

# EPOXY ULTRA STRONG

## 2-COMPONENT ADHESIVE BASED ON EPOXY RESIN

# UHU



### PRODUCT DESCRIPTION

2-component epoxy resin adhesive for heavy-duty requirements.

### FIELD OF APPLICATION

Glues metal, glass, porcelain, ceramic, wood, marble, stone, concrete, thermosets, glass fiber, reinforced plastics, hard-pvc, rubber, Styrofoam® and more. Not suitable for large glass surfaces, PE, PP styrofoam and soft PVC.

### PROPERTIES

Resistance: UHU Epoxy Ultra Strong joins are resistant to moisture, oil, dilute acids and alkalis and many solvents. Moisture, dilute acids and alkalis have very little effect on bond strength, even in the event of lengthy exposure. No universally valid data can be given as there are always many factors, such as the possibility of corrosion, duration of exposure and temperature, that affect the assembly.

UHU Epoxy Ultra Strong is resistant to ageing and weathering. The adhesive is not affected by even extremely low temperatures. At temperatures below  $-60^{\circ}\text{C}$ , resistance to combined tension and shearing is reduced to approximately 75-80% of the value measured at room temperature; if the samples are heated up to room temperature once more, the original bond strength is also regained.

- 2-component epoxy resin adhesive for heavy-duty requirements
- mixing ratio: 1:1 (by volume)
- working time (open time) approx. 90 minutes
- setting time and final strength depend on temperature
- hardens at room temperature after 12 hours
- shock-resistant
- resistant to age and humidity

### PREPARATION

**Personal safety:** When using UHU Epoxy Ultra Strong, contact of the adhesive with the skin should be avoided as much as possible.

Cleanliness makes the work easier. The hands should be cleaned using soap and water – never solvent – as soon as possible.

Once hardened, UHU Epoxy Ultra Strong is, like most synthetic materials, physiologically safe and has no smell or taste. It is not recommended that this product is used to stick together parts that are likely to come into contact with foodstuffs, as it has not been authorised for this by appropriate American or German authorities.

**Preliminary surface treatment:** The surfaces to be stuck together must be cleaned very thoroughly before the adhesive is applied.

It is worth first using abrasive cloth (abrasive rating 100), then degreasing using cellulose moistened with a grease solvent such as acetone. Special preliminary treatments to achieve the best possible bond strengths are described in DIN Regulation 53281 (Sheet 1). (This may be obtained from Beuth-Verlag GmbH in Berlin.)

Aluminium and its alloys should be pre-treated using the "pickling" process. The cleaned parts are dipped in a caustic solution at  $60 - 65^{\circ}\text{C}$  for 30 minutes.

This solution has the following composition:

27.5 parts by weight of concentrated sulphuric acid (density:  $1.82\text{ g/cm}^3$ )

7.5 parts by weight of dichromate of sodium ( $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$ )

65.0 parts by weight of water

After pickling, the parts should be rinsed thoroughly and left to dry in a warm air current.

For other metals, see DIN 53281, Sheet 1.

Rubber: Surfaces made of vulcanised natural or synthetic rubber should be treated with concentrated sulphuric acid (density  $1.82\text{ g/cm}^3$ ) for between 2 and 10 minutes, depending on the quality of the rubber. The parts should then be very thoroughly rinsed to remove all trace of acid, and dried. If hairline cracks are visible on the treated surface when the part is flexed, this indicates that the surface has been sufficiently pre-treated.

Glass, porcelain and similar materials normally only need to be degreased using solvent. For wood, care must be taken to ensure that the surface is free of dust. Hardened plastics (duroplasts) such as phenolic resin (Bakelite®), melamine, urea, resorcin, polyester and epoxy resins should be roughened with an abrasive cloth (abrasive rating 100) and degreased as above.

UHU Epoxy Ultra Strong is not suitable for use with thermoplastic plastics such as polyethylene, polypropylene, polystyrene and soft PVC.

**Tools:** For mixing it is best to use a plastic cup (in polyethylene, for example) or an unwaxed paper cup. Alternatively, small quantities may be mixed on a glass plate or something similar, using a wooden or metal spatula. Mixing should continue until the paste is of an even colour and the components are thoroughly combined.

As soon as possible after mixing, the paste should be applied to the surfaces to be stuck together in order to achieve the best possible bond. The adhesive is applied using a wooden or metal spatula, or a short-haired brush. For large areas, a fine-toothed spatula should be used as this ensures an even application.

## APPLICATION

**Mixture ratio:** (by volume) 1:1 (other mixing ratios possible)

### Directions for use:

After the two components have been mixed, UHU Epoxy Ultra Strong hardens with almost no loss of volume to form a duroplastic synthetic resin. The parts to be assembled usually need to be fixed under pressure. It is not necessary to apply extreme pressure. Hardening takes place by evaporation. The working consistency is so designed that a good bond is achieved at room temperature with a minimal amount of movement.

The UHU Epoxy system enables the user to achieve a harder or softer final product by varying the quantity of hardener used:

- a) The mixing ratio 100 parts binder by weight + 50 parts hardener by weight produces a harder end product with slightly greater resistance to heat, water and chemical substances.
- b) The mixing ratio 100 parts binder by weight + 80 parts hardener by weight (equal lengths of strips from the tubes) is the normal mixing ratio for universal applications.
- c) The mixing ratio 100 parts binder by weight + 120 parts hardener by weight produces an end product that is flexible and resists peeling better, although it is less resistant to heat, water and chemical substances.

Within these limits, any mixing ratio is possible depending on requirements. A higher proportion of hardener reduces the working life of the mixture and its hardness.

Temperatures below 18°C slow down the hardening process and result in poor adhesion; extra warmth (heater, infrared radiator or similar) is therefore needed when working in cold places or in the open air.

Particularly strong adhesion is achieved if hardening takes place at a higher temperature, in the region of 70 to 180°C. The following table shows the relationship between time and temperature for minimum hardening times:

45 minutes at 70 °C
30 minutes at 80 °C
20 minutes at 90 °C
10 minutes at 100 °C
7 minutes at 120 °C
6 minutes at 140 °C
5 minutes at 150 - 180 °C

Temperatures should not exceed 200°C either during hardening or when the assembly is subsequently put under pressure, as this would affect firmness and the stability of the substance.

Mixing Ratio(binder and hardener, by volume) 1:1 = mixing ratio (by weight) 100:80

Hardening at room temperature Hardening: 20 mins. at 100°C, Hardening: 5 mins. at 180°C

Mixing ratio (by weight)100:50

Hardening at room temperature Hardening: 20 mins. at 100°C, Hardening: 5

mins. at 180°C Dosing and mixing:

Precise dosing and thorough mixing are essential for good bonding and even joins.

The normal mixing ratio is 1:1 by volume (equal lengths of strands from the tube), which is equivalent to 100 parts binder by weight + 80 parts hardener by weight.

Small variations in the proportions of binder and hardener make virtually no difference.

**Open time:** 90 mins. (Period of usability at 20°C room temperature)

**Stains/residue:** Working equipment should be cleaned before the adhesive has hardened – acetone and nitro thinners are suitable solvents for this. The same applies to soiled clothing.

**Points of attention:** Protective precautions:

UHU Epoxy Ultra Strong contains solvents. Some solvents, such as methylene chloride and trichloroethylene (Warning! Precautions must always be taken when using these substances!), soften the adhesive over a period of time. This effect can be made use of for dissolving adhesive joins. Appropriate precautions should therefore be taken during storage or when working with the adhesive.

When using UHU Epoxy Ultra Strong, contact of the adhesive with the skin should be avoided as much as possible.

Cleanliness makes the work easier. The hands should be cleaned using soap and water – never solvent – as soon as possible. For mass production, the workplace must be well ventilated. Once hardened, UHU Epoxy Ultra Strong is, like most synthetic materials, physiologically safe and has no smell or taste. It is not recommended that this product is used to stick together parts that are likely to come into contact with foodstuffs, as it has not been authorised for this by appropriate American or German authorities.

## TECHNICAL PROPERTIES

**Temperature resistance:** Between -40 and +100°C (dependent on material and construction; higher temperatures may also be possible). Temperatures should not exceed 200°C either during hardening or when the assembly is subsequently put under pressure, as this would affect firmness and the stability of the substance. UHU Epoxy is resistant to ageing and weathering. The adhesive is not affected by even extremely low temperatures. At temperatures below -60°C, resistance to combined tension and shearing is reduced

**Chemicals resistance:** many solvents, oil, dilute acids, alkalis and many solvents. Moisture, dilute acids and alkalis have very little effect on bond strength, even in the event of lengthy exposure. No universally valid data can be given as there are always many factors, such as the possibility of corrosion, duration of exposure and temperature, that affect the assembly.

## TECHNICAL SPECIFICATIONS

**Appearance:** binder: opaque; hardener: honey coloured

**Chemical base:** binder: epoxy resin; hardener: aliphatic amines

**Bonding technique:** Wet adhesion

**Viscosity:** binder: 40.000; hardener: 30.000 mPa.s.

**Solid contents:** approx. 100 %

**Density:** approx. binder: approx. 1.2; hardener approx. 0.96 g/cm<sup>3</sup>

**Specifications:**

Note: This information is the result of carefully executed tests. This Technical Data Sheet has been prepared to the best of our knowledge to provide you with advice when gluing. We cannot be held responsible for the results or any damage suffered, as the variety of factors involved (type and combination of materials and working method) are beyond our control. Users have to carry out their own checks and trials. Liability can only be accepted for the consistently high quality of our product.

Consistency - binder: High viscosity; hardener: medium viscosity

Flame point [°C] - binder: approx. 210; hardener: approx. 110

Firm to the touch: 6 hours

Firm enough to use: 12 hours

Final firmness: 24 hours

## STORAGE CONDITIONS

Please store the product at a dry and frost free place.

## PHYSIOLOGICAL PROPERTIES

Hardened UHU Epoxy has exceptional electrical insulation properties:

Specific resistance: 5.6 - 5.8;  $10^{13}$   $\Omega$ -cm at 100 V and 21 °C.

Heat Conductivity according to DIN 52612 is 0.249 W/m×K at 28.3 °C.

The linear coefficient of thermal expansion is 90.10-6 K-1 at 20°C.

Compression resistance (according to DIN 53454 measured using cubes measuring 10 mm)

100 : 50 parts weight approx. 69 N/mm<sup>2</sup>

100 : 80 parts weight approx. 45 N/mm<sup>2</sup>

100 : 100 parts weight approx. 16 N/mm<sup>2</sup>

## PACK SIZES

Tube of binder, tube of hardener, 2x10ml