



At a glance

RESION Universal Epoxy is a versatile two-component epoxy system suitable for laminating, coating, bonding and repairs. The system consists of one base epoxy resin and three different hardeners, allowing the working time and application temperature to be adapted to the intended application.

The mixing ratio is **2:1 by weight** for all three hardeners.

The epoxy can be used without additives or combined with reinforcement materials, fillers and suitable pigments.

Applications

RESION Universal Epoxy is suitable for a wide range of applications, including:

- Laminating with glass, carbon and aramid fibres
- Repairing and reinforcing composite structures
- Boatbuilding, boat repairs and maintenance
- Bonding wood, composites and suitable mineral-based materials
- Creating fillet joints and adhesive pastes
- Filling and fairing damaged areas
- Coating and protecting wood and other suitable substrates
- Priming wood, concrete and plaster
- Furniture making, model making and window frame repairs
- Protection against moisture penetration

The epoxy provides good adhesion to many substrates, provided they are suitable and properly prepared.



Product components

Product code	Description
EP101	RESION Epoxy Resin Base
EP111	RESION Epoxy Hardener Winter
EP113	RESION Epoxy Hardener Fast
EP115	RESION Epoxy Hardener Slow

Depending on the selected kit, EP101 is combined with one of the hardeners listed above.

Choosing the hardener

EP111 – Winter Hardener

Suitable for application at low temperatures, starting from 4°C. This hardener reacts relatively quickly at higher temperatures and is particularly suitable for work carried out in cold conditions.

EP113 – Fast Hardener

Suitable for general applications where a relatively short working time and fast curing are required, such as repairs, bonding and smaller laminating projects.

EP115 – Slow Hardener

Suitable for larger projects or applications requiring more working time, such as laminating large surfaces, coating and more complex bonding operations.



Features and benefits

- Versatile system for laminating, bonding and coating
- Good mechanical properties after full curing
- Good adhesion to suitable substrates
- Compatible with various reinforcement materials
- Can be combined with different fillers
- Simple mixing ratio of 2:1 by weight
- Choice of three hardeners
- Suitable dispensing pumps available



Technical data

General properties

Property	Value
Type	Two-component epoxy system
Mixing ratio (by weight)	100:50 (2:1)
Full cure	Approximately 7 days at 23°C
Compressive strength, unfilled	80 MPa
Compressive strength, quartz-filled	200–300 MPa
Flexural strength	100 MPa
Tensile strength	40 MPa
Elastic modulus	2,250 MPa
Hardness	Shore D 75

Indicative glass transition temperature (T_g) Approximately 40–50°C

The mechanical properties have been taken from existing product documentation and should be regarded as indicative values. Properties may vary depending on the selected hardener, fillers used and curing conditions.

The stated T_g is an indicative value based on available information regarding the thermal behaviour of the system. The exact glass transition temperature has not been determined using a separately specified test method and is therefore not guaranteed. Actual thermal properties depend on the selected hardener and the degree of cure. Additional curing at elevated temperatures (post-curing) may affect the thermal properties.

The glass transition temperature is not necessarily equal to the maximum service temperature. The permissible service temperature also depends on the mechanical load and duration of exposure.

Working times and curing

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Hardener	Working time*	Curing time**	Min. application temperature
EP111 Winter	Approx. 15 minutes	6–8 hours	4°C
EP113 Fast	20–30 minutes	12–18 hours	8°C
EP115 Slow	50–60 minutes	24–48 hours	12°C

* **Working time (pot life):** measured at 20°C using 100 grams of mixed epoxy in a mixing cup.

At a temperature of 4°C, the working time of EP111 Winter is approximately 45–60 minutes.

** **Curing time:** indicative curing time at 20°C. Actual curing depends on factors including temperature, layer thickness and the amount of epoxy applied.

Working time, initial cure and full cure

Three different stages can be distinguished during the curing of epoxy.

Working time (pot life)

The period during which the mixed epoxy remains sufficiently fluid and workable. This time is measured in a mixing cup using a specified quantity of epoxy.

Initial cure

The stage during which the epoxy gradually hardens and develops sufficient strength to be carefully handled or further processed, depending on the application.

A tack-free surface does not necessarily mean that the epoxy has fully cured or reached its maximum load-bearing capacity.

Full cure

The stage at which the epoxy has reached its intended final degree of cure. Under normal conditions, approximately seven days at 23°C are allowed for this process.

At lower temperatures, this may take considerably longer.

Influence of temperature, quantity and layer thickness

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Epoxy cures through a chemical reaction that generates heat.

- **Higher temperature:** faster reaction, shorter working time and faster curing.
- **Lower temperature:** slower reaction, longer working time and longer curing time.
- **Larger mixing quantity:** greater heat build-up in the mixing cup, which may shorten the working time.
- **Smaller mixing quantity:** less heat build-up, generally resulting in a longer working time.
- **Thin layers:** better heat dissipation, which may slow down curing.
- **Thicker layers:** greater heat build-up, which may accelerate the reaction.

The stated working times and curing times should therefore be regarded as guidelines.

The minimum application temperature is not necessarily the ideal application temperature. At low temperatures, viscosity increases and curing proceeds considerably more slowly.

Both the ambient temperature and the substrate temperature are important.



Application instructions

General – Mixing

Mix two parts by weight of epoxy resin (component A) with one part by weight of hardener (component B).

For example:

Epoxy resin	Hardener	Total
100 grams	50 grams	150 grams
200 grams	100 grams	300 grams
500 grams	250 grams	750 grams

Accurately weigh both components using a suitable scale.

Mix the resin and hardener slowly and thoroughly for approximately 2–3 minutes. Regularly scrape the sides and bottom of the mixing cup during mixing.

For additional assurance, the mixture can be transferred into a second clean mixing cup and mixed again. This reduces the risk of insufficiently mixed material remaining on the sides or bottom of the original cup and ending up in the finished product.

For many applications, this second mixing step is not necessary, provided the components have been mixed thoroughly. However, the two-cup mixing method is recommended for coatings, transparent finishes and other critical applications.

Important: never change the mixing ratio to influence the working time. Too much or too little hardener may result in incomplete curing and reduced material properties.



Substrate preparation

The substrate must be clean, dry, stable and free from dust, oil, grease, wax and other contaminants.

If necessary, degrease before sanding to prevent contaminants from being worked into the surface.

Sand the substrate sufficiently to ensure good mechanical adhesion and carefully remove all sanding dust.

Highly absorbent or porous substrates may require pretreatment with unfilled epoxy.

Avoid application on damp substrates or under conditions where condensation may occur.

Laminating

RESION Universal Epoxy is suitable for impregnating and laminating various reinforcement materials, including:

- Glass fibre fabrics
- Carbon fibre fabrics
- Aramid fabrics
- Unidirectional fabrics (UD)
- Multiaxial reinforcements
- Woven tapes and reinforcement tapes
- Epoxy-compatible glass fibre mats and fibre reinforcements

When using glass fibre mats, only use products with a binder that is compatible with epoxy.

Apply a thin layer of mixed epoxy to the prepared substrate. Position the reinforcement material and impregnate it with additional epoxy.

Distribute the epoxy evenly using a suitable laminating roller, brush or spreader.

Consolidate the laminate using an air-release roller to remove any trapped air.

Apply additional layers of reinforcement material in the same manner.

Use sufficient epoxy to fully impregnate the fibres, but avoid excessive resin. The ideal resin-to-fibre ratio depends on the reinforcement material and the laminating technique used.



Optionally, a final layer of peel ply can be applied. After curing and removing the peel ply, a clean, textured surface is generally obtained that is suitable for further processing.

Bonding

Sand and degrease the surfaces to be bonded.

Mix the epoxy according to the specified mixing ratio. If desired, the epoxy can be thickened with suitable fillers to create an adhesive paste.

For porous materials such as wood, it is recommended to first wet out the surfaces with a thin layer of unfilled epoxy.

Then apply the adhesive and join the parts together.

Depending on the application, the adhesive may be applied to one or both surfaces.

Ensure sufficient contact between the surfaces. High clamping pressure is generally not necessary. Avoid squeezing the entire adhesive layer out of the joint.

Secure the parts in position during curing.



Filling and fillet joints

By combining the epoxy with suitable fillers, a paste can be prepared for filling holes, repairing damaged areas or creating fillet joints.

First mix the resin and hardener thoroughly, then gradually add filler until the desired consistency is achieved.

For fillet joints, a non-sagging paste is generally used, allowing it to remain in place and be shaped with a spatula or suitable filleting tool.

For filling small surface imperfections, a thinner mixture may be used.

Use of fillers

Filler	Main application
Stewathix	Thickening, improving sag resistance and preventing the mixture from running
Cotton fibres	Reinforcing bonded joints and structural repairs
Red microballoons	Lightweight, easily sanded filler compound
White microballoons	Lightweight filling and fairing compound

Fillers can be used individually or in combination.

The required quantity of filler depends on the application and the desired consistency.

Microballoons are suitable for lightweight, easily sanded fairing compounds. For structurally loaded bonded joints, reinforcing fillers such as cotton fibres are generally more suitable.



Coating

Sand and degrease the surface to be coated.

Mix the epoxy according to the specified ratio and apply evenly using a suitable epoxy roller, velour roller or brush.

If desired, lightly brush out the surface to reduce trapped air and roller marks.

Apply the epoxy in an even layer. Avoid unnecessarily thick layers and excessive accumulations of epoxy.

Several coats may be required to provide adequate protection.

A subsequent coat can be applied while the previous coat is still sufficiently reactive. Once the previous coat has fully cured, the surface must be prepared again.

Where necessary, protect coatings exposed to outdoor conditions with a suitable finishing system.

Pigmentation

RESION Universal Epoxy can be coloured using suitable pigment pastes designed for epoxy.

When using RESION epoxy pigment pastes, a dosage of approximately 3–5% can generally be used, depending on the desired colour and opacity.

Always check the recommended dosage of the pigment being used.

For even pigment distribution, the pigment can first be mixed into the resin component before adding the hardener.

The specified mixing ratio between epoxy resin and hardener remains unchanged.

The addition of pigment may affect the processing characteristics and properties of the cured product.



Applying subsequent coats

Epoxy layers can form a chemical bond with each other within a certain time window.

When a subsequent coat is applied while the previous coat is still sufficiently reactive, intermediate sanding is generally not necessary.

Once the epoxy has fully cured, mechanical surface preparation, such as sanding with P120–P180 grit abrasive paper, is generally required to ensure adequate adhesion.

The exact overcoating interval depends on the selected hardener, temperature and layer thickness. As a general rule, a subsequent coat can be applied without sanding for up to 48 hours after the previous coat was applied.

Amine blush

During the curing of certain epoxy hardeners, a thin, waxy layer may form on the surface. This phenomenon is known as *amine blush* and may occur particularly at low temperatures and high humidity.

Amine blush can reduce the adhesion of subsequent layers.

If present, remove this layer using clean water and a suitable cleaning pad. Dry the surface and sand if necessary before applying another coat.

Do not use solvents to remove amine blush.



Important considerations

Heat generation

Heat is generated during the curing process.

With larger quantities of mixed epoxy, this heat can accumulate, causing the reaction to accelerate considerably.

As a result, the epoxy may become extremely hot, potentially leading to smoke generation, severe discolouration or damage to the mixing cup.

Therefore, do not mix more epoxy than can be applied within the available working time.

Preferably, spread the mixed epoxy over the surface to be treated as soon as possible.

Use as a casting resin

RESION Universal Epoxy has primarily been developed for laminating, coating, bonding and repairs.

The system is not intended for large or thick castings.

Excessive heat may develop in thicker castings, particularly when using the Fast or Winter hardener.

For thicker casting layers or larger casting volumes, use an epoxy casting resin system specifically designed for this purpose.

Temperature and moisture

Avoid application on damp surfaces or under conditions where condensation may occur.

Bear in mind that application becomes more difficult at low temperatures and that curing may take considerably longer.

Ensure that the temperature remains sufficiently high throughout the curing period.

Safety and personal protection

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Avoid skin and eye contact with uncured epoxy resin and hardener.

Wear suitable nitrile gloves, safety glasses and protective clothing.

Work in a well-ventilated area. Where necessary, use suitable respiratory protection based on the level and type of exposure and the information provided in the Safety Data Sheet.

Uncured epoxy components may cause skin irritation and allergic reactions. Depending on their composition, hardeners may be corrosive and cause severe skin and eye damage.

Before use, consult the latest Safety Data Sheets (SDS) for both the epoxy resin and the selected hardener.

Cleaning tools

Clean tools immediately after use, before the epoxy has cured.

Use a cleaning agent suitable for uncured epoxy.

Fully cured epoxy can generally only be removed mechanically.

Prevent epoxy residues and cleaning agents from entering drains or the environment.



Storage and shelf life

Store the resin and hardener in their original, tightly sealed containers in a dry, dark place.

The recommended storage temperature is 15–20°C.

Avoid direct sunlight, extreme temperatures and exposure to moisture.

Under these conditions, the stated shelf life is at least one year.

During prolonged storage, the epoxy resin may develop some yellowing. Slight discolouration does not necessarily affect its mechanical properties.

After prolonged storage or if visible changes have occurred, check the suitability of the material before