XEPOX

CE
EN1504-4

Two-component epoxy adhesive

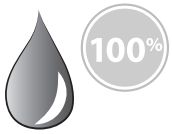
Polymeric epoxy synthetic binder

PACKAGING

Sold on volume basis rather than on weight basis

EFFECTIVE

100% epoxy adhesive with high performance



STRUCTURAL JOINTS

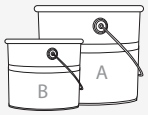
Realization of hidden structural joints. Suitable for moment resisting joints, joints with knee joists, multi-way joints

STRUCTURAL REINFORCEMENT

Can be used to rebuild "timber material" in combination with metal rods and other materials (gravel, bark, ecc.)

CODES AND DIMENSIONS

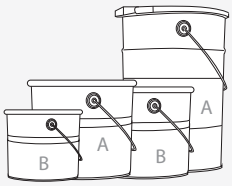
XEPOX 40 VERY LIQUID



code	type	content	pcs/box
XP400150	Capillary	A + B = 3 liters	1

Two-component epoxy adhesive for structural usage, very fluid, applicable via pouring into very deep vertical holes and suitable for large joints with hidden inserts placed in quite extended grooves, also good in case of reduced spacing (1mm or more), provided that the slots are accurately sealed.

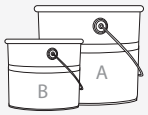
XEPOX 26 FLUID



code	type	content	pcs/box
XP400100	Floor	A + B = 3 liters	1
XP400120	Floor	A + B = 5 liters	1

Two-component fluid epoxy adhesive for structural usage, applicable via pouring into deep vertical holes and into grooves, provided that the slots are accurately sealed. The pouring into the vertical holes of the floor-slab shall be done before the insertion of the FeB44k bent fasteners while, in case of grooving, the pouring shall be done after the steel plates or Dywidag bars are inserted.

XEPOX 70 VERY DENSE



code	type	content	pcs/box
XP400080	Gel	A + B = 3 liters	1

Two-component epoxy gel adhesive for structural usage, applicable via trowel also on vertical surfaces, permits the realization of thick or uneven layers. Suitable for large timber overlaps, for gluing structural reinforcing elements by using glass or carbon fiber textures and for metal or timber coatings.

XEPOX 226.4 FLUID

code	type	content	pcs/box
XP400050	Floor	400 ml	1

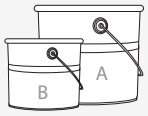
Two-component epoxy adhesive for structural usage, applicable via injection into holes and grooves, provided that the slots are accurately sealed. Preferable for binding FeB44k bent fasteners to timber (Turrini-Piazza method) in timber-concrete composite floors®, both with new and existing timber joists; gap between timber and metal of approximately 2 mm or more.

XEPOX 235.4 DENSE

code	type	content	pcs/box
XP400060	Beam	400 ml	1

Two-component epoxy thixotropic (dense) adhesive for structural usage, applicable via injection especially into horizontal or vertical holes in Glulam and solid wood beams, masonry or reinforced concrete walls.

XEPOX 14 SUPERFLUID



code	type	content	pcs/box
XP400165	Basic	A + B = 3 liters	1

Two-component epoxy adhesive with extremely low creep and high wetting properties for structural reinforcments through carbon or glass fiber textures. Useful to protect sanded metal sheets SA2,5/3 and to realize FRP (Fiber Reinforced Polymers) inserts.

ADDITIONAL PRODUCTS - ACCESSORIES

code	description	pcs/box
MAMDB	double cartridge gun	1
AT0202	mixing nozzle	12

INFORMATION ON TWO-COMPONENT STRUCTURAL EPOXY ADHESIVE XEPOX

ADHESIVE XEPOX PRODUCTS

Can or cartridge	type	characteristics and usage	usage temperature	working life a 23 ± 2°C [min]	pot life a 23 ± 2°C [min] (1)
XEPOX 14	Basic	very fluid, without charge	10 ÷ 35 °C	-	circa 50
XEPOX 26 - 226.4	Floor	intermediate viscosity (eg. timber-concrete composite floors)	10 ÷ 35 °C	25 ÷ 30	50 ÷ 60
XEPOX 235.4	Beam	multipurpose	5 ÷ 45 °C	25 ÷ 30	50 ÷ 60
XEPOX 40	Capillary	optimal pouring properties, for large structures	10 ÷ 35 °C	25 ÷ 30	50 ÷ 60
XEPOX 70	Gel	trowelable, holes in walls	10 ÷ 35 °C	30 ÷ 35	60 ÷ 70

(1) Pot-life: chemical reaction index describing the maximum time interval after mixing during which the product is apt to be used

TWO-COMPONENT STRUCTURAL EPOXY ADHESIVE XEPOX MECHANICAL PROPERTIES

MINIMUM FAILURE STRENGTH

external action \ adhesive type		BASIC 14	FLOOR 26 - 226.4	BEAM 235.4	CAPILLARY 40	GEL 70
Compression	[N/mm²]	70	80	90	75	65
Tension	[N/mm²]	30	38	40	30	42
Combined tension and bending	[N/mm²]	50	50	45	45	56
Shear	[N/mm²]	50	40	45	45	38
Elastic modulus in compression	[N/mm²]	6.000	7.200	9.000	6.500	6.800
Density	[kg/dm³]	1,10	1,40	1,45	1,25	1,50

INSTALLATION INSTRUCTION

ADHESIVE CONSERVATION

Epoxy adhesives must be maintained at moderate temperature levels (approximately +16°C / +20°C) both in winter and summer until the moment they are used. Do not store the box in cold temperature environments, as it may increase the viscosity and hinder the pouring and the cartridge extrusion. Do not leave the box exposed to direct sunlight as heated product means reduced polymerization times.

METALLIC INSERTS

The metallic inserts reinforcing the joints (eg. metal sheets) must be cleaned and ungreased. Smooth sheets must be treated with grade SA2,5/ SA3 sanding and then protected through a layer of Xepox 14 to avoid their oxidation. Alternatively, adequate predrill of the sheets must be provided to allow a correct meshing of the adhesive. The striped sheets should be doubled and fixed together by welding, with the smooth surfaces joined together and the striped surfaces facing the timber. Especially during hot seasons, it is necessary to protect the metallic surfaces from direct sunlight to prevent overheating.

SEALINGS

The matching edges (of the timber elements) that have to be linked together must be accurately sealed to avoid adhesive leeks and the consequent emptying and invalidation of the joint. Sealing must be effective and can be performed at least one day before the joint potting. Wait for the sealer's complete hardening before performing the potting. After the polymerization (hardening) the sealing can be removed from visible edges.

TEMPERATURES

The recommended application room temperature is > +10°C. In case the application had to be performed at lower temperatures (ranging from 0 to 10°C), in order to cope with the reduced fluidity of component A (resin) due to low temperature, the package (cans and cartridge) should be warmed at least one hour before their usage. A further way to speed up the hardening can be obtained by warming the slots and the metallic inserts before pouring the product. If the above mentioned prescriptions are not observed, the low temperature causes the polymerization process to stop with subsequent lack of hardening and low static performance of the joint. During summertime, conversely, pouring must be done in fresh environments (early morning or late afternoon) avoiding the warmest hours of the day.

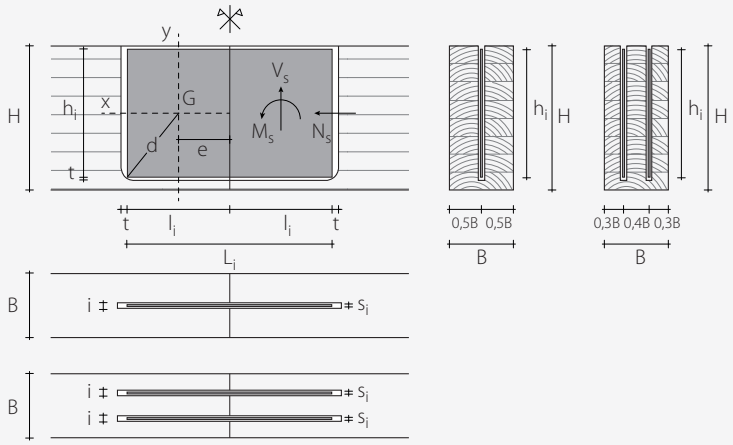
GROOVING AND HOLE TREATMENTS

Before pouring and injecting the adhesive, holes and grooves must be protected from meteoric water and humidity, and cleaned with compressed air. If the parts expecting the potting are wet, it is mandatory to dry them. The use of Xepox adhesive is indicated for timber adequately dried. The timber moisture content shall be lower than 18%.

ADHESIVE PERCOLATION

In order to guarantee the correct realization and static performance of the joints, it is compulsory to perform a complete percolation of the adhesive in all the slots and interfaces between inserts and timber. For this reason, particular attention shall be paid to the realization of grooves, perforations, positioning of elements side by side, sealing, etc., according to the prescriptions previously listed.

CALCULATION EXAMPLE - GLUED JOINT WITH XEPOX ADHESIVE



DESIGN DATA

- external actions on node [Md, Vd, Nd]
- smooth and sanded metallic inserts with one degree of SA 2,5÷3,0
- inserts protection through adhesive XEPOX 14
- use of XEPOX 26 or XEPOX 40 resins
- i = grooving thickness ($\geq s_i + 4$ mm)
- s_i = metal insert thickness

VERIFICATION OF METALLIC INSERTS [1]

ELASTIC SECTION MODULUS OF METALLIC INSERTS

$$W_x = \frac{n_{inserts} \cdot s_i \cdot h_i^2}{6}$$

s_i = metallic insert thickness
h_i = metallic insert height

MAXIMUM STRESS IN THE INSERT

$$\sigma_s = \frac{M_d}{W_x}$$

W_x = elastic section modulus of metallic inserts
M_d = external bending moment

VERIFICATION

$$\sigma_s \leq f_{y,d\_steel}$$

σ_s = maximum stress in the insert
$f_{y,d}$ = steel design yield strength

VERIFICATION OF TIMBER SECTION WITHOUT SLOTS [2]

net section
$B_{net} = B - (n_{inserts} \cdot i)$

TIMBER ELASTIC SECTION MODULUS

$$W_{net} = \frac{B_{net} \cdot H^2}{6}$$

B_{net} = width without slots
H = element depth

MAXIMUM STRESS IN THE TIMBER ELEMENT

$$\sigma_s = \frac{M_d}{W_{net}}$$

W_{net} = elastic section modulus of the net section
M_d = external bending moment

VERIFICATION

$$\sigma_s \leq f_{m,d\_timber}$$

σ_s = maximum stress in the insert
$f_{m,d}$ = timber design flexural strength

VERIFICATION OF TORSIONAL CAPACITY AT THE INTERFACE [3]

$A_{inserts}$ = surface of half the insert ($h_i \cdot l_i$)
G = center of gravity of the insert
d = farthest position of the interfaced surfaces from the center of gravity G
e = eccentricity among center of gravity G and joint vertical axis

INERTIA OF HALF INSERT

$$J_P = J_X + J_Y$$

J_X = inertia modulus of half insert with respect to the center of gravity G – X axis

$$J_X = \frac{l_i \cdot h_i^3}{12}$$

J_Y = inertia modulus of half insert with respect to the center of gravity G – Y axis

$$J_Y = \frac{h_i \cdot l_i^3}{12}$$

The shear stress "τ" of the interface timber-adhesive-steel, transferred to the timber, includes also the additional moment $M_{T,Ed}$ due to shear load:

$M_{T,Ed} = V_d \cdot e$

The design stress is evaluated as:

$$\tau_{max} = \frac{(M_d + M_{T,Ed}) \cdot d}{2 \cdot n_{inserts} \cdot J_P} + \frac{\sqrt{N_d^2 + V_d^2}}{2 \cdot n_{inserts} \cdot A_{inserts}}$$

VERIFICATION

$$\tau_{max} \leq f_{v,d\_timber}$$

τ_{max} = maximum design stress
$f_{v,d}$ = timber design shear strength

NOTES

[1] In this calculation note only the bending check of the inserts is illustrated as it is generally the most severe condition. It is necessary, though, to check also the resistance to combined actions.
[2] In this calculation note only the bending check of the element is described as it is generally the most severe condition. It is necessary, however, to check the combined resistance to the other loading conditions as well.
[3] XEPOX adhesives are characterized by tensile and shear strength values much larger than those of timber and with constant value over time. Due to this reason the interface torsional capacity check can be performed only on the timber element, considering the same check satisfied by the adhesive.