

# Technical Data Sheet

## EPI-REZ™ Resin 3510-W-60

### Product Description

EPI-REZ™ Resin 3510-W-60 is a nonionic, aqueous dispersion of a bisphenol A epoxy resin similar to EPON™ Resin 828, a liquid epoxy resin with an equivalent weight of 187. Supplied at typically 60% nonvolatile, EPI-REZ 3510-W-60 has a moderate viscosity and is mechanically stable. No organic solvents are present. EPI-REZ 3510-W-60 is completely water reducible, providing wide latitude for viscosity reduction.

### Application Areas/Suggested Uses

- High epoxy functionality
- Completely water reducible
- Compatible with most latex resins
- Good water resistance
- Good chemical resistance

### Benefits

- Industrial textile binders or fiber finishes
- Adhesives
- Fiberglass reinforced plastics
- Coatings
- Performance modifiers for other waterborne resins

### Sales Specifications

| Property  | Value      | Unit    | Test Method |
|---|------------|---------|-------------|
| Particle Size Coulter (Vol.Mean)                          | 1 - 2.2    | microns | SCR-1       |
| pH  | 2 - 5      |         | ASTME70     |
| Solids  | 60 - 62    | %       | ASTMD1259   |
| Viscosity at 25°C, (Brookfield RVT, #5 Spindle at 10 rpm) | 500 - 5000 | cP      | ASTMD2196   |
| Weight per Epoxide Based on Solids                        | 185 - 215  | g/eq    | ASTMD1652   |

### Typical Properties

| Property | Value | Unit   | Test Method |
|----------|-------|--------|-------------|
| Density  | 9.0   | lb/gal | ASTMD1475   |
| Water    | Water |        |             |

### Cured State Properties

Typical formulations and cured state properties of EPI-REZ 3510-W-60 with representative EPIKURE Curing Agents are described in Table 1. Two cure cycles, 10 minutes at 250 °F and 10 minutes at 350 °F, were evaluated.

Table 1/Properties of systems employing EPI-REZ Resin 3510-W-60

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Generated: January 21, 2020

Issue Date:

Revision:

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| Composition                    |     | A    | B    | C    | D    | E    | F    | G   |
|--------------------------------|-----|------|------|------|------|------|------|-----|
| EPI-REZ Resin 3510-W-60        | pbw | 100  | 100  | 100  | 100  | 100  | 100  | 100 |
| EPIKURE™ Curing Agent 3295     | pbw | 13.8 |      |      |      |      |      |     |
| EPIKURE Curing Agent 3046      | pbw |      | 27.7 |      |      |      |      |     |
| EPIKURE Curing Agent 3072      | pbw |      |      | 20.0 |      |      |      |     |
| EPIKURE Curing Agent 3125      | pbw |      |      |      | 39.1 |      |      |     |
| EPIKURE Curing Agent 3140      | pbw |      |      |      |      | 25.5 |      |     |
| EPIKURE Curing Agent 8535-W-50 | pbw |      |      |      |      |      | 62.8 |     |
| 2-Methylimidazole              | pbw |      |      |      |      |      |      | 3.0 |

### Stroke gel <sup>1</sup>

|         |         |     |     |     |     |     |     |    |
|---------|---------|-----|-----|-----|-----|-----|-----|----|
| Initial | seconds | 21  | 44  | 34  | 17  | 26  | 24  | 20 |
| 4 hrs.  | seconds | 21  | 28  | 18  | <10 | 19  | gel | 17 |
| 24 hrs. | seconds | <10 | <10 | <10 | <10 | <10 | --- | 13 |

### Brookfield viscosity <sup>2</sup>

|         |    |    |       |     |        |        |         |       |
|---------|----|----|-------|-----|--------|--------|---------|-------|
| Initial | cP | 80 | 1,400 | 800 | 26,000 | 14,400 | 9,200   | 80    |
| 4 hrs.  | cP | 80 | 320   | 80  | 6,600  | 7,600  | (gel in | 80    |
| 24 hrs. | cP | 80 | 50    | 80  | gel    | 80     | 2 hrs)  | 1,600 |

### Film properties <sup>3</sup>

#### Pencil hardness

|                        |   |    |   |    |    |    |    |
|------------------------|---|----|---|----|----|----|----|
| 10 min. at 250 °F cure | H | HB | F | B  | HB | HB | 2H |
| 10 min. at 350 °F cure | H | F  | F | HB | HB | H  | 2H |

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| Composition              | A    | B    | C    | D    | E    | F    | G    |
|--------------------------|------|------|------|------|------|------|------|
| Reverse impact, in.•lbs. |      |      |      |      |      |      |      |
| 10 min. at 250 °F cure   | >160 | 100  | >160 | >160 | >160 | 120  | <20  |
| 10 min. at 350 °F cure   | >160 | >160 | >160 | >160 | >160 | >160 | <20  |
| MEK double rubs          |      |      |      |      |      |      |      |
| 10 min. at 250 °F cure   | >100 | 80   | 74   | >100 | 67   | 56   | >100 |
| 10 min. at 350 °F cure   | >100 | >100 | >100 | >100 | >100 | 90   | >100 |

| Tg, °C, by DMA <sup>4</sup> | A  | B  | C  | D  | E   | F   | G   |
|-----------------------------|----|----|----|----|-----|-----|-----|
| 10 min. at 350 °F cure      | 79 | 89 | 77 | 69 | --- | --- | 134 |
| 60 min. at 350 °F cure      | 96 | 86 | 88 | 85 | --- | --- | --- |

<sup>1</sup> Stroke gel at 340 °F, tested on 1-2 grams of formulation.

<sup>2</sup> Brookfield viscosity measured at 10 rpm, #5 Spindle, 25 °C.

<sup>3</sup> Pencil hardness, reverse impact, MEK double rubs measured on steel Q panels. Film thickness of one mil.

<sup>4</sup> Tg measured on thin films (fiberglass cloth reinforced) using Dupont 982 Dynamic Mechanical Analyzer in the horizontal mode with heating rate of 5 °C per minute.

## General Information

EPI-REZ 3510-W-60 offers a solvent-free approach to the formulation of film adhesives, fiberglass reinforced plastics, coatings and electrical dip coatings and varnishes. It can also be incorporated into formulations which are traditionally water-based and which require good strength and outstanding chemical or water resistance. Examples of such applications are industrial fiber finishes, binders or stiffeners.

EPI-REZ 3510-W-60 can be cured with many of the same curing agents that are used with liquid or solution epoxy resins. Curing agents most conveniently employed are those which are water soluble or dispersible and which are stable in an aqueous medium. Examples of such curing agents include dicyandiamide, substituted imidazoles, aliphatic and aromatic amines and various EPIKURE™ Curing Agents.

Latex resins which benefit most from EPI-REZ 3510-W-60 modification are those which contain sufficient amine or carboxyl functionality to react with available epoxy groups.

When applied at room temperature, EPI-REZ 3510-W-60 coalesces to form a clear, continuous, tacky film after evaporation of the water.

## Formulation Procedures

EPI-REZ 3510-W-60 can be formulated with EPIKURE Curing Agents, with catalytic amine curing agents such as 2-methylimidazole (2-MI) or DMP-301 or with other waterborne polymer systems.

When formulating with water soluble or dispersible EPIKURE Curing Agents, the recommended mixing procedure involves diluting the curing agent with the free water used in the formulation and slowly adding it to the epoxy resin dispersion with good agitation.

When formulating with water soluble catalytic amine curing agents (2-MI and DMP-30), the amine should be dissolved in water prior to addition to the epoxy dispersion.

EPI-REZ 3510-W-60 is compatible with most latex resins. Latex/epoxy blends can be prepared by adding the epoxy dispersion to the latex with mild agitation.

## Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

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Please refer to the Hexion web site for Shelf Life and recommended Storage information.

For ease of handling and optimum shelf life, epoxy dispersions should be stored in tightly sealed containers at temperatures between 50 °F (10 °C) and 100 °F (37.8 °C). Do not allow the product to freeze. To prevent skinning or surface drying, do not leave the product uncovered for extended periods of time. If the need arises to store partially filled drums, replace the plastic top-sheet onto the surface of the liquid product.

Exposure to these materials should be minimized and avoided, if feasible, through the observance of proper precautions, use of appropriate engineering controls and proper personal protective clothing and equipment, and adherence to proper handling procedures. None of these materials should be used, stored, or transported until the handling precautions and recommendations as stated in the Material Safety Data Sheet (MSDS) for these and all other products being used are understood by all persons who will work with them. Questions and requests for information on Hexion Inc. ("Hexion") products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs on non-Hexion products should be obtained from the respective manufacturer.

## Packaging

Available in bulk and drum quantities.

## Contact Information

For product prices, availability, or order placement, please contact customer service:

[www.hexion.com/Contacts/](http://www.hexion.com/Contacts/)

For literature and technical assistance, visit our website at [www.hexion.com](http://www.hexion.com)

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