HUNTSMAN

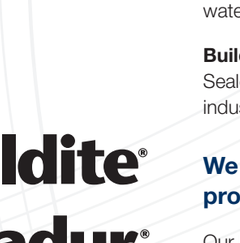
Enriching lives through innovation

**Advanced Materials**

Build your properties

# Curatives and resins selector guide

# Rely on us with confidence



## Rely on us with confidence

For more than 60 years Huntsman Advanced Materials, as a global partner and innovator produces and develops knowledgebase specialty components for high-end-performance industrial products. Its unique portfolio including a broad range of epoxy resins and reactive diluents, hardeners, crosslinkers and matting agents appeals to formulators, chemists and scientists working in challenging markets who want to be at the forefront of innovation and product development in area such as:

**Coatings for metallic and mineral substrates**
Primers, undercoats, topcoats, heavy-duty corrosion protection, powder coatings, potable water and food industry coatings, waterborne coatings, chemical resistant coatings

**Building protection**
Sealers, flexible and elastic coatings, mortars, injection resins, industrial flooring, chemical anchoring.

Araldite®
Aradur®
Ara® Cool

The original brands
serving worldwide coatings and construction industries for more than half a century

Registered for REACH

## We value your challenge with more than just products

Our know-how and expertise allow us to answer your specific formulation requirements. Huntsman Advanced Materials has a worldwide team of experts

> to modify or develop when needed high performance products

> to improve the quality, the durability and the performance of your products such as mechanical, temperature, fire, chemical or corrosion resistance and more to help you in process optimization and to quickly bring your product to market.

We offer product consistency through multi-scale synthesis and mixing / blending capabilities.

All the components of the products contained in this brochure have been preregistered under REACH.

# Construction flooring

| | | In combination with |
|---|---|---|
| **Aradur® 51**<br>**Aradur® 3290** | Primers | **Araldite® GY 783**<br>Standard low viscosity, low crystalizing resin |
| **Aradur® 450**<br>**Aradur® 450-1 S** | Primer for wet concrete and metals | |
| **Aradur® 3296** | Fast curing system | |
| **Aradur® 3484** | Solvent-free coating | |
| **Aradur® 2965**<br>**Aradur® 43-1 (S)** | Self-leveling systems | |
| **Aradur® 3253-1** | Decorative system (low yellowing) | |
| Aradur® 20317 | Decorative system (low yellowing) | **Araldite® DY-T**<br>**Araldite® DY-C**<br>Non aromatic multifunctional epoxy resins |

# Mortar, repair, injection

| | | In combination with |
|---|---|---|
| **Aradur® 2963-1**<br>**Aradur® 46-1 (S)** | Flooring mortars | **Araldite® GY 253**<br>Standard low viscosity resin for flooring with better mechanical properties |
| Aradur® 20250<br>Aradur® 2992 | Repair mortars<br>Concrete injection systems<br>Adhesives for concrete | **Araldite® BY 158**<br>Very low viscosity but high mechanical properties<br><br>**Araldite® PY 302-2**<br>Good all rounder, absolutely non-crystalizing<br><br>**Araldite® DY-T**<br>Fast reactive diluent |

# Coatings for metal substrates

| | | In combination with |
|---|---|---|
| **Aradur® 450**<br>**Aradur® 450-1 S** | Surface tolerant PAA-adducts | **Araldite® GZ 290 X 90**<br>Modified solid resin<br><br>**Araldite® GZ 7071 X 75**<br>Solid resin in solution<br><br>**Araldite® GZ 7071 X 75 / GY 783**<br>Blend of solid resin in solvent with liquid resin |
| **Aradur® 3776 XW 55**<br>**Aradur® 30 XWM 55** | Amine adducts for high chemical resistance | |
| **Aradur® 3282-1** | No benzyl alcohol | |
| **Aradur® 3296**<br>**Aradur® 837-1** | Highly reactive CA to increase reactivity | |
| Aradur® 3275<br>Aradur® 75-1 | Flexibilizing CA | |
| Accelerator 2950 | Co-crosslinking accelerator | |

# Coatings with excellent chemical resistance

| | | In combination with |
|---|---|---|
| **Aradur® 20315** | Best chemical resistance (better with post cure at 80°C), food contact compliant* | **Araldite® GY 250**<br>Bis A-Liquid resin, food contact compliant*<br><br>**Araldite® GY 289**<br>**Araldite® EPN 1183**<br>Low viscosity, novolac resin based<br><br>**Araldite® EPN 1180**<br>**Araldite® EPN 1180 X 80**<br>Novolac resins of functionality = 3.6 |
| **Aradur® 2973** | High chemical resistance | |
| **Aradur® 33641** | Highly reactive CA to increase reactivity, food contact compliant* | |
| **Aradur® 3776 XW 55**<br>**Aradur® 30 XWM 55** | Good chemical resistance, but containing solvents | |
| Aradur® 3275<br>Aradur® 75-1 | Flexibilizing CA | |
| Accelerator 2950 | Co-crosslinking accelerator | |

* Food compliance according to EU-legislation

# Waterborne anti corrosion primers

| | | In combination with |
|---|---|---|
| **Aradur® 3986** | Fast drying hardener with good flexibility | **Araldite® PZ 3961-1**<br>Solid resin dispersion, type 1, with excellent adhesion to critical substrates<br><br>**Araldite® PY 33757**<br>Solvent-free primer, water-dilutable liquid resin, 100% solid content<br><br>**Araldite® PZ 756-1/67**<br>Solvent-free, liquid resin emulsion<br><br>**Araldite® GY 776**<br>Modified liquid resin without surfactant, solvent-free, offering good chemical resistance |

# Waterborne systems for mineral / non-metal substrates

| | | In combination with |
|---|---|---|
| **Aradur® 3985** | Thick layer system | **Araldite® GY 257**<br>Modified liquid resin without surfactant |
| **Aradur® 3987** | Reasonable chemical resistance, food contact compliant* | **Araldite® BY 157**<br>Modified liquid resin without surfactant, food contact compliant*<br><br>**Araldite® PY 33757**<br>Solvent-free primer, water-dilutable liquid resin, 100% solid content<br><br>**Araldite® PZ 756-1/67**<br>Solvent-free, liquid resin emulsion<br><br>**Araldite® GY 776**<br>Modified liquid resin without surfactant |
| **Aradur® 39** | Fast drying coating / sealer | |

* Food compliance according to EU-legislation

# VOC* free systems

| | | In combination with |
|---|---|---|
| **Aradur® 3277** | Self-leveling system | **Araldite® GY 783**<br>Standard low viscosity, low crystalizing resin |
| **Aradur® 3282-1**<br>**Aradur® 837-1** | Primer for wet concrete and metals | |
| **Aradur® 3275** | Flexible membrane | |
| **Aradur® 20250**<br>**Aradur® 2992** | Injection systems | |
| **Aradur® 20315**<br>**Aradur® 33641** | High chemical resistance systems | |
| **Accelerator 2950** | Co-crosslinking accelerator | |
| **Aradur® 20317** | Decorative system (low yellowing) | **Araldite® DY-T**<br>**Araldite® DY-C**<br>Non aromatic multifunctional epoxy resins |

* Volatile Organic Compound

# Powder coating building blocks for formulators

## Solid epoxy systems*

| | |
|---|---|
| **Araldite® GT 7203**<br>**Araldite® GT 6143**<br>**Araldite® GT 2874-1** | Resin with flow agent and low melt viscosity, for powder coatings with excellent flow |
| **Araldite® ECN 9699** | Suitable as modifier in combination with standard resins to enhance reactivity, improving chemical and temperature resistance |

## Matting agents

| | |
|---|---|
| **DT 125-2**<br>**DT 3330 N**<br>**DT 3360 N** | Wax-free non yellowing matting additives |
| **DT 3329-1** | Wax-containing matting additive |
| **DT 3357** | Non yellowing chemical matting agent achieving extremely low gloss |

* See separate flyer for standard solid epoxy resin

## Solid curing agents

| | |
|---|---|
| **Aradur® 2844**<br>**Aradur® 835** | Amine-type |
| **Aradur® 3123** | Imidazole-type |
| **Aradur® 9690-1** | Phenolic-type |
| **Aradur® 3380-1** | Anhydride-type |

## Crosslinkers for polyester powder

| | |
|---|---|
| **Araldite® PT 810** | Epoxy functional crosslinker (TGIC) |
| **Araldite® PT 910** | Epoxy functional crosslinker with good UV resistance |
| **Araldite® PT 912** | Higher functionality compared to PT 910 |

## Accelerator

| | |
|---|---|
| **Accelerator DT 3126-4** | Suitable for polyester - PT 910 or PT 912 systems |

# Curing agents

## Polyamine curatives

| Product designation | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 15-1** | Polyamine | 100 - 300 | 170 - 230 | 140 | 18 | ≤ 5 | CE, IM, MC | O |
| **Aradur® 21** | Aliphatic polyamine | < 10 | 680 - 720 | 40 | 51 | ≤ 1 | CE, IM, MC | O |
| **Aradur® 22** | Aliphatic polyamine | < 8 | 810 - 830 | 34 | 71 | ≤ 2 | CE, IM, MC | O |
| **Aradur® 42** | Cycloaliphatic polyamine | 10 - 20 | 645 - 665 | 42 | 95 | ≤ 1 | CE, IM, MC | O |
| **Aradur® 43-1** | Cycloaliphatic polyamine | 200 - 400 | 260 - 280 | 115 | 44 | ≤ 1 | CE, IM | |
| **Aradur® 43-1S** | Accelerated cycloaliphatic polyamine | 500 - 800 | 265 - 285 | 115 | 19 | ≤ 1 | CE, IM | |
| **Aradur® 46-1** | Polyamine adduct | 130 - 230 | 310 - 340 | 95 | 38 | ≤ 3 | CE, IM | |
| **Aradur® 46-1S** | Cycloaliphatic polyamine | 220 - 320 | 310 - 340 | 95 | 25 | ≤ 3 | CE, IM, MC | |
| **Aradur® 49-1S** | Cycloaliphatic polyamine | 130 - 230 | 295 - 325 | 95 | 25 | ≤ 4 | CE, IM, MC | |
| **Aradur® 51** | Polyamine | 20 - 40 | 440 - 480 | 67 - 90 | 20 | ≤ 3 | CE | |
| **Aradur® 53-1S** | Polyamine adduct | 580 - 640 | 275 - 305 | ~ 115 | 17 | ≤ 1 | CE, IM | |
| **Aradur® 70** | Polyetherurethane amine | 16 000 - 27 000 | 65 - 75 | ~ 900 | 300 - 500 | ≤ 5 | CE | O |
| **Aradur® 75-1** | Polyetherurethane amine | 3 000 - 9 000 | 120 - 140 | ~ 250 | 40 | ≤ 7 | CE | O |
| **Aradur® 90** | Polymercaptane | 10 000 - 16 000 | - | 200 | 4 - 5 (20 g) | ≤ 3 | CE, IM, A | O |
| **Aradur® 835** | Solid isolated aliphatic polyamine adduct | 600 - 1 200 [1] | 180 - 210 | ~ 200 | 1 000 [2] | ≤ 6.5 | IM, MC | O |
| **Aradur® 837-1** | Polyamine adduct | 4 600 - 6 500 | 300 - 500 | 66 - 75 | 19 | ≤ 3 | CE, IM | O |
| **Aradur® 847** | Cycloaliphatic polyamine | 150 - 300 | 350 - 375 | ~ 75 | 30 | ≤ 2 | CE, IM, MC | |
| **Aradur® 2963-1** | Cycloaliphatic polyamide | 30 - 70 | 325 - 350 | 85 | 40 | ≤ 2 | CE, IM, MC | |
| **Aradur® 2965** | Cycloaliphatic polyamine | 100 - 300 | 300 - 325 | ~ 94 | 25 | ≤ 4 | CE, IM, MC | |
| **Aradur® 2973** | Aliphatic polyamine | 900 - 1400 | 300 - 335 | ~ 85 | 40 | ≤ 7 | CE, IM | |
| **Aradur® 2992** | Aliphatic polyamine | 10 - 20 | 575 - 605 | ~ 55 | 5 | ≤ 2 | CE | O |
| **Aradur® 3243-1** | Cycloaliphatic polyamine | 220 - 360 | 280 - 360 | 95 | 60 | ≤ 1 | CE, IM | |
| **Aradur® 3253-1** | Cycloaliphatic polyamine | 200 - 260 | 290 - 320 | ~ 95 | 40 | ≤ 1 | CE | |

[1] 30% in xylene/butanol (1:1) I [2] With solid epoxy resin and solvent I * Gel time has been measured with Araldite® GY 250

| Product designation | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 3275** | Formulated polyetherpolyamine | 200 - 300 | 100 - 170 | 250 | 85 | ≤ 6 | CE, IM | O |
| **Aradur® 3277** | Formulated polyamine adduct | 250 - 450 | 450 - 500 | 91 | 80 | ≤ 6 | CE | O |
| **Aradur® 3290** | Polyamine adduct | 100 - 180 | 820 - 900 | 48 | 22 | ≤ 4 | CE | |
| **Aradur® 3296** | Polyamine | 350 - 650 | 330 - 370 | 75 | ~ 17 | ≤ 8 | CE, IM, MC | |
| **Aradur® 3484** | Polyamine adduct | 300 - 550 | 350 - 450 | 95 | 30 | ≤ 6 | CE | |
| **Aradur® 3741** | Cycloaliphatic polyamine | 1 - 15 | 695 - 730 | 39 | 84 | ≤ 1 | CE | O |
| **Aradur® 20250** | Accelerated polyamine | 130 - 210 | 1 010 - 1 170 | 30 | 18 | ≤ 6 | CE | O |
| **Aradur® 20315** | Formulated polyamine adduct | 5 500 - 8 000 | 470 - 510 | 59 | ~ 100 | - | CE, IM, MC | O |
| **Aradur® 20317** | Formulated polyamine adduct | 2 500 - 6 000 | 410 - 510 | ~ 65 | 65 | ≤ 0.5 | CE | O |
| **Aradur® 33641** | Formulated fast cure amine | 4 000 - 8 000 | 450 - 550 | 58 | ~ 10 | ≤ 8 | CE, IM, MC | O |

[1] 30% in xylene/butanol (1:1) I [2] With solid epoxy resin and solvent I * Gel time has been measured with Araldite® GY 250

## Waterborne curatives

| Product | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time [1] | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 35-1** | Polyamine adduct 52-54% in water | 19 000 - 35 000 | 100 - 120 | ~ 380 | ~ 70 | ≤ 6 | CE, IM, MC | O |
| **Aradur® 36** | Polyamine adduct 79-81% in water | 4 000 - 7 000 | 185 - 225 | ~ 165 | ~ 150 | ≤ 6 | CE, IM, MC | O |
| **Aradur® 38-1** | Polyamine adduct 79-81% in water | 12 000 - 20 000 | 170 - 210 | ~ 150 | ~ 75 | ≤ 6 | CE, IM, MC | O |
| **Aradur® 39** | Polyamine adduct 49-51% in water | 12 000 - 20 000 | 120 - 140 | ~ 335 | 120 - 240 | ≤ 5 | CE, IM, MC | O |
| **Aradur® 340** | Polyamidoamine adduct 49-51% in water | 18 000 - 23 000 | 155 - 175 | ~ 210 | 120 - 180 | ≤ 12 | CE, IM, MC | O |
| **Aradur® 435** | Polyamidoamine adduct 49-51% in water | 13 000 - 23 000 | 160 - 200 | ~ 250 | 90 - 120 | ≤ 10 | CE, IM, MC | O |
| **Aradur® 3985** | Polyamine adduct 54-56% in water | 1 000 - 6 000 | 170 - 210 | ~ 265 | 60 | ≤ 6 | CE, IM, MC | O |
| **Aradur® 3986** | Polyamine adduct 39-41% in water | 15 000 - 35 000 | 90 - 110 | ~ 415 | 180 | ≤ 6 | IM, MC | O |
| **Aradur® 3987** | Polyamine adduct 79-81% in water | 15 000 - 30 000 | 200 - 250 | ~ 147 | 60 | ≤ 8 | CE, IM, MC | O |

[1] Gel time for waterborne hardeners has been measured with Araldite® GY 776

## Accelerators and non-amine curatives

| Product | Characteristics | Viscosity 25°C | Softening point | Applications | BzOH Free |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | °C | | |
| **Accelerator 960-1** | Tertiary amine for ambient cure epoxy systems | 120 - 250 | n/a | CE, IM, MC | O |
| **Accelerator 2950** | Co-reacting tertiaryamine based accelerator (H+ active equiv. = 75 g/Eq), for ambient cure epoxy systems, low plasticising effect | 2 000 - 6 000 | n/a | CE, IM, MC | O |
| **Accelerator 3130** | 40% in ethanol, non amine accelerator for epoxy systems, extremely high reactivity at ambient temperature, ideal as drop-in accelerator to cope with cold weather | 10 - 100 | n/a | CE, IM, MC | O |
| **Aradur® 3123** | Low toxicity imidazole based accelerator, oustanding latency vs. standard imidazole | n/a | 180 - 250 | PC | O |
| **Aradur® 9690-1** | Cresol novolac hardener for high temperature resistant powder coatings | n/a | 85 - 95 | PC | O |
| **Aradur® 2844** | Hardener (H+ active equiv. = 37 g/Eq) for epoxy powder coatings exhibiting relatively high reactivity compared to DICY | n/a | 139 - 143 | PC | O |
| **Aradur® 3380-1** | Low molecular weight modified anhydride (Anhydride content ~ 3.5 eq/kg), hardener for epoxy based can coatings and powder coating | n/a | 95 - 110 | CC, PC | O |
| **Aradur® 3380 H 40** | Solvented version of Aradur® 3380-1 (40% solid in cyclohexanone) | 20 - 200 | n/a | CC, PC | O |
| **Accelerator DT 3126-4** | Accelerator for powder coatings which allows the adjustment of the reactivity of epoxy/polyester and polyester/Araldite® PT910 powder systems | n/a | 30 - 60 | PC | O |

## Polyamidoamine curatives

| Product | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 115** | Polyamidoamine | 3 100 - 3 700 at 75°C | 240 - 260 | 240 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 125** | Polyamidoamine | 700 - 900 at 75°C | 340 - 370 | 130 | 120 | ≤ 10 | CE, IM, MC, A | O |
| **Aradur® 140** | Polyaminoimidazoline | 300 - 600 at 75°C | 370 - 410 | 95 | 120 | ≤ 10 | CE, IM, MC, A | O |
| **Aradur® 145** | Polyaminoimidazoline | 2 400 - 4 000 | 380 - 420 | 95 | 180 | ≤ 10 | CE, IM, MC, A | O |
| **Aradur® 223** | Polyamidoamine | 80 - 180 | 325 - 355 | 115 - 130 | 300 | ≤ 6 | CE, IM, MC | |
| **Aradur® 224** | Polyaminoimidazoline | 4 000 - 7 000 | 260 - 320 | 180 | > 480 | ≤ 10 | IM, A | O |
| **Aradur® 250** | Polyamidoamine | 400 - 700 | 425 - 455 | 95 | 60 | ≤ 8 | CE, A | O |
| **Aradur® 350** | Polyaminoimidazoline | 100 - 400 | 370 - 410 | 95 | 180 | ≤ 10 | CE, A | O |
| **Aradur® 370** | Polyaminoimidazoline | 150 - 350 | 480 - 520 | 95 | 70 | ≤ 10 | CE, A | O |
| **Aradur® 450** | Polyamidoamine adduct | 700 - 2 000 | 250 - 290 | 115 | 78 | ≤ 10 | CE, IM, MC | |
| **Aradur® 450-1S** | Polyamidoamine adduct | 450 - 1300 | 280 - 320 | 115 | 50 | ≤ 10 | CE, IM, MC | |
| **Aradur® 3282-1** | Formulated polyamidoamine adduct | 900 - 1900 | 290 - 350 | 115 | 100 | ≤ 10 | CE, IM | O |
| **Aradur® 848** | Polyamidoamine adduct | 2 500 - 5 500 | 200 - 230 | 135 - 190 | 95 | ≤ 10 | CE, IM, MC | |

Continued on next page

[2] With solid epoxy resin and solvent I * Gel time has been measured with Araldite® GY 250



Continued

| Product | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 891** | Formulated polyamidoamine | 130 - 190 | 520 - 550 | 74 - 82 | ~100 | ≤ 10 | CE | O |
| **Aradur® 33225** | Polyamidoimidazoline | 100 - 400 | 240 - 310 | 75 - 115 | 900 | ≤ 12 | CE, IM | O |

[2] With solid epoxy resin and solvent I * Gel time has been measured with Araldite® GY 250

## Curatives in solutions

| Product | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Aradur® 100 PP 77.5** | Polyamidoamine in n-propanol | 10 000 - 17 000 | 64 - 72 | ~ 610 | > 1 000 [2] | ≤ 9 | IM, MC | O |
| **Aradur® 100 X 60** | Polyamidoamine in xylene | 2 100 - 3 500 | 49 - 57 | ~ 790 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 100 XM 60** | Polyamidoamine in xylene/methoxypropanol (4:1) | 2 200 - 3 900 | 50 - 56 | ~ 790 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 115 X 70** | Polyamidoamine in xylene | 750 - 1250 | 168 - 182 | ~ 340 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 422 XW 70** | Polyamidoamine adduct in xylene/n-butanol (3:2) | 6 000 - 12 000 | 140 - 170 | ~ 340 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 423 XW 60** | Polyamidoamine adduct in xylene/n-butanol (4:1) | 800 - 1400 | 122 - 138 | ~ 520 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 424 XW 50** | Polyamidoamine adduct in xylene/n-butanol (4:1) | 600 - 2400 | 80 - 110 | ~ 785 | > 1 000 [2] | ≤ 10 | IM, MC | O |
| **Aradur® 460 J 90** | Polyamidoamine adduct in ethanol | 1 800 - 5 500 | 240 - 270 | ~ 190 | 100 | ≤ 10 | CE, IM, MC | O |
| **Aradur® 20115 I 73** | Polyamidoamine in 2-propanol | 1 400 - 3 200 | 165 - 185 | ~ 330 | > 1 000 [2] | ≤ 12 | IM, MC | O |
| **Aradur® 30 XWM 55** | Isolated amine adduct in xylene/ n-butanol/methoxypropanol (4:1:4) | 2 000 - 2 800 | 98 - 114 | ~ 370 | > 1 000 [2] | ≤ 5 | IM, MC | O |
| **Aradur® 3776 XW 55** | Isolated amine adduct in xylene/n-butanol | 1 500 - 2 500 | 100 - 120 | ~ 350 | > 1 000 [2] | ≤ 8 | IM, MC | O |
| **Aradur® 20161 XW 60** | Aliphatic polyamine high molecular weight adduct (60% solid) in solution (Xylene/Butanol, 3/1) | 1 800 - 2 200 | 215 - 240 | ~ 233 | > 1 000 [2] | ≤ 4 | IM, MC | O |
| **Aradur® 3467 XW 70** | Phenalkamine adduct | 1 000 - 3 000 | 170 - 210 | 180 - 220 | 120 [2] | ≤ 18 | IM, MC | O |

## Ara® Cool curatives for low temperature applications

| Product | Characteristics | Viscosity 25°C | Amine value | H+ active equiv. | Gel time* | Color | Applications | BzOH Free |
|---|---|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | mg KOH/g | g/Eq | min | Gardner | | |
| **Ara® Cool 3077** | Formulated amine zero-VOC | 400 - 540 | 380 - 420 | 70 - 75 | 15 | < 6 | CE, IM, MC | O |
| **Ara® Cool 1047 W 80** | Mannich-Base type hardener without residual volatile amine (80% solid) in solution Butanol | 1800 - 2700 | 255 - 285 | 130 - 185 | 20 | < 7 | IM, MC | O |
| **Ara® Cool 1034 XW 90** | Modified Mannich-Base type hardener (90% solid) in solution Xylene/Butanol | 1000 - 2500 | 425 - 450 | 105 - 155 | 90 | < 10 | IM, MC | O |

[2] With solid epoxy resin and solvent I * Gel time has been measured with Araldite® GY 250

# Epoxy resins

## Liquid resins

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® GY 240** | BPA | 7 000 - 9 000 | 5.45 - 5.56 | 180 - 183 | ≤ 2 |
| **Araldite® GY 250** | BPA | 10 000 - 12 000 | 5.30 - 5.45 | 183 - 189 | ≤ 2 |
| **Araldite® GY 260** | BPA | 12 000 - 16 000 | 5.20 - 5.49 | 182 - 192 | ≤ 3 |
| **Araldite® GY 261** | BPA, high chlorine content | 12 500 - 17 500 | 4.90 - 5.20 | 192 - 204 | ≤ 3 |
| **Araldite® GY 266** | BPA | 9 500 - 12 000 | 5.10 - 5.30 | 189 - 196 | ≤ 2 |
| **Araldite® GY 280** | BPA, semi-solid | 450 - 700 [2] | 3.57 - 4.45 | 225 - 280 | ≤ 3 [2] |
| **Araldite® GY 2600** | BPA | 12 000 - 14 000 | 5.29 - 5.43 | 184 - 189 | ≤ 1 |

## Solid resins

| Product designation | Characteristics | Viscosity [1] 25°C | Epoxy index | Epoxy equiv. | Mettler soft point | Color [1] |
|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | °C | Gardner |
| **Araldite® GT 6071** | BPA type 1 | 160 - 190 | 2.15 - 2.22 | 450 - 465 | 70 - 75 | ≤ 1 |
| **Araldite® GT 7071** | BPA type 1 | 200 - 250 | 1.90 - 2.00 | 500 - 525 | 77 - 82 | ≤ 1 |
| **Araldite® GT 7072** | BPA type 2 | 280 - 340 | 1.68 - 1.75 | 570 - 595 | 82 - 90 | ≤ 1 |
| **Araldite® GT 2874-1** | BPA based resin FCA 10% | 350 - 550 | 1.15 - 1.35 | 740 - 870 | 85 - 95 | ≤ 2 |
| **Araldite® GT 6143** | BPA based resin FCA 2.5% | 250 - 375 | 1.51 - 1.61 | 620 - 660 | 90 - 96 | ≤ 3 |
| **Araldite® GT 7203** | BPA based resin FCA 2.5% | 300 - 400 | 1.55 - 1.65 | 605 - 645 | 82 - 90 | ≤ 1 |
| **Araldite® ECN 1280** | Epoxy cresol novolac, functionality ~ 5 | 3 000 - 4 000 [3] | 4.45 - 4.85 | 205 - 225 | 75 - 85 | ≤ 6 |
| **Araldite® ECN 9699** | Epoxy cresol novolac, functionality ~ 5.5 | 7 000 - 10 000 [3] | 4.45 - 4.85 | 205 - 225 | 80 - 100 | ≤ 6 |
| **Araldite® GT 7220** | Modified epoxy novolac | 460 - 670 | 1.83 - 1.93 | 520 - 545 | ~ 95 | ≤ 2 |
| **Araldite® GT 7255** | Modified epoxy novolac | 1 000 - 1 600 | 1.17 - 1.29 | 775 - 855 | 106 - 113 | ≤ 2 |

[1] 40% in butylcarbitol • [2] 70% in butylcarbito I [3] 150 °C

## Solutions

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Solids | Color |
|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | % | Gardner |
| **Araldite® GZ 7488 N50** | High MWt. BPA in solution [4] | 2 000 - 5 000 | ≤ 0.08 | ≥ 12 500 | 49 - 51 | ≤ 4 |
| **Araldite® GZ 7488 V40** | High MWt. BPA in solution [5] | 3 000 - 6 000 | ≤ 0.06 | ≥ 17 000 | 39 - 41 | ≤ 4 |
| **Araldite® GZ 280 X 80** | Semi-solid BPA in xylene | 650 - 900 | 3.10 - 3.40 | 290 - 323 | 79 - 81 | ≤ 3 |
| **Araldite® GZ 20500 X 90** | Modified semi-solid BPA in xylene | 3 000 - 8 000 | 3.60 - 4.30 | 232 - 278 | 89 - 91 | ≤ 3 |
| **Araldite® GZ 290 X 90** | Modified semi-solid BPA in xylene | 1 300 - 3 700 | 3.30 - 3.70 | 270 - 305 | 89 - 91 | ≤ 6 |
| **Araldite® GZ 601 X 75** | Solid BPA in xylene | 5 500 - 7 500 | 1.60 - 1.80 | 555 - 625 | 74 - 76 | ≤ 2 |
| **Araldite® GZ 7071 X 75** | Solid BPA in xylene | 8 000 - 13 000 | 1.50 - 1.67 | 600 - 670 | 74 - 76 | ≤ 2 |

[1] 40% in butylcarbitol I [2] 70% in butylcarbitol I [3] 150 °C I [4] 50% in methylethylketone/cyclohexanone/1-methoxy-2-propylacetate (81:11:8)

[5] 40% in 1-methoxy-2-propylacetate/cyclohexanone (93:7)

## Waterborne resins

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Solids | Color |
|---|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | % | Gardner |
| **Araldite® PY 33757** | Emulsifiable, crystallization-resistant epoxy resin | 5 000 - 8 000 | 5.50 - 5.80 | 172 - 182 | 100 | ≤ 3 |
| **Araldite® PZ 323** | Aqueous dispersion of polyfunctional EPN resin | sl. Thixotropic | 4.00 - 4.50 | 222 - 250 | 75 - 78 | white |
| **Araldite® PZ 756-1/67** | Emulsified, crystallization-resistant epoxy resin | 80 - 400 | 3.38 - 3.70 | 270 - 295 | 66 - 68 | white |
| **Araldite® PZ 33757/67** | Emulsified, crystallization-resistant epoxy resin | 50 - 400 | 3.65 - 3.90 | 256 - 274 | 65 - 69 | white |
| **Araldite® PZ 3961-1** | Aqueous dispersion of BPA type 1 resin | 500 - 1 500 at 23°C | 1.96 - 2.22 [1] | 450 - 510 [1] | 51 - 55 | white |
| **Araldite® ECN 1400** | Water-based epoxy cresol novolac resin | 900 - 1 500 | 4.10 - 4.61 [1] | 217 - 244 [1] | 38 - 42 | white |

[1] Measured on the solid products

## Crosslinkers

| Product designation | Characteristics | Melting point | Epoxy index | Epoxy equiv. | Solids | Color |
|---|---|---|---|---|---|---|
| Unit / scale | | °C | Eq/kg | g/Eq | % | Gardner |
| **Araldite® PT 810** | Hardener for polyester or acrylic resin powder coatings (TGIC) | 88 - 98 | 9.30 - 10.00 | 100 - 108 | 100 | white |
| **Araldite® PT 910** | Hardener for polyester or acrylic resin powder coatings | 90 - 102 | 6.50 - 7.10 | 141 - 154 | 100 | white |
| **Araldite® PT 912** | Hardener for polyester or acrylic resin powder coatings | 82 - 96 | 6.50 - 7.10 | 141 - 154 | 100 | white |

# Specialty epoxy resins and diluents

## Bisphenol A with reactive diluent

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® BY 157** | BPA with difunctional reactive diluent | 4 200 - 5 700 | 5.20 - 5.50 | 182 - 187 | ≤ 2 |
| **Araldite® BY 158** | BPA with difunctional reactive diluent | 280 - 360 | 6.20 - 6.50 | 154 - 161 | ≤ 3 |
| **Araldite® GY 253** | BPA with difunctional reactive diluent | 800 - 1 400 | 5.40 - 5.80 | 172 - 185 | ≤ 1 |
| **Araldite® GY 257** | BPA with monofunctional reactive diluent | 500 - 650 | 5.20 - 5.50 | 182 - 192 | ≤ 2 |
| **Araldite® GY 279** | BPA with monofunctional reactive diluent | 800 - 1 500 | 4.80 - 5.15 | 194 - 208 | ≤ 2 |
| **Araldite® GY 298** | BPA with reactive flexibilizer | 2 000 - 4 000 | 2.20 - 2.50 | 400 - 455 | ≤ 2 |
| **Araldite® GY 764** | BPA with difunctional reactive diluent | 350 - 550 | 5.50 - 5.80 | 179 - 189 | ≤ 2 |
| **Araldite® GY 776** | BPA with monofunctional reactive diluent | 2 700 - 3 800 | 5.10 - 5.40 | 185 - 196 | ≤ 2 |
| **Araldite® GY 784** | BPA with monofunctional reactive diluent | 1 200 - 1 600 | 4.90 - 5.20 | 192 - 204 | ≤ 2 |

## Bisphenol A/F with reactive diluent

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® GY 783** | BPA/F with monofunctional reactive diluent | 800 - 1 100 | 5.10 - 5.40 | 185 - 196 | ≤ 2 |
| **Araldite® GY 793** | BPA/F with monofunctional reactive diluent | 650 - 750 | 5.00 - 5.40 | 185 - 200 | ≤ 2 |
| **Araldite® PY 3483** | BPA/F with monofunctional reactive diluent | 1 000 - 1 600 | 4.80 - 5.10 | 196 - 208 | ≤ 4 |

## Bisphenol F and A/F pure

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® GY 281** | BPF | 5 000 - 7 000 | 5.80 - 6.30 | 158 - 172 | ≤ 4 |
| **Araldite® GY 282** | BPF | 3 300 - 4 100 | 5.80 - 6.10 | 164 - 172 | ≤ 2 |
| **Araldite® GY 285** | BPF | 2 000 - 3 000 | 5.80 - 6.10 | 164 - 172 | ≤ 5 |
| **Araldite® PY 302-2** | BPA/F, non-crystallizing | 6 500 - 8 000 | 5.65 - 5.90 | 169 - 177 | ≤ 3 |
| **Araldite® PY 304** | BPA/F | 6 500 - 8 000 | 5.50 - 5.80 | 172 - 182 | ≤ 3 |
| **Araldite® PY 306** | BPF, low viscosity | 1 200 - 1 600 | 6.00 - 6.40 | 156 - 167 | ≤ 1 |
| **Araldite® PY 720** | BPA/F | 7 000 - 9 400 | 5.30 - 5.60 | 179 - 189 | ≤ 2 |

## Epoxy phenol novolac

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® EPN 1179** | Semi-solid EPN, functionality 2.5 | 1 100 - 1 700 [1] | 5.60 - 5.80 | 172 - 179 | ≤ 3 |
| **Araldite® EPN 1180** | Semi-solid EPN, functionality 3.6 | 20 000 - 50 000 [1] | 5.50 - 5.70 | 175 - 182 | ≤ 2 |
| **Araldite® EPN 1183** | Medium viscosity, modified EPN, functionality 3.3 | 7 000 - 13 000 | 6.30 - 6.90 | 145 - 159 | ≤ 3 |
| **Araldite® EPN 1180 X 80** | EPN in xylene | 1 200 - 2 000 | 4.40 - 4.60 | 217 - 227 | ≤ 2 |
| **Araldite® GY 289** | Low viscosity EPN, functionality 2.2 | 9 000 - 11 000 | 5.70 - 6.00 | 167 - 175 | ≤ 5 |
| **Araldite® PY 307-1** | Medium viscosity, EPN, functionality 2.2 | 30 000 - 50 000 | 5.60 - 5.90 | 170 - 179 | ≤ 4 |

[1] Measured at 52°C

## Reactive diluents

| Product designation | Characteristics | Viscosity 25°C | Epoxy index | Epoxy equiv. | Color |
|---|---|---|---|---|---|
| Unit / scale | | mPa·s | Eq/kg | g/Eq | Gardner |
| **Araldite® DY-C** | Diglycidylether of cyclohexane dimethanol | 50 - 100 | 6.00 - 6.50 | 154 - 167 | ≤ 2 |
| **Araldite® DY-D** | Diglycidylether of butanediol | 15 - 25 | 8.00 - 8.50 | 118 - 125 | ≤ 2 |
| **Araldite® DY-E** | Monoglycidylether of C12-C14 alcohol | 4 - 12 | 3.15 - 3.60 | 278 - 317 | ≤ 2 |
| **Araldite® DY-F** | Diglycidylether of polyoxypropylene | 60 - 90 | 1.95 - 2.35 | 425 - 513 | ≤ 3 |
| **Araldite® DY-H** | Diglycidylether of hexanediol | 21 - 31 | 6.25 - 7.00 | 143 - 155 | ≤ 2 |
| **Araldite® DY-K** | Monoglycidylether of cresol | 6 - 12 | 5.30 - 5.70 | 175 - 189 | ≤ 2 |
| **Araldite® DY-L** | Glycerol propoxylated triglycidylether | 160 - 240 | 1.25 - 1.65 | 606-800 | ≤ 5 |
| **Araldite® DY-P** | Monoglycidylether of p-tert. butylphenol | 20 - 28 | 4.10 - 4.50 | 222 - 244 | ≤ 3 |
| **Araldite® DY-S** | Multiglycidylether of polyglycerol | 1 000 - 1 400 | 5.60 - 6.20 | 160 - 180 | ≤ 4 |
| **Araldite® DY-T** | Triglycidylether of trimethylolpropane | 100 - 300 | 7.80 - 8.20 | 122 - 128 | ≤ 3 |
| **Araldite® DY 3601** | Diglycidylether of polyoxypropylene | 42 - 52 | 2.47 - 2.60 | 385 - 405 | ≤ 3 |
| **Araldite® DY 3602** | Diglycidylether of polyoxyethylene | 15 - 60 | 5.20 - 6.30 | 159 - 192 | ≤ 2 |
| **Araldite® CY 184** | Hexahydrophthalic acid diglycidylester | 700 - 900 | 5.80 - 6.10 | 164 - 172 | ≤ 3 |



## Nomenclature

Huntsman Advanced Materials' registered trademark for commercial hardeners are Aradur® and Ara®Cool; Araldite® for commercial resins.

The number following the product letter code is the characteristic for the product name. A one- up to three-letter code behind the characteristic product number indicates a solvent (mixture). This solvent code is followed by a number indicating the solid content of the product (in the example bellow it's 70% hardener dissolved in a xylene/butanol mixture).
Example: Aradur® 3467 XW **70**

In case of minor product changes, we indicate the actual version by a figure separated from the product number by a dash.
Example: Aradur® **43-1**

In case of Aradur® hardener, a one-letter code (S) behind the characteristic product number indicates that the hardener is the fast version of the original product.

In case of Araldite® resin, the two-letter code following the registered trademark has the following meaning:

First letter
indicates the intended use of the product.
Example: Araldite® **P**Y 302-2 CH

- **B** Special resin for civil engineering applications
- **D** Modification product (reactive diluent, flexibilizer, matting agent, etc.)
- **G** Standard resin
- **P** Special resin
- **EPN** Epoxy phenol novolac
- **ECN** Epoxy cresol novolac

Second letter
indicates the supply form.
Example: Araldite® P**Y** 302-2 CH

- **T** Solid product
- **Y** Liquid product
- **Z** Resin in solution, emulsion or dispersion form

## Legend

### Applications legend

- **A** Automotive
- **CC** Can & Coil
- **CE** Civil Engineering
- **IM** Industrial Maintenance
- **PC** Powder Coatings
- **MC** Marine Coatings

### Acronyms legend

- **BPA** Bisphenol A epoxy resin
- **BPF** Bisphenol F epoxy resin
- **FCA** Flow control agent (in %)

## REACH

Registered for REACH

**All products mentioned hereby are:**

> Nonyl phenol-free
> Phenol-free
> Tert-butyl phenol-free
> Bisphenol-A-free[1]
> Bisphenol-F-free[1]

Those products marked «o» in the column «BzOH Free» do not contain benzyl alcohol.

All the components of the products contained in this brochure have been pre-registered and will be registered under REACH (or might be REACH exempt).

[1] Certain products may contain trace amounts where adducted with BPA or BPF epoxy resins.

## Gel times

The values under «Gel time» have been measured using TECAM, 250g/23ºC with Araldite® GY 250 unless otherwise specified. (n.m. = not measured).

## Safety and handling precautions

The Material Safety Data Sheet (MSDS) should be consulted prior to handling any of here listed products.

## Product range

Additional products are available upon request. Separate catalogues exist for standard solid epoxy resins and Ara®Cool product family.

## With innovation

Every day, all over the world, our Technical Competence centers engage in intensive research and development focusing on one goal : to deliver innovative solutions by working hand-in-hand with our business partners. Together through a continual exchange of ideas, supported by an experienced team of sales and technical specialists, we strive to deliver innovative solutions.

We track both new market expectations and changing regulations. Protection of the environment, as well as health and safety are paramount concerns, playing an integral part in our development projects.

By providing certified technologies, combined with high quality and reliability, our chemists and experts bring enhanced value to our customers, ensuring their success.

## With customer understanding

We market a unique product portfolio and a broad range of forward-looking solutions for our customers. Customers and partners benefit from an advanced level of service in:

> product development and quality
> product trials in-house and with customers
> customer seminars and training
> trouble-shooting and problem-solving

Partnership with our customers is more than simply «putting them first». It requires long-term commitment to forging close relationships that create synergies of knowledge, security and adaptability to create a successful, shared future.

## With care

Sustainability is a fundamental part of our corporate and business strategy. We see a better world in which our innovations help reduce consumption of natural resources and improve the quality of life for people everywhere. We are identifying the long-term trends that affect our markets and looking to see how products and applications can play a part in supporting and providing solutions to the challenges those markets face.



## Huntsman Advanced Materials

Our Advanced Materials division is a leading global chemical solutions provider with a long heritage of pioneering technologically advanced epoxy, acrylic, phenolic and polyurethane-based polymer products.

Our capabilities in high-performance adhesives and composites, delivered by more than 1 600 associates, serve over 2 000 global customers with innovative, tailor-made solutions and more than 1 500 products which address global engineering challenges.

## We operate synthesis, formulating and production facilities around the world

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