viroc
by Investwood

Flooring Fact Sheets

Virocfloor

Virodal

Unsanded Floor

Technical Floor

Percussion Sounds

Sandwich Board

Please consult **Viroc Technical File** available at www.viroc.pt, on EN language, on Downloads page.
Other **Viroc Recommended Solutions files,** organized by type of application, available on request.

viroc by Investwood

Virocfloor

Flooring Fact Sheet

Application: Indoors

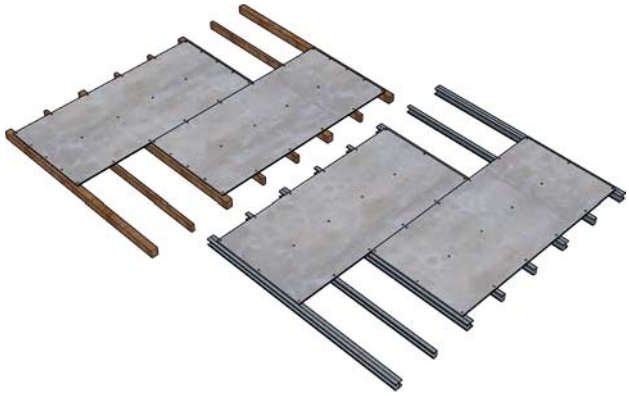
Support structure: Wood or Metal

Fastening: Screws and glue in the tongue & groove joints. Tongue & grooved on long edges only

Surface: Factory calibrated / sanded

Thickness: 19 mm (¾"), 22 mm (⅞"), 25 mm (1"), 28 mm (1 ⅛") or 32 mm (1 ¼"). Tolerance: ± 0,5 mm

Board size:
2440 x 1220 mm (96,00" x 48,00")
2600 x 1220 mm (102,36" x 48,00")
3000 x 1220 mm (118,11" x 48,00")



1. Description

Viroc is a cement bonded particle board. It 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.
The Viroc panel is produced in different colours.

2. Relative humidity effect

Viroc boards have small size variations due to the air relative humidity.
The expected maximum size variation of the board for indoors would be +0.5‰ to -1.0 ‰.
The fastening system near the edges will have to take into account those size variations.

3. Application Conditions

Virocfloor is for indoor use only.
Before installation, the board must be exposed for 48 hours to the relative humidity of the location where it will be applied and should be left in a dry location out of direct sunlight.
It is the installer's responsibility to check the support structure conditions (distance between supports and respective width) for the correct application.

4. Support structure

Treated dry pine beams or metallic profiles of galvanized steel can be used to support the boards.
In the joints of two boards, the width of the beams must be at least 125mm (5") to respect the minimum distance of fasteners to the edge.
The structure that will support Viroc boards must be aligned and leveled and the board cannot be warped.
The spacing between the support components depends on the ultimate limit state safety criteria for resistance and deformation.

5. Fastening

Boards are fastened with screws, suitable for metallic or wood structure.
The tongue and groove joints between boards must be glued with a mastic bond.
Boards must be arranged alternately for the joints between boards do not match.

6. Surface treatment

Boards are factory calibrated/sanded. A primer can be applied on both surfaces by request.
The final finish may involve the traditional surfacing materials, vinyl fabric, ceramic tiles, wooden flooring, etc.

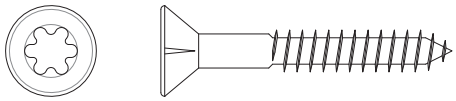
Notes & recommendations

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

7. Fastening elements

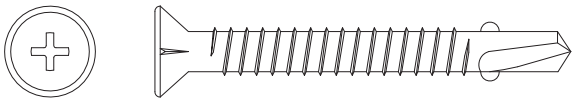
Flat head screws for wood structure

IMAD C12-5.5x50 - Viroc 19 to 32mm



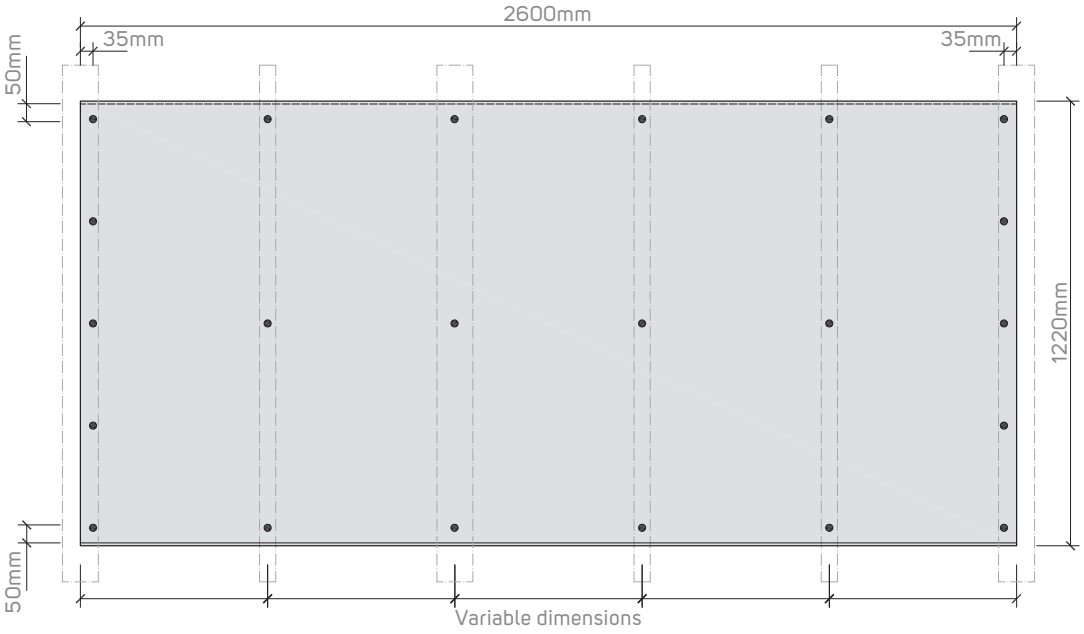
Flat head screws for metallic structure

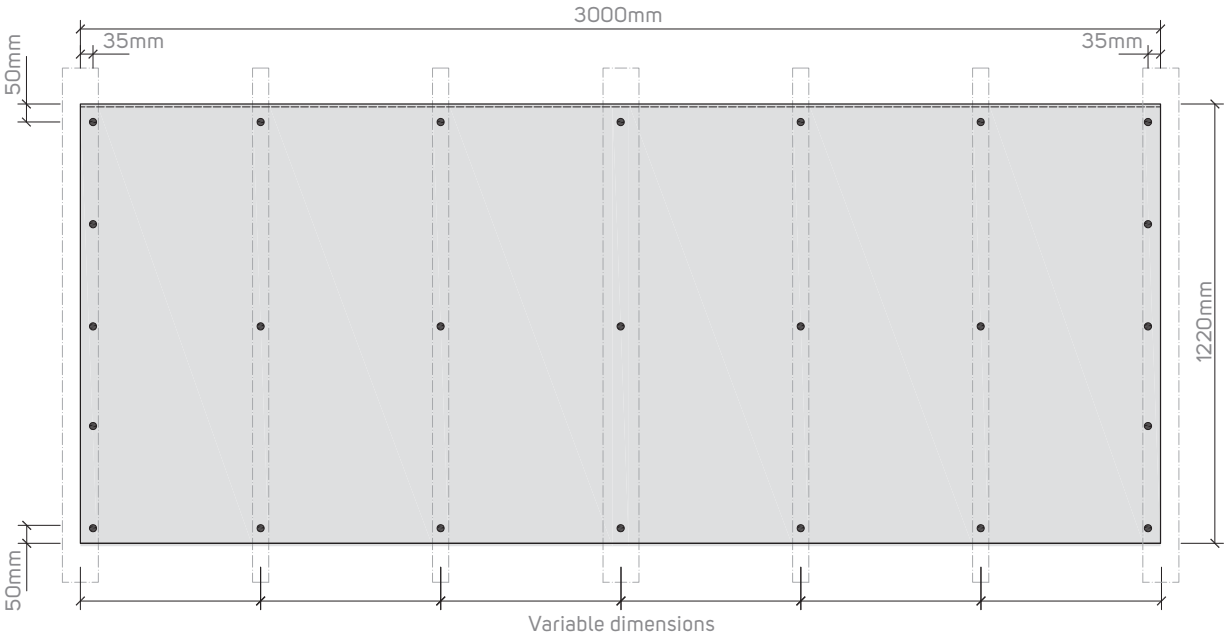
IMET C12-5.5x38 - Viroc 19mm
IMET C12-5.5x45 - Viroc 22 to 25mm
IMET C12-5.5x55 - Viroc 28 to 32mm



NOTA: Please consult Viroc Technical File to get more information about the fastening systems.

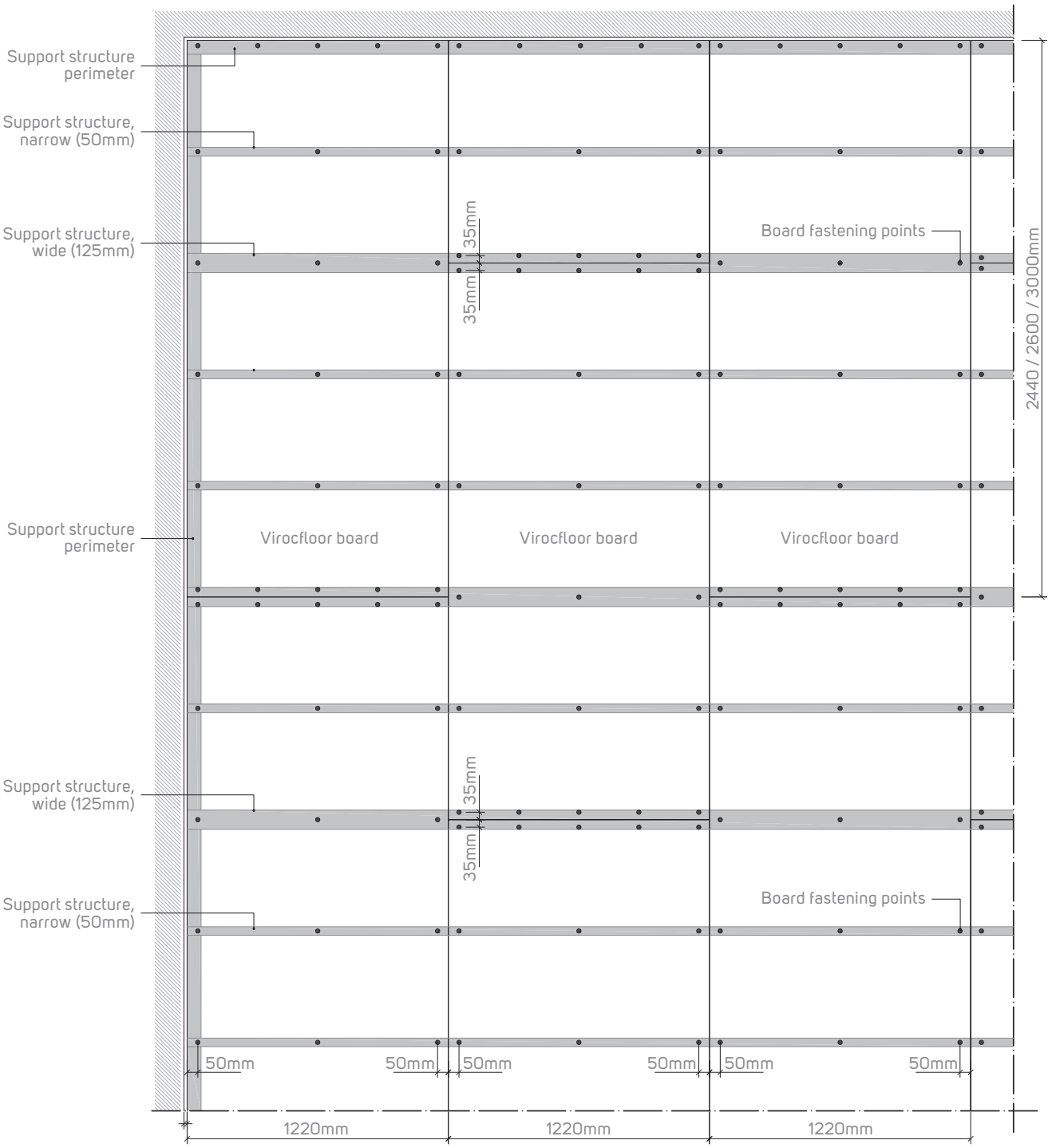
8. Fixture position





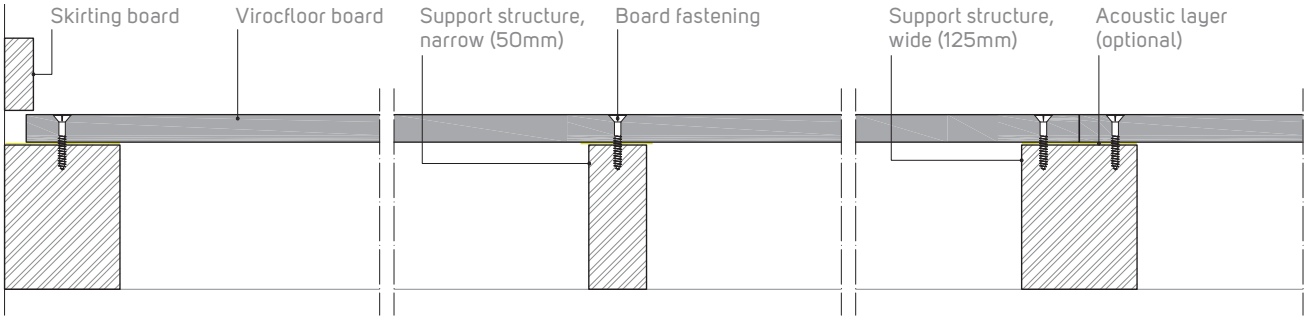
9. Support structure

Virocfloor board 2440 / 2600 / 3000 x 1220mm

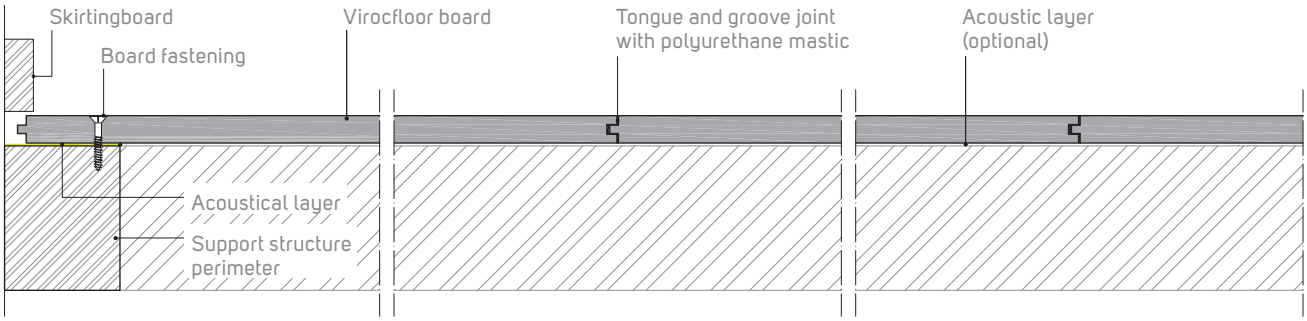


10. Construction details (wood structure)

Transversal section

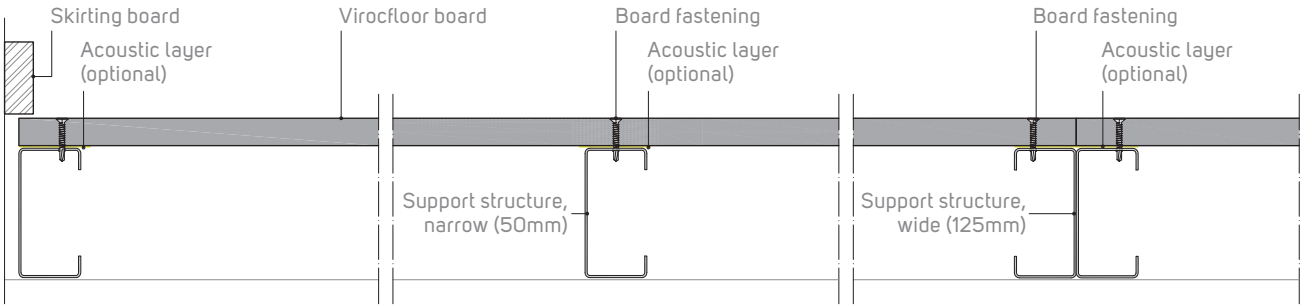


Longitudinal section

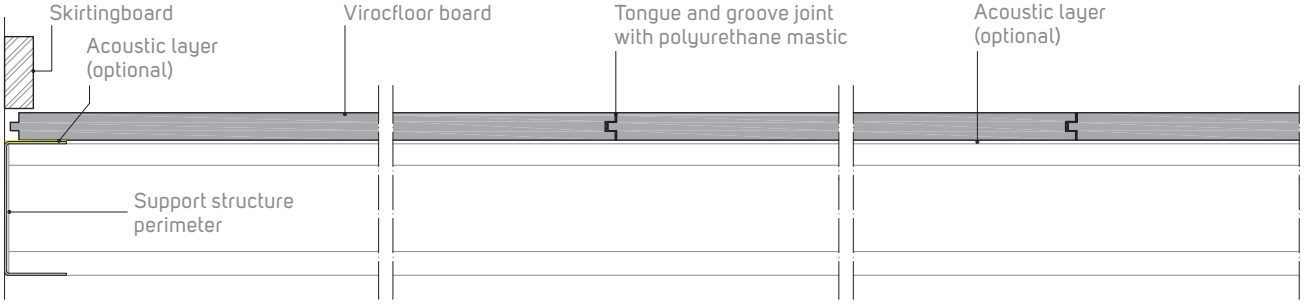


11. Construction details (steel structure)

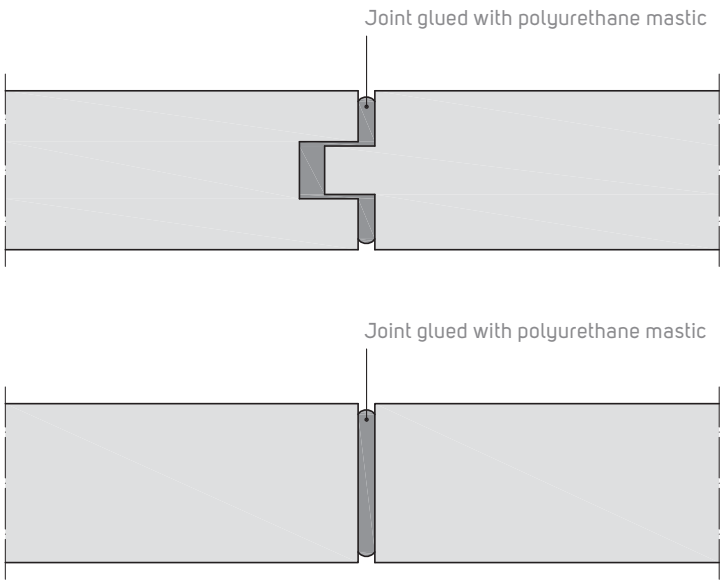
Transversal section



Longitudinal section

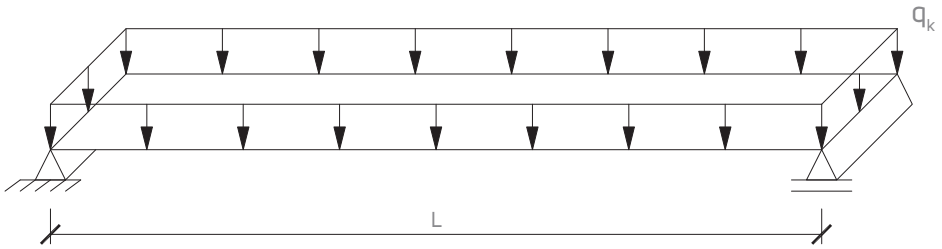


12. Detail of the joint



13. Load table

Uniformly distributed load table
q_k (kN/m²) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	4,31	2,37	1,47	0,98	0,68	0,49	0,36	0,27
12	6,24	3,44	2,14	1,44	1,01	0,74	0,55	0,41
16	11,16	6,18	3,88	2,63	1,87	1,38	1,05	0,81
19	15,79	8,77	5,52	3,75	2,69	2,00	1,53	1,19
22	21,21	11,80	7,45	5,08	3,65	2,73	2,09	1,64
25	27,44	15,29	9,66	6,61	4,76	3,57	2,75	2,16
28	34,47	19,22	12,17	8,33	6,02	4,52	3,49	2,76
32	45,08	25,17	15,95	10,95	7,93	5,97	4,62	3,66

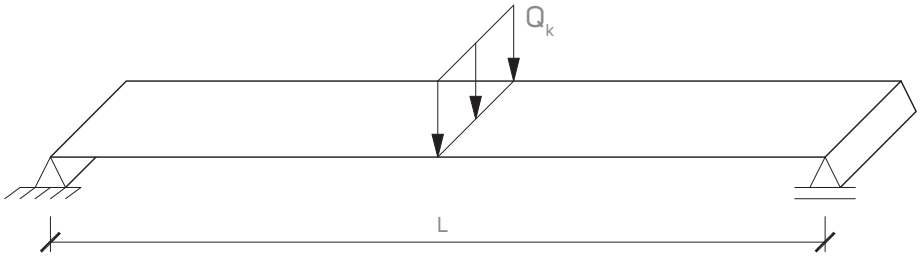
Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	3,42	1,37	0,63	0,31	0,14	0,05	0,00	0,00
12	5,98	2,43	1,17	0,61	0,32	0,16	0,07	0,00
16	11,16	5,93	2,93	1,60	0,93	0,55	0,32	0,18
19	15,79	8,77	5,01	2,79	1,66	1,03	0,65	0,40
22	21,21	11,80	7,45	4,44	2,68	1,70	1,11	0,73
25	27,44	15,29	9,66	6,61	4,04	2,59	1,72	1,16
28	34,47	19,22	12,17	8,33	5,77	3,74	2,51	1,73
32	45,08	25,17	15,95	10,95	7,93	5,71	3,88	2,71

■ Values conditioned by the board's resistance

14. Load table

Midspan concentrated load table
Q_k (kN/m) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	0,65	0,47	0,37	0,29	0,24	0,20	0,16	0,13
12	0,94	0,69	0,54	0,43	0,35	0,30	0,25	0,21
16	1,67	1,24	0,97	0,79	0,66	0,55	0,47	0,40
19	2,37	1,75	1,38	1,13	0,94	0,80	0,69	0,59
22	3,18	2,36	1,86	1,52	1,28	1,09	0,94	0,82
25	4,12	3,06	2,42	1,98	1,67	1,43	1,24	1,08
28	5,17	3,84	3,04	2,50	2,11	1,81	1,57	1,38
32	6,76	5,03	3,99	3,28	2,77	2,39	2,08	1,83

Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	0,64	0,34	0,20	0,12	0,06	0,03	0,00	0,00
12	0,94	0,61	0,36	0,23	0,14	0,08	0,04	0,00
16	1,67	1,24	0,92	0,60	0,41	0,28	0,18	0,11
19	2,37	1,75	1,38	1,05	0,73	0,51	0,36	0,25
22	3,18	2,36	1,86	1,52	1,17	0,85	0,62	0,45
25	4,12	3,06	2,42	1,98	1,67	1,30	0,97	0,73
28	5,17	3,84	3,04	2,50	2,11	1,81	1,41	1,08
32	6,76	5,03	3,99	3,28	2,77	2,39	2,08	1,70

■ Values conditioned by the board's resistance

15. Design

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

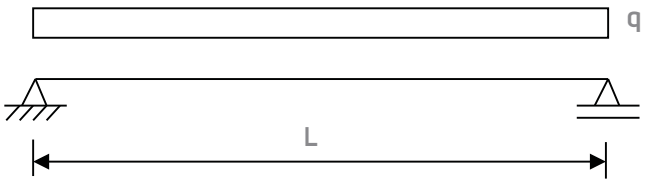
Feature	Symbol		Value
Bending strength	$f_{m,k}$		9.0 N/mm²
Shear strength	$f_{v,k}$		1.0 N/mm²
Modulus of elasticity	E		4500 N/mm²
Modification factor	k_{mod}	Permanent action	0.30
		Long term action	0.45
		Medium term action	0.65
		Short term action	0.85
		Instantaneous action	1.10
Deformation factor	k_{def}		2.25
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 uniform load



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	q_k	4.00 kN/m²

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m^3
Bending strength	$f_{m,k}$	9.0 N/mm^2
Shear strength	$f_{v,k}$	1.0 N/mm^2
Modulus of elasticity	E	4500 N/mm^2
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m^2

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

Permanent loads (pp + cv)	g_k	1.38 kN/m^2
Variable loads	q_k	4.00 kN/m^2

Design loads

$q_{Sd} = 1{,}35 * g_k + 1{,}50 * q_k$	q_{Sd}	7.86 kN/m^2

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8$	$M_{Sd.max}$	0.25 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

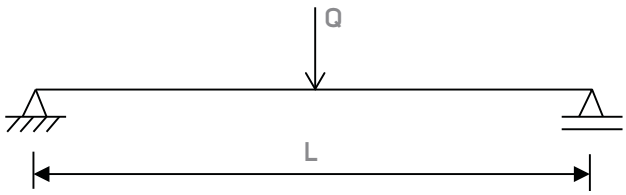
$V_{S.max} = q_{Sd} L / 2$	$V_{S.max}$	1.97 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_s = 1{,}00 * g_k + \Psi_2 * q_k$	q_s	3.78 kN/m^2	
$I = b . e^3 / 12$	I	1829333 mm^4	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm^2	
Deformation			
$f_{max} = 5 . q_s . L^4 / (384 . EI)$	f_{max}	0.88 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

Example 2

Security verifications - Static concentrated loads



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	Q_k	1.50 kN

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m³
Bending strength	$f_{m,k}$	9.0 N/mm²
Shear strength	$f_{v,k}$	1.0 N/mm²
Modulus of elasticity	E	4500 N/mm²
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m²

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

Permanent loads (pp + cv)	g_k	1.38 kN/m²
Variable loads	Q_k	1.50 kN

Design loads

$q_{Sd} = 1,35*g_k + 1,50*q_k$	Uniform loads	q_{Sd}	1.86 kN/m²
	Concentrated loads	Q_{Sd}	2.25 kN

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8 + Q_{sd} L/4$	$M_{Sd.max}$	0.34 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

$V_{S.max} = q_{Sd} L / 2 + Q_{sd}/2$	$V_{S.max}$	1.59 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_S = 1{,}00 * g_k + \Psi_2 * q_k$	q_s	1.38 kN/m²	
	Q_s	0.90 kN	
$I = b . e^3 / 12$	I	1829333 mm⁴	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm²	
Deformation			
$f_{max} = 5 . q_S . L^4 / (384 . EI) + Q_S . L^3 / (48 . EI)$	f_{max}	0.99 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

Application: Indoors

Support structure: Wood or Metal

Fastening: Screws and glue in the tongue & groove joints. Tongue & grooved on all four edges

Surface: Factory calibrated / sanded

Thickness: 18 mm (11/16"), 21 mm (13/16"), 24 mm (15/16") or 28 mm (1 ⅛"). Tolerance: ± 0,3 mm

Board size:
1200 x 600 mm (47,24" x 23,62")
1500 x 600 mm (59,00" x 23,62")

1. Description

Viroc is a cement bonded particle board. It 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.
The Viroc panel is produced in different colours.

2. Relative humidity effect

Viroc boards have small size variations due to the air relative humidity.
The expected maximum size variation of the board for indoors would be +0.5‰ to -1.0 ‰.
The fastening system near the edges will have to take into account those size variations.

3. Application Conditions

Virodal is for indoor use only.
Before installation, the board must be exposed for 48 hours to the relative humidity of the location where it will be applied and should be left in a dry location out of direct sunlight.
It is the installer's responsibility to check the support structure conditions (distance between supports and respective width) for the correct application.

4. Support structure

Treated dry pine beams or metallic profiles of galvanized steel can be used to support the boards.
In the joints of two boards, the width of the beams must be at least 125mm (5") to respect the minimum distance of fasteners to the edge.
The structure that will support Viroc boards must be aligned and leveled and the board cannot be warped.
The spacing between the support components depends on the ultimate limit state safety criteria for resistance and deformation.

5. Fastening

Boards are fastened with screws, suitable for metallic or wood structure.
The tongue and groove joints between boards must be glued with a mastic bond.
Boards must be arranged alternately for the joints between boards do not match.

6. Surface treatment

Boards are factory calibrated/sanded.
The final finish may involve the traditional surfacing materials, vinyl fabric, ceramic tiles, wooden flooring, etc.

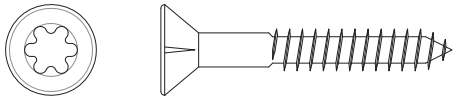
Notes & recommendations

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

7. Fastening elements

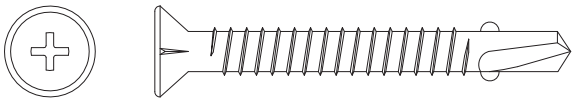
Flat head screws for wood structure

IMAD C12-5.5x50 - Viroc 19 to 32mm



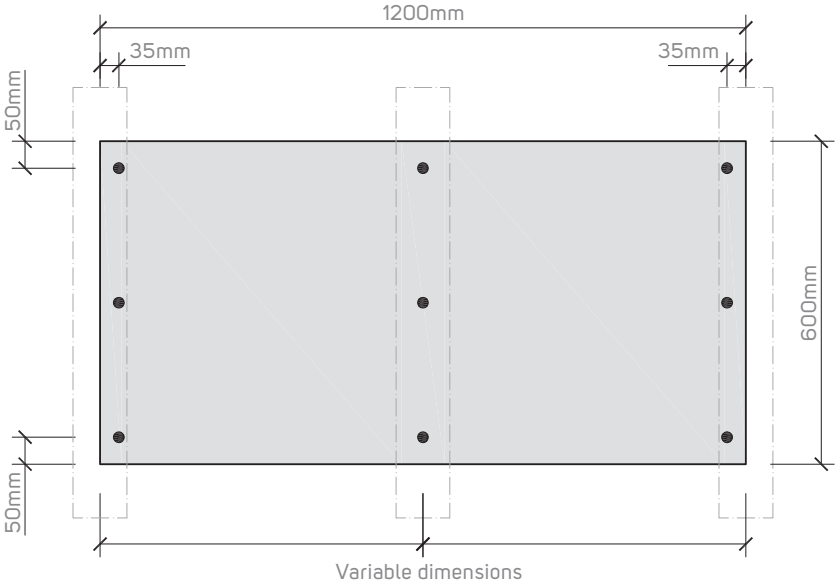
Flat head screws for metallic structure

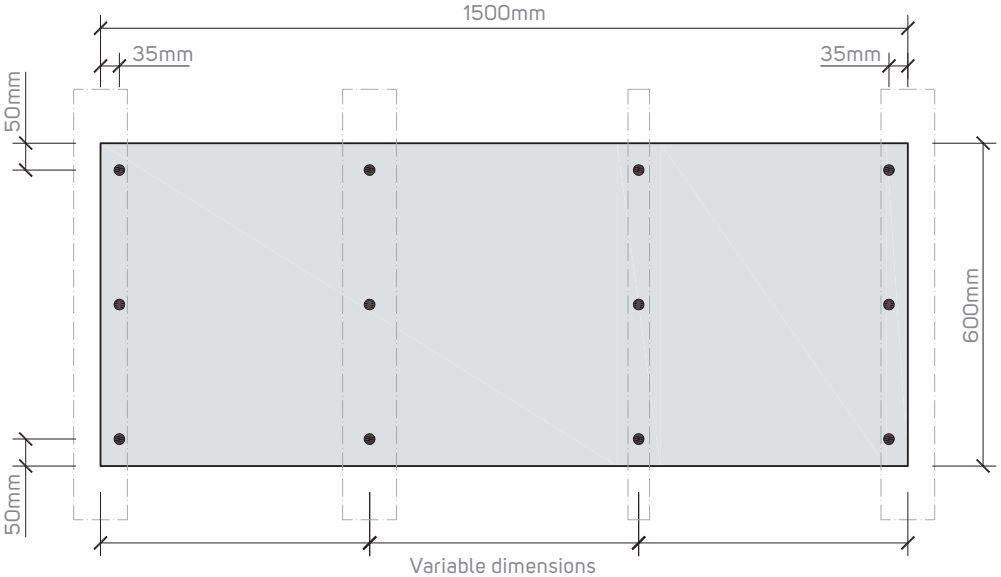
IMET C12-5.5x38 - Viroc 18mm
IMET C12-5.5x45 - Viroc 21 to 24mm
IMET C12-5.5x55 - Viroc 28mm



NOTA: Please consult Viroc Technical File to get more information about the fastening systems.

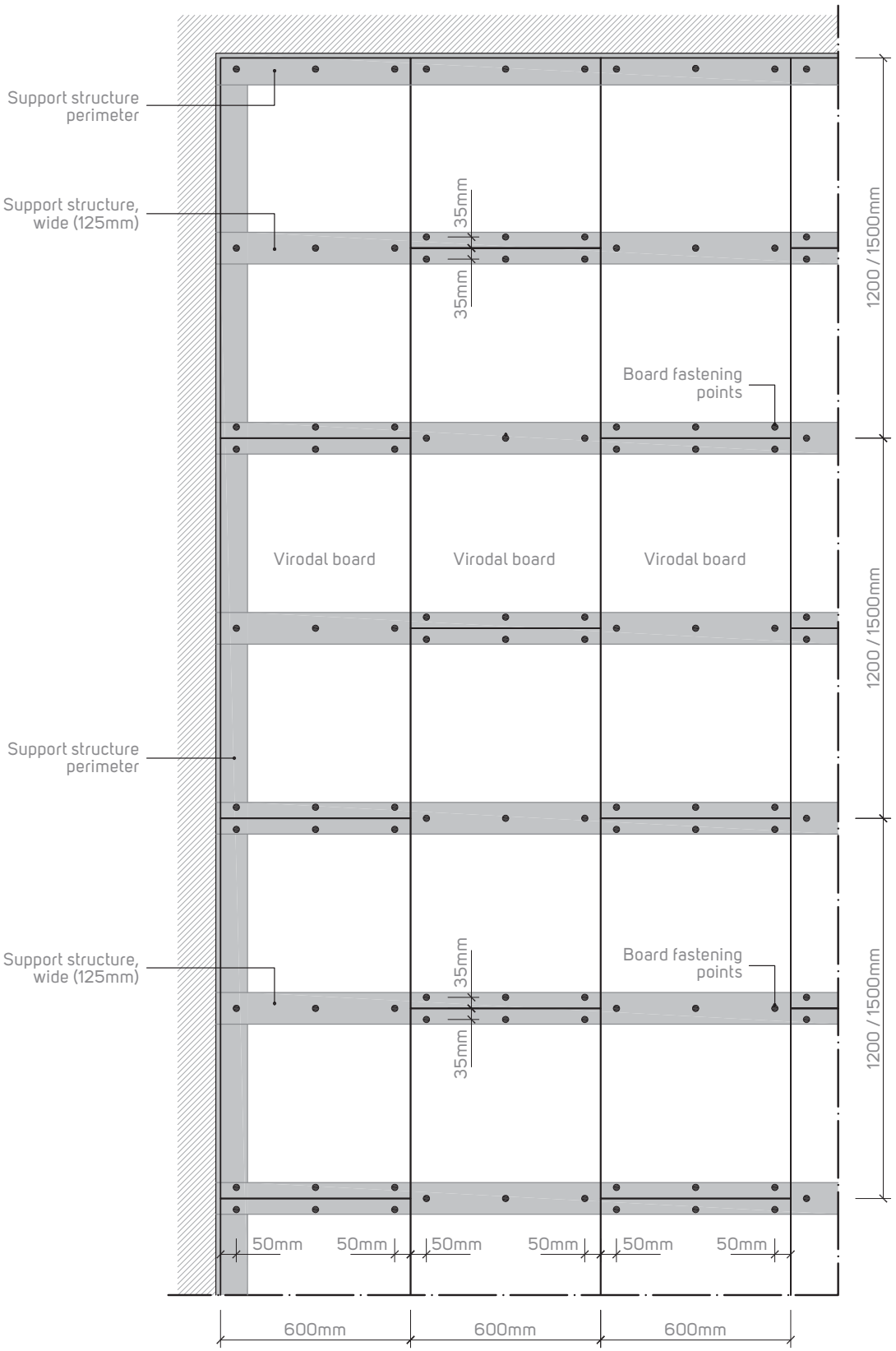
8. Fixture position





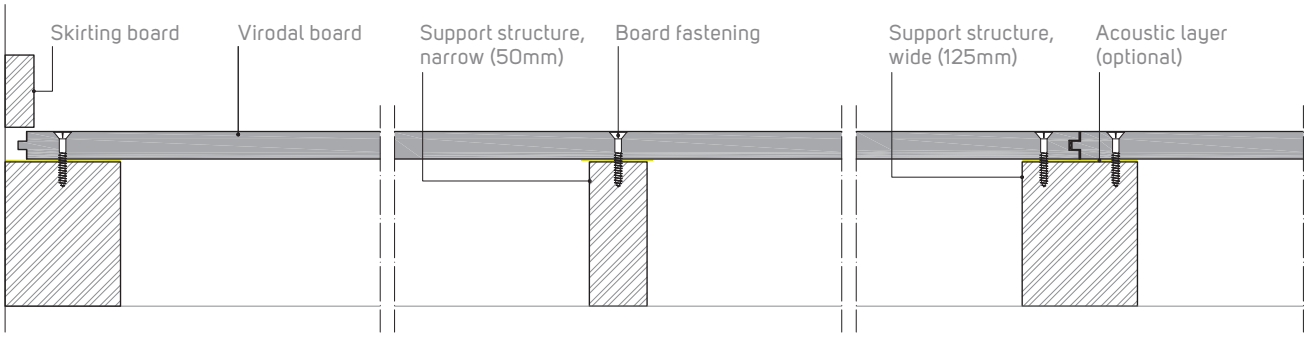
9. Support structure

Virodal board 1200 / 1500 x 600mm

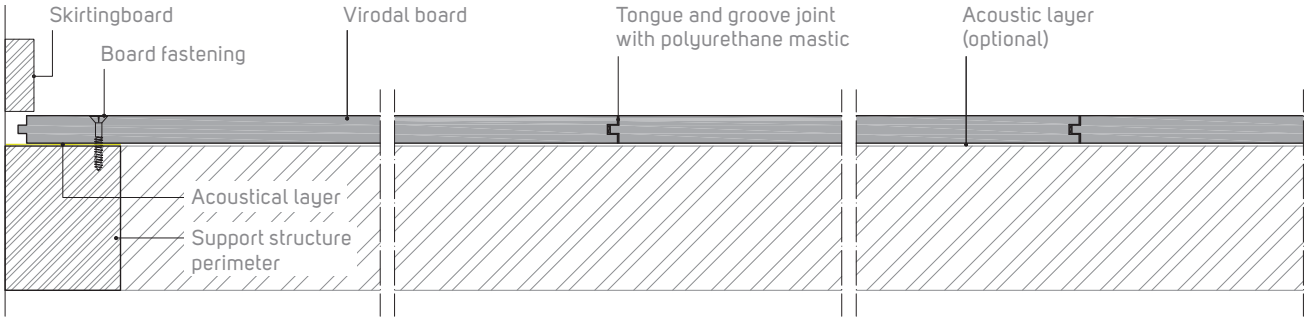


10. Construction details (wood structure)

Transversal section

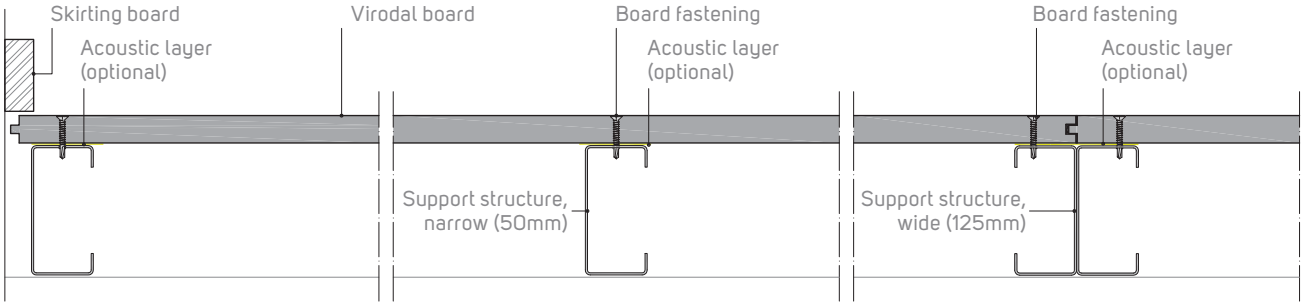


Longitudinal section

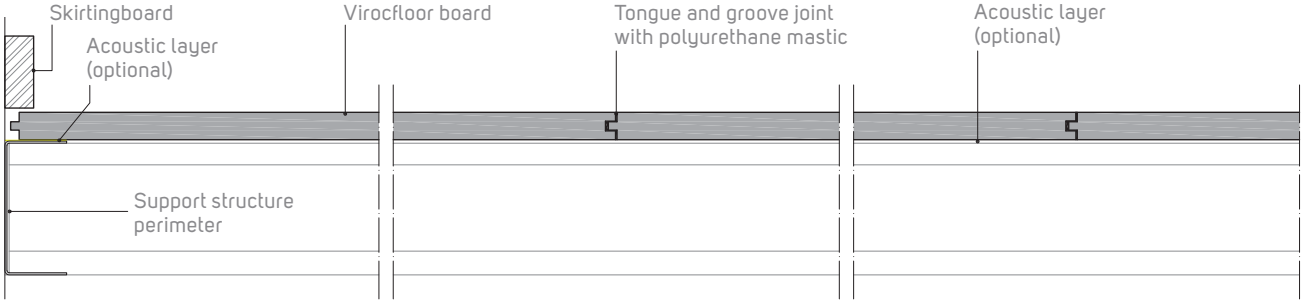


11. Construction details (steel structure)

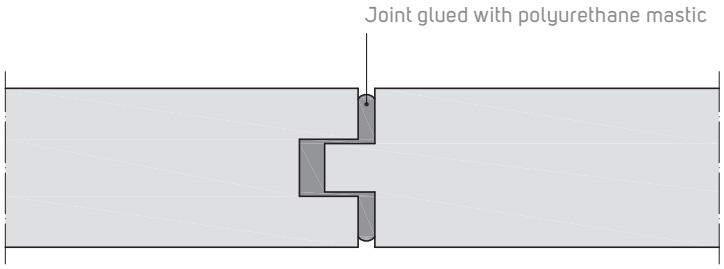
Transversal section



Longitudinal section

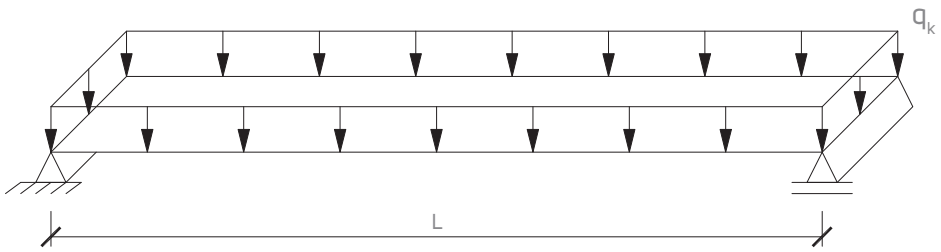


12. Detail of the joint



13. Load table

Uniformly distributed load table
q_k (kN/m²) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
18	14,16	7,86	4,94	3,36	2,40	1,78	1,36	1,05
21	19,32	10,74	6,77	4,62	3,32	2,47	1,89	1,48
24	25,28	14,08	8,89	6,08	4,38	3,28	2,52	1,98
28	34,47	19,22	12,17	8,33	6,02	4,52	3,49	2,76

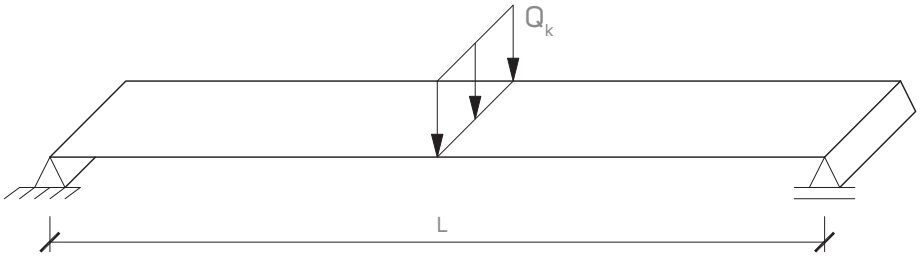
Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	14,16	7,86	4,24	2,35	1,39	0,85	0,53	0,32
12	19,32	10,74	6,77	3,83	2,31	1,45	0,94	0,61
16	25,28	14,08	8,89	5,82	3,55	2,27	1,50	1,00
19	34,47	19,22	12,17	8,33	5,77	3,74	2,51	1,73

■ Values conditioned by the board's resistance

14. Load table

Midspan concentrated load table
Q_k (kN/m) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
18	2,12	1,57	1,24	1,01	0,84	0,71	0,61	0,53
21	2,90	2,15	1,69	1,38	1,16	0,99	0,85	0,74
24	3,79	2,82	2,22	1,82	1,53	1,31	1,13	0,99
28	5,17	3,84	3,04	2,50	2,11	1,81	1,57	1,38

Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
18	2,12	1,57	1,24	0,88	0,61	0,43	0,30	0,20
21	2,90	2,15	1,69	1,38	1,01	0,73	0,53	0,38
24	3,79	2,82	2,22	1,82	1,53	1,31	0,84	0,63
28	5,17	3,84	3,04	2,50	2,11	1,81	1,41	1,08

■ Values conditioned by the board's resistance

15. Design

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

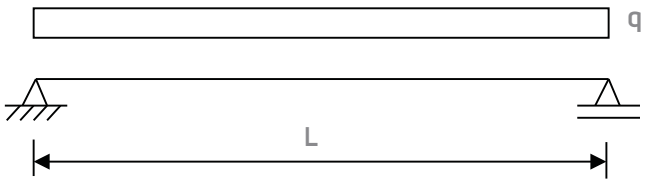
Feature	Symbol		Value
Bending strength	$f_{m,k}$		9.0 N/mm²
Shear strength	$f_{v,k}$		1.0 N/mm²
Modulus of elasticity	E		4500 N/mm²
Modification factor	k_{mod}	Permanent action	0.30
		Long term action	0.45
		Medium term action	0.65
		Short term action	0.85
		Instantaneous action	1.10
Deformation factor	k_{def}		2.25
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 uniform load



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	q_k	4.00 kN/m²

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m^3
Bending strength	$f_{m,k}$	9.0 N/mm^2
Shear strength	$f_{v,k}$	1.0 N/mm^2
Modulus of elasticity	E	4500 N/mm^2
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m^2

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

Permanent loads (pp + cv)	g_k	1.38 kN/m^2
Variable loads	q_k	4.00 kN/m^2

Design loads

$q_{Sd} = 1{,}35*g_k + 1{,}50*q_k$	q_{Sd}	7.86 kN/m^2

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8$	$M_{Sd.max}$	0.25 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

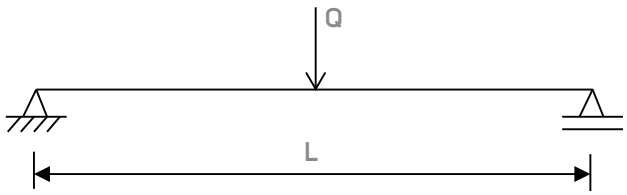
$V_{S.max} = q_{Sd} L / 2$	$V_{S.max}$	1.97 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_S = 1{,}00 * g_k + \Psi_2 * q_k$	q_s	3.78 kN/m^2	
$I = b . e^3 / 12$	I	1829333 mm^4	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm^2	
Deformation			
$f_{max} = 5 . q_S . L^4 / (384 . EI)$	f_{max}	0.88 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

Example 2

Security verifications - Static concentrated loads



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	Q_k	1.50 kN

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m³
Bending strength	$f_{m,k}$	9.0 N/mm²
Shear strength	$f_{v,k}$	1.0 N/mm²
Modulus of elasticity	E	4500 N/mm²
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m²

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

Permanent loads (pp + cv)	g_k	1.38 kN/m²
Variable loads	Q_k	1.50 kN

Design loads

$q_{Sd} = 1{,}35 * g_k + 1{,}50 * q_k$

Uniform loads	q_{Sd}	1.86 kN/m²
Concentrated loads	Q_{Sd}	2.25 kN

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8 + Q_{sd} L/4$	$M_{Sd.max}$	0.34 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

$V_{S.max} = q_{Sd} L / 2 + Q_{sd} /2$	$V_{S.max}$	1.59 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_S = 1,00 * g_k + \Psi_2 * q_k$	q_s	1.38 kN/m^2	
	Q_s	0.90 kN	
$I = b . e^3 / 12$	I	1829333 mm^4	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm^2	
Deformation			
$f_{max} = 5 . q_S . L^4 / (384 . EI) + Q_S . L^3 / (48 . EI)$	f_{max}	0.99 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

viroc by Investwood

Unsanded Floor

Flooring Fact Sheet

Application: Interior

Support structure: Wood or Metal

Fastening: Bonding system

Thickness: ≥ 19 mm (3/4")

Board maximum size:
3000 x 1250 mm (118,11" x 49,21")

1. Description

Viroc is a cement bonded particle board. It 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.
The Viroc panel is produced in different colours.

2. Relative humidity effect

Viroc boards have small size variations due to the air relative humidity.
In situations of extreme humidity and temperature amplitude, the expected maximum size variation of the board would be +0.5‰ to -1.0‰.
The fastening system near the edges will have to take into account those size variations.

3. Application conditions

Before installation, the board must be exposed for 48 hours to the relative humidity of the location where it will be applied and should be left in a dry location out of direct sunlight.
It is the installer's responsibility to check the support structure conditions (distance between supports and respective width) for the correct application.
When applying, the temperature has to be between +5ºC and +30ºC, the board temperature has to be +3ºC above due point.
Primer or glues cannot be applied if it is raining or in a very damp environment (e.g. foggy).
The surface has to be clean, dry and free of dust or grease before applying primer.
This system should only be used by specialised companies that know how this kind of fastening is performed in Viroc.

4. Support structure

Treated dry pine beams or metallic profiles of galvanized steel and aluminum can be used to support the boards.
The structure that will support Viroc boards must be aligned and leveled and the board cannot be warped.
Keep the distance between the structural elements as further described.

5. Fastening

The attachments will be made with mastic adhesive glue.
The mastic adhesion system is composed of four parts:

1 - Mastic adhesive – Polymer MS , Polyurethane Mastic or Hybrid Mastic

2 - Double-sided adhesive tape

3 - Primer for the supporting structure

4 - Primer for the Viroc board

Manufacturers that supply bonding system for panels: Bostik, Sika, 3M and Henkel.

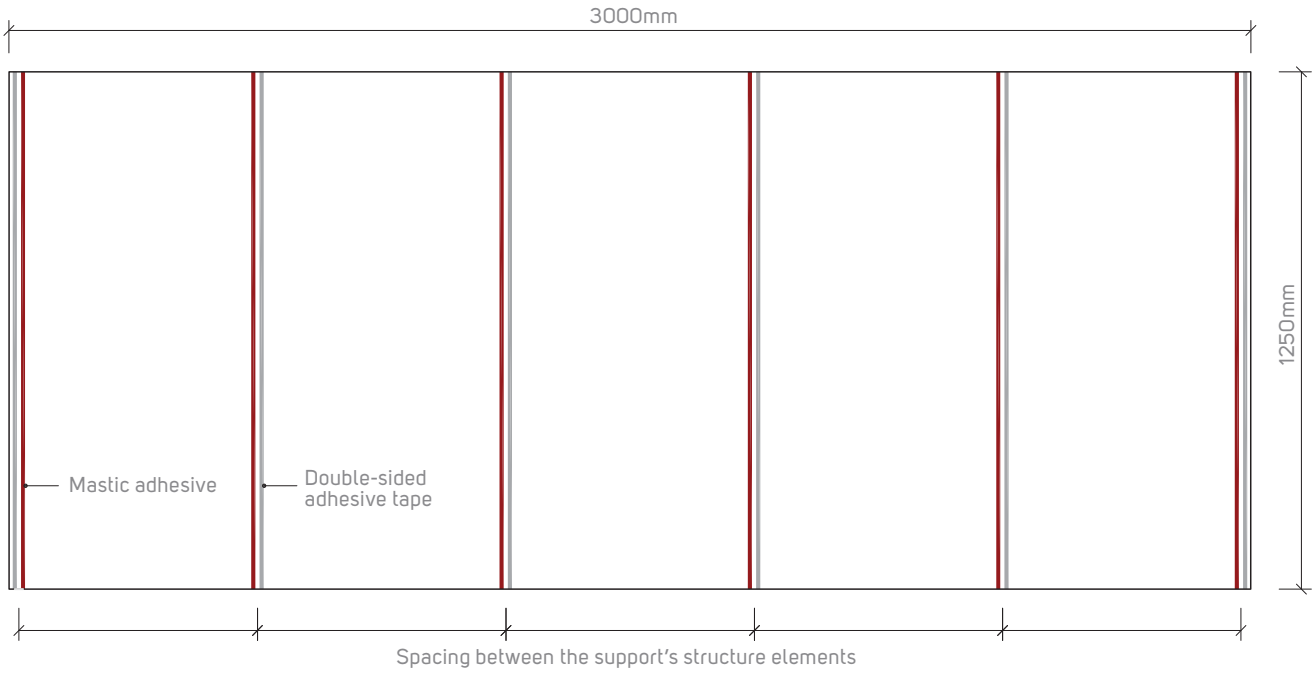
6. Surface treatment

Viroc boards must be protected with paint or varnish. Before applying varnish the panel surfaces must be completely clean and dry, free from grease, dust or surface salts. The surface should be cleaned by polishing with a cleaning disc.
Viroc S.A. has suitable cleaning discs available that can be supplied on request.
The first coat must cover both sides and edges of the board. The other coats need only to be applied on exposed face and edges.
The bonding system primer applied to the back of the board cannot be mixed or applied over paint or varnish.

Notes & recommendations

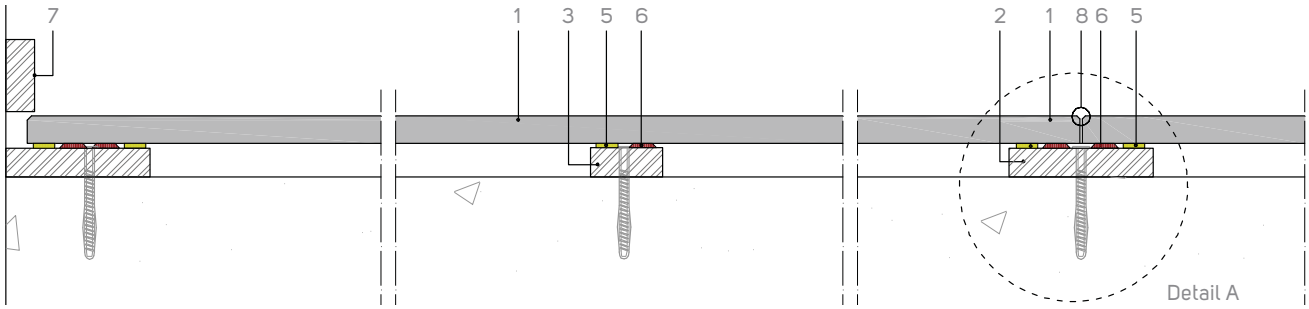
Please consult Viroc Product Data Sheet to know the board tolerances and properties.
Always check standard safety procedures and local legislation requirements.
Please contact the finishing suppliers for application procedures.

7. Board fastening

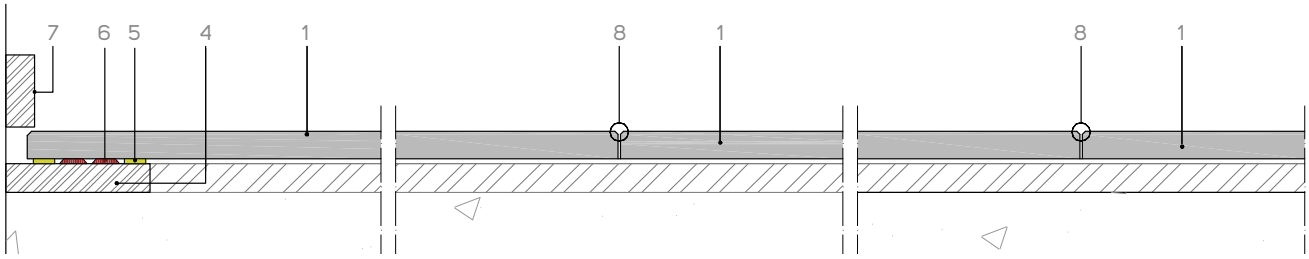


8. Construction details

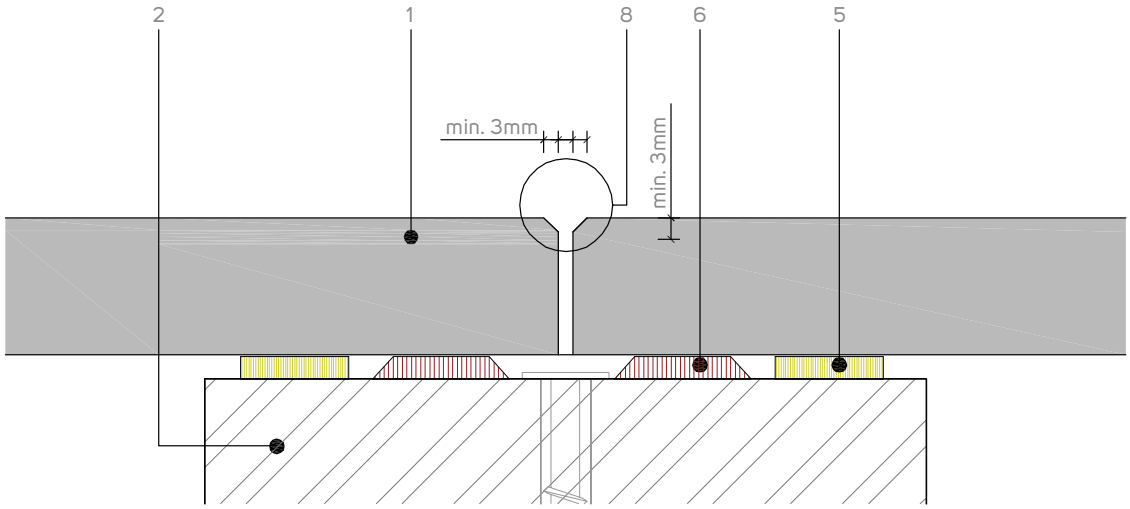
Transversal section - wood structure



Longitudinal section - wood structure



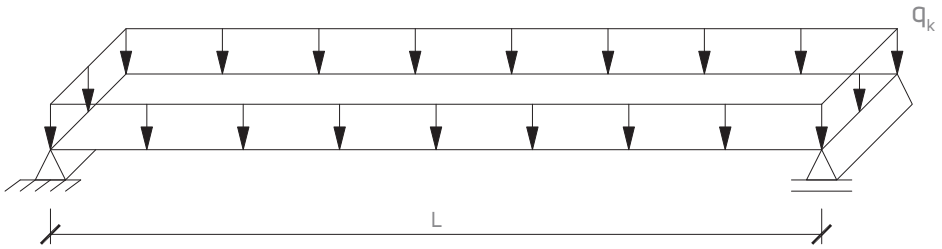
Detail A



1 - Viroc board
2 - Structure between boards
3 - Intermediate structure
4 - Support structure perimeter
5 - Double-sided adhesive tape
6 - Mastic adhesive
7 - Skirting board
8 - Bevelled edge

9. Load table

Uniformly distributed load table
q_k (kN/m²) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	4,31	2,37	1,47	0,98	0,68	0,49	0,36	0,27
12	6,24	3,44	2,14	1,44	1,01	0,74	0,55	0,41
16	11,16	6,18	3,88	2,63	1,87	1,38	1,05	0,81
19	15,79	8,77	5,52	3,75	2,69	2,00	1,53	1,19
22	21,21	11,80	7,45	5,08	3,65	2,73	2,09	1,64
25	27,44	15,29	9,66	6,61	4,76	3,57	2,75	2,16
28	34,47	19,22	12,17	8,33	6,02	4,52	3,49	2,76
32	45,08	25,17	15,95	10,95	7,93	5,97	4,62	3,66

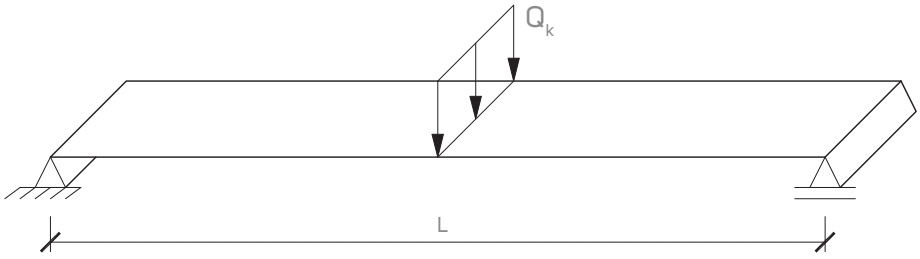
Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	3,42	1,37	0,63	0,31	0,14	0,05	0,00	0,00
12	5,98	2,43	1,17	0,61	0,32	0,16	0,07	0,00
16	11,16	5,93	2,93	1,60	0,93	0,55	0,32	0,18
19	15,79	8,77	5,01	2,79	1,66	1,03	0,65	0,40
22	21,21	11,80	7,45	4,44	2,68	1,70	1,11	0,73
25	27,44	15,29	9,66	6,61	4,04	2,59	1,72	1,16
28	34,47	19,22	12,17	8,33	5,77	3,74	2,51	1,73
32	45,08	25,17	15,95	10,95	7,93	5,71	3,88	2,71

■ Values conditioned by the board's resistance

10. Load table

Midspan concentrated load table
Q_k (kN/m) - Static load



Typical breaking strength under flexing	9	N/mm²
Safety coefficient, Y_M	3	
Elastic Modulus	4500	N/mm²

Board resistance

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	0,65	0,47	0,37	0,29	0,24	0,20	0,16	0,13
12	0,94	0,69	0,54	0,43	0,35	0,30	0,25	0,21
16	1,67	1,24	0,97	0,79	0,66	0,55	0,47	0,40
19	2,37	1,75	1,38	1,13	0,94	0,80	0,69	0,59
22	3,18	2,36	1,86	1,52	1,28	1,09	0,94	0,82
25	4,12	3,06	2,42	1,98	1,67	1,43	1,24	1,08
28	5,17	3,84	3,04	2,50	2,11	1,81	1,57	1,38
32	6,76	5,03	3,99	3,28	2,77	2,39	2,08	1,83

Deformation limit L/300

Thickness (mm) \ L (m)	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
10	0,64	0,34	0,20	0,12	0,06	0,03	0,00	0,00
12	0,94	0,61	0,36	0,23	0,14	0,08	0,04	0,00
16	1,67	1,24	0,92	0,60	0,41	0,28	0,18	0,11
19	2,37	1,75	1,38	1,05	0,73	0,51	0,36	0,25
22	3,18	2,36	1,86	1,52	1,17	0,85	0,62	0,45
25	4,12	3,06	2,42	1,98	1,67	1,30	0,97	0,73
28	5,17	3,84	3,04	2,50	2,11	1,81	1,41	1,08
32	6,76	5,03	3,99	3,28	2,77	2,39	2,08	1,70

■ Values conditioned by the board's resistance

11. Design

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

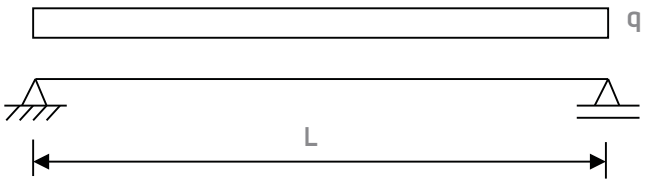
Feature	Symbol		Value
Bending strength	$f_{m,k}$		9.0 N/mm²
Shear strength	$f_{v,k}$		1.0 N/mm²
Modulus of elasticity	E		4500 N/mm²
Modification factor	k_{mod}	Permanent action	0.30
		Long term action	0.45
		Medium term action	0.65
		Short term action	0.85
		Instantaneous action	1.10
Deformation factor	k_{def}		2.25
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 uniform load



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	q_k	4.00 kN/m²

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m^3
Bending strength	$f_{m,k}$	9.0 N/mm^2
Shear strength	$f_{v,k}$	1.0 N/mm^2
Modulus of elasticity	E	4500 N/mm^2
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m^2

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

Permanent loads (pp + cv)	g_k	1.38 kN/m^2
Variable loads	q_k	4.00 kN/m^2

Design loads

$q_{Sd} = 1{,}35 * g_k + 1{,}50 * q_k$	q_{Sd}	7.86 kN/m^2

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8$	$M_{Sd.max}$	0.25 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

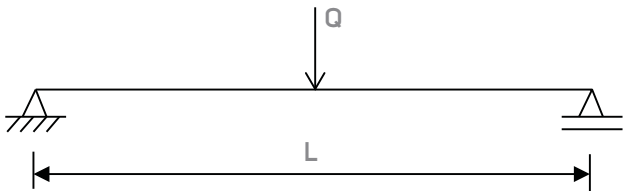
$V_{S.max} = q_{Sd} L / 2$	$V_{S.max}$	1.97 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_s = 1{,}00 * g_k + \Psi_2 * q_k$	q_s	3.78 kN/m^2	
$I = b . e^3 / 12$	I	1829333 mm^4	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm^2	
Deformation			
$f_{max} = 5 . q_s . L^4 / (384 . EI)$	f_{max}	0.88 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

Example 2

Security verifications - Static concentrated loads



Characteristics

Span	L	0.500 m

Actions EN 1991-1-6 (Eurocode 1)

Covering	cv	1.00 kN/m²
Variable loads	Q_k	1.50 kN

Characteristics of Viroc board

Board thickness	e	28mm
Viroc density	γ	13.5 kN/m³
Bending strength	$f_{m,k}$	9.0 N/mm²
Shear strength	$f_{v,k}$	1.0 N/mm²
Modulus of elasticity	E	4500 N/mm²
Modification factor (long term action)	k_{mod}	0.45
Deformation factor	k_{def}	2.25
Partial factor properties	γ_M	1.3
Self weight	pp	0.38 kN/m²

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

Permanent loads (pp + cv)	g_k	1.38 kN/m²
Variable loads	Q_k	1.50 kN

Design loads

$q_{Sd} = 1,35*g_k + 1,50*q_k$

Uniform loads	q_{Sd}	1.86 kN/m²
Concentrated loads	Q_{Sd}	2.25 kN

Ultimate limit states of flexion

$M_{Sd.max} = q_{sd} L^2/8 + Q_{sd} L/4$	$M_{Sd.max}$	0.34 kNm/m	
$M_{Rd} = k_{mod} . w . f_{m.k} / \gamma_M$	M_{Rd}	0.41 kNm/m	Security checked ($M_{Rd} \geq M_{Sd.max}$)
$w = b . e^2 / 6$			

Ultimate limit states of shear

$V_{S.max} = q_{Sd} L / 2 + Q_{sd} /2$	$V_{S.max}$	1.59 kN/m	
$V_{Rd} = k_{mod} . A_v . f_{v.k} / \gamma_M$	V_{Rd}	8.08 kN/m	Security checked ($V_{Rd} \geq V_{Sd.max}$)
$A_v = 5 / 6 . b . e$			

Limit states of deformation

Factor for quasi-permanent combination	Ψ_2	0.6	
$q_S = 1{,}00 * g_k + \Psi_2 * q_k$	q_s	1.38 kN/m²	
	Q_s	0.90 kN	
$I = b . e^3 / 12$	I	1829333 mm⁴	
$E_{mean,fin} = E / (1 + \Psi_2 . k_{def})$	$E_{mean,fin}$	1915 N/mm²	
Deformation			
$f_{max} = 5 . q_S . L^4 / (384 . EI) + Q_S . L^3 / (48 . EI)$	f_{max}	0.99 mm	
Maximal deformation	L / 300	1.67 mm	Deformation verified ($f_{max} \leq L / 300$)

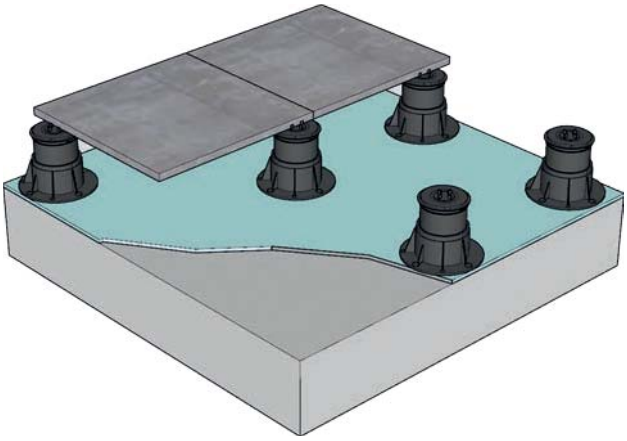
Application: Indoors

Support structure: High-density PVC supports

Thickness unsanded: 22 mm (⅞"), 25 mm (1"), 28 mm (1 ⅛") or 32 mm (1 ¼").

Thickness sanded: 21mm (13/16"), 24mm (15/16"), 28mm (1 ⅛") or 32 mm (1 ¼").

Board size:
400 x 400 mm (15,75" x 15,75")
500 x 500 mm (19,685" x 19,685")
600 x 600 mm (23,62" x 23,62")



1. Description

Viroc is a cement bonded particle board. It 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.

2. Application Conditions

Before installation, the board must be exposed for 48 hours to the relative humidity of the location where it will be applied and should be left in a dry location out of direct sunlight.
It is the installer's responsibility to check the support structure conditions for the correct application.

3. Support structure

High-density PVC supports are used to support the boards. PVC supports are placed at the corners of each board and each one can carry 4 boards. Each support has a leveling device to perform leveling 0-5% when necessary.
Boards are supported on the PVC supports, placed on a floor slab. PVC supports may be fixed to the base through bushings.
Joints between boards must be 2 mm, 4.5 mm, 6 mm, 8 mm or 10 mm.

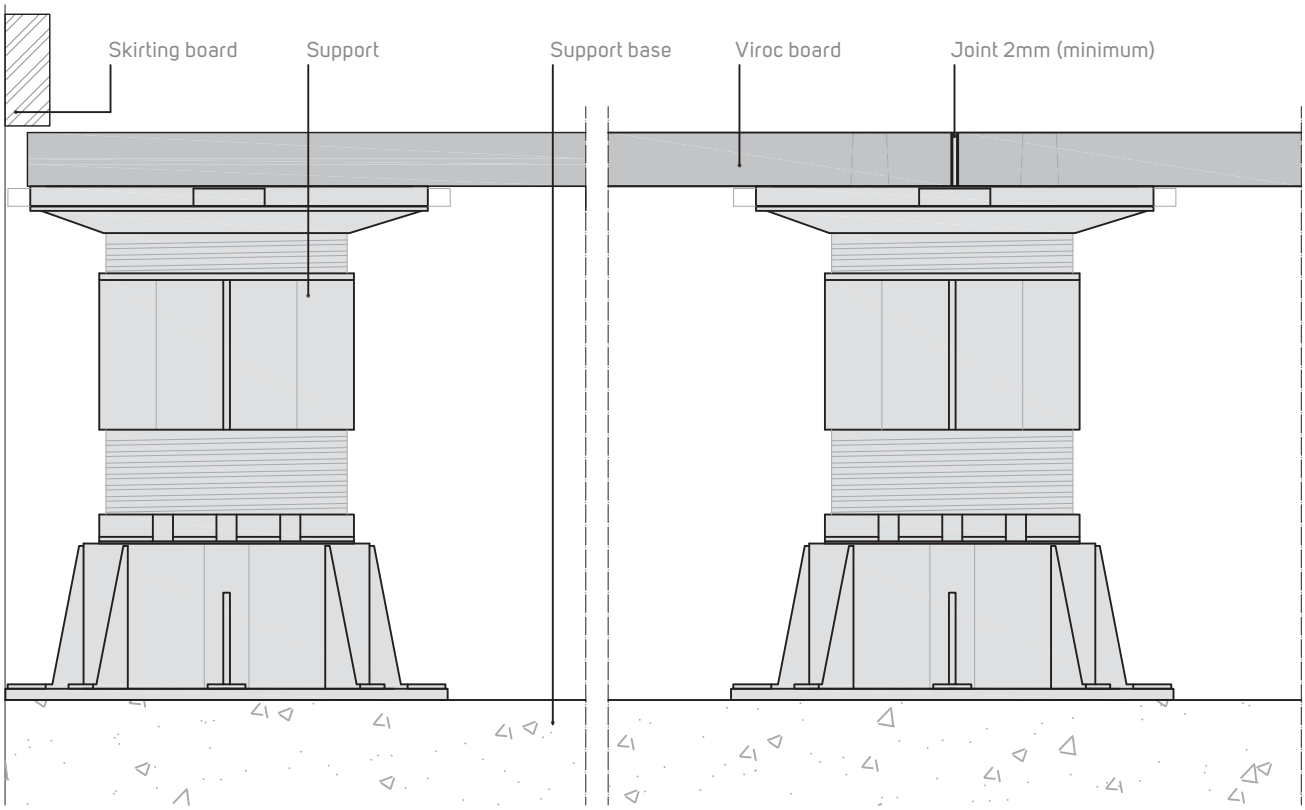
4. Surface treatment

The final finish may involve the traditional surfacing materials.

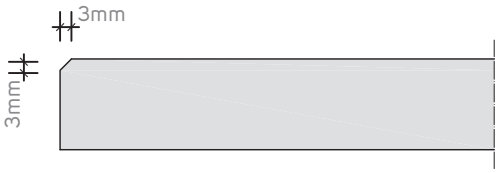
Notes & recommendations

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

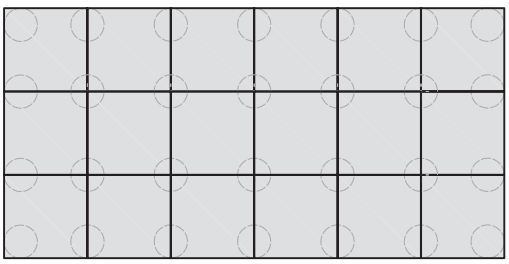
6. Transversal section



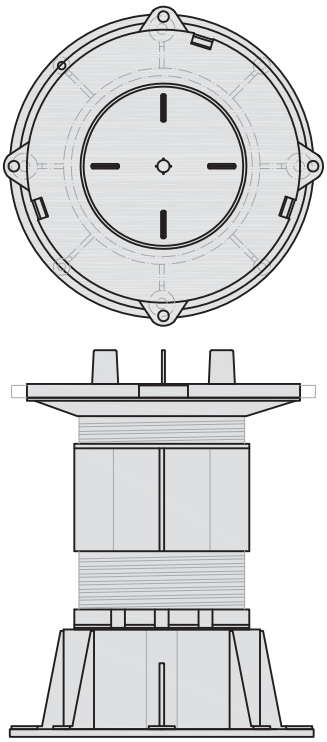
7. Bevel board



8. Standard boards

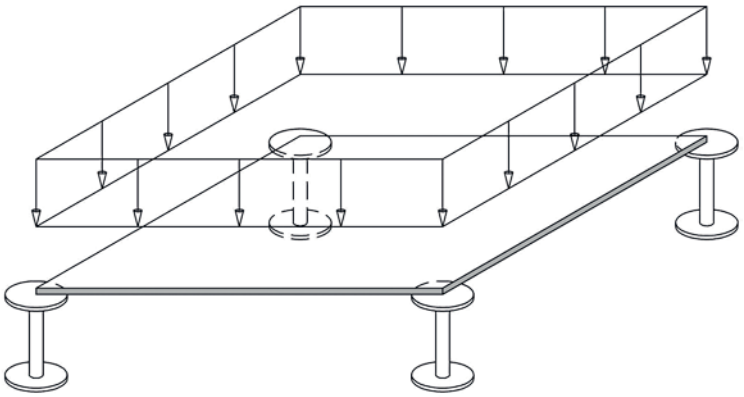


9. Support elements



10. Load table

Uniformly distributed load table - Static load



Bending strength	9	N/mm²
Modulus of Elasticity in bending	4500	N/mm²

Load table 400x400mm q (kN/m²)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	21,2	10,6	7,1
21 (*)	26,0	13,0	8,7
22	28,5	14,3	9,5
24 (*)	34,0	17,0	11,3
25	36,9	18,4	12,3
28	46,3	23,1	15,4
32	60,5	30,3	20,2
36	76,7	38,3	25,6
40	94,7	47,3	31,6

(*) Thickness only produced in sanded board

Load table 500x500mm q (kN/m²)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	13,5	6,7	4,5
21 (*)	16,5	8,2	5,5
22	18,1	9,0	6,0
24 (*)	21,5	10,8	7,2
25	23,4	11,7	7,8
28	29,4	14,7	9,8
32	38,5	19,2	12,8
36	48,7	24,4	16,2
40	60,2	30,1	20,1

(*) Thickness only produced in sanded board

Load table 600x600mm q (kN/m²)

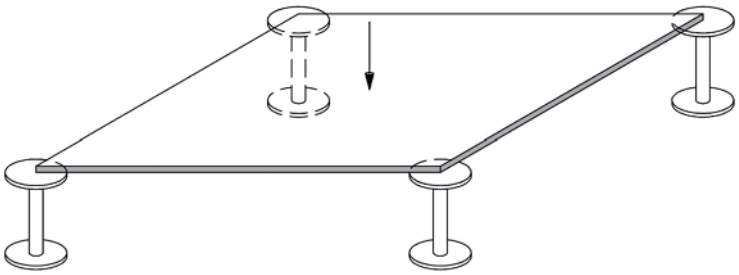
Thickness	Collapse	FS = 2.0	FS = 3.0
19	9,3	4,6	3,1
21 (*)	11,4	5,7	3,8
22	12,5	6,2	4,2
24 (*)	14,9	7,4	5,0
25	16,2	8,1	5,4
28	20,3	10,2	6,8
32	26,6	13,3	8,9
36	33,7	16,9	11,2
40	41,7	20,9	13,9

(*) Thickness only produced in sanded board

Note: These values were calculated analytically.

11. Load table

Concentrated load table - Static load



Bending strength	9	N/mm²
Modulus of Elasticity in bending	4500	N/mm²

Load table 400x400mm Q (kN)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	1,3	0,7	0,4
21 (*)	1,6	0,8	0,5
22	1,8	0,9	0,6
24 (*)	2,1	1,1	0,7
25	2,3	1,1	0,8
28	2,9	1,4	1,0
32	3,8	1,9	1,3
36	4,8	2,4	1,6
40	5,9	2,9	2,0

(*) Thickness only produced in sanded board

Load table 500x500mm Q (kN)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	1,3	0,6	0,4
21 (*)	1,5	0,8	0,5
22	1,7	0,8	0,6
24 (*)	2,0	1,0	0,7
25	2,2	1,1	0,7
28	2,7	1,4	0,9
32	3,6	1,8	1,2
36	4,5	2,3	1,5
40	5,6	2,8	1,9

(*) Thickness only produced in sanded board

Load table 600x600mm Q (kN)

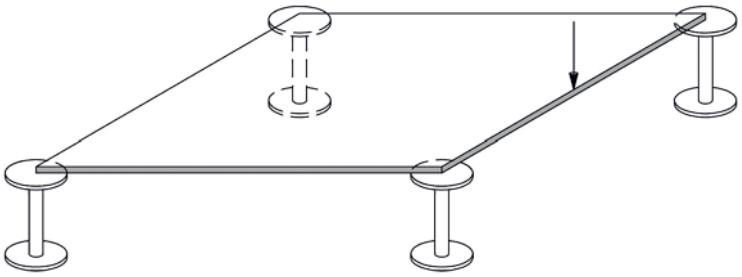
Thickness	Collapse	FS = 2.0	FS = 3.0
19	1,2	0,6	0,4
21 (*)	1,5	0,7	0,5
22	1,6	0,8	0,5
24 (*)	1,9	1,0	0,6
25	2,1	1,0	0,7
28	2,6	1,3	0,9
32	3,4	1,7	1,1
36	4,4	2,2	1,5
40	5,4	2,7	1,8

(*) Thickness only produced in sanded board

Note: These values were calculated analytically.

12. Load table

Edge Concentrated load table - Static load



Bending strength	9	N/mm²
Modulus of Elasticity in bending	4500	N/mm²

Load table 400x400mm Q (kN)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	0,6	0,3	0,2
21 (*)	0,7	0,4	0,2
22	0,8	0,4	0,3
24 (*)	1,0	0,5	0,3
25	1,0	0,5	0,3
28	1,3	0,7	0,4
32	1,7	0,9	0,6
36	2,2	1,1	0,7
40	2,7	1,3	0,9

(*) Thickness only produced in sanded board

Load table 500x500mm Q (kN)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	0,6	0,3	0,2
21 (*)	0,7	0,3	0,2
22	0,8	0,4	0,3
24 (*)	0,9	0,5	0,3
25	1,0	0,5	0,3
28	1,2	0,6	0,4
32	1,6	0,8	0,5
36	2,0	1,0	0,7
40	2,5	1,3	0,8

(*) Thickness only produced in sanded board

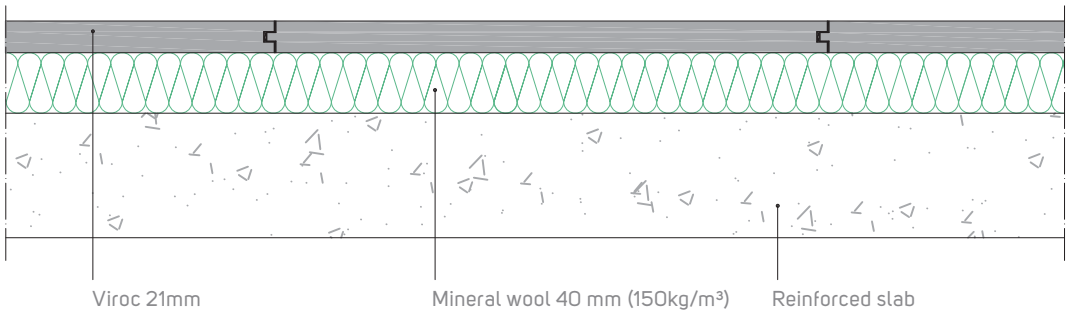
Load table 600x600mm Q (kN)

Thickness	Collapse	FS = 2.0	FS = 3.0
19	0,5	0,3	0,2
21 (*)	0,7	0,3	0,2
22	0,7	0,4	0,2
24 (*)	0,9	0,4	0,3
25	0,9	0,5	0,3
28	1,2	0,6	0,4
32	1,5	0,8	0,5
36	2,0	1,0	0,7
40	2,4	1,2	0,8

(*) Thickness only produced in sanded board

Note: These values were calculated analytically.

Viroc pavement with mineral wool



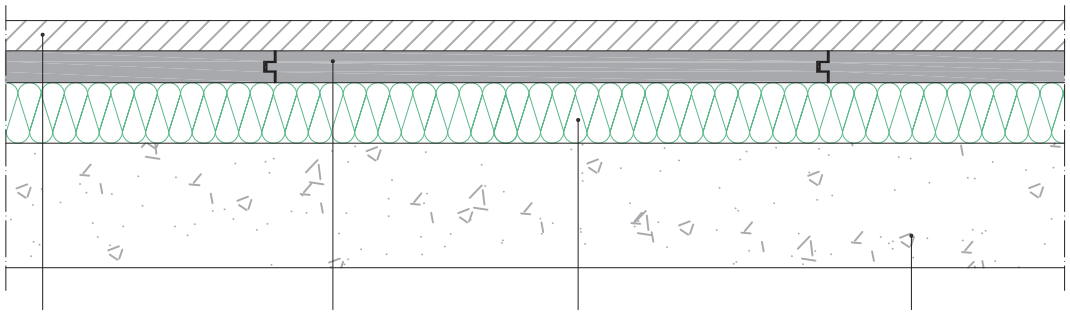
ΔL_w (dB) = 24.6

$C_{l,r}$ (dB) = 1.7

$C_{l\Delta}$ (dB) = -12.7

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	3.6	0.2	7.5	7.8	19.5	19.1	19.8	25.2	27.0	32.1	35.0	37.6	40.7	40.6	45.5	48.1	52.4	55.7

Viroc pavement with mineral wool, coated with ceramic



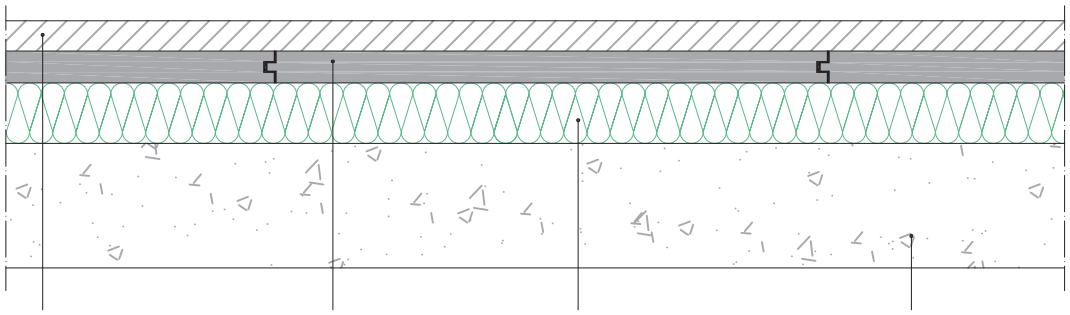
ΔL_w (dB) = 25

$C_{l,r}$ (dB) = 3.1

$C_{l\Delta}$ (dB) = -14.1

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	0.0	0.0	6.2	13.4	18.4	18.2	20.4	23.9	27.2	29.2	33.0	35.5	36.3	37.5	40.9	40.7	43.8	44.2

Viroc pavement with mineral wool, coated with ceramic and cork



ΔL_w (dB) = 26.9

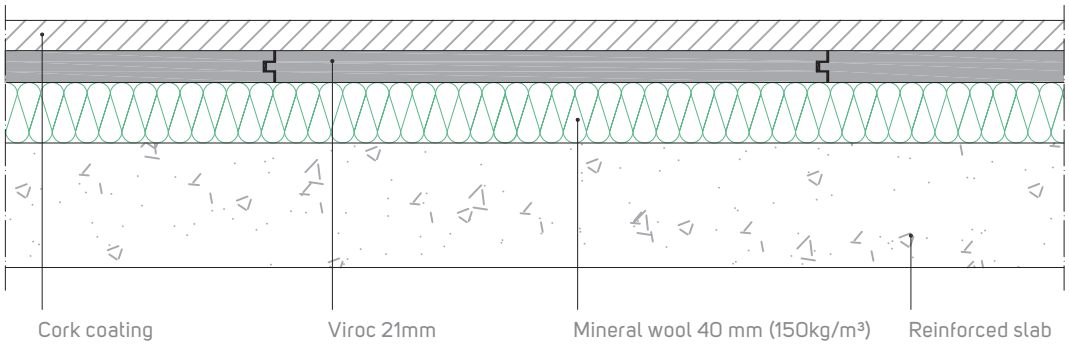
$C_{l,r}$ (dB) = 2.2

$C_{l\Delta}$ (dB) = -13.2

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	1.9	5.1	9.0	11.4	18.9	21.5	19.2	23.1	25.5	29.0	32.7	35.0	37.7	35.7	35.5	40.8	41.0	36.9

Tests performed according to EN ISO 140-8 and EN ISO 717-2.

Viroc pavement with mineral wool, coated with cork



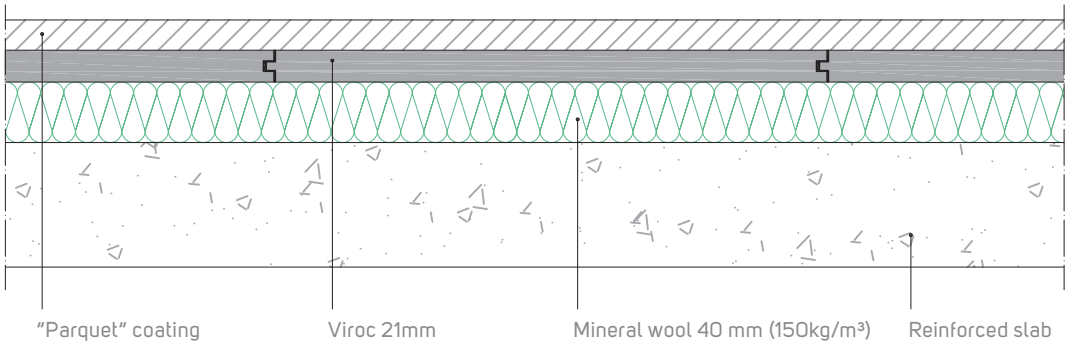
ΔL_w (dB) = 23

$C_{l,r}$ (dB) = 1.5

$C_{l\Delta}$ (dB) = -12.5

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	0.0	0.0	4.4	9.2	15.9	18.4	19.9	26.0	30.4	37.7	42.0	48.3	53.1	56.0	61.2	64.6	74.9	72.4

Viroc pavement with mineral wool, coated with "parquet"



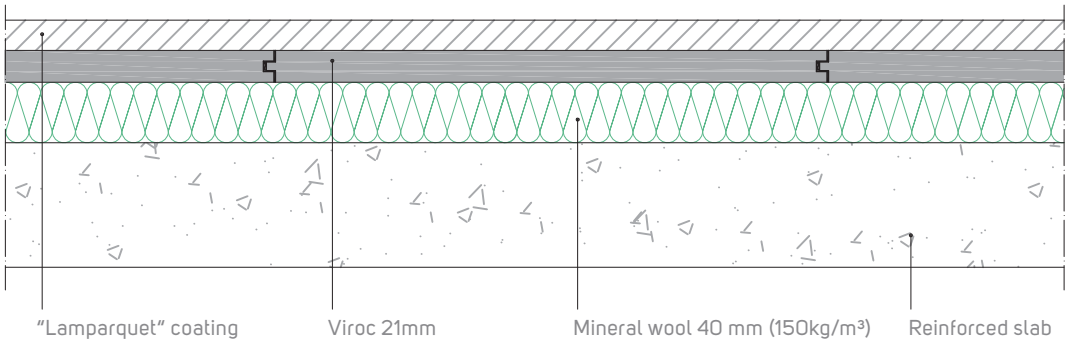
ΔL_w (dB) = 24.3

$C_{l,r}$ (dB) = 2.3

$C_{l\Delta}$ (dB) = -13.3

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	0.3	0.0	6.8	9.6	17.2	21.7	22.8	31.8	35.4	42.9	47.3	52.5	56.4	57.7	62.6	62.5	61.0	59.4

Viroc pavement with mineral wool, coated with "Lamparquet"



ΔL_w (dB) = 24.0

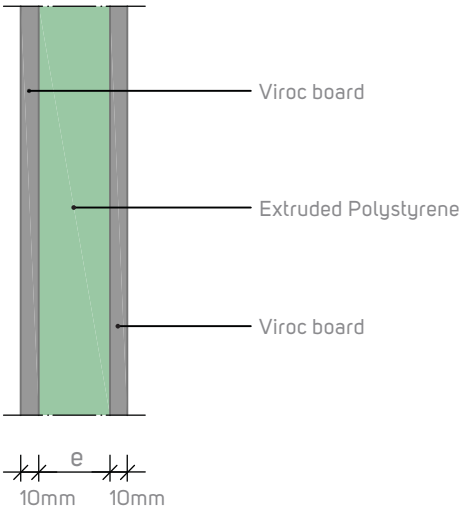
$C_{l,r}$ (dB) = 2.1

$C_{l\Delta}$ (dB) = -13.1

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
ΔL (dB)	0.0	0.5	6.2	9.0	18.3	18.2	21.2	28.6	33.6	37.5	40.3	43.2	45.3	40.4	40.1	46.0	46.5	41.9

Tests performed according to EN ISO 140-8 and EN ISO 717-2.

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

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