

ORTHOPOXY® LAMINATING RESINS

New generation of biosourced epoxy resins Bisphenol-free, patented, specially developed for orthopedic equipment.

The ORTHOPOXY® range is composed of three versions:

- “SLOW” for the realization of orthoses
- “FAST” for the realization of prosthetics
- “CLEAR” for the faster realization of aspect parts lightweight and having excellent mechanical and thermal properties.

We recommend using the CLEAR version for devices in contact with water or for patients subject to excessive sweating.

These resins have been designed to impregnate our flax fibers (ORTHOFLAX®) and basalt fibers (ECO-BLACK) but also all the other fibers used in the orthopedic field (Carbon, Glass, Perlon®, Nylglass®, etc.).

These resins can be colored.

Curing process

Orthodoxy® systems have been designed to manufacture external orthopedic devices by lamination according to standard CPOs methods.

The curing process takes place in two stages:

- After an under-vacuum injection, wait the instructed times to stop the vacuum and remove the PVA bag (at the hardening time),
- Realize a post-curing as recommended as follow.

A post-cure of 1h at 100°C is recommended to achieve optimal Tg and mechanical properties. Nevertheless, this step is not mandatory (complete curing at room temperature in 24 hours).

The device can be post-cured with its PVA bag. If so, we advise to apply a damp cloth during 40 min to facilitate the detachment of the bag or to remove it while the device is still warm.



Dangers of Epoxy resins BPA-based

To manufacture a quality composite (mechanical performance, surface state, fiber impregnation, etc.), the main matrix on the market are Epoxy resins. All Epoxy systems are currently formulated with DGEBA resins which are synthesized from Bisphenol A (BPA) and epichlorohydrin. BPA is an **endocrine disruptor** able to interfere with our hormones and produce bad effect even at very low concentrations: infertility, cancer, diabetes, obesity, etc.

This molecule is harmful during the implementation of the resin but also after polymerization. Indeed, some BPA molecules which have not polymerized are still « free » on the composite surface.

Advantages compared to Acrylic resins

Comfort at work:

- Odorless
- Non flammable

Performance:

- More rigid, more resistant
- Good compatibility with fibers and easy to impregnate

Respect of the environment:

- BP-Free epoxy resin
- Partially bio based 45% FAST - 45% SLOW - 50% CLEAR

Reactivity on pure resin.

Three versions have been designed with adapted working time for the realization of prosthetics or orthoses.

		ORTHOPOXY® SLOW	ORTHOPOXY® FAST	ORTHOPOXY® CLEAR
Mixing ratio in weight	Resin : Hardener	100 : 40	100 : 40	100 : 40
Mixing viscosity at 20 °C (mPa.s)	ISO 12058-2	450	450	500
Gelling time at 20 °C (/200 g) (=working time)	ISO 2535	1 h 30	35 min	30 min
Gelling time at 20 °C (/12 g)	ISO 2535	5 h 30	1 h 30	3 h 30
End of vacuum time		6 h	2 h	4 h
12g layer hardening time at 20 °C		6 h 30	4 h	6 h 30
Final hardness		24 h	24 h	24 h

Mechanical properties

		STANDARD	UNIT	ORTHOPOXY® SLOW	ORTHOPOXY® FAST	ORTHOPOXY® CLEAR
Flexural tests	Young modulus		MPa	2000	2000	4200
	Breaking load	ISO 178	MPa	63	79	90.58
	Distortion at break		%	3.4	3.2	3.5
Tensile tests	Young modulus		MPa	3300	3350	2790
	Breaking load	ISO 527-4	MPa	56	52	46.03
	Distortion at break		%	3	2,5	2,4
Glass transition temperature (Tg)	1 h at 100 °C		°C	70	70	70
Final hardness		ISO 868	Sh D	85	85	85

Data obtained on a standardized batch of neat resin (no fibers) / Curing time: 1 h at 100 °C

Handling and safety

Mix well the resin and hardener before use.

The 100/40 mixing ratio must be strictly respected by weighing the two components. Our kits of 3 different sizes are provided to facilitate the preparation of your application process.

!/\ Mass effect: we advise users that a large volume of mixture in the pot or in the sprue will increase the mass effect: the reaction will self-accelerate, causing a risk of an exothermic overheating. We recommend you to adjust the volume of preparation, to use large diameter pots, to reduce the residual quantity in the sprue (< 100g), and if necessary split the residual quantity in several pots to allow a better dissipation of the calories.

The epoxy hardener part is composed of amines that are irritating in nature. Although we took care to select the least dangerous ones, it is essential when handling to strictly observe the appropriate safety and hygiene measures:

- Good ventilation,
- Wearing gloves and goggles.

For more information, please refer to the safety data sheet.

The resin and hardener must be mixed slowly until a perfectly homogeneous system is obtained. Ensure avoid incorporating too many bubbles in the system during the stirring. The mixture is then poured into a clean pot for use.

Securely close the amine can after use at the risk of strong reactivities and exothermies because of their great hygroscopy.

Storage and packaging

The ORTHOPOXY® resins are guaranteed 18 months if they are stored between 15 and 25°C in well-sealed drums and away from light and humidity.

GRADE		KIT 1.4KG		KIT 3.5KG		KIT 7KG	
ORTHOPOXY® SLOW	RESIN	1KG	EPOX-S R01	2,5KG	EPOX-S R02	5KG	EPOX-S R03
	HARDENER	0,4KG	EPOX-S D01	1KG	EPOX-S D02	2x1KG	EPOX-S D03
ORTHOPOXY® FAST	RESIN	1KG	EPOX-F R01	2,5KG	EPOX-F R02	5KG	EPOX-F R03
	HARDENER	0,4KG	EPOX-F D01	1KG	EPOX-F D02	2x1KG	EPOX-F D03
ORTHOPOXY® CLEAR	RESIN	1KG	EPOX-C R01	2,5KG	EPOX-C R02	5KG	EPOX-C R03
	HARDENER	0,4KG	EPOX-C D01	1KG	EPOX-C D02	2x1KG	EPOX-C D03

Customs' code

ORTHOPOXY® RESIN	29109000
ORTHOPOXY® HARDENER	29215990

The information in this document are provided in good faith and based on our current know-how. It is therefore only indications and not of formal constraints, especially if the product is not used in accordance with the applications contained in this data sheet. A pre-test will therefore always be the basis of relevant conclusions for the user.

The user of this product agrees to comply with the legislation in force regarding the disposal of waste.