NEUBURG SILICEOUS EARTH IN 2P VHS EPOXY ANTI-CORROSION COATING, Solids Content 85 % SILLITIN and AKTISIL vs. Talc / Barite

FORMULATION

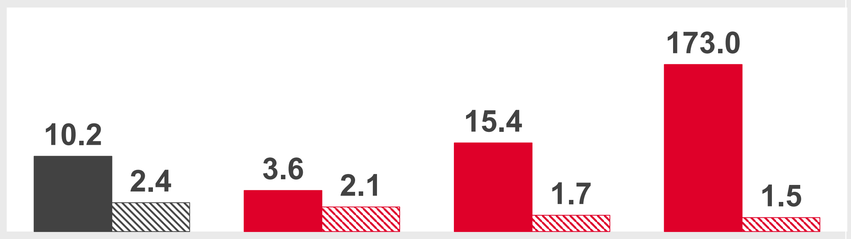
			Control	Replacement of filler: Substitution of Talc / Barite by equal volume of		
				Sillitin Z 86	Aktisil AM	Aktisil PF 777
Component A	*Araldite GZ 7071* Solid BPA resin in xylene, EEW 635		17.8			
	Araldite GY 783 Reactive-diluted BPA/F, EEW 190		13.4			
	Solvent		5.4			
	Additives		0.6			
	Red pigment, iron oxide		4.9			
	Zinc phosphate		**7.3** (-)			
	Talc	7 µm	**24.4**			
	Barite	4 µm	**9.8**			
	Neuburg Siliceous Earth			**30.5**	**30.5**	**30.5**
B	*Aradur 450* Polyamidoamine adduct, HEW 115		11.1			
	Solvent		5.3			
	Total parts by weight		100.0			
	Solids content w/w [%]		85			

* Base formulation by Huntsman Advanced Materials

IMPROVED FEATURES

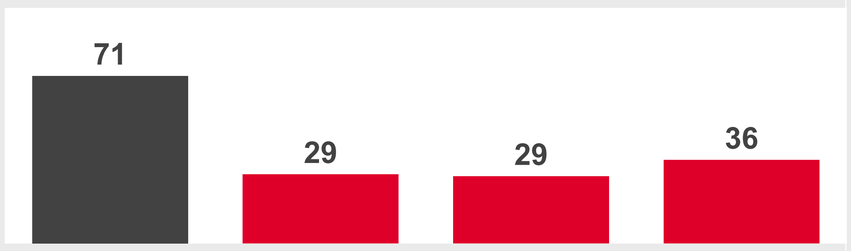
Processing Properties	Talc / Barite	Sillitin Z 86	Aktisil AM	Aktisil PF 777
Incorporation of filler	difficult	good	good	moderate
Fineness of grind [µm]	20	10 - 15	10 - 15	15
Storage Stability Component A, 28 d 50°C	poor	good	perfect	perfect

Viscosity
Component A+B [Pa*s]
Rheometer 23 °C,
Searle system
at 0.1 s^{-1} at 1000 s^{-1}



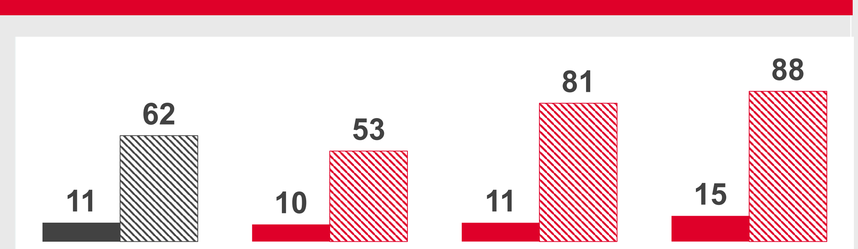
Viscosity increase rate
[mPa*s/min], Brookfield

Lower rate = longer pot life

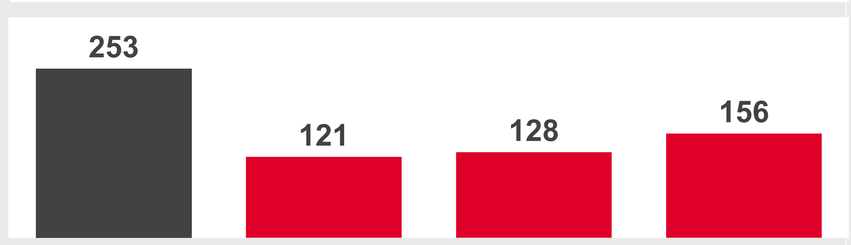


MECHANICAL PROPERTIES

Hardness
König Pendulum [s]
after 2 d after 14 d



Abrasion loss
Taber Test S-42,
Load 5.4 N
[mg/100 revolutions]



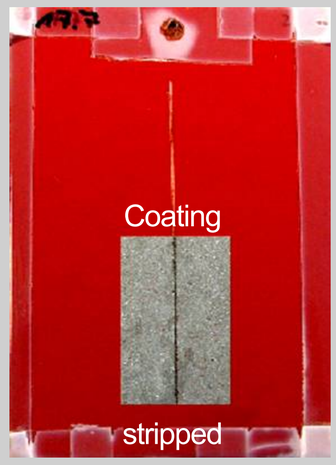
RETAINED FEATURES

Without significant difference or minor effects

- Drying characteristic
  Erichsen-method: no damage with sliding wire bow, dust dryness slightly improved by Neuburg Siliceous Earth
- Adhesion
  Cross-cut test [GT]: 0 - 1
- Humidity Test 1500 h

Surface:
No blistering / corrosion in or under coating, good adhesion

Scribe:
Corrosion average < 0.5 mm, no delamination, no blistering



EXPERIMENTAL

- Preparation
  Dissolver equipped with bead mill agitator
  20 min 7.8 m/s
- Application
  By air pressure on cold rolled grit-blasted steel, SA 2 ½
  DFT 260 µm
- Conditioning
  14 d 23 °C / 50 % RH

SUMMARY

Neuburg Siliceous Earth
gains the following combined benefits

- ✓ Improved processing properties, storage stability and pot life
- ✓ Adjustable rheological effect:
  - Good leveling with Sillitin Z 86 or Aktisil AM
  - Strong anti-sagging effect with Aktisil PF 777
- ✓ Higher hardness and abrasion resistance for improved wear resistance
- ✓ Better heavy duty corrosion protection increasingly favorable with exposure time:
  - With zinc phosphate reduced delamination at comparable low corrosion at scribe
  - Without zinc phospate markedly reduction of delamination, particularly with Aktisil PF 777
- ✓ Markedly enhanced resistance against acids, particularly with Aktisil AM and Aktisil PF 777
- ✓ Improved filler embedding into polymer film

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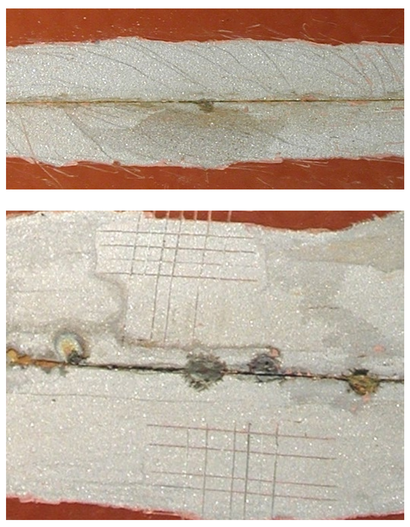
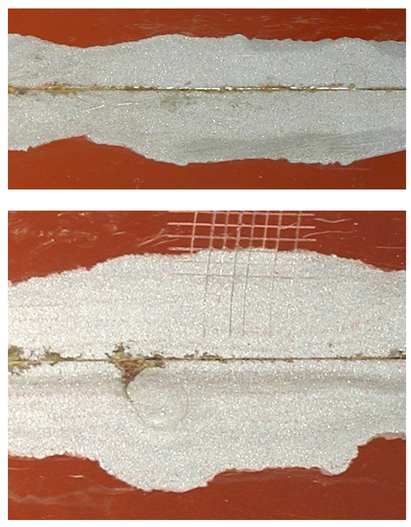
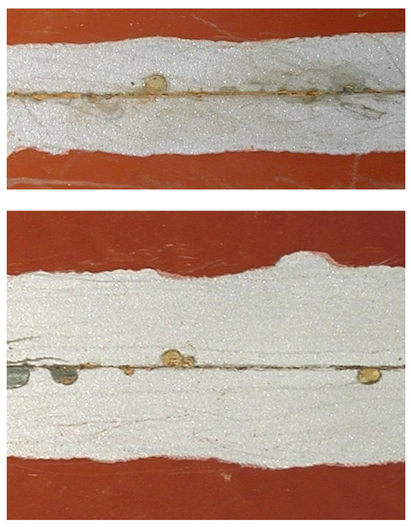
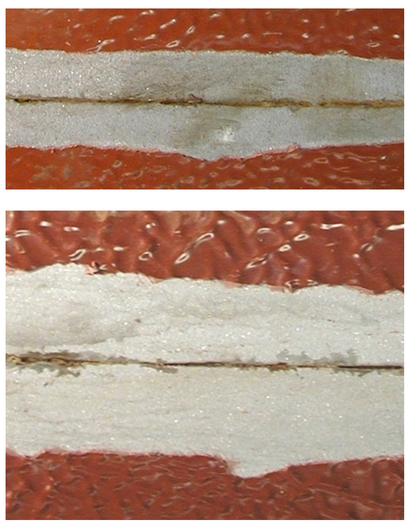
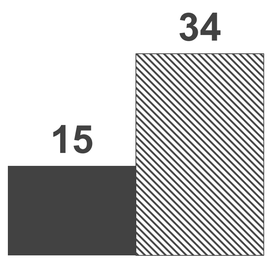
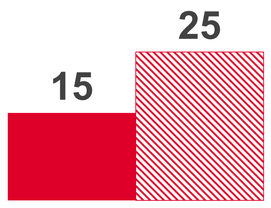
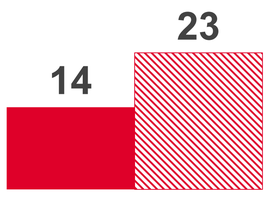
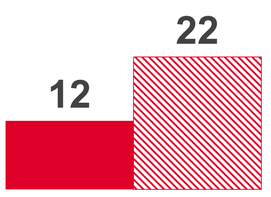
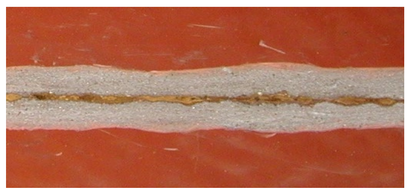
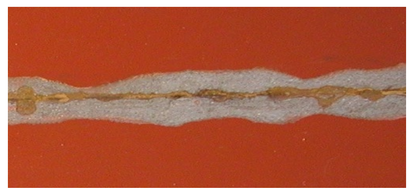
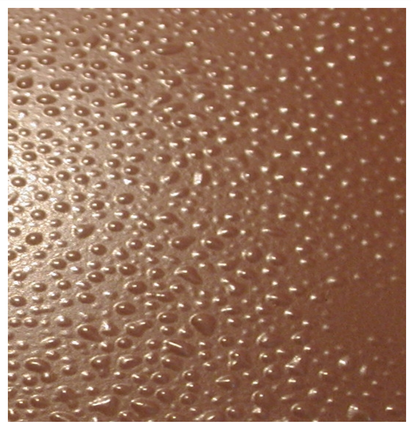
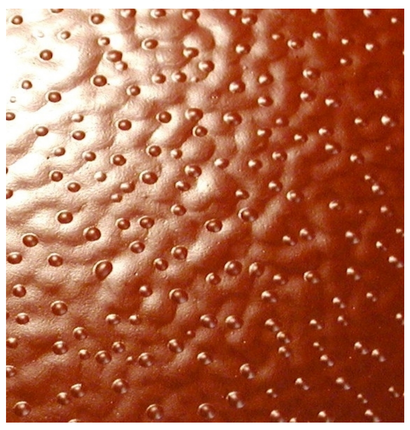
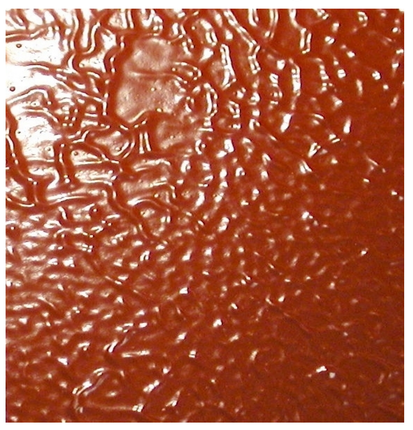
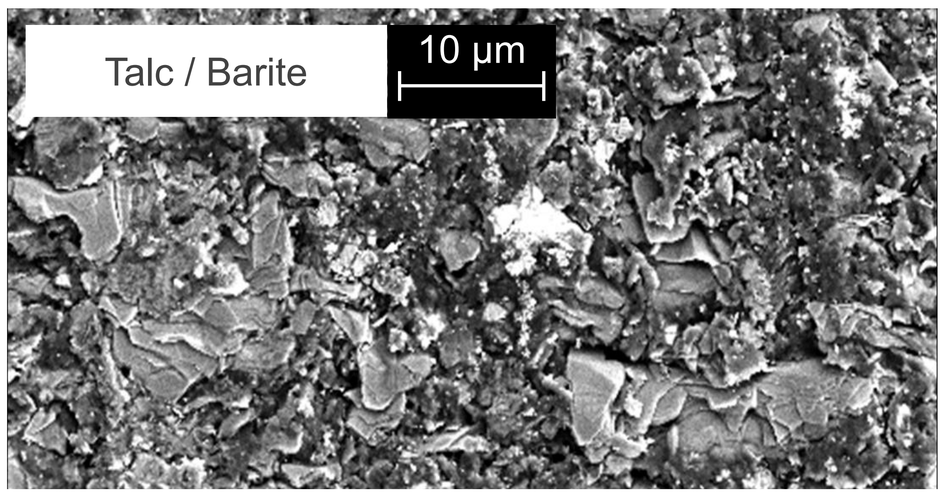
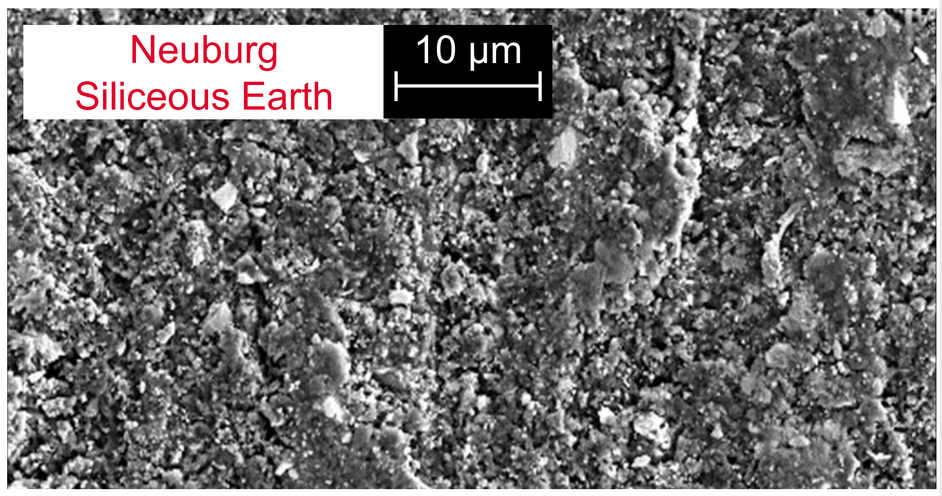
OBJECTIVE

Improved Features Salt Spray Test	Talc / Barite	Sillitin Z 86	Aktisil AM	Aktisil PF 777
With zinc phosphate 1500 h				
4000 h				
Delamination at scribe [mm] 1500 h / 4000 h				
Without zinc phosphate 1500 h substitution by filler at equal PVC				
Acid Resistance				
Sulfuric Acid H_2SO_4 10 % 1500 h	 coalescing blisters	 small blisters	 no blistering	 no blistering
Acetic Acid HAc 5 % 168 h	 small blisters	 small blisters	 small blisters	 few small blisters
Film Morphologie				
SEM Cross-section of unstressed coating				

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