F)

The use of Kwark® powder technology provides high insulating properties to the coating. With of thickness of only 300 µm, the surface of the painted bucket is reduced by 10.3 °C.



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