Technical File

Chapter 1 - Introduction

Cement-bonded particleboards

Office

Lisboa Oriente

Av. Infante Dom Henrique 337, 3rd Floor

1800- 210 LISBON, PORTUGAL

Factory

VIROC Portugal S.A.

National Road 10

Km 44.7, Vale da Rosa

2914-519 SETÚBAL, PORTUGAL

In/ investwood

www.investwood.pt

2025.1

INDEX

INDEX OF TABLES AND FIGURES

Credits

Author

José Pinheiro Soares,

suporte.tecnico@investwood.pt

Issue: July 1, 2025

1. INTRODUCTION

1.1 Description

Viroc is a composite panel made from a mixture of cement and wood, known as Cement Bonded Particle Board (CBPB). It combines the flexibility of wood with the strength and durability of cement, allowing a wide range of applications, both indoors and outdoors. The production of Viroc panels complies with the specifications of standards EN 634 and EN 13986, and it is CE marked.

Viroc panels have a heterogeneous appearance, with different shades randomly distributed, resulting from the natural colours of the raw materials used and the chemical reactions that occur during the manufacturing process.

The surfaces may present some irregularities such as small incrustations, dirt, stains, scratches, salts (efflorescence), and small wood chips. Whenever the panel is to be installed in visible areas, even if no varnish is planned, the visible surface should be cleaned or polished using a cleaning pad to remove imperfections.

Colour differences may be observed on the same face, between the two faces of the same panel, or between different production batches.

When requested, panel surfaces can be supplied polished. Polishing consists of superficial cleaning to remove salts, dust, and some dirt from the manufacturing process, without altering the panel's natural appearance. The panel retains the stains and colour variations that characterize it.

When requested, panels can also be supplied sanded. This process involves rough sanding of the surfaces to minimize thickness variation. Once sanded, the surfaces will show visible wood particles. Sanded panels are not suitable for decorative exposed applications.

Viroc panels have only one face suitable for visible applications. When packaged, this face is placed facing upwards.

The standard Viroc panel has fire reaction class B-s1,d0. The Viroc A2 panel has fire reaction class A2-s1,d0.

1.2 Materials Used in Manufacturing

Dry Weight Percentage:

- Portland cement: 61,8%
- Pine wood chips: 22,7%
- Water: 10,7%
- Non-toxic additives: 1,4%
- Pigment: 3,4%

1.3 Dimensions

Manufacturing dimensions:

2600x1250 mm and 3000x1250 mm

1.4 Cutting Tolerances

- Length and width: ± 3 mm
- Squareness: ≤ 2.0 mm/m
- Edge straightness: ≤ 1.5 mm/m

1.5 Colours

Viroc panels are produced in six different colours. The panel's colour results from the addition of pigment into the mix during production. The panel has a heterogeneous appearance, with various tones randomly distributed due to the natural colour of raw materials and chemical reactions. See photos 1.1 to 1.6.

For information on the availability of colours and dimensions, please consult the Viroc technical data sheet.

Figure 1.1 - Viroc Grey

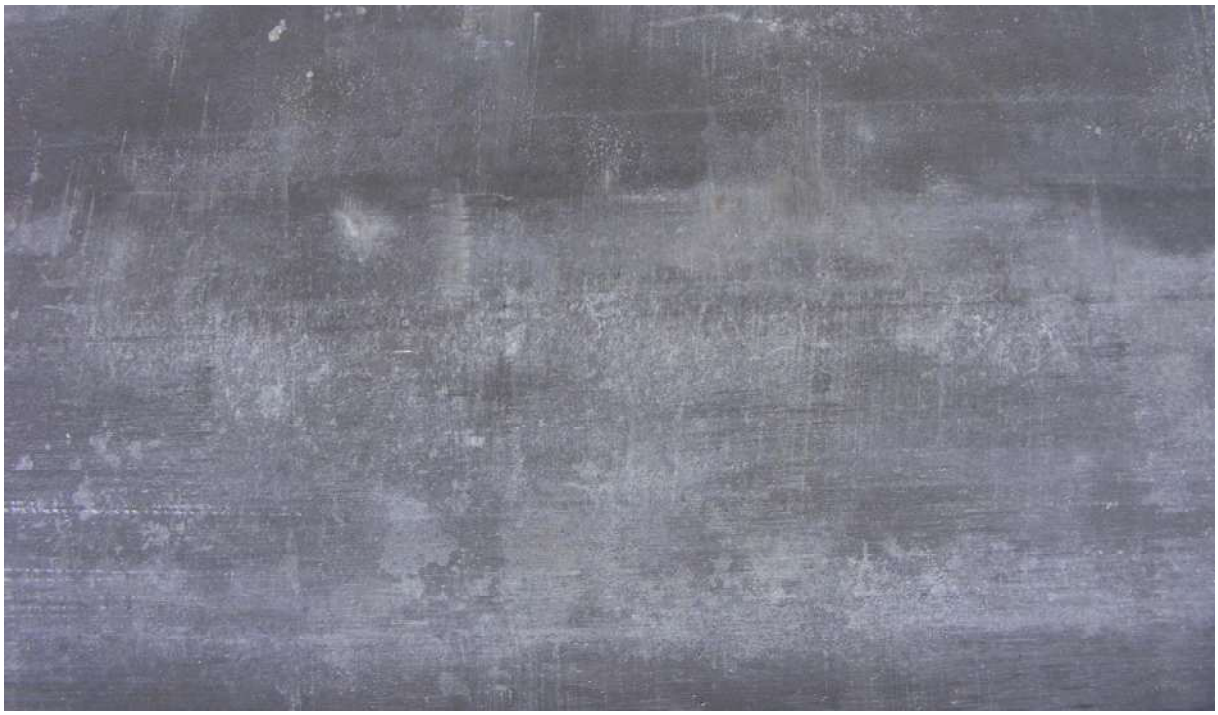

Figure 1.2 - Black Viroc

Figure 1.3 - White Viroc

Figure 1.4 - Yellow Viroc

Figure 1.5 - Red Viroc

Figure 1.6 – Ochre Viroc

1.6 Thicknesses and Thickness Tolerances

Viroc panels, in raw or polished versions, are available in several nominal thicknesses, each with the corresponding tolerance:

Raw and polished panel	
Thickness (mm)	Tolerance (mm)
8	± 0.7
10	± 0.7
12	± 1.0
16	± 1.2
19	± 1.5
22	± 1.5
25	± 1.5
28	± 1.5
32	± 1.5

1.7 Mechanical Properties

Viroc panels present the following mechanical properties, determined according to the applicable European standards:

Features	Performance	Standard
Density Average value	≥ 1000 Kg/m^3 1350 Kg/m^3	EN 323
Modulus of Elasticity in bending: Class 2 Class 1 Average value	 ≥ 4000 N/mm2 ≥ 4500 N/mm2 6000 N/mm2	EN 310
Bending strength Average value	≥ 9 N/mm^2 12 N/mm^2	EN 310
Internal bond Average value	≥ 0.5 N/mm^2 0.8 N/mm^2	EN 319
Internal bond after cyclic test	≥ 0.3 N/mm^2	EN 319 EN 321
Swelling 24h Average value	≤ 1.5% ≤ 0.8%	EN 317
Swelling after cyclic test	≤ 1.5%	EN 317 EN 321

1.8 Other Characteristics

- Fire Reaction Class:
  - Viroc: B-s1,d0 - Combustible but not flammable
  - Viroc A2: A2-s1,d0 - Non combustible
- Thermal Conductivity: $\lambda = 0.22$ W/(m·K)
- Moisture Content: 6% to 12%
- Surface Alkalinity: pH between 11 and 13
- Formaldehyde:
  - Emission Class E1 (EN 13986 – Annex B)
  - No added formaldehyde (NAF)
- Hazardous Substances:
  - Asbestos-free
  - No pentachlorophenol
  - No microcrystalline silica

1.9 Sound Insulation

Acoustic performance according to panel thickness:

Thickness (mm)	Rw (C;Ctr) (dB)
8	31 (-1;-3)
10	32 (-2;-3)
12	33 (-1;-3)
16	35 (-2;-3)
19	35 (-1;-2)
22	37 (-2;-3)

Note: Values in parentheses are correction factors for pink noise (C) and traffic noise (Ctr).

1.10 Weight

Average specific weight: 1350 kg/m³. The weight per square metre (kg/m²) varies depending on thickness and influences the total weight of standard formats.

Thickness (mm)	Weight per m² (Kg/m²)	Weight of panels	
		2600x1250 (Kg)	3000x1250 (Kg)
8	10.8	35.1	40.5
10	13.5	43.9	50.6
12	16.2	52.7	60.8
16	21.6	70.2	81.0
19	25.7	83.4	96.2
22	29.7	96.5	111.4
25	33.8	109.7	126.6
28	37.8	122.9	141.8
32	43.2	140.4	162.0

1.11 Packaging

The number of panels per pallet varies according to thickness and format.

Thickness (mm)	2600x1250 (mm)	3000x1250 (mm)
8	60	57
10	48	46
12	40	38
16	30	28
19	25	24
22	24	23
25	21	20
28	18	18
32	16	16

1.12 Quality Control in Production

VIROC Portugal is CE certified, ensuring that all tests follow European standards (EN). Non-conforming materials are not marketed with CE marking.

Raw material control:

- Wood sugars: checked in every batch
- Wood particle moisture: once per day

During production:

- Wood chips size: once per day
- Density and chemical additives: every 8 hours or after each refill
- Mix moisture content: twice per hour
- Mattress thickness, temperature and humidity in tunnels: continuous monitoring

Final product control:

- Thickness: every panel
- Dimensions, squareness, edge straightness: every 2 hours or after changes
- Density, bending strength, modulus of elasticity: every 8 hours or after changes
- Internal bond, thickness swelling: once per day or after changes
- Cyclic tests: once per week
- Final moisture content: every 8 hours or after changes

1.13 Pallet Identification

Each pallet is labelled with:

- Manufacturer name and address
- Panel type: raw or sanded
- CE logo and certificate number
- Thickness, colour, and dimensions
- Edge type
- Quantity of panels
- Volume number

1.14 Varnishing and Painting

Viroc panels must be painted or varnished to enhance their resistance to weather exposure. In addition to a protective function, the application of paint or varnish may also serve a decorative purpose. VIROC Portugal S.A. recommends fully sealing the panels — including both faces and all edges — with paint or varnish, especially when they are used outdoors. This sealing aims to close surface pores, protecting the panel from UV radiation, rain, and temperature changes, while also increasing durability and dimensional stability.

Without surface treatment, panels are more susceptible to streaking and efflorescence stains. These phenomena, although partially removable through mechanical polishing with an abrasive pad, may leave residual marks and do not guarantee full restoration of the original appearance.

Additionally, the absence of paint or varnish contributes to greater dimensional variation. In extreme conditions, the panel may shrink up to 0.5% (equivalent to 5 mm per meter), which can result in out-of-plane deformation (warping).

Before applying any coating, the surfaces must be thoroughly cleaned, free from dust, dirt, grease, or efflorescence. This can be done using abrasive polishing or, alternatively, with sandpaper of grain size ≥120. The cleaning process must be carried out carefully to avoid excessive abrasion, which could expose the wood fibres and compromise the panel's final appearance.

The finishing product (paint or varnish) must be applied to both faces and all panel edges, strictly following the manufacturer's instructions regarding the number of coats.

Although there are no coatings specifically developed for Viroc panels, their surface alkalinity (pH between 11 and 13) requires the use of paints and varnishes compatible with alkaline substrates, such as concrete and wood.

Acrylic resins and solvent-based aliphatic polyurethanes have shown the best performance in terms of adhesion and durability. Water-based varnishes, on the other hand, tend to better preserve the original panel colour.

The choice of coating must also consider the panel's final application. For façades, products must be suitable for outdoor exposure. For flooring use, the coating must offer high mechanical and abrasion resistance.

Although varnish application is generally simple, ensuring process uniformity is essential to achieve a consistent final finish and avoid stains or tone variations. The manufacturer's application procedure must be strictly followed.

1.15 Cutting

Viroc panels can be cut, drilled, and machined using electric or pneumatic tools commonly found in carpentry or metalworking workshops.

These operations release dust that may contain silica and cement components, making the use of personal protective equipment (PPE) essential — including a mask with an appropriate filter, gloves, and protective eyewear.

For cutting, circular saws with high-wear-resistant carbide blades, such as tungsten, or preferably diamond blades, are recommended (see figure 1.7). For multiple cuts or panels over 19 mm thick, it is advisable to use a horizontal panel saw, which offers greater precision, ergonomics, and efficiency.

Frezite (www.frezite.pt) has saw blades suitable for cutting Viroc panels.

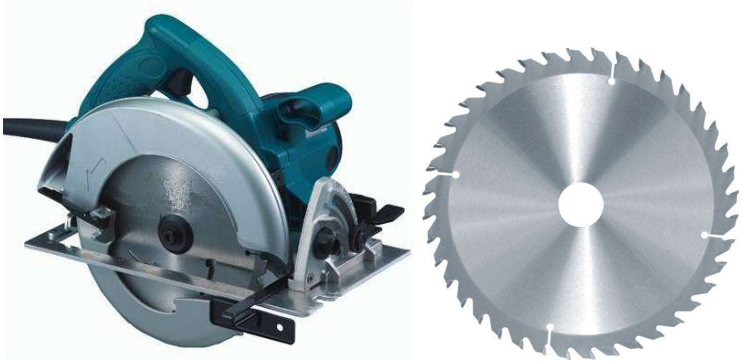

Figure 1.7 - Circular saw with tungsten cutting disc

1.16 Drilling

Drilling of Viroc panels should be carried out using drills in **non-impact mode** to avoid cracking or delamination. HSS (High-Speed Steel) drill bits, suitable for metal drilling, should be used to ensure higher precision and durability (see figure 1.8).

Frezite (www.frezite.pt) has drill bits suitable for drilling Viroc panels.

Figure 1.8 - HSS drill and bits (for drilling metal)

1.17 Edge Machining

Basic edge machining of Viroc panels can be carried out on-site using a portable router fitted with appropriate cutters (see figure 1.9). This allows the execution of various edge finishes, such as bevels, rounding, notches, among others (see figure 1.10).

Alternatively, panels can be factory-supplied with pre-machined edges, including tongue-and-groove or half-lap joints, which facilitate assembly and improve joint stability (see figure 1.11).

Note: Tongue-and-groove joints can only be made on previously sanded (calibrated) panels to ensure precise and uniform fitting.

Figure 1.9 - Electric router and cutters for machining edges

Figure 1.10 - Bevelling, rounding and notching.

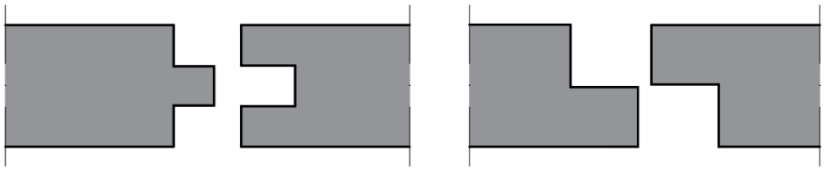

Figure 1.11 – Tongue and groove and half-lap

1.18 Surface Polishing

Polishing is a superficial cleaning process aimed at removing salts, dust, and other impurities from the manufacturing process, without altering the natural appearance of the panel. After polishing, the panel retains its stains and colour variations, which are intrinsic to the material.

Although Viroc panels can be supplied pre-polished from the factory, this operation can also be carried out on-site.

On-site polishing should be done using an orbital sander fitted with abrasive cleaning pads (see figure 1.12). These pads, usually made of polypropylene abrasive fibre (e.g. Scotch-Brite), effectively remove dirt without damaging the panel's surface layer.

Alternatively, sanding discs with grit size ≥120 may be used. However, this option requires extra caution, as excessive abrasion may remove the fine surface layer, exposing wood fibres and significantly changing the panel's appearance.

Figure 1.12 - Orbital sander and cleaning disk

Video illustrating the cleaning of a panel with an orbital sander:

https://www.youtube.com/watch?v=HeQZNVN0ZYI

1.19 Sanded Surfaces

Upon request, Viroc panels can be supplied with sanded (calibrated) surfaces, as is the case with the Viroc Floor product. This process involves controlled surface removal using coarse-grit sandpaper, to minimize thickness variation across the panel.

After calibration, surfaces show visible wood particles. However, sanded panels are not recommended for decorative exposed use, as the finish is not uniform.

Panels calibrated on both faces have a thickness tolerance of ±0.3 mm.

1.20 Storage

Viroc panels ready for dispatch are properly protected with a waterproof plastic sheet. The lateral edges are protected with L-shaped cardboard, including contact areas with the strapping. Protective elements must only be removed when the panels are ready to be acclimatised to the installation environment.

Panels must be stored in a covered space, protected from direct sunlight and rain, on a flat, horizontal base — a requirement that also applies on-site.

Pallets should rest on supports with a minimum height of 8 cm to allow forklift handling. The maximum spacing between supports should not exceed 800 mm, and the distance from the first support to the pallet edge should be no more than 210 mm.

When stacking pallets, their support bases must be precisely aligned vertically to avoid deformation. Stacking is allowed up to 6 pallets, not exceeding a total height of 4 metres (see figure 1.13).

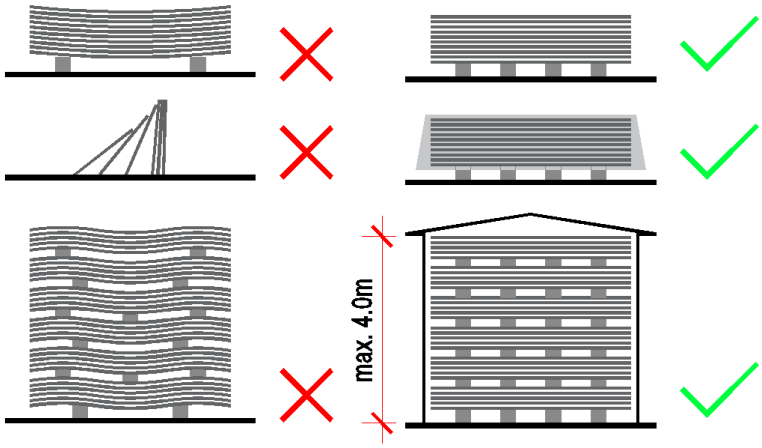

Figure 1.13 - Storage of Viroc panels

1.21 Handling

Whenever possible, Viroc panels should be handled using appropriate mechanical equipment such as forklifts, panel lifters, or other purpose-built devices.

When manual handling is required, panels must be moved one by one, kept in a vertical position to avoid deformation or warping (see figure 1.14).

The weight of the panels is indicated in section 1.10; manual handling should only be carried out by enough people to ensure the safety and integrity of the material.

Best practices for manual handling of loads must be followed, including the use of suitable personal protective equipment (PPE) and compliance with European health and safety regulations, particularly Factsheet No. 73 from the European Agency for Safety and Health at Work (OSHA.Europa.eu – Factsheet 73).

https://osha.europa.eu/pt/tools-and-publications/publications/factsheets/73/view

Figure 1.14 - Viroc panels Handling

1.22 Acclimatisation

When leaving the production unit, Viroc panels have a moisture content between 6% and 12%.

To ensure optimal installation conditions, it is essential to allow the panels to adapt to the temperature and humidity of the environment in which they will be installed. For this, the plastic protective sheet must be removed, and the pallet strapping cut. The panels should remain at the installation site for at least 72 hours (3 days) to acclimatise to the ambient conditions.

It is common for the top panels on the pallets to show some deformation (upward concavity) after the strapping is removed. This phenomenon is due to a moisture imbalance between the two faces of the panel and is reversible.

The original shape can be restored by flipping the panel so that the opposite face is facing up, allowing hygrometric balance to re-establish. Alternatively, this balance can be accelerated by applying water to the concave face (facing upwards) (see figure 1.15).

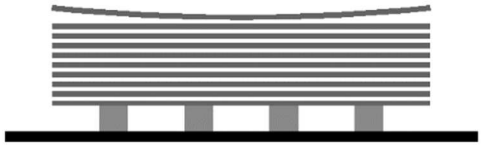

Figure 1.15 – Upward concavity

1.23 Application

VIROC Portugal S.A. is the manufacturer of Viroc panels and is not involved in their on-site application. Panels can be purchased from authorised distributors by contractors or subcontractors responsible for installation.

VIROC Portugal S.A. supplies only the panels. All other elements required for installation, such as fixing systems, profiles or support structures, must be supplied by the installer, provided they meet the technical and construction requirements defined in this Technical Dossier.

TABLE 1 presents the recommended thicknesses for different types of applications.

1.24 Colour Variation

When exposed to sunlight, Viroc panels may undergo slight tonal changes, typically becoming lighter. The degree of variation depends on the original colour and the intensity of exposure.

An artificial ageing study carried out by the Polytechnic Institute of Viseu (IPV) analysed the colour variation of Viroc panels under different accelerated ageing conditions.

The following table shows the average ΔE colour variation values recorded after 1500 hours of exposure in a Xenon chamber and in QUV equipment.

Colour	Delta E	
	Xenon	QUV
Grey	7	2
Black	14	2
White	13	10
Yellow	6	1
Red	12	4
Ochre	13	3

1.25 Maintenance

Viroc panels do not require periodic maintenance under normal usage conditions.

For exterior applications where panels are varnished or painted, a visual inspection is recommended every 5 years to check the condition of the protective coating (varnish or paint).

If no anomalies are found, another inspection should be scheduled after the same interval. If signs of significant wear or deterioration of the coating are detected, the panels should be washed with water and a neutral detergent, followed by reapplication of the protective finish according to the manufacturer's specifications.

1.26 Technical Support

VIROC Portugal S.A. has a qualified Technical Department that offers support both during the design phase and during on-site implementation, providing technical information, application recommendations, and clarifications regarding Viroc panel characteristics.

1.27 Declaration of Performance (DoP)

In accordance with Regulation (EU) No. 305/2011 of the European Parliament and Council, which establishes harmonised conditions for the marketing of construction products, the Viroc panel is CE certified.

VIROC Portugal S.A. ensures that the product complies with all declared characteristics and properties as stated in the corresponding Declaration of Performance (DoP), which is available on the official Investwood website.

TABLE

Summary of applications by thickness

Application	Thickness (mm)								
	8	10	12	16	19	22	25	28	32
Façades			●	●					
Walls and wall cladding		●	●						
False ceilings	●	●	●						
Floor covering			●	●					
Beam-supported floors					●	●	●	●	●
Furniture	●	●	●	●	●	●	●	●	●

TABLE 1 - Summary of applications by thickness