HUNTSMAN

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Advanced Materials

TECHNICAL DATA SHEET

Araldite® PZ 3961-1 Epoxy Resin

GENERAL

Aqueous Emulsion of a Solid "1-type" Epoxy Resin

Araldite® PZ 3961-1 epoxy resin is an emulsion of a solid "1-type" epoxy resin that offers a good combination of properties for ambient or force-curing coatings on metal or concrete. Metal coatings based on this emulsion show rapid dry time, good adhesion, flexibility and corrosion resistance. It can be used with a variety of Aradur® Waterborne Epoxy Curing Agents to formulate coatings with low volatile organic compounds (VOC) content and a wide range of end properties.

Coatings based on Aradur® 3986 waterborne epoxy curing agent offer optimum corrosion resistance, fast dry, excellent adhesion and good flexibility. Coatings based on Aradur® 3984 waterborne epoxy curing agent show high gloss with good color stability, rapid through-cure, good compatibility with pigment pastes and good adhesion for use on metal or concrete. Coatings based on Aradur® 340 waterborne epoxy hardener show short touch-dry, a very long pot life, excellent adhesion, impact resistance and flexibility.

APPLICATIONS

Primers, direct-to-metal, and top coats for metal. Primers and coatings for concrete.

PROPERTIES

- Low viscosity
- Fast "lacquer dry" properties
- Very good adhesion and flexibility
- Good development of hardness
- Good corrosion protection

TECH DATA*

Specified key data

Visual Appearance	Opaque, white liquid
Epoxy Equivalent Weight (g/eq.)	490 - 550
Solids Content, wt %	53 ± 2
Solvents, wt%	Water (40), methoxypropanol (7)
Viscosity at 25°C (cP)	400 - 750
Particle Size Distribution, 90%, µm	≤ 1
Flash Point, Closed Cup (°C)	> 93
Density at 25°C (g/cm^3, lb/gal)	1.10, 9.2

* Typical properties are based on Huntsman's test methods. Copies are available upon request.

FORMULATIONS

Waterborne Anti-Corrosive Epoxy Primer Formulation (MF-360)

- Outstanding corrosion resistance
- Very good adhesion to cold rolled steel and sandblasted steel
- Long pot life
- VOC less than 100/g/l; HAP's free
- Free of heavy metals and silanes

Part A (Epoxy Resin)	**Kg**	**Liter**	**Comments**
Araldite PZ 3961 Epoxy Resin	197	180	Waterborne Epoxy Resin (Huntsman Corp.)
Water	8.5	8.5	
Total (Part A)	205.5	188.5	

Part B (Hardener)			
Combine the following and blend until homogeneous			
Aradur 3986 Epoxy Curing Agent	64.04	60.53	Waterborne Curing Agent (Huntsman Corp.)
Disperbyk® 192	9.03	8.63	Wetting & Dispersing (Byk-Chemie USA)
Byk® 024	0.49	0.49	Silicone Defoamer (Byk-Chemie USA)
Byk® 019	1.48	1.51	Silicone Defoamer (Byk-Chemie USA)
Deionized Water	32.93	32.97	
Add the following, then grind to 30 µm			
Minex® 7	9.03	3.48	Nepheline syenite (Unimin Corp.)
Tioxide® TR93	28.74	7.19	Titanium dioxide (Huntsman Corp.)
Blanc Fixe® N	29.56	6.74	Barium sulfate (Sachtleben Chemie GmbH)
Wollastocoat® 10 ES	42.69	14.73	Calcium Metasilicate (R.T Vanderbilt)
Vantalc® 6H	9.85	3.75	Hydrated magnesium silicate (R.T Vanderbilt)
Moly-White® C-100	30.38	10.49	Zinc-free corrosion inhibitor (Moly-White Pigments)
Reduce mixing speed then add			
Raybo® 60	3.78	3.41	Flash rust inhibitor (Raybo Chemical)
Optiflow® H600	5.05	4.88	Nonionic Associative Thickeners (Southern Clay Products)
Optiflow® L100	10.10	9.77	Nonionic Associative Thickeners (Southern Clay Products)
Deionized Water	219.53	22.03	
Total (Part B)	299.08	190.52	
Formulation Total	504.61	378.54	

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FORMULATIONS PROPERTIES

Mix Ratio, A : B (vol.)	1 : 1
Weight per liter (Kg/L)	1.33
PVC (%)	29.0
P/B Ratio (wt)	1.2 : 1
Solids, wt (%)	58.9
Solids, vol (%)	44.5
VOC, minus water (g/L)	80.6
Viscosity Profile, 25℃, 300-g mass (KU)	
- Initial	90
- 1 hr	90
- 4 hr	90
Induction Time, 23℃ (min.)	30

Coating Properties (125µm WFT, cold rolled steel, 7 days @ 23℃ / 50% Relative Humidity)

Tack-free / Dry Through Time[1] (hr)	0.5 / 3.5
Sag Resistance (µm)	150 - 200
Pencil Hardness[2]	HB
Pot-life[3] (hr)	~ 4
Cross-Cut Adhesion[4]	5B
Impact Resistance[5], Direct/Rev. (Kg-cm)	92 / 22
Gloss, 60°[6]	28
Pull-Off Adhesion[7], Sandblasted Steel (Mpa)	> 6.89
Mandrel Bend[8]	Pass 1.59cm

Anti-corrosion Performance (125µm WFT, ASTM B-117)

Exposure Period	Substrate	Creepage[9] (mm)	Scribe Rating[9]	Blister Rating[10]	Rust Rating[11]
1000 hr	Cold Rolled Steel	8.4	3	10	9
1000 hr	Sandblasted Steel	0.6	8	10	9
2000 hr	Cold Rolled Steel	13.3	1	8F	9
2000 hr	Sandblasted Steel	1.9	7	8F	9

[1] Tested by Gardner® Circular Drying Time Recorder on a 125µm wet coating

[2] ASTM D3363

[3] Determined by loss of film mechanical properties, 23℃

[4] ASTM D3359

[5] ASTM D2794

[6] ASTM D523

[7] ASTM D4541-95

[8] ASTM D522

[9] ASTM D1654.10=best

[10] ASTM D714.10=best; F=few, M=medium, D=dense

[11] ASTM D610.10=best

STORAGE	Araldite PZ 3961-1 epoxy resin may be stored for up to two years from date of manufacture at room temperature provided the product is stored in the original sealed container. Do not freeze.
HANDLING PRECAUTIONS	Huntsman Advanced Materials Americas maintains up–to-date Material Safety Data Sheets (MSDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material. **First Aid!** Refer to MSDS as mentioned above. **KEEP OUT OF REACH OF CHILDREN** **FOR PROFESSIONAL AND INDUSTRIAL USE ONLY**

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