# Product Datasheet

# EpoPro 112A/D

# EpoPro 112A/DF

## VERY LOW OUTGASSING, MULTIPURPOSE EPOXY ADHESIVES

EpoPro 112A/D and 112A/DF are two part epoxy adhesives with a semi-paste and paste consistency respectively. The cured adhesives provides tough, peel resistant bonds to metal, wood, glass, ceramics, many plastics, and most other materials. Both versions of this system when fully cured easily meets NASA outgassing requirements and provide excellent heat, chemical and environmental resistant. When fully cured both versions are sandable and machinable and excellent for many repair and assembly applications. Due to the chemistry of these adhesive they provide excellent sealing abilities and can be used to provide water and gas proof seals including in many vacuum applications. The 112A/D version is generally suitable for filling gaps and leaks of up to 50mils (1.27mm) The 112A/DF version can be used to fill gaps and leaks up to at least 100 mils (2.5 mm).

These products can be supplied in custom colored, accelerated, or thickened or thinned versions if helpful. Please contact us to discuss your application if a custom variant might be of interest.

### Benefits

- Tough semi-rigid bonds with good impact & thermal shock resistance
- Low outgassing properties & very good heat, chemical and moisture resistance.
- Bonds metals, ceramics, wood, cardboard, glass, plastics and many other materials.

| HANDLING PROPERTIES | VALUE | TEST METHOD |
|---|---|---|
| EpoPro 112A | | |
| Density, g/cm³ | 1.50 | ASTM E-201 |
| Viscosity at 25ºC, cps | 250,000 | ASTM D-2393 |
| EpoPro 112D | | |
| Density, g/cm³ | 1.00 | ASTM E-201 |
| Viscosity at 25ºC, cps | 16,000 | ASTM D-2393 |
| EpoPro 112DF | | |
| Density, g/cm³ | 1.22 | ASTM E-201 |
| Viscosity at 25ºC, cps | 280,000 | ASTM D-2393 |
| Mixed Properties | | |
| Mix Ratio By Weight - 112A:112D | 100A:20B | Calculated |
| Mix Ratio By Volume - 112A:112D | 100A:30B | Calculated |

| | | |
|---|---|---|
| Mix Ratio By Weight - 112A:112DF | 100A:40B | Calculated |
| Mix Ratio By Weight - 112A:112DF | 100A:50B | Calculated |
| Mixed Viscosity at 25ºC, 112A/D | 130,000 | ASTM D-2393 |
| Mixed Viscosity at 25ºC, 112A/DF | 260,000 | ASTM D-2393 |
| Gel Time at 25ºC, 100g mass | 35 -60 minutes | ASTM D-2471 |
| Gel Time at 25ºC, 1/16" thick film | 90 – 120 minutes | ASTM D-2471 |
| Minimum Time to achieve Handling Strength | 8-16 hours | |

Recommended Cure Schedule: Functional cures are achieved in 24 hours, but full strength will take 48-72 hours at 25ºC or gelation at room temp + 2-3 hours at 150ºF (66ºC) or 1 hours at 180ºF (82ºC).

| PHYSICAL PROPERTIES | VALUE | TEST METHOD |
|---|---|---|
| Color | Tan | Visual |
| Shore D Hardness | 80 | ASTM D-2240 |
| Lap Shear Strength | | ASTM D-1002 |

Aluminum Lap shear Coupons, cured 72 hours at 25ºC

| Test Temperature | Shear Strength |
|---|---|
| -40ºC (-40ºF) | 2700 psi (18.6 mPa) |
| 0ºC (32ºF) | 2600 psi (17.9 mPa) |
| 25ºC / 77ºF | 2700 psi (18.6 mPa) |
| 93ºC / 200ºF | 2500 psi (17.2 mPa) |
| 149ºC / 300ºF | 500 psi (3.4 mPa) |

After Fluid Immersion for 7 days at 25ºC:

| Fluid | Shear Strength at 25ºC |
|---|---|
| JP-4 | 2700 psi (18.6 mPa) |
| Skydrol | 2400 psi (16.5 mPa) |
| Distilled Water | 2400 psi (16.5 mPa) |

Bond Strength with Other Materials:

| Material (substrate thickness) | Shear Strength at 25ºC |
|---|---|
| Carbon Steel (1mm) | 2790 psi (19.2 mPa) |
| Stainless Steel (1mm) | 2750 psi (19.0 mPa) |
| Galvanized Steel (1.5mm)* | 2100 psi (14.5 mPa) |
| Copper (1.5mm) | 2340 psi (16.1 mPa) |
| Polyester to polyester | 1800 psi (12.4 mPa) |

*Surface degreased only, not roughened

Outgassing, samples cured for 3 hours at 66ºC — ASTM E-595

| | |
|---|---|
| EpoPro 112A/D | |
| Total Mass Loss | 0.72% |
| CCVM | 0.00% |
| EpoPro 112A/DF | |
| Total Mass Loss | 0.48% |
| CCVM | 0.01% |

Note: our lab testing suggests that even lower outgassing results are achieved by curing at higher temperatures and that after an initial room temperature or 66ºC cure a post-cure of just 60 minutes at 125ºC reduces outgassing to even lower levels.

**NOTE** : Typical Properties determined using EpoPro 112A/D and 112A/DF cured for 3 hours at 66ºC. All testing is run at 25ºC unless otherwise noted. Values based on laboratory or average production results – not for specification purposes.

## SUGGESTED PROCESSING GUIDELINES

EpoPro 112A/D and 112A/DF can be applied by stiff brush, roller, squeegee, knife, or spatula. These systems may also be suitable for meter-mix dispensing and the 112A/DF system can be supplied in dual syringes cartridges in a 100A:50B by volume mix ratio.

Weigh Part A and Part B in the recommended ratio as accurately as possible into a clean mixing container. Always use weighing equipment having accuracy in proportion to the amounts being weighted. Blend by using a spatula or stirring stick for 1-2 minutes using a kneading motion. Scrape the bottom and sides of the mixing container carefully and frequently to produce a uniform mixture.

Apply to clean, dry surfaces. For best adhesion, abrade the surface with a wire brush, scouring pad, steel wool or coarse sandpaper. After abrasion, clean the surface of any loose material and degrease with solvent or detergent to remove any contaminants. The material may then be applied with any suitable application method include brushes, spatulas, trowels, etc.

Optimal bond strengths are typically achieved with an adhesive bondline thickness of 3 – 5 mils, but larger gaps and thicker bond lines are possible with this adhesive without major loss of mechanical strength.

Allow to cure at room temperature for at least 8-16 hours before handling.

## PACKAGING AVAILABLE

These products are available in half-pint, pint, & quart kits. They are also available in 2oz and 4oz squeeze tube kits. The EpoPro 112A/DF system can also be supplied in 50ml dual syringe cartridges that eliminate the need for hand mixing.

Please call use with any special packaging requests, or for information on custom kitting.

## STORAGE GUIDELINES

Store this material in a clean, cool and dry environment in its tightly closed original containers. Products may settle during storage and should be thoroughly re-mixed prior to use. Avoid extended exposure to high humidity. Tightly re-seal after use. If the recommended storage conditions are observed the products will have a minimum shelf-life of 24 months from the date of shipment.

## HANDLING PRECAUTIONS

Mandatory and recommended industrial hygiene procedures should be followed whenever these products are being handled and processed. For additional information please consult the corresponding Safety Data Sheets.

## FIRST AID

In case of contact:
**Skin** – Immediately wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Destroy contaminated shoes and other articles made of leather. **Eyes** – Immediately flush eyes with plenty of water for 15 minutes and get prompt medical attention. **Inhalation** - Remove person to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician. **Ingestion** - Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

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