Echo linear®

You're in a noisy restaurant, the din making conversation impossible. At a stadium, hearing the one concert seven different times—simultaneously. On the phone, whispering to avoid being eavesdropped in the adjacent office. It's unpleasant, uncomfortable.

At the other extreme lies the anechoic chamber—a space so acoustically dead, you can barely hear, let alone recognise, the sound of your own voice. A sensation that produces profound unease. **Why?**

Because the way you experience an environment is the product of all your senses. Less than optimal acoustics in any enclosed space will leave you less relaxed and less productive.

Herein lies the beauty of Echolinear.
Its effectiveness, adaptability and appearance free you to create or retrofit any shape environment and achieve total acoustic comfort, without compromising design integrity or intention.

Sounds Like a Plan

Echolinear panelling combines highly effective acoustic absorption, with a pure architectural aesthetic and materiality that is durable, E0 and FSC pure.

Its invisible mounting system is suited equally to walls and ceilings, where the precision jointing of its component planks forms a smooth, seamless surface.

Echolinear is in widespread use throughout Australia, and features in many award-winning commercial, residential, educational and community buildings, including:

Reserve Bank of Australia New South Wales *Hassell*
Ipswich Law Courts Queensland *Cox*
Trinity Grammar Victoria *Hamiltons Commercial Interiors*
Thomson Playford Cutlers South Australia *MPH Architects*
Bovis Lend Lease Queensland *PDT Architects*
Deacons New South Wales *Carr Design*
UTS New South Wales *Gardner Wetherill + Associates*
CSR New South Wales *Colliers International*
BHP Yandi Western Australia *T&Z*
Clayton Utz New South Wales *Bates Smart*

See more examples on our website at **eltongroup.com**

Sound in Theory & Practice

Each Echolinear plank features an arrangement of drilled perforations and visible horizontal millings, backed by sound-deadening material.

The small surface interruptions formed by the drillings and millings act as multiple resonance chambers. Sound waves entering a chamber are dissipated by friction, particularly those of medium frequency, such as the spoken word.

Four different drilling and milling combinations are available, each with high sound absorption coefficients for the complete range of audible frequencies, but differing application—specific nuances.

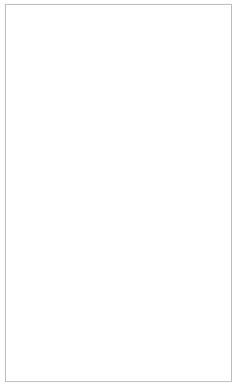
Echolinear can thus be employed in a wide range of demanding situations where acoustic quality is necessary for amenity and function—from the work place and public spaces, to private homes, residential buildings, restaurants, auditoriums, cinemas and sports facilities.

Architecturally Sound

Echolinear planks are 4086mm long, 128mm wide and are available in a range of colourways. The rapid mounting system is ingenious; planks just click into place using a tongue and groove style mechanism teamed with snap lock clips. With such slimline components and no visible fixings, Echolinear panelled surfaces read as a perfect, uniform whole, with a compelling linear aesthetic.

Colours are representative only, please review samples for true colour accuracy.

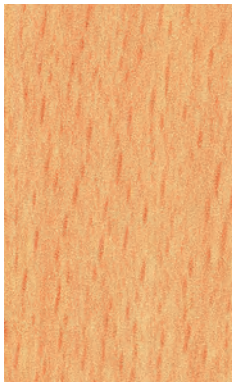
Length 4086mm **Width** 128mm **Depth** 16mm



White

Oak

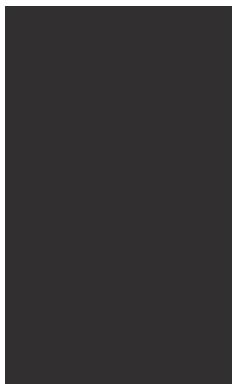
Maple



Beech

Aluminium

Graphite



Black

Wenge

Sound Qualities

In addition to its technological sophistication, Echolinear is an immensely practical solution for creating acoustic comfort.

The planks have a durable melamine facing, which is resistant to abrasion, sunlight and cleaning products in accordance with UNI standards, and can simply be wiped clean with a cloth. If a plank is damaged, the component-based nature of Echolinear means only the compromised plank need be replaced.

Echolinear also has impressive sustainability credentials:

— installations can be demounted as quickly and easily as they are fitted, and the panelling re-located or re-used.
— Echolinear planks are made from E0, Moisture Resistant, FSC pure, Medium Density Fibreboard.
— when combined with optional rockwool panels, Echolinear installations can contribute to the thermal insulation of a space.

Physical & Mechanical Characteristics	Test Method	Unit of Measurement	Performance Level
Class E1	EN 120	mg/100g	8
Evaluation of Resistance to Dry Heat	UNI EN 12722	Class	B*
Evaluation of Resistance to Steam	UNI EN 12721	Class	B*
Resistance to Temperature Variations	UNI EN 12721	Level	5
Resistance to Dirt	UNI 9300	Level	5
Surface Resistance to Various Products	UNI EN 12720	Class	B*
Resistance to Light	UNI 9427	Level	5
Adhesion of Finishes to Base	UNI 9240	N/mm2	1,5
Flame Test	CE	Class	B–S2 d0
Resistance to Wear by Abrasion	UNI 9115	Level	4
Resistance to Scratching	UNI 9428	Level	4

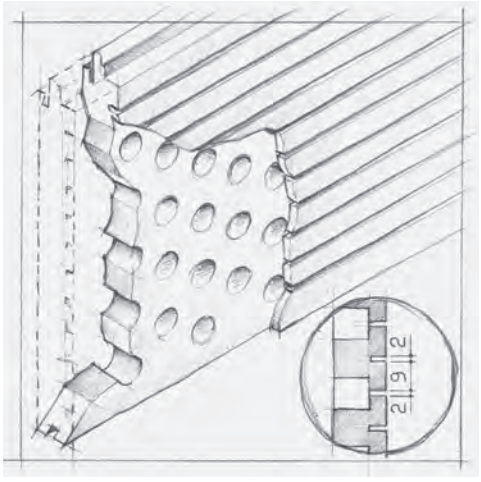
In accordance with UNI U41101400

Installation

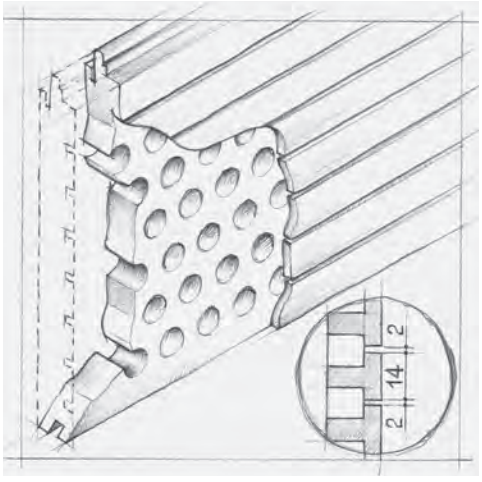
Sounds Impressive

Used with or without optional rockwool insulation panels, all four different millings of Echolinear panelling deliver highly effective sound absorption across a broad frequency spectrum.

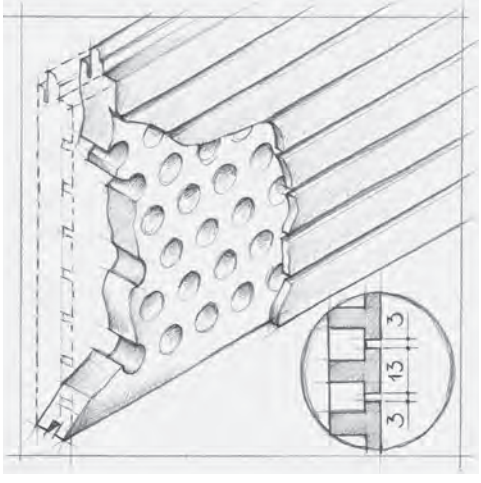
As the following ISO 354 measurements show, the unique combinations of millings and drillings imbue each of the four with particular characteristics that lend themselves to specific environments.



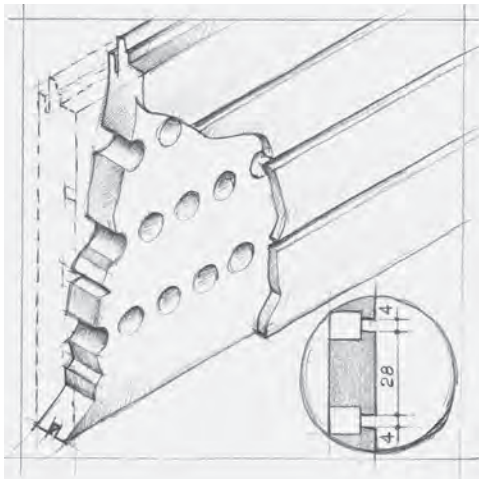
Type 9/2 6% Perforation



Type 14/2 7% Perforation



Type 13/3 12% Perforation



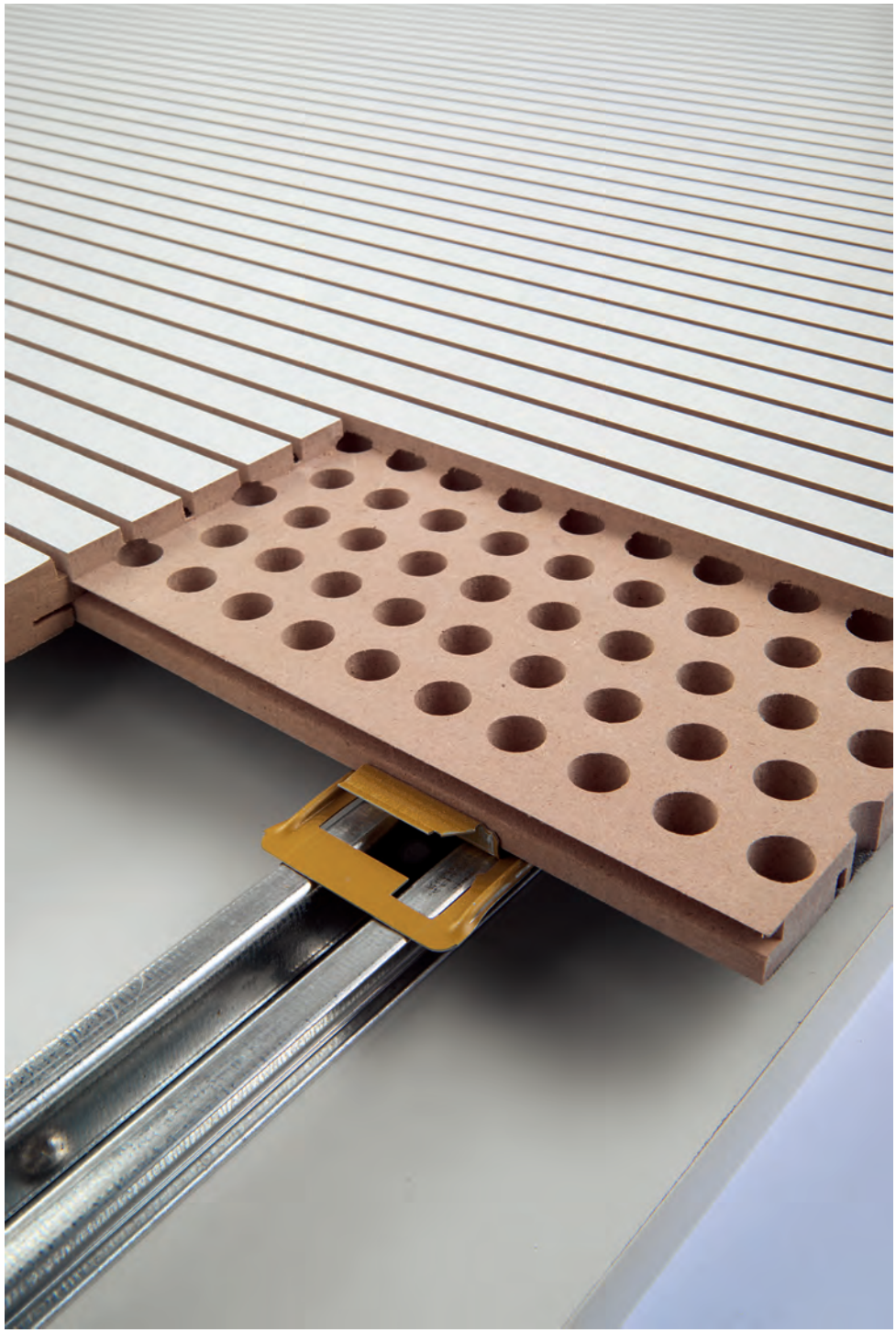
Type 28/4 7.5% Perforation

Common Characteristics
Material & Dimensions

Support Material
MDF 16 mm E0
Absolute Density 760 kg/m3

Visible Surface
Melamine
Aluminium / Beech / Black / Graphite / Oak / Maple / Wenge / White /
Other colours are available, please contact Elton Group
Timber Veneer
Contact Elton Group for finishes options (Lead times apply)
Powder Coat
High Gloss

Rear Surface
Black non-woven fabric, bonded
Strip Length 4086mm
Strip Width 128mm
Tolerances
Width ±0.1 mm / Length ±2mm
Long Edges
With male-female slotted joint
Short Edges
Square cut end (90°)



Test Results for Echolinear and Topakustik
by Fantoni Group

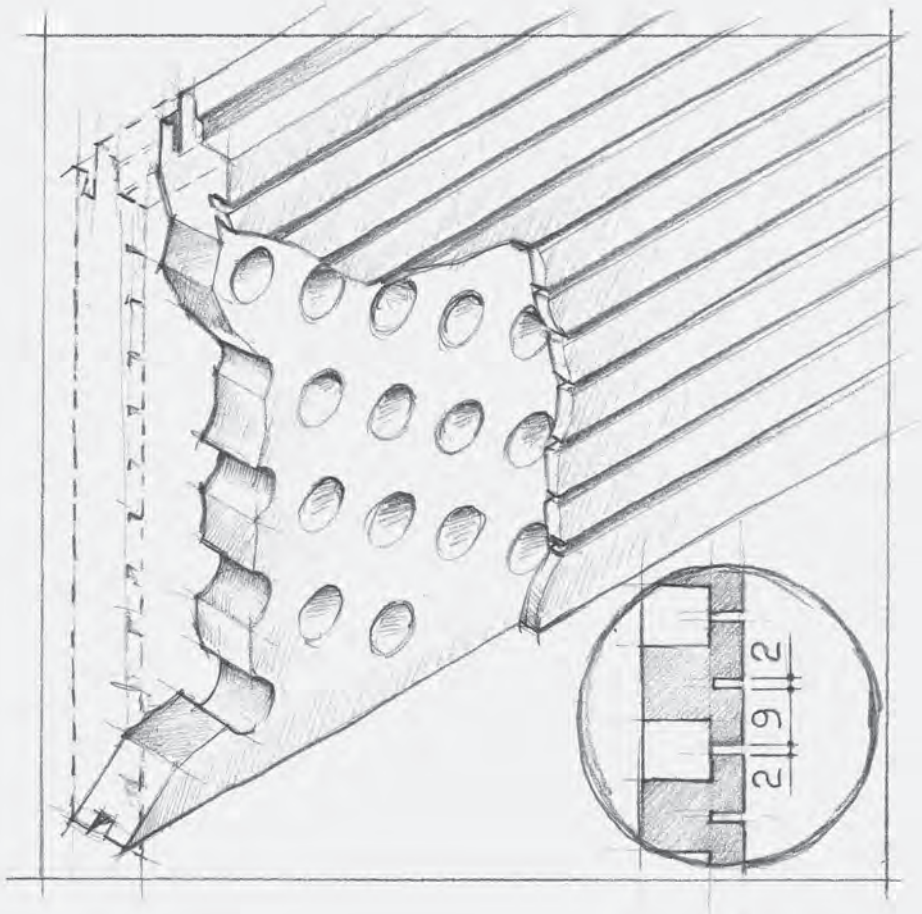
Echolinear 9/2
6% Perforation

Sound-deadening capacity according to ISO354

Measurements in Reverberation Chamber

Volume 214.3m³
Temperature 20°C
Air Humidity 55%
Area Covered 12m²

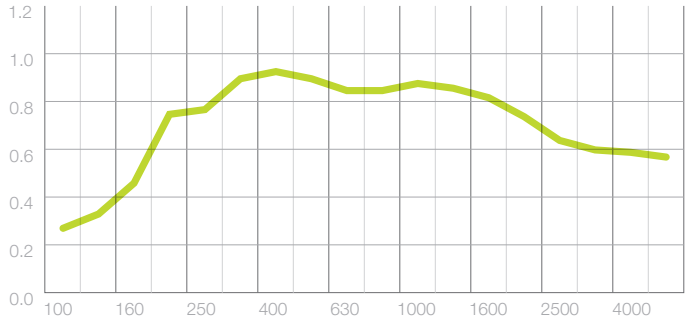
Echolinear 9/2

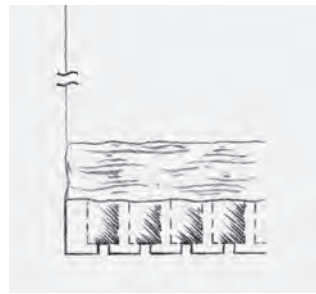


Noise Reduction
Coefficients
↓

Sound Absorption
Average Values
↓

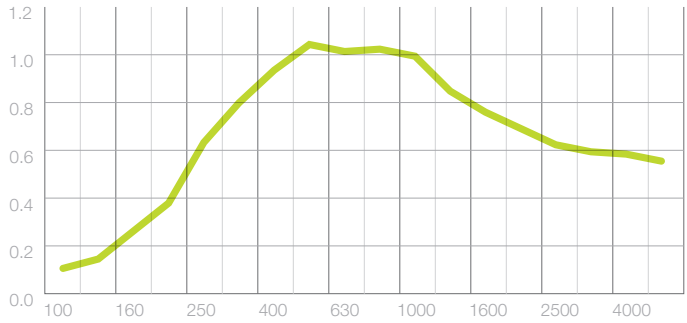
Free Space Behind 170mm
Mineral Wool 30mm
NRC 0.85

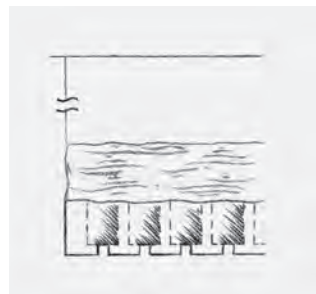




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.27**	**0.33**	**0.46**	**0.75**	**0.77**	**0.90**	**0.93**	**0.90**	**0.85**	**0.85**	**0.88**	**0.86**	**0.82**	**0.74**	**0.64**	**0.60**	**0.59**	**0.57**

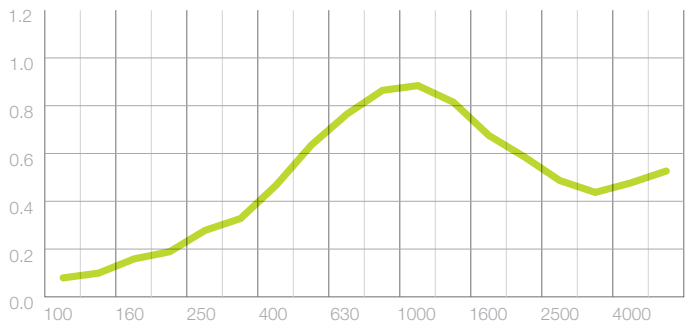
Free Space Behind 10mm
Mineral Wool 30mm
NRC 0.85

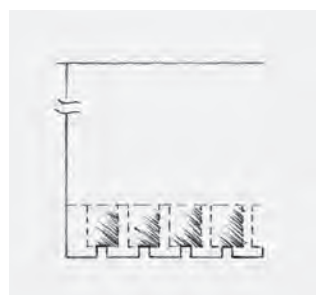




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.10**	**0.14**	**0.26**	**0.38**	**0.64**	**0.81**	**0.95**	**1.06**	**1.03**	**1.04**	**1.01**	**0.86**	**0.77**	**0.70**	**0.63**	**0.60**	**0.59**	**0.56**

Free Space Behind 40mm
Without Mineral Wool
NRC 0.60





Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.08**	**0.10**	**0.16**	**0.19**	**0.28**	**0.33**	**0.47**	**0.64**	**0.77**	**0.87**	**0.89**	**0.82**	**0.68**	**0.59**	**0.49**	**0.44**	**0.48**	**0.53**

Test Results for Echolinear and Topakustik
by Fantoni Group

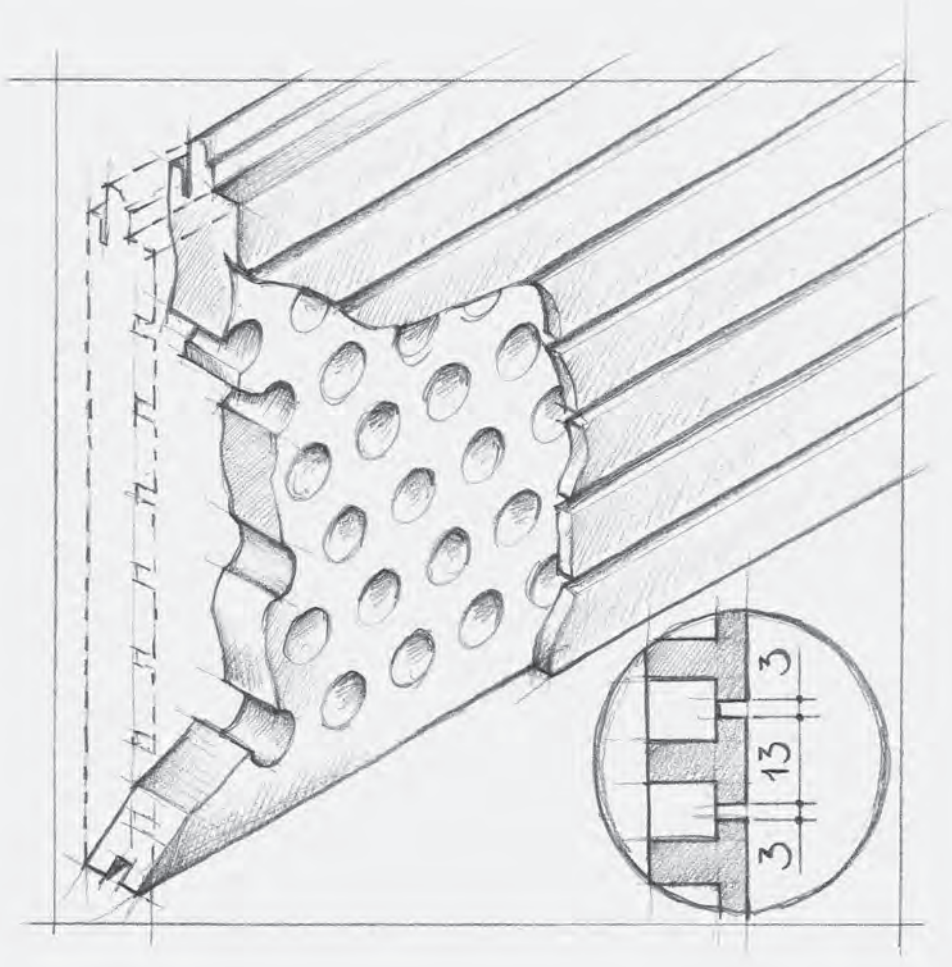
Echolinear 13/3
12% Perforation

Sound-deadening capacity according to ISO354

Measurements in
Reverberation Chamber

Volume A 211m³ / **C** 214.3m³
Temperature A 21°C / **C** 20°C
Air Humidity A 52% / **C** 55%
Area Covered A 12m² / **C** 3m²

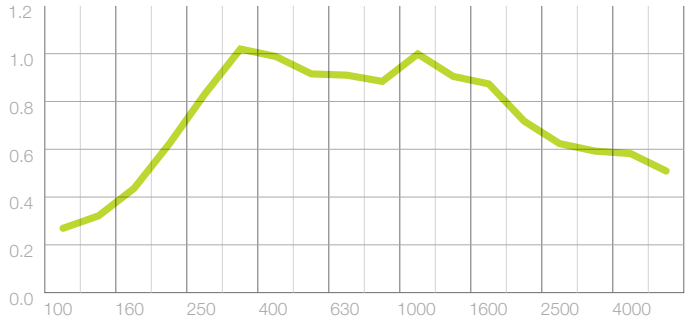
Echolinear 13/3

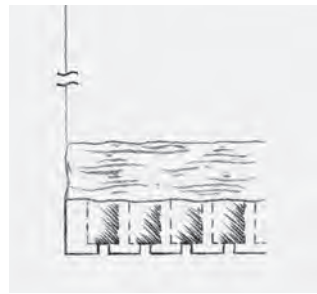


Noise Reduction Coefficients ↓

Sound Absorption Average Values ↓

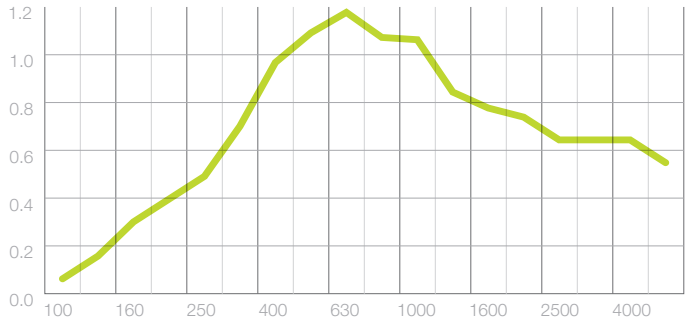
Free Space Behind 200mm
Mineral Wool 30mm
NRC 0.90

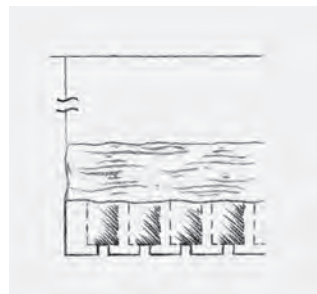




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.29**	**0.34**	**0.45**	**0.63**	**0.83**	**1.01**	**0.98**	**0.90**	**0.90**	**0.88**	**0.99**	**0.90**	**0.87**	**0.72**	**0.63**	**0.60**	**0.59**	**0.52**

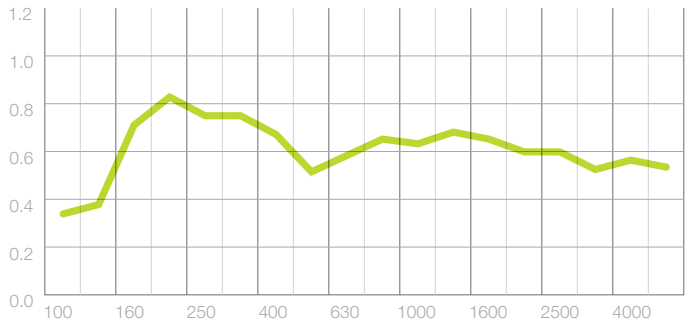
Free Space Behind 10mm
Mineral Wool 30mm
NRC 0.85

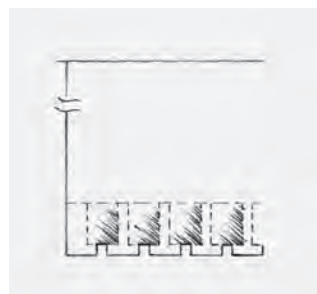




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.06**	**0.16**	**0.31**	**0.41**	**0.51**	**0.73**	**1.01**	**1.14**	**1.23**	**1.12**	**1.11**	**0.88**	**0.81**	**0.77**	**0.67**	**0.67**	**0.67**	**0.57**

Free Space Behind 400mm
Without Mineral Wool
NRC 0.65





Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.34**	**0.38**	**0.72**	**0.84**	**0.76**	**0.76**	**0.68**	**0.52**	**0.59**	**0.66**	**0.64**	**0.69**	**0.66**	**0.60**	**0.60**	**0.53**	**0.57**	**0.54**

Test Results for Echolinear and Topakustik
by Fantoni Group

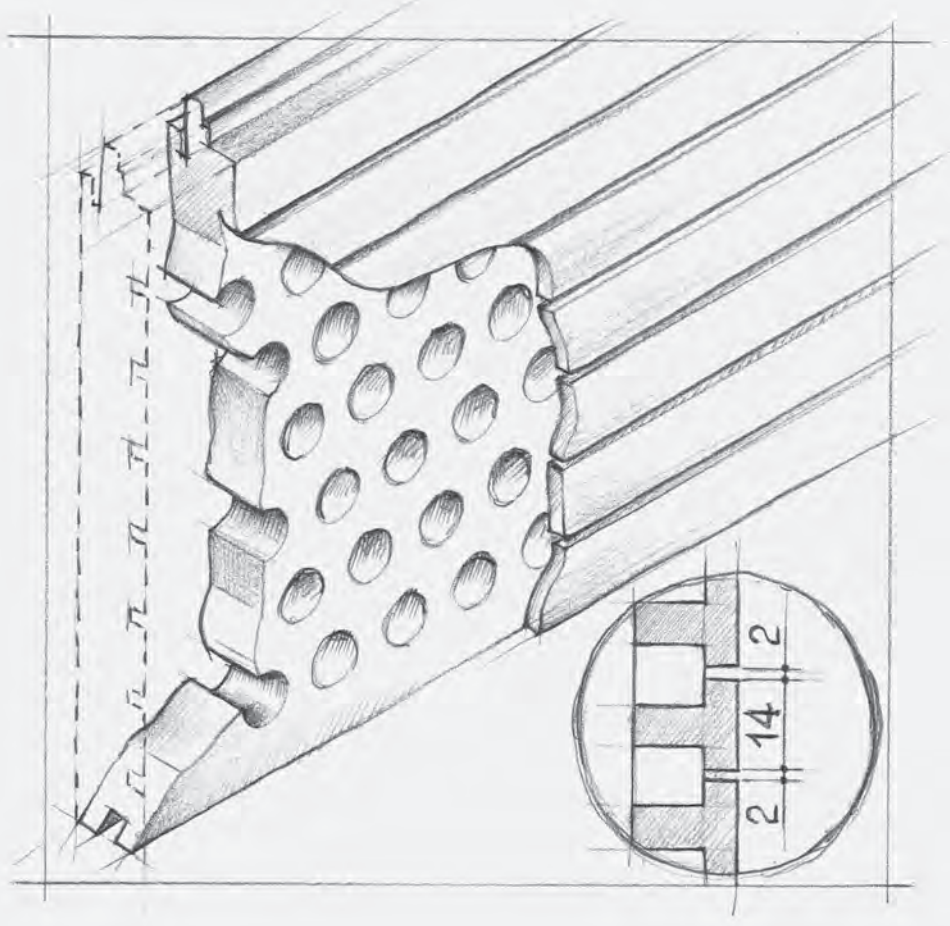
Echolinear 14/2
7% Perforation

Sound-deadening capacity according to ISO354

Measurements in Reverberation Chamber

Volume 214.3m³
Temperature 20°C
Air Humidity 55%
Area Covered 12m²

Echolinear 14/2



Noise Reduction
Coefficients
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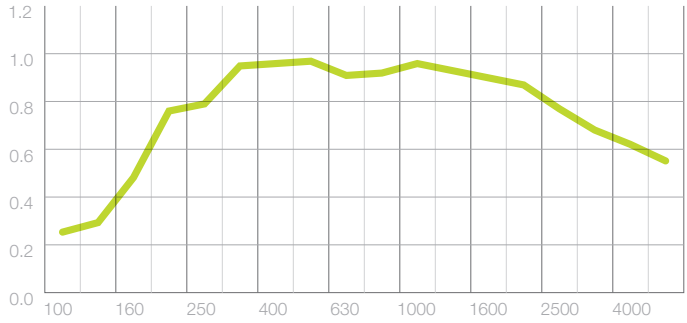
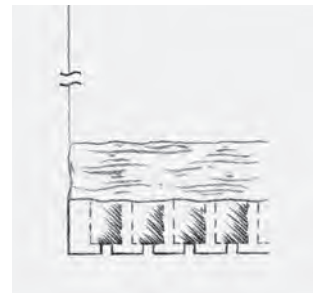
Sound Absorption
Average Values
↓

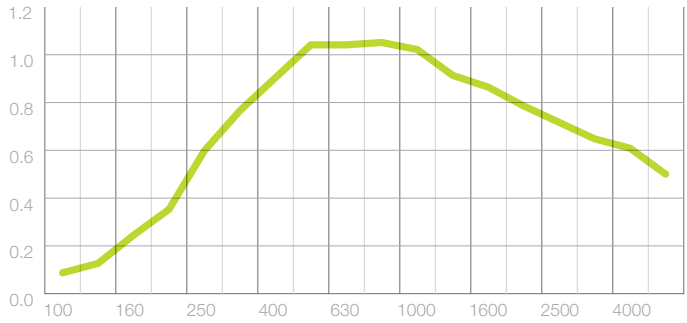
Free Space Behind 170mm
Mineral Wool 30mm
NRC 0.90

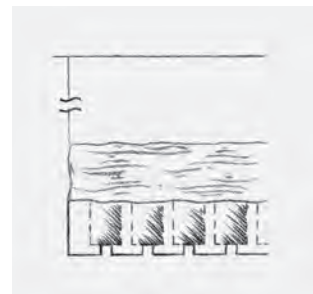




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.23**	**0.27**	**0.46**	**0.74**	**0.77**	**0.93**	**0.94**	**0.95**	**0.89**	**0.90**	**0.94**	**0.91**	**0.88**	**0.85**	**0.75**	**0.66**	**0.60**	**0.53**

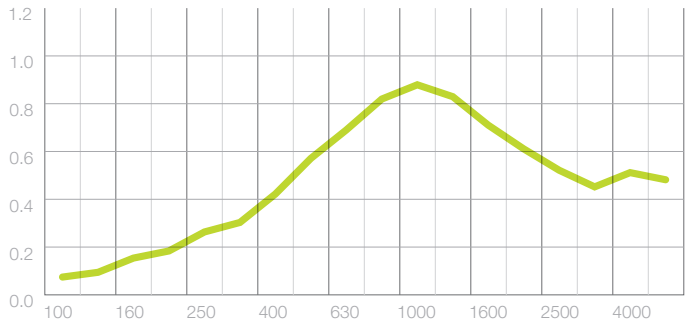
Free Space Behind 10mm
Mineral Wool 30mm
NRC 0.85

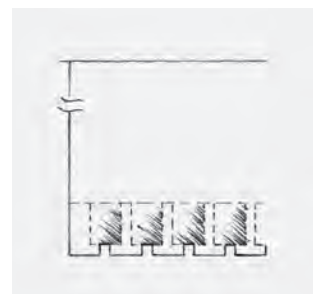




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.08**	**0.12**	**0.24**	**0.35**	**0.60**	**0.77**	**0.91**	**1.05**	**1.05**	**1.06**	**1.03**	**0.92**	**0.87**	**0.79**	**0.72**	**0.65**	**0.61**	**0.50**

Free Space Behind 40mm
Without Mineral Wool
NRC 0.60





Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.06**	**0.08**	**0.14**	**0.17**	**0.25**	**0.29**	**0.41**	**0.56**	**0.68**	**0.81**	**0.87**	**0.82**	**0.70**	**0.60**	**0.51**	**0.44**	**0.50**	**0.47**

Test Results for Echolinear and Topakustik
by Fantoni Group

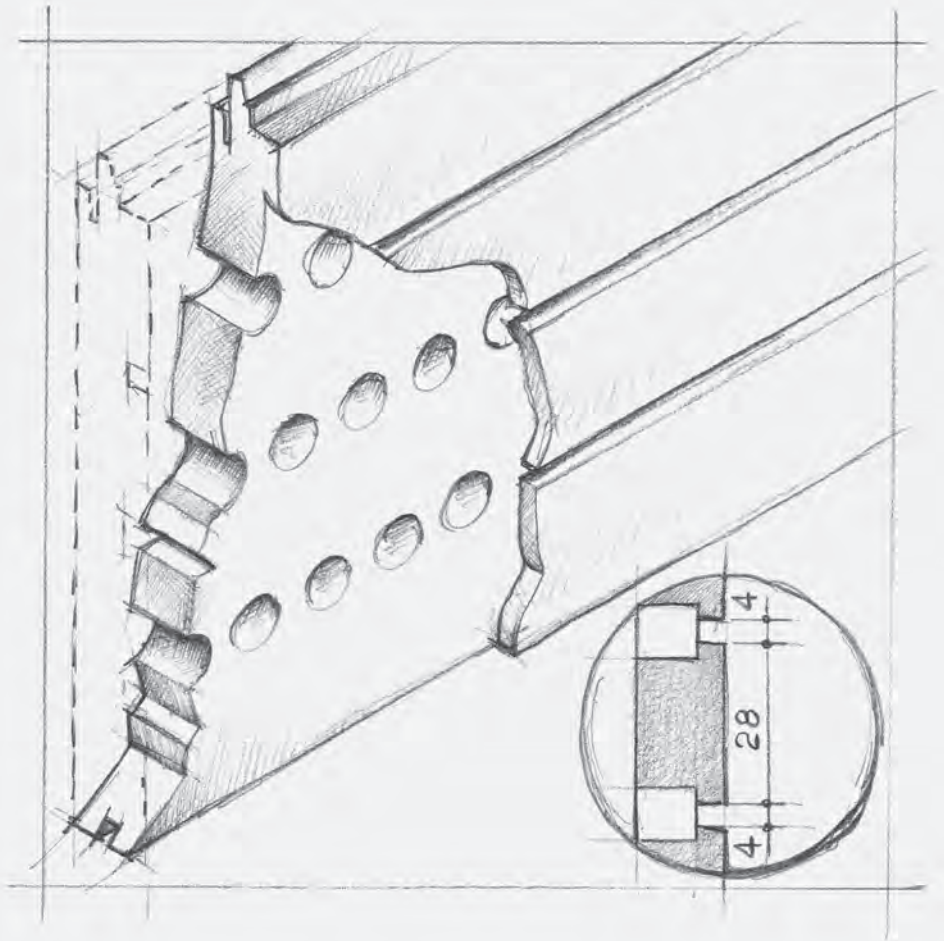
Echolinear 28/4
7.5% Perforation

Sound-deadening capacity according to ISO354

Measurements in Reverberation Chamber

Volume 218m³
Temperature 13°C
Air Humidity 80%
Area Covered 10m²

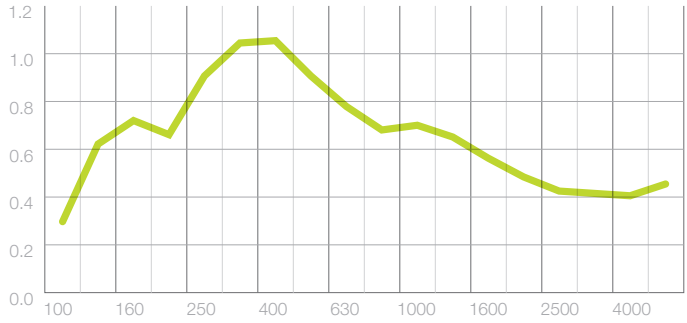
Echolinear 28/4

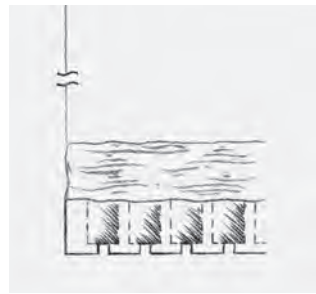


Noise Reduction
Coefficients
↓

Sound Absorption
Average Values
↓

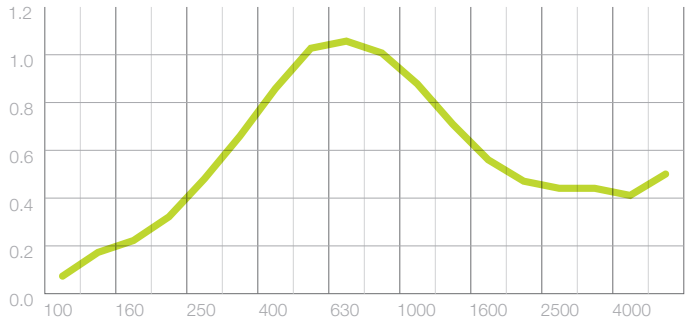
Free Space Behind 170mm
Mineral Wool 30mm
NRC 0.80

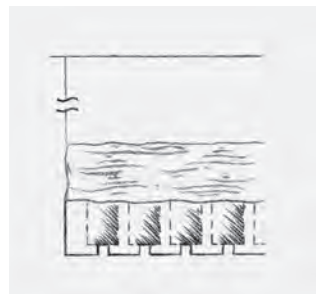




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.32**	**0.65**	**0.75**	**0.69**	**0.94**	**1.08**	**1.09**	**0.94**	**0.81**	**0.71**	**0.73**	**0.68**	**0.59**	**0.51**	**0.45**	**0.44**	**0.43**	**0.48**

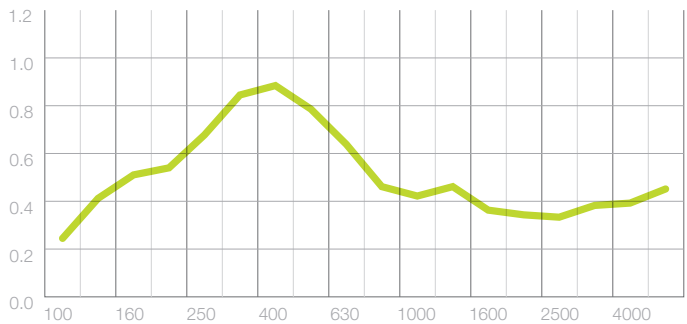
Free Space Behind 0mm
Mineral Wool 30mm
NRC 0.85

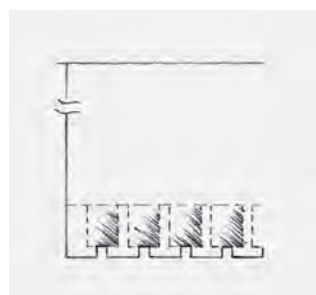




Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.07**	**0.17**	**0.22**	**0.32**	**0.48**	**0.66**	**0.86**	**1.03**	**1.06**	**1.01**	**0.88**	**0.71**	**0.56**	**0.47**	**0.44**	**0.44**	**0.41**	**0.50**

Free Space Behind 200mm
Without Mineral Wool
NRC 0.60





Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Result	**0.25**	**0.42**	**0.52**	**0.55**	**0.69**	**0.86**	**0.90**	**0.80**	**0.65**	**0.47**	**0.43**	**0.47**	**0.37**	**0.35**	**0.34**	**0.39**	**0.40**	**0.46**

Sound Advice
Storage & Acclimatisation

You must store Echolinear packs indoors and protect them from moisture and humidity; 48 hours prior to installing, open the Echolinear packs in the installation location and allow the planks to stabilise at the ambient conditions.

The environment in which you are installing Echolinear must have been conditioned prior for at least 24 hours, and have a temperature of at least 15°C and humidity between 40% and 60%.

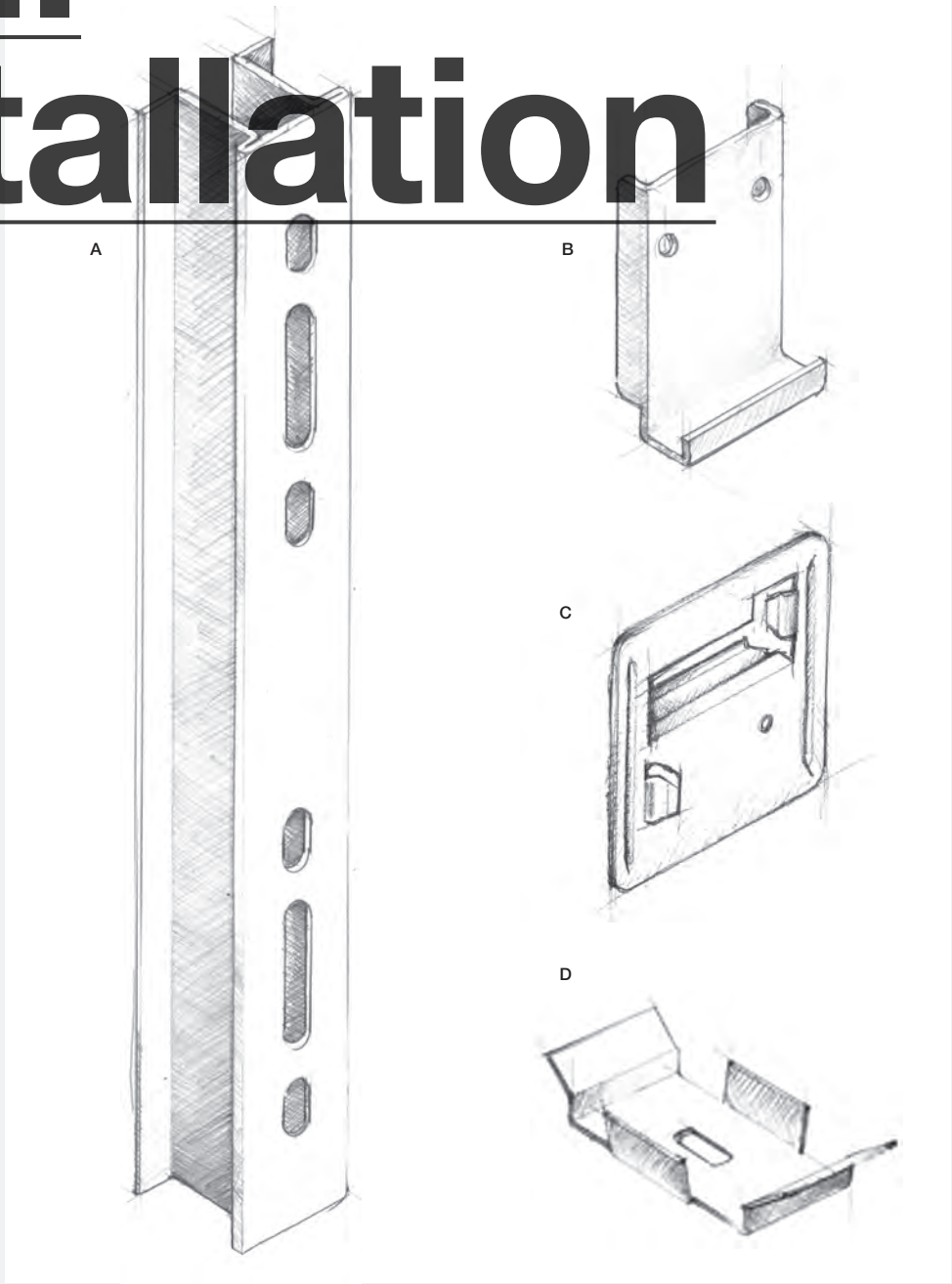
Mounting System Structure

When using Echolinear as acoustic wall cladding, you will require the following support structure parts and materials:

A Metal omega support rails 3000 x 18 x 26mm
B Starter clips
C Clips for anchoring planks to the omega rails and screws for securing the clips
— Fixing accessories / either self-tapping screws, or screws plus expansion fixings, depending on the type of support wall (third party supplied)
— Rockwool insulation panels (Optional – third party supplied)

D Finishing clip to secure last plank

Wall Installation



Installation

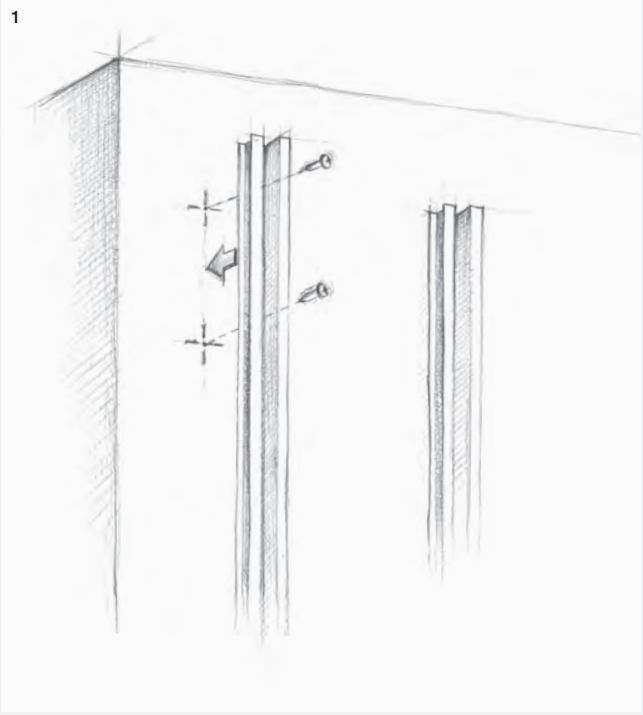
1 Secure the metal omega rails to the wall at intervals of no more than 600mm, and at right angles to the orientation of the Echolinear planks.

2 Then lay rockwool between the rails.

3 For horizontal orientations, mount the first plank with the female side towards the floor and secure it with the special starter clips;

4 Then insert the clips to anchor the male side.

1



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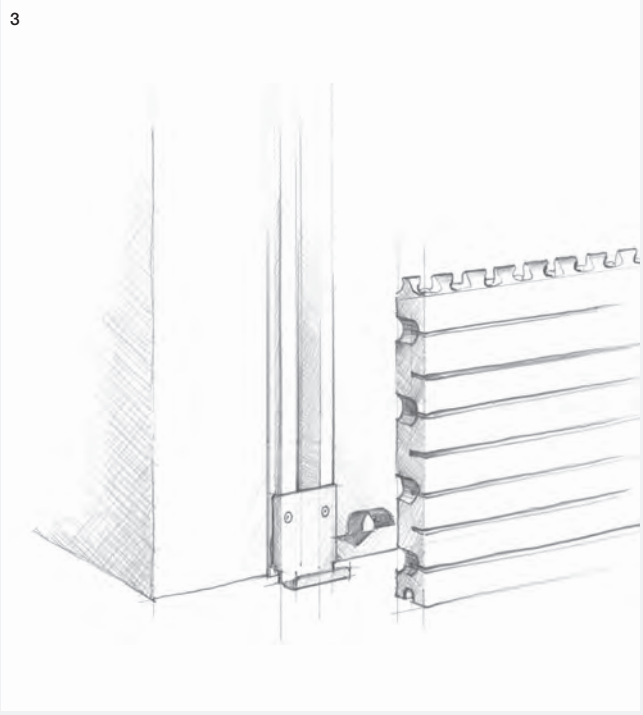

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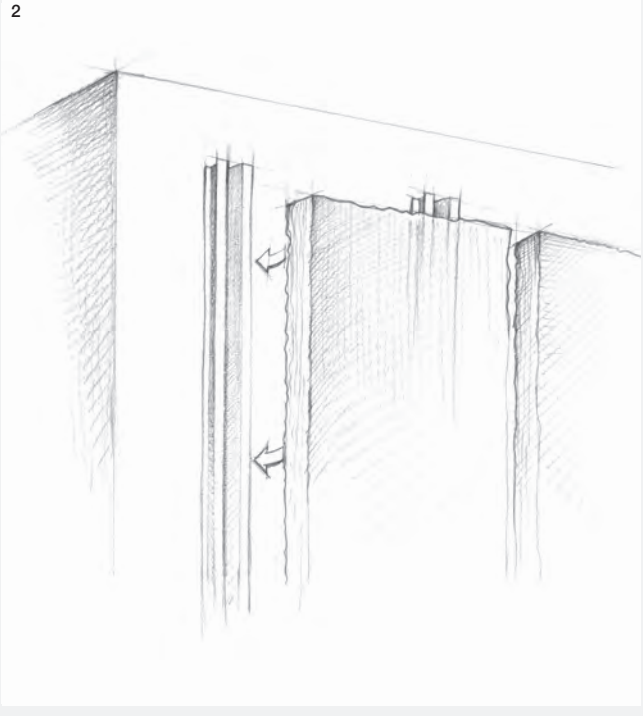

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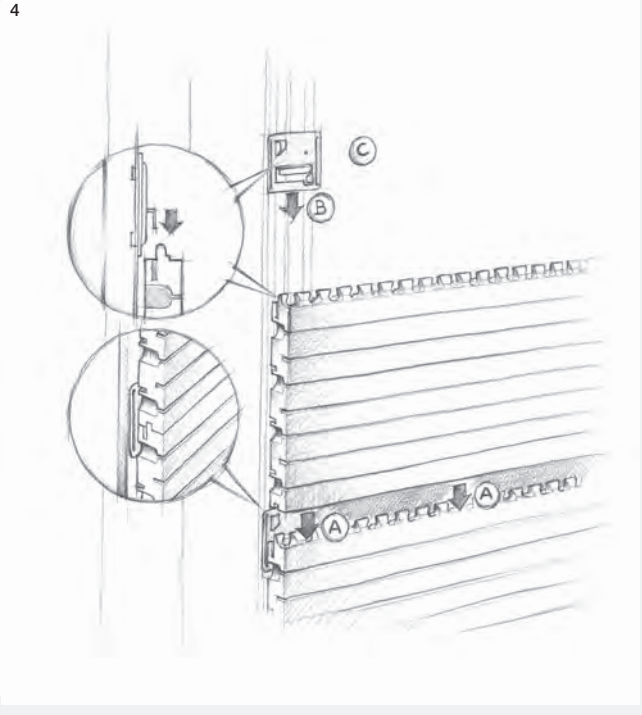
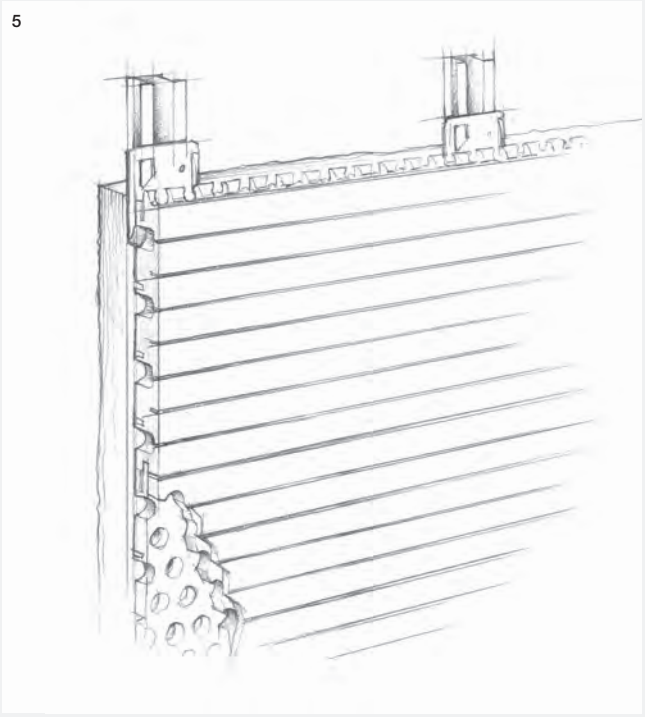


5 Mount subsequent planks above the first, securing them in the same way.

6 Joining spring to secure abutting plank ends together. Rear view shown.

It is recommended that you screw fix at least every fourth clip to the support structure omega rail by means of the self tapping screws provided.

5



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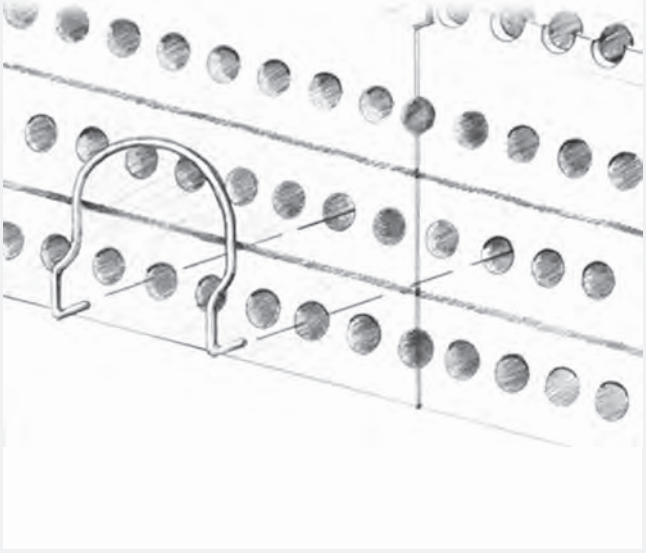


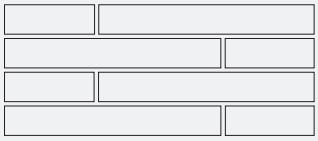
Jointing

You have various jointing options when laying Echolinear planks end to end, including:
- leaving a gap between the two planks, the same width as the milling
- butt-joining the ends in a random or hinged configuration, and securing them together using the special joining springs (to a maximum of two planks).

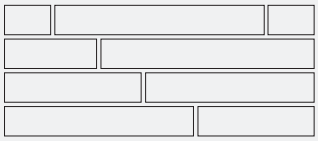
When deciding between these alternatives, remember that the length of Echolinear planks can vary according to differing environmental humidity conditions.

Walls requiring the jointing of more than two planks require expansion joints to be designed into the installation.

Hinge Type



Staggered Type



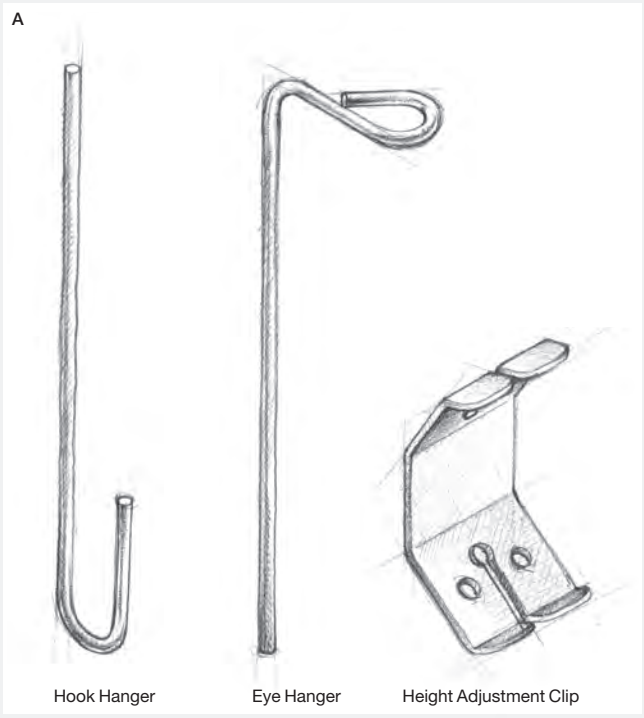
Serial Type

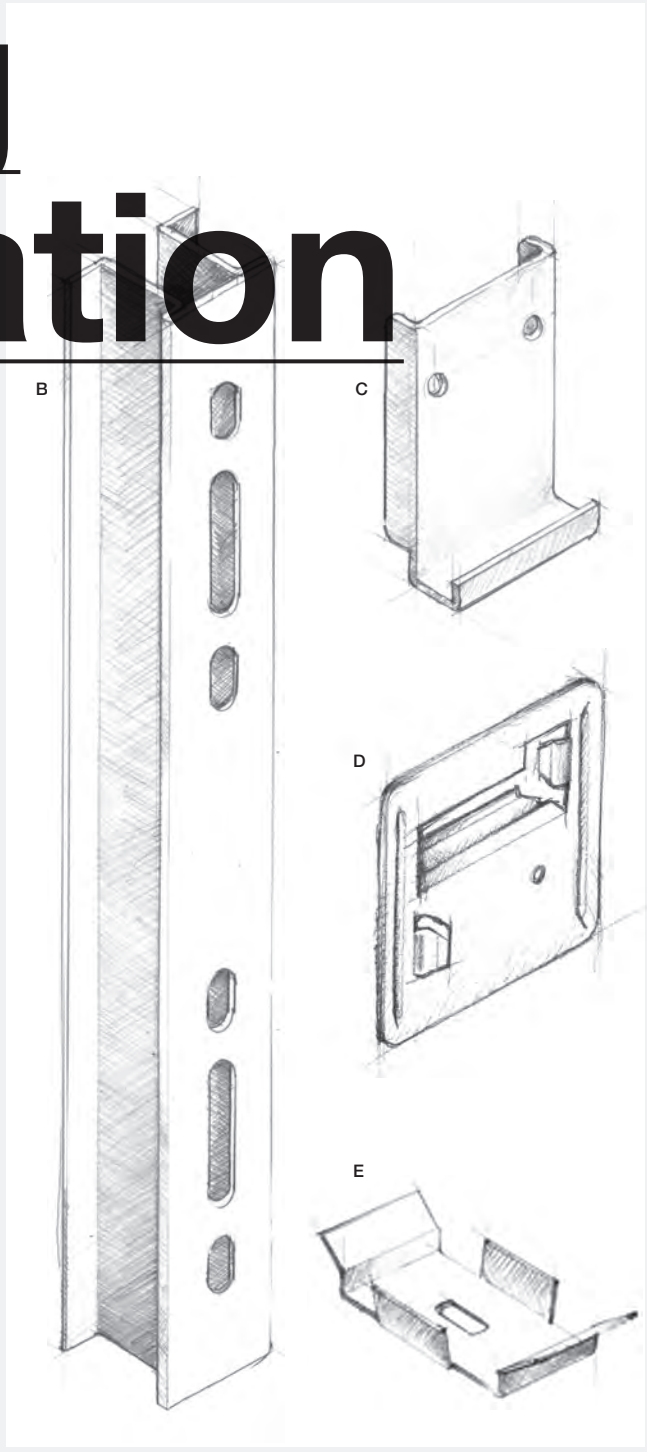
Mounting System
Structure

When using Echolinear to create a suspended ceiling, you will require the following support structure parts and materials:

A 4mm diameter hanger system for fixing the omega rails to the ceiling
B Metal omega support rails 3000 x 18 x 24mm
C Starter clips and screws
D Clips for anchoring planks to the omega rails
— Rockwool insulation panels (Optional – third party supplied)
E Finishing clip to secure last plank

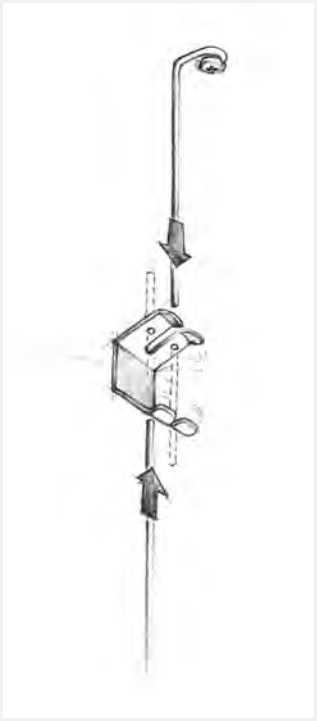
Ceiling Installation

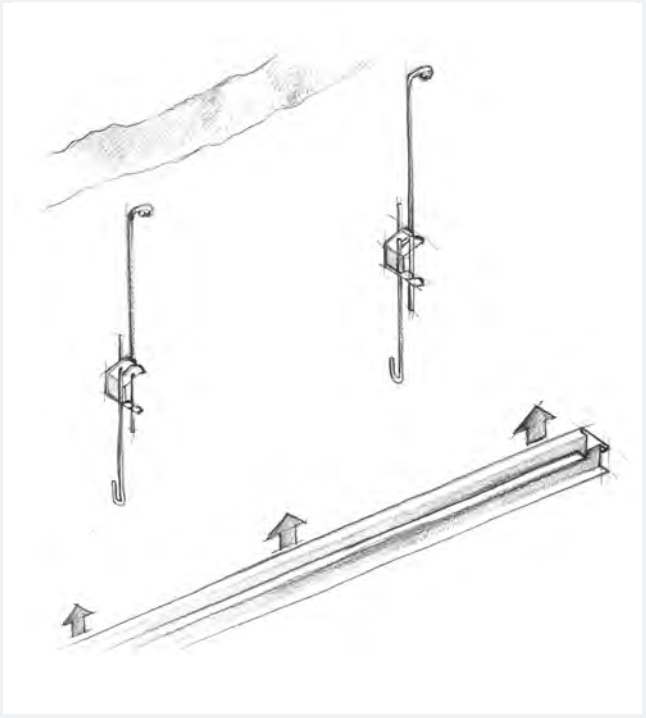




1 Using the hanger system and metal omega rails, first build the metal support structure for your Echolinear ceiling at the required height from the ground. Fit the rails to the hangers at right angles to the orientation of the planks—the recommended distance between both rails and hangers is about 600mm. When fitting the perimeter rail, leave a gap of 18mm between the rail's horizontal seat and the wall.

1





Installation
Continued

2 Place the female side of the first Echolinear plank against the perimeter rail and use the special starter clips to secure it to the omega rail.

3 Next, insert the clips to anchor the male side.

4 Now, place the second plank against the first and then continue with subsequent planks, repeating the anchoring operation using clips until installation is complete.

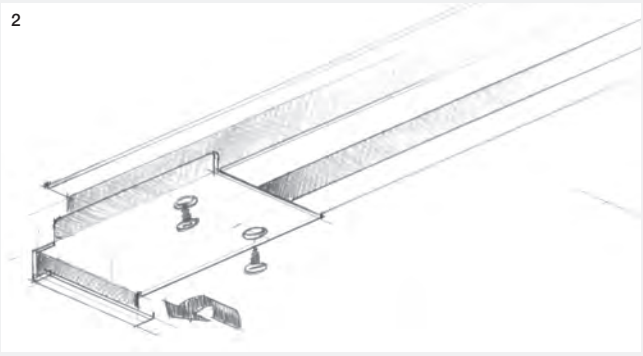
It is recommended that you secure all clips to the support structure omega rail by means of the self-tapping screws provided.

5 Secure last plank with finishing clips and wire as required.

Drop in rockwool insulation batts between omega rails. (Optional)

6 Joining spring to secure abutting plank ends together.

2



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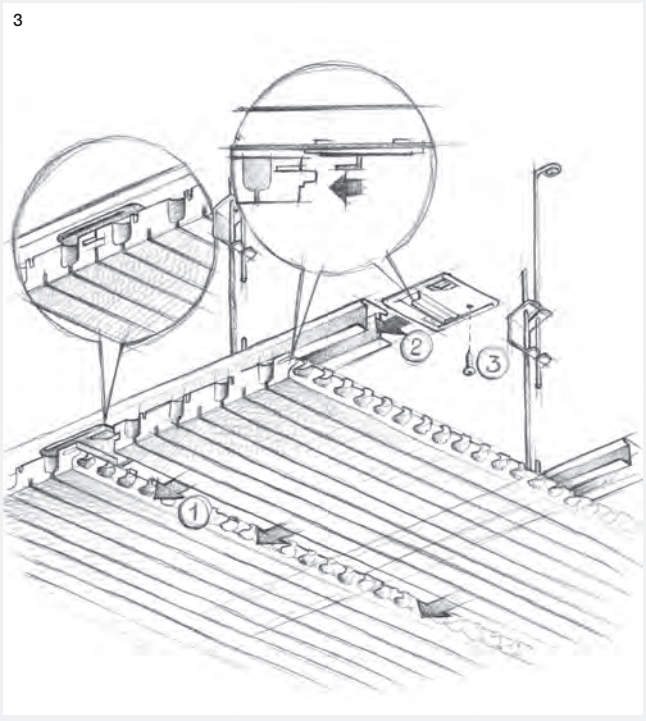

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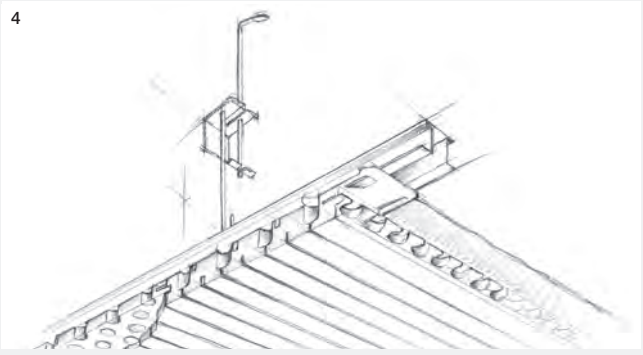

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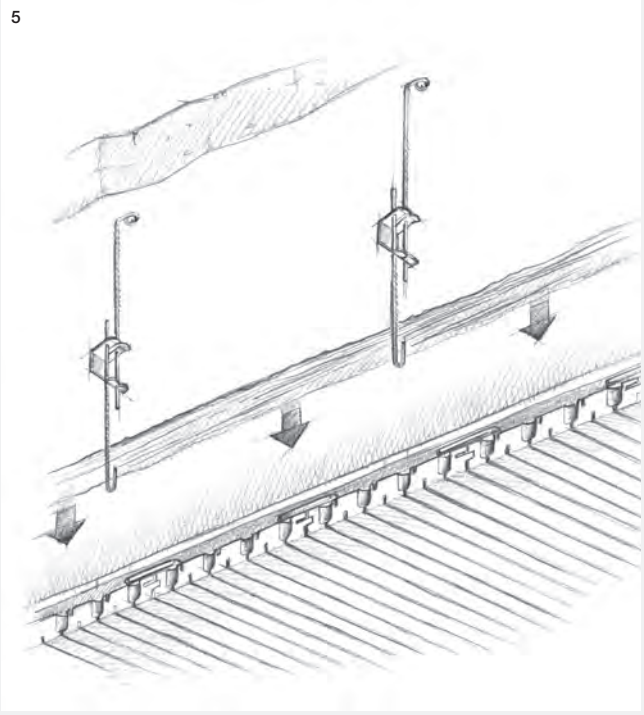

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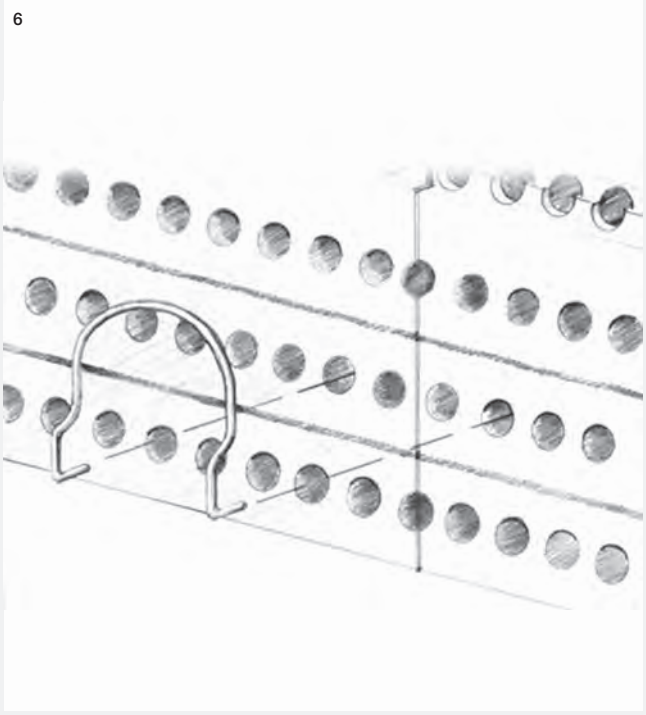


Jointing

You have various jointing options when laying Echolinear planks end to end, including:

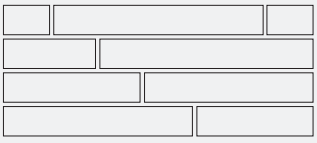
— leaving a gap between the two planks, the same width as the milling
— butt-joining the ends in a random or hinged configuration, and securing them together using the special expansion springs (to a maximum of two planks).

When deciding between these alternatives, remember that the length of Echolinear planks can vary according to differing environmental humidity conditions.

Ceilings requiring the jointing of more than two planks require expansion joints to be designed into the installation.

Hinge Type

Staggered Type



Serial Type

Accessories

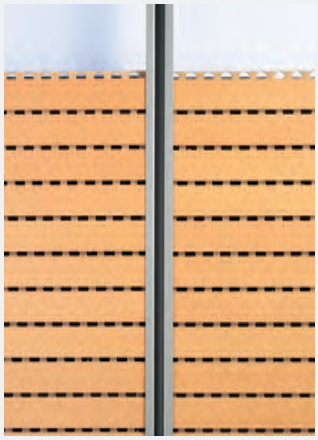
Recommended edge and expansion profiles shown below. (Third party supplied)

Access Panel

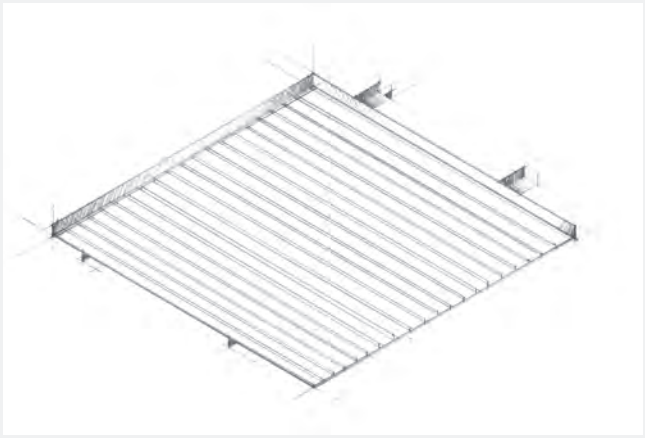
You can integrate an access panel into your Echolinear ceiling at the time of installation. A special kit is available for this purpose.

Cleaning and Maintenance

Clean with a soft damp cloth and mild cleaning agent. A soft eraser can be used for pencil lines

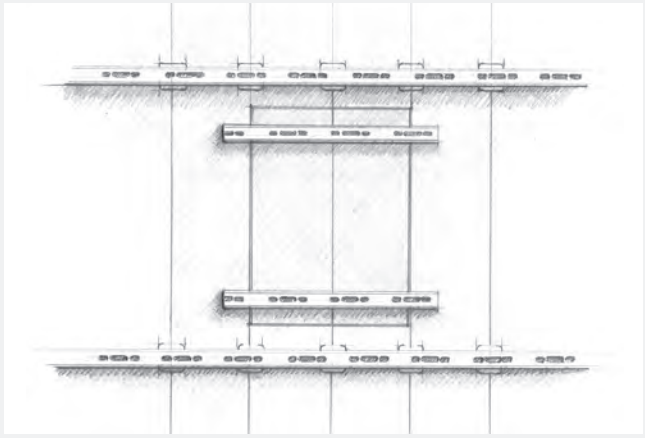


Joint Rail

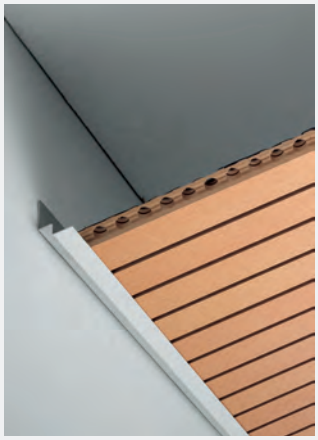


Standard Access Panel 640 x 640mm

L-shaped Rail



Access panel manufactured on site to required dimensions using on-site machined Echolinear planks with omega rails fixed to the rear



Double L-shaped Rail

Certifications

ATCA
AWPA TEST CENTRE ASSOCIATION INC.
TESTING AND CERTIFICATION

Panel Checker v3.0

AWPA Test Centre Association Incorporated

CERTIFICATE OF TEST

Client: Elton Group **Pty Ltd**

Product Type: 16 mm Fibreboard (AS/NZS1859 Part 2)

The Fibreboard sample supplied by Elton Group Pty Ltd , identified as 'Echolinear Board manufactured by Fantoni, Italy' and received on 27 Apr 2010 has been tested for Formaldehyde Emission in accordance with AS/NZS 4266:16 Formaldehyde Emission - Desiccator Method. The sample result was 0.37 mg/l which meets the requirements for Class E0 as specified in AS/NZS1859 Part 2 i.e. less than 1 mg/l. This Certificate relates to the ATCA Report No. 21964, dated 8 June, 2010

Approved Signatory: Vince Wilkinson

NATA Accredited Laboratory Number 1492
NATA endorsed test report. This document shall not be reproduced except in full.

ATCA Laboratory
Telephone: (07) 5520 4215 Fax: (07) 5520 4216
Address: Unit 3/45 Tallebudgera Creek Road, West Burleigh Qld 4219

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Test Report

Report No: 21964
Sample No: Echolinear
Completed: ☑

Company Name	Elton Group
Plant Name	Pty Ltd
Panel Source	Plant
Product Standard	Fibreboard (AS/NZS1859 Part 2)
Grade	Moisture Resistant
Panel Dimensions	Pre-cut
Thickness (mm)	16
Condition	Good
Sample Type	Special Product
Date Received	27 Apr 2010
Date Reported	08 Jul 2010
Cutting Operator	Vince.Wilkinson
Cutting Date	28 Apr 2010
Status	☐ Market ☐ Audit

	Test	Method	Mean	Std Dev	Limit	Units	Pass	Date	Shelf No	Operator	Instrument
Data	Thickness	AS/NZS 4266:35	16.07	0.02	max. 0.3	mm	Pass	28 Apr 2010		Vince.Wilkinson	Mitutoyo A
Data	Moisture	AS/NZS 4266:3	6.9	0.1	5 - 12	%	Pass	30 Apr 2010		joshz	
Data	Density	AS/NZS 4266:4	811.4	7.3	N/A	kg/m^3		12 May 2010	X	martins	Starrett 727 Mitutoyo A
Data	Thickness Swell	AS/NZS 4266:8	4.6	0.1	max. 9	%	Pass	13 May 2010	X	joshz	Mitutoyo A
	Internal Bond	AS/NZS 4266:6	1.36	0.05	min. 0.5	MPa	Pass	11 May 2010	X	joshz	Instron 5566 Mitutoyo 200
	MOE	AS/NZS 4266:5	3263	39	min. 2000	MPa	Pass	18 May 2010		joshz	
	MOR	AS/NZS 4266:5	38.8	1.81	min. 26	MPa	Pass	18 May 2010	X	joshz	Instron 5566 Mitutoyo 150
Data	Formaldehyde Emission	AS/NZS 4266:16	0.37	0.04	max. 1.0	mg/L	E0 Pass	06 May 2010	X	martins	varian
	Surface Soundness	AS/NZS 4266:7	2.67	0.19	min. 0.9	MPa	Pass	05 May 2010	X	joshz	Instron 5566
	Screwholding Edge	AS/NZS 4266:13			N/A	N					
	Screwholding Face	AS/NZS 4266:13			N/A	N					
Data	WBS A	AS/NZS 4266:10 A	13.62	0.48	min. 5.00	MPa	Pass	18 May 2010	X	joshz	Starrett 727 Instron 5566
	Cyclic Test (V313) - IB	AS/NZS 4266:11	0.63	0.07	min. 0.20	MPa	Pass	08 Jun 2010	X	Vince.Wilkinson	Instron 5566 Starrett 727
Data	Cyclic Test (V313) - TSW	AS/NZS 4266:11	4.15	0.41	max. 15.00	%	Pass	07 May 2010	X	martins	Mitutoyo A

ATCA Comments

ECHOLINEAR BOARD MANUFACTURED BY FANTONI, ITALY

Factory Comments

ECHOLINEAR BOARD MANUFACTURED BY FANTONI, ITALY

The inspection lot size is one. Limit values are from AS/NZS1859 Part 2:2004. A cutting plan is not supplied - samples are cut in accordance with Clauses 2 & 3 of AS/NZS 4266:1. Sampling at source and limit values are not included in the Scope of this NATA Accreditation. All AS/NZS test method standards are 2004. The mean and std dev values reported apply to the results of replicate test pieces.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

Approved Signatory:

Vince Wilkinson

For more information about Echolinear and other Elton Group products please visit www.eltongroup.com or call from anywhere within Australia on 1300 133 481 or from overseas +61 3 9499 7776

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