



INTRODUCTION

A new standard (EN 17619), that classifies non-structural wood adhesives for external use, has recently been issued. **This new classification fills the gap between structural and non-structural applications.** Examples of application include swimming pool boards, playgrounds and outdoor furniture, log cabins, etc.

VINAVIL 2K glue classified as **XT5** is an easy to handle two-component adhesive system (**VINAVIL XT 500** polymer dispersion and **VINADUR 500** hardner). It has a very long pot life (>5 days) to allow the assembly of large wooden structures in severe environments.

VINAVIL 2K glue classified as **XT6** is a two-component system (**VINAVIL XT 700** polymer dispersion and **VINADUR 700** hardner). It is a very reactive system with a maximum 5 minutes open time.

XT6 allows the assembly of wooden joints in even more extreme environments.

ADHESIVE



CLASS XT5
CLASS XT6

VINAVIL
PRODUCT RANGE

New adhesives
meet EN 17619
for Non-Structural
Exterior Wood
Applications

Product type: two-component,
wood adhesives

Suitable for non-structural exterior
wood applications without surface
coating protection

Conforms to new
EN 17619

2K-System easy to handle
with limited hazards

Thermosetting capability

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CLASS XT5 / CLASS XT6 VINAVAL PRODUCT RANGE

STANDARD EN 17619

Different competing adhesive technologies are currently used for non-structural exterior wood applications without guidelines. In fact, different polymer-based adhesives could be proposed (PU, PRF, PVAc, etc.). Such a wide selection range (from thermoplastic to thermosetting) could bring the risk of excessive performances and unnecessarily high prices.

A new standard (EN 17619), that classifies non-structural wood adhesives for external use, has recently been issued.

This new classification fills the gap between structural and non-structural applications. It defines **adhesives that can be used for non-structural wood applications for outside uses without surface coating protection**. Examples of application include swimming pool boards, playgrounds and outdoor furniture, log cabins, and other wooden structures where the adhesive reinforces the mechanical structure of the wood.

The new standard provides **three durability classes**, as seen in the table below. The adhesives belonging to XT classes should have a minimum durability class of D4, as specified in EN 204. Then, the performance of the adhesives shall be carried out with a tensile shear test after two different conditioning sequences:

- 24 hours boiling water immersion, followed by 1 hour cooling in water at 20°C.
- Heat conditioning for 1 hour in a ventilated oven at 110°C.

The high-performance levels achieved after boiling water and heat exposure can be used to select the proper adhesive for the specific exterior use.



DURABILITY CLASS	CLIMATIC CONDITIONS AND APPLICATIONS
XT5	Exterior application with rare exposure to direct weathering, in which the glued wooden product is covered by constructive protection from the weather. e.g.: wooden products behind cladding and products completely protected by roofs, coverings, canopy, or open sheds.
XT6	Exterior application with occasional but not persistent exposure to direct weathering, in which the glued wooden product is partially covered by constructive protection.
XT7	Exterior application with frequent exposure to direct weathering, in which the glued wooden product is not covered by constructive protection and not in contact with the ground e.g.: decking, outdoor playground equipment and urban furniture, etc.

KEY BENEFITS

New EN 17619 compliances

Achieving high performance by both boiling water and high heat exposure sorts **Vinavil** adhesives suitable for the specific exterior category.

The XT durability conditions stipulated in EN 17619 exceed the durability conditions required in EN 204 (D4 classes), as shown in the table below.

	EN 14257	EN 204	EN 14256
CONDITION	HEAT RESISTANCE	WATER RESISTANCE	CREEP RESISTANCE
D4 conditioning sequences	-	6 hrs boiling water	-
D4 market conditioning sequences	80°C (Watt 91)	6 hrs boiling water	>21 days
EN 17619			
XT conditioning sequences	110°C (Watt 110)	24 hrs boiling water	-

XT market conditioning sequences include WATT'110 + 24 hrs boiling water (EN 17619), WATT'91 (EN 14257), D4 (EN 204) and creep resistance (EN 14256).

To meet the durability class requirements in EN 17619, the adhesive must have the shear strength values indicated below.

CONDITIONING SEQUENCES	DURABILITY CLASS		
	XT5	XT6	XT7
Shear strength after 1 hr at 110°C	≥ 4	≥ 8	≥ 10
Shear strength after 24 hrs in boiling water and then 1 hr in 20°C water	≥ 3	≥ 5	≥ 6



2K-System easy to manage with limited hazards

VINAVIL 2K GLUE CLASSIFIED AS XT5

It is an **easy to handle two-component adhesive system**. It has a **very long pot life** up to 5 days to allow the assembly of large wooden structures in severe environment. Simple rotating mixers can be used to mix **VINAVIL XT 500** polymer dispersion with **VINADUR 500** hardner.

The components in **VINAVIL 2K** glue class XT5 (**VINAVIL XT 500** and **VINADUR 500**) **do not require hazardous labeling**, as indicated by the HSE, although, under GHS-US certification, **VINADUR XT 500** is classified H315 (skin irritant) and H319 (eye irritant).

VINAVIL 2K GLUE CLASSIFIED AS XT6

It is a **two-component system** (**VINAVIL XT 700** polymer dispersion with **VINADUR 700** hardner). It is a very reactive system with a **maximum 5 minutes open time**. Even if the components easily mix together, mixing is suggested using a **dynamic in-line mixer** due to the high reactivity.

VINAVIL XT 700 polymer dispersion **does not require hazardous labeling**, as indicated by HSE. However, **VINADUR 700** is classified as harmful if inhaled and as a probable health hazard (cancer and organ damage).

The handling of **VINADUR 700** requires the knowledge of **preventive safety measures** described in safety data sheet. All the diisocyanate users must have successfully completed a specifically training course from the 24th of August 2023.

From thermoplastic polymers towards thermosetting adhesives

Thermosetting resins constitute the main type of adhesives presently used to bond wood in structural, exterior applications, because of their high degree of durability. Durability requires that the adhesive not only has **good initial bond strength but also maintains it on exposure to environmental service conditions** (high humidity, freeze-thaw cycles, and temperature variations).

PVAc based polymers are thermoplastic and are commonly used for non-structural applications. Nevertheless, there are specific applications that are between structural and non-structural applications. The new challenge for **Vinavil** is to fill that gap by giving the opportunity to the thermoplastic nature of the basic polymers to acquire thermosetting properties in the final adhesives.

VINAVIL 2K glue classified as **XT6** (100 pbw of **VINAVIL XT 700** + 20 pbw of **VINADUR 700**) is the result of the **Vinavil R&D activity**: starting from a thermoplastic polymer emulsion, the suggested formulation behaves as thermosetting adhesive that crosslinks very quickly to provide optimum properties. The main advantage of thermosetting wood adhesives specified by the new EN 17619 is their **high degree of resistance to exterior environments** including heat and boiling water.

A NOVEL RANGE OF ADHESIVE SOLUTIONS

Vinavil has developed a new range of two-component adhesives in compliance with the recently issued EN 17619 XT classification. These adhesives are a **blend of existing Vinavil chemical compounds** and can be purchased as individual components that can be bought separately and blended to the desired quality. These **Vinavil** adhesives meet the **durability standards required by EN 17619** and thus provide the very well-known **durability performance described in EN 204** (D classes) as well as resistance to more severe conditioning sequences: exposure to 110°C and, in parallel, a heat/cold cycle of 24 hrs boiling water followed by 1 hr 20°C water.

Vinavil's compliance with EN 17619 has been **confirmed by CATAS Spa**, an international center of excellence for testing in the wood and furniture industry. Further certifications can be obtained based on market need and demand.

Consistent EN 17619 performance ensures well-bonded, non-structural, timber products for exterior applications. **Vinavil** adhesive systems guarantees excellent outdoor performance and provide unique application characteristics.



CLASS XT5 ADHESIVE BLEND

100 pbw of **VINAVIL XT 500**
+ 5 pbw of **VINADUR 500**

APPLICATION FEATURES

2K-System: easy to mix and handle

Limited hazards

Long pot life up to 5 days

CLASS XT6 ADHESIVE BLEND

100 pbw of **VINAVIL XT 700**
+ 20 pbw of **VINADUR 700**

APPLICATION FEATURES

A dynamic in-line mixer
needs to be used

Highly reactive
(max 5 minutes open time)

Similar to
a thermosetting system

SUMMARY

An additional classification of wood adhesives of XT5, XT6, and XT7 durability categories should soon become a familiar option in exterior non-structural wood applications. The new EN 17619 will **fill the “standardization gap” between structural and non-structural adhesive classification**. Thus, it will clarify doubts or personal choices in the selection of the proper adhesive suitable for specific applications such as urban furniture, outdoor playground wooden equipment, cladding and decking.

VINAVIL XT 2K products are a further improved solution vs D4 to develop non-structural, external, wood adhesives that are cost effective and provide excellent heat and moisture resistance in severe and extreme environments. They grant better performance than the D4 adhesives.



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