Other Solutions
Fact Sheets

Lost Formwork

Perforated Board

Sandwich Board

Lost Formwork

Description

Viroc® Cement Bonded Particle Board
Viroc is a composite material, composed by a compressed and dry mixture of pine wood particles and cement.
Its appearance is not homogeneous. A natural characteristic of the product is to have patches of various shades.

Lost formwork application

The strength and durability of the Viroc board make it an excellent performing product for lost formwork. In order to minimize waste, the board must be cut crosswise along its longest dimension, forming boards with a length of 1250 mm and the intended width.

Dimensions

The width of lost formwork boards is determined by the spacing between beams, whether metallic or reinforced concrete, plus 4cm on each side, which is the minimum width for support on the beams.
The board's standard dimensions are 2600 x 1250 mm and 3000 x 1250 mm. The most profitable dimension in terms of waste is the length of 1250mm.
The thickness of the board should be equal or higher than 19mm, up to 40mm.
Please note that, only for this specific application, the board can be produced in 36 and 40 mm, besides standard thicknesses.

$$C = L + 80 \text{ (mm)}$$

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$$C = L + B/2 + 20 \text{ (mm)}$$
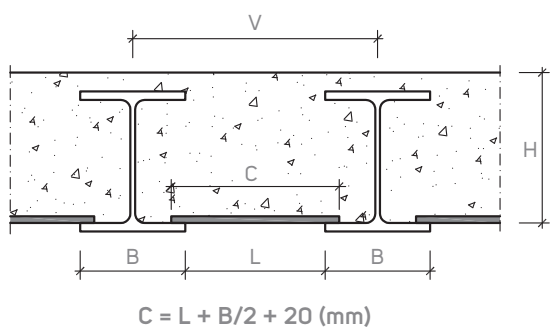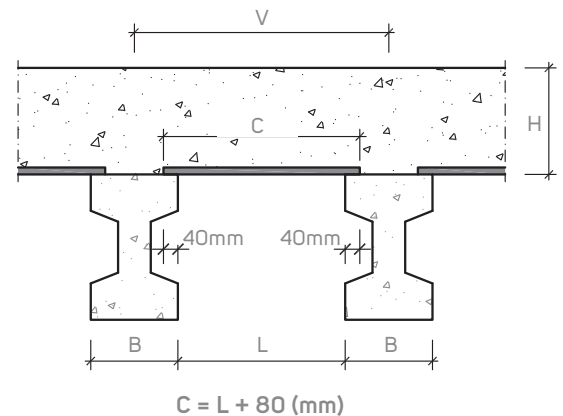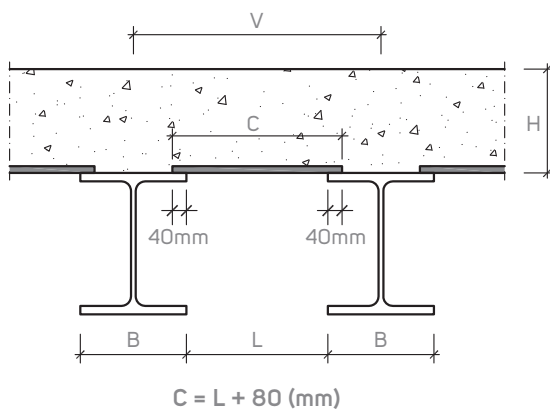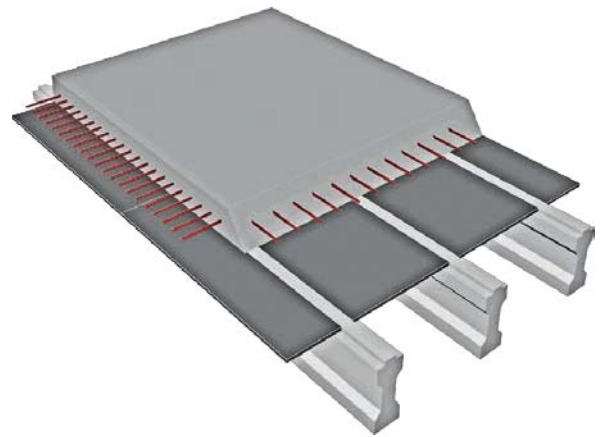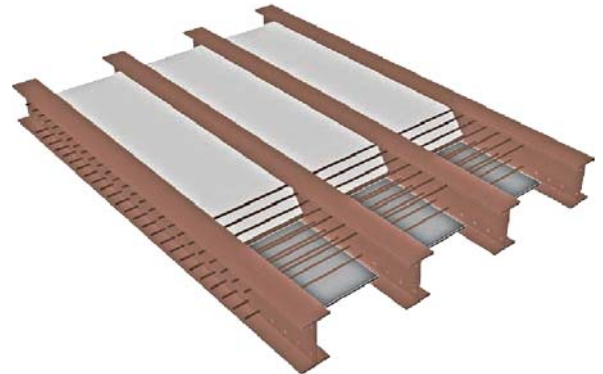
Notes & recommendations

Please consult Viroc Product Data Sheet to know the board tolerances and properties.
Always check standard safety procedures and local legislation requirements.

Design

The design of the panel is performed in accordance with the requirements of Eurocode 5 (EN 1995-1-1).

| Feature	Symbol	Value
Characteristic bending strength	$f_{m,k}$	9.0 N/mm²
Characteristic shear strength	$f_{v,k}$	1.0 N/mm²
Modulus of elasticity	E	4500 N/mm²
Modification factor for duration of load and moisture content	k_{mod}	0.85 (Short term actions)
Partial factor for material properties	γ_M	1.3

Technical Support

The Viroc disposes of a department that can provide technical support to its customers in the security checks.

Example
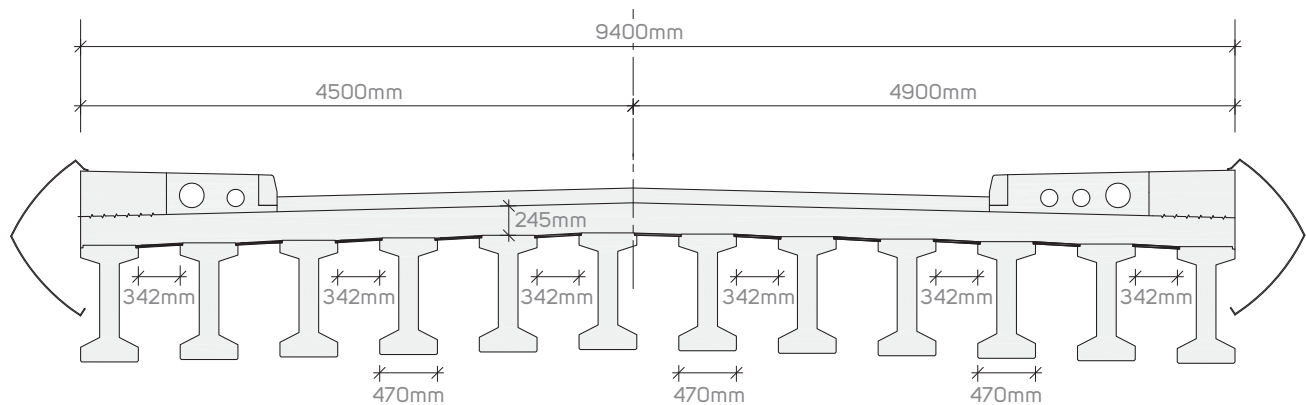
1. Security verifications - Static loads
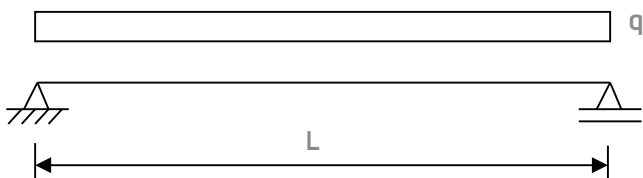
1.1 Characteristics of the lost formwork

Span (20+342+20)	L	0.382 m
Concrete thickness	h	0.245 m

1.2 Actions EN 1991-1-6 (Eurocode 1)

Concrete weight (25kN/m³)	g	6.13 kN/m²
Construction loads during casting of concrete	q_k	1.50 kN/m²

1.3 Characteristics of Viroc board

Board thickness	e	19mm
Viroc density	γ	13.5 kN/m³
Characteristic bending strength	$f_{m,k}$	9 N/mm²
Characteristic shear strength	$f_{v,k}$	1.0 N/mm²
Value of elasticity modulus	E	4500 N/mm²
Modification factor (short term action)	k_{mod}	0.85
Partial factor properties	γ_M	1.3
Self weight	pp	0.26 kN/m²

1.4 Ultimate limit states EN 1995-1-1 (Eurocode 5)

Permanent loads (pp + g)	g_k	6.38 kN/m²
Construction loads during casting of concrete	q_k	1.50 kN/m²

1.5 Design loads

$q_{Sd} = 1{,}35*g_k + 1{,}50*q_k$	q_{Sd}	10.87 kN/m²

1.6 Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8$	$M_{Sd.max}$	0.20 kNm/m	
$M_{Rd} = k_{mod} \cdot w \cdot f_{m.k} / \gamma_M$	M_{Rd}	0.35 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b \cdot e^2 / 6$			

1.7 Ultimate limit states of shear

$V_{S.max} = q_{Sd} L / 2$	$V_{S.max}$	2.08 kN/m	
$V_{Rd} = k_{mod} \cdot A_v \cdot f_{v.k} / \gamma_M$	V_{Rd}	10.35 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 \cdot b \cdot e$			

1.8 Limit states of deformation

$q_s = 1,00 * g_k + 1,00 * q_k$ q_s 7.88 kN/m^2

$I = b \cdot e^3 / 12$ I 571583 mm^4

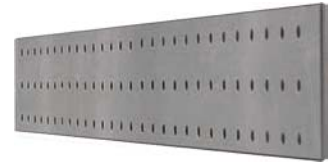$E_d = E / \gamma_M$ E_d 3462 N/mm^2

Deformation

$f_{max} = 5 \cdot q_s \cdot L^4 / (384 \cdot EI)$ f_{max} 1.10 mm

Maximal deformation $L / 300$ 1.27 mm Deformation verified ($f_{max} \leq L / 300$)

viroc
by Investwood

Perforated Board

Dimension: 2600x1250mm

Holes: 2475

Diameters of holes: 8 mm

Wheelbase: 32 mm

Perforation rate: 3,83%

116mm

2368mm

2600mm

116mm

113mm 1024mm 113mm
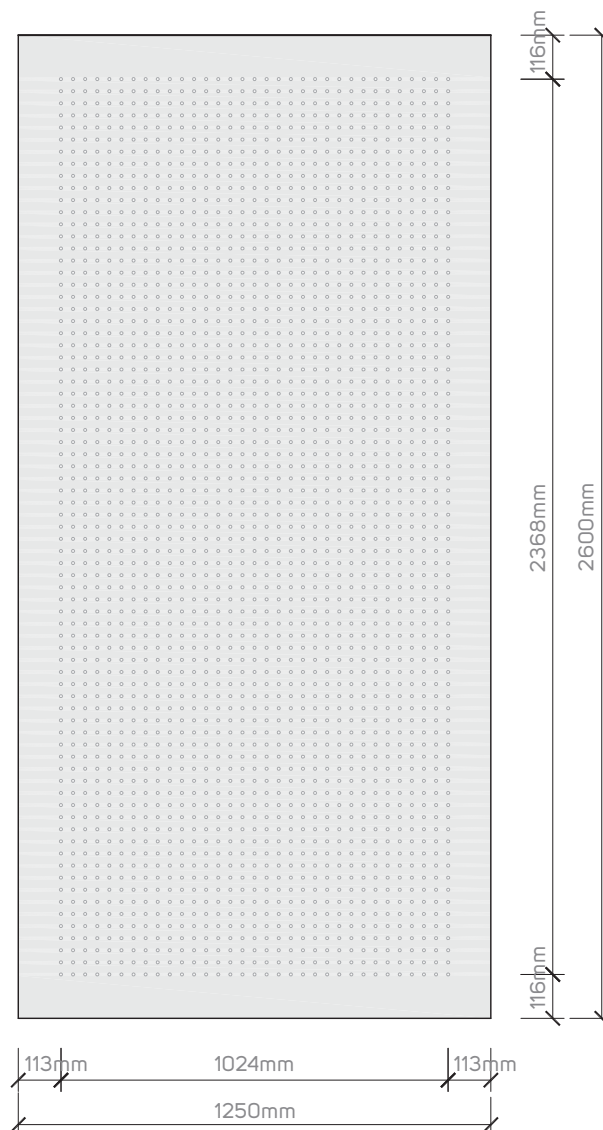
1250mm

Perforated Board

Dimension: 2600x1250mm

Holes: 646

Diameters of holes: 12 mm

Wheelbase: 64 mm

Perforation rate: 2,25%

116mm

2368mm

2600mm

116mm

113mm

1024mm

113mm
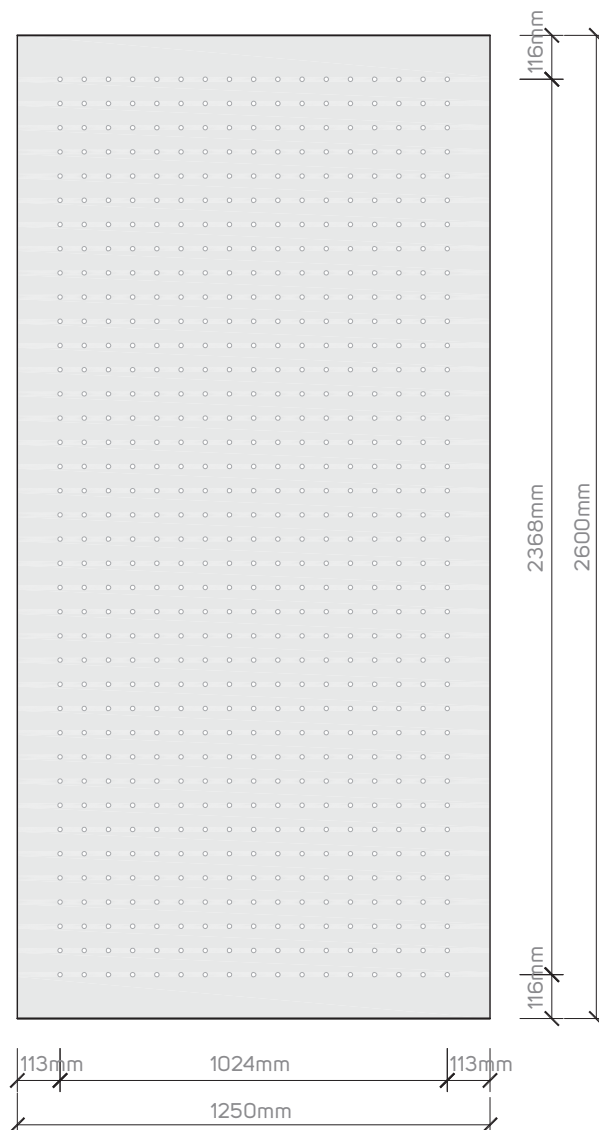
1250mm
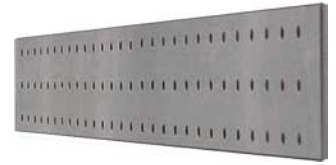
Perforated Board

Dimension: 3000x1250mm

Holes: 2871

Diameters of holes: 8 mm

Wheelbase: 32 mm

Perforation rate: 3,85%

124mm

2752mm

3000mm

124mm

113mm   1024mm   113mm
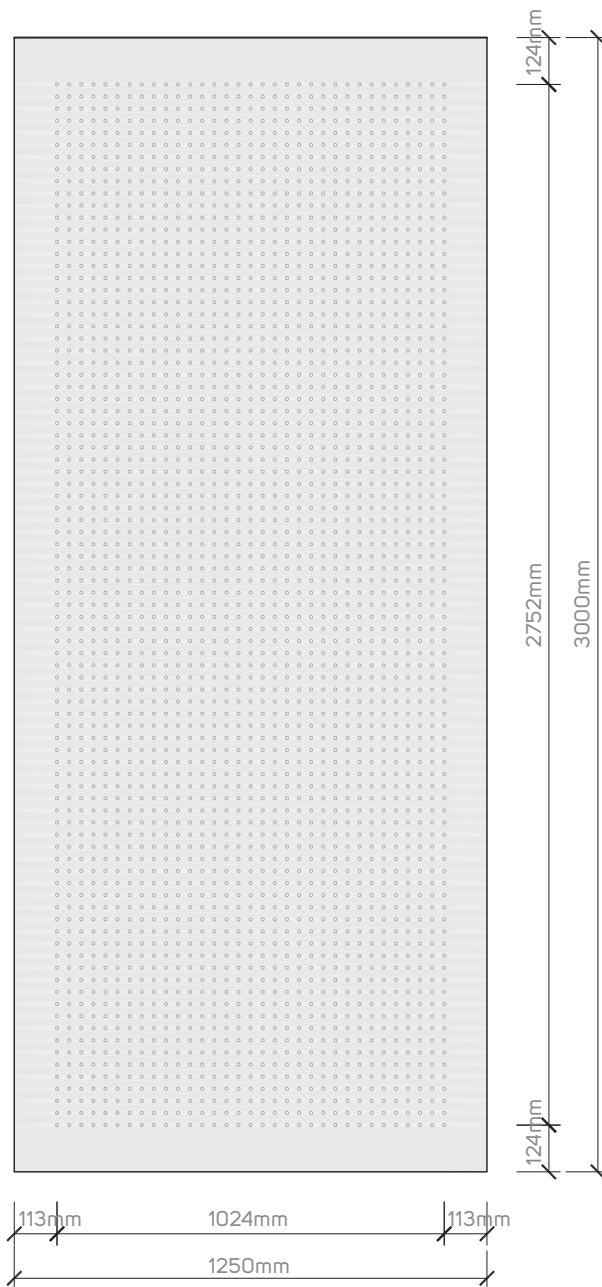
1250mm
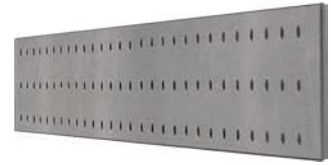
Perforated Board

Dimension: 3000x1250mm

Holes: 748

Diameters of holes: 12 mm

Wheelbase: 64 mm

Perforation rate: 2,26%

124mm

2752mm

3000mm

124mm

113mm   1024mm   113mm

1250mm

viroc
by **Invest**wood

Sandwich Board
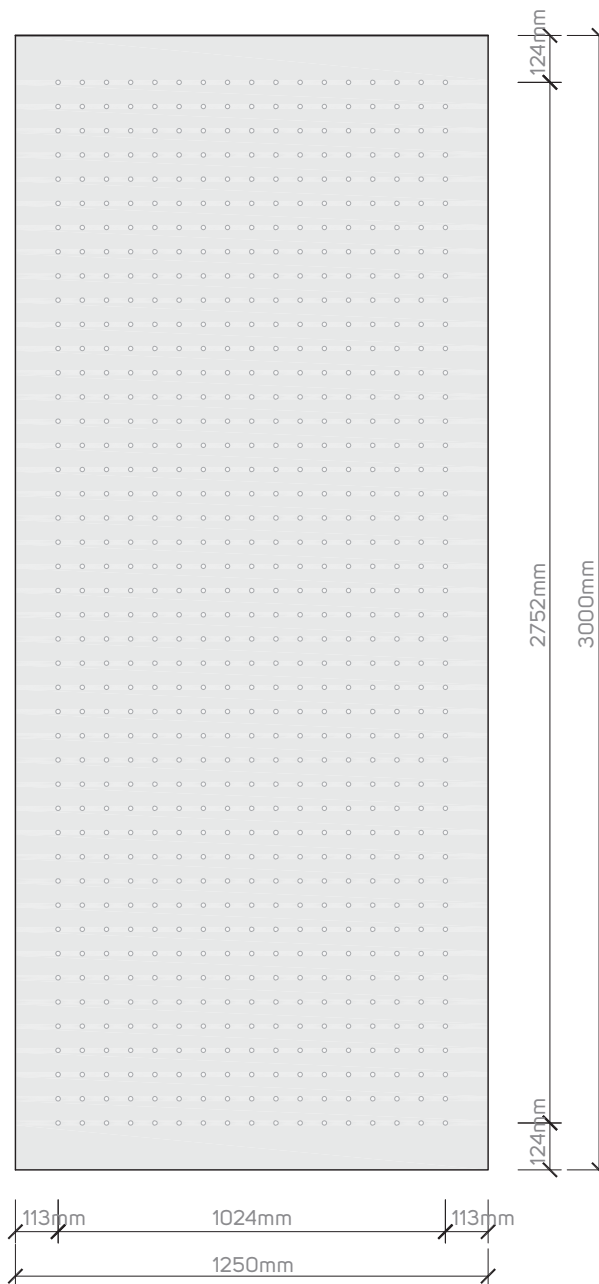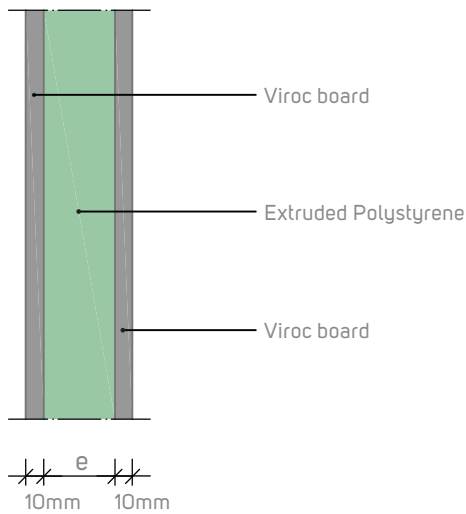
e (mm)	Board	Dimension	Weight (Kg)
40	10-40-10	2400x550x66 mm	29,40
50	10-50-10	2400x550x76 mm	29,70
60	10-60-10	2400x550x86 mm	30,10
80	10-80-10	2400x550x106 mm	30,80

Viroc board

Extruded Polystyrene

Viroc board

e   10mm   10mm

Thermal properties

e (mm)	Designation	Kcal/h.m².ºC	W/m².ºC
40	10-40-10	0,45	0,52
50	10-50-10	0,37	0,44
60	10-60-10	0,32	0,38
80	10-80-10	0,25	0,29

Load for L/250 | Kg/m²

e (mm)	Designation	1200mm	800mm	600mm
40	10-40-10	464	1083	1170
50	10-50-10	496	1166	1440
60	10-60-10	680	1453	1600
80	10-80-10	740	1606	1893

Reaction to fire: B-s2, d0

Tests performed with CVXV Calister sandwich board