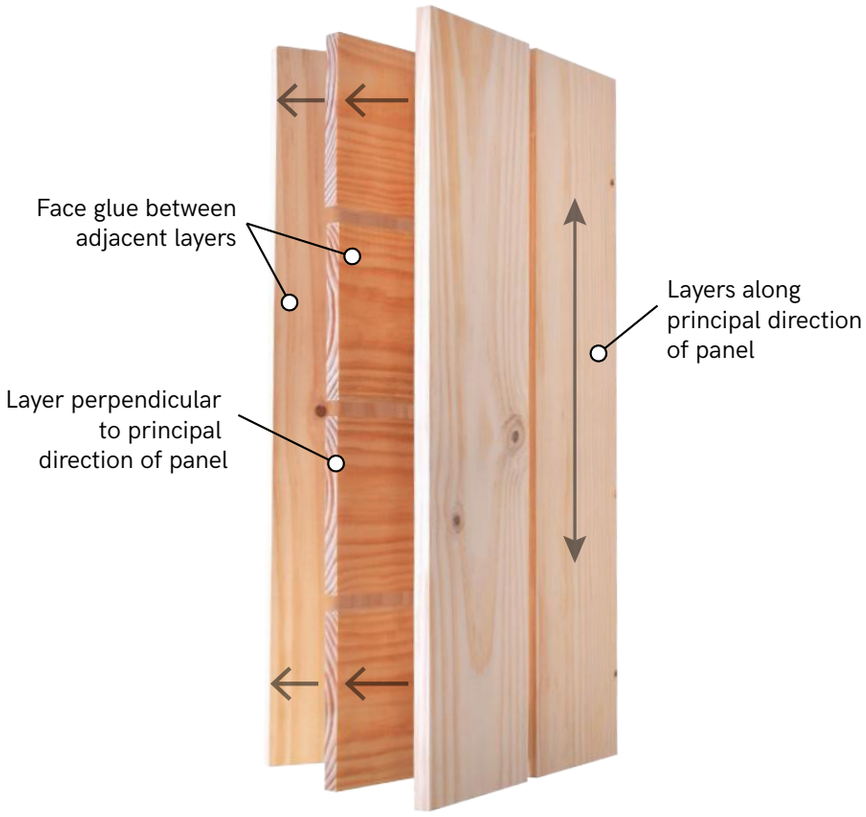
MiniCLT™

Technical documentation

Lamnata

Live well with wood.

Contents.



What is MiniCLT™?

MiniCLT™ is a small format Cross Laminated Timber plank developed using high performance European glue technology. CLT provides strength by gluing three (or more) layers of timber, with the middle layer at right angles to the outer layers.

This CLT plank has enormous rigidity, strength and dimensional stability transforming the individual boards into a versitile building product.

Advantages include fences and small buildings that can be constructed without the need for conventional rails and framing

Process and Treatment

Laminata has placed considerable focus on making our unique product as innovative as possible. Timber is kiln dried and treated using MIRCOPRO (MCA) which has been accredited with GreenTag Level A Certification. Through the gluing process, various quality control measures are in place to ensure structural integrity and visual grade acceptancy.

Laminata works closely with Koppers, an international timber preservative company. With some of the most innovative and environmentally conscious timber preservatives in the world, we are proud to promote their products.

Laminata engaged Henkle during the inception of our Cross Laminated Timber venture. Offering world-class, scientific-based advice Laminata was able to launch products with accurate documentation to back it up.

SCS Global Services *does hereby certify that an independent assessment has been conducted on behalf of:*

Koppers Performance Chemicals

1016 Everee Inn Road, Griffin, GA, USA; Millington, TN; Rockhill, NC

For the following product(s):

MicroPro® Wood Treatment Technology (Micronized Copper Azole)

The product(s) meet(s) all of the necessary qualifications to be certified for the following claim(s):

Environmentally Preferable Treated Wood Process based on Life-Cycle Assessment

CERTIFIED ENVIRONMENTALLY PREFERABLE PRODUCT™ SCS GLOBAL SERVICES

TREATED WOOD PROCESS

Registration # SCS-EPP-01699a
Valid from: June 27, 2008 to October 31, 2018

SCSglobal SERVICES

Stanley Mathuram, PE, Vice President
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

Koppers Performance Chemicals
New Zealand
14 Mayo Road
Wiri, Auckland, 2104 New Zealand
www.kopperspc.co.nz

100%

Green Star® "Sustainable Product" credit. "Sustainability Factor" score.

News Release

FOR IMMEDIATE RELEASE

For information: Steve Crimp, General Manager,
Koppers Performance Chemicals New Zealand
64 9 277 7770
crimps@koppers.co.nz

KOPPERS PERFORMANCE CHEMICALS ANNOUNCES THAT THE MICROPRO WOOD TREATMENT TECHNOLOGY HAS RECEIVED GLOBAL GREENTAG GREENRATE LEVEL A PRODUCT CERTFICATION

AUCKLAND, NZ, September 25, 2018 - MicroPro® Wood Treatment Technology has received a Global GreenTag GreenRate™ Level A award under Version 4.0 of the Global GreenTag International Product Certification Standard. It is the highest level achievement for a product under Global GreenTag's GreenRate™ product rating system – declared by the certification body as 'Fit-for-Purpose' and confirmed for Green Building compliance.

GreenRate™ Level A equals to a Sustainability Factor of 100 percent under the Australian and New Zealand Green Building Councils' Green Star™ 'Design and As Built v1.2' and 'Interiors v1.2' Rating Tools Credits. "It is a very good result," says David Baggs, CEO and Program Director of Global GreenTag International. "Koppers Performance Chemicals are to be congratulated as they have designed a very effective and sustainable GreenRate Level A technology." Steve Crimp, General Manager New Zealand said, "We are very pleased to have achieved GreenTag Certification for MicroPro and it is a further confirmation of Koppers commitment to the production of responsible products for the timber and wider building industries."

To compare the differences between the three levels of GreenRate (A, B and C) the Global GreenTag certification systems ranks a Level B product to have a Sustainability Factor of 75 percent and a Level C product, a Sustainability Factor of 50 percent.

The Global GreenTag GreenRate™ Level A rating given to MicroPro® Wood Treatment Technology also gives the product relevancies and compliance with Features under the WELL™ Building Standard Equivalencies, including Feature 26: Enhanced Material Safety and Feature 97: Material Transparency.

The program is recognised by the Green Building Councils of New Zealand and South Africa. In Australia, the GreenRate™ program is also relevant to Infrastructure professionals working with the 'IS' rating tool from the Infrastructure Sustainability Council of Australia.

About Global GreenTag International
Global GreenTag International Pty Ltd is an internationally recognised, multi-award-winning Type 1 (Third Party) Ecolabelling, Product Certification, Environmental Product Declaration (EPD) and Product Health Declaration (PhD) program operator based in Australia, but with offices and representation also in South Africa, Mainland China, Hong Kong, Taiwan, Malaysia and will be soon launching in the USA. Global GreenTag programs are formally recognised in WELL™, BREEAM International, EarthCheck®, Green Star®, LOTUS® and the Malaysian Government's MyHIJAU program and compliant with credit requirements in LEED® (PhDs and EPDs), and BREEAM® (EPDs).

About Koppers
Koppers, with corporate headquarters in Pittsburgh, Pennsylvania, is an integrated global provider of treated wood products, wood treatment chemicals and carbon compounds. Our products and services are used in a variety of niche applications in a diverse range of end-markets, including the railroad, specialty chemical, utility, residential lumber, agriculture, aluminum, steel, rubber, and construction industries. Including our joint ventures, we serve our customers through a comprehensive global manufacturing and distribution network, with facilities located in North America, South America, Australasia, China and Europe. For more information, visit www.koppers.com or http://www.kopperspc.co.nz

Purbond
Adhesive systems for engineered wood

Adhesive systems for engineered wood

Durability statement for LOCTITE-PURBOND Adhesives

LOCTITE-PURBOND adhesives for Engineered Wood Elements

LOCTITE-PURBOND adhesives have ever since been evaluated for the use in all three service classes, mainly considering glulam as target application. Since the introduction of the first commercially available 1C PUR adhesive in 1994 – PURBOND HB 110 – thousends of cubic meters of load-bearing wood elements have been produced using this technology. Therefore, in addition to the many accelerated durability tests specified by the standards, a hugh pool of practical experience could be gathered meanwhile.

Compliance to standard durability requirements

LOCTITE-PURBOND adhesive are classified as Typ I adhesive for the use service classes 1, 2 and 3. They are certified according to the relevant standards for use in structural applications. These standards include a range of durability tests or so called *accelerated aging tests*. Such tests are designed to predict the durability and the long-term performance of adhesives.

- EN 301 and EN 302-2, delamination test
- EN 301 and EN 302-1, tension shear test after various climatic treatments
- EN 391, Method A and Method B, delamination test
- EN 14080, Annex C, longterm creep tests under varying climate conditions
- AS/NZS 4364:2010 and AS/NZS 4364:1996, delamination and shear tests after various climatic treatments
- JAS OE-4, delamination test of finger joints (boil-dry and vacuum-pressure)
- JAS Cond B&C, delamination and shear tests

Durability of the LOCTITE-PURBOND glueline

LOCTITE-PURBOND adhesives are formulated for the most part with high-performance raw materials from Bayer MaterialScience AG. These so called prepolymers are based on polyether polyols and diisocyanatodiphenylmethane and are terminated with moisture reactive isocyanate groups. The adhesives also contain catalysts and other additives. When an adhesive so formulated is applied to wood, it reacts with moisture from the substrate or the ambient air to form a durable and inert polyether-based polyurethane-polyurea system. Once cured, LOCTITE-PURBOND products are resistant to hydrolysis, oxidation and thermal or microbial degradation.

Purbond
Adhesive systems for engineered wood

Adhesive systems for engineered wood

Long-term experience with durability

Over the years, Purbond has not only subjected all their adhesives to the necessary strength- and durability tests called up by the relevant certification bodies and standards, but also installed additional long-term durability and in-service trials. These trials have produced evidence that LOCTITE-PURBOND adhesives used in glulam beams (1) perform on the same level as the established formaldehyde-based adhesives under constant load in terms of deflection and creep, and (2) resist long-term full exposure to the weather. (1) is proven by an ongoing comparative full-scale 4-point bending test on glulam beams loaded at a bending stress level of 14 MPa (1,2 MPa shear stress), which were installed at MPA University, Stuttgart, Germany in 1992. This test is still ongoing. (2) is supported by a study on a fully exposed 20-year-old beam showing that the adhesive layer blocked the advancement of microbiological decay of the exposed wood. Additionally, EMPA (Swiss Federal Laboratories for Materials Testing and Research) conducted a status assessment of LOCTITE-PURBOND-adhesive joints in fully exposed timber bridges[(1)]. The bridges were at the time of assessment between 6 and 12 years in service. The results of the inspections showed no signs of delamination and degradation.

With thousands of engineered wood structures bonded with LOCTITE-PURBOND adhesives, being in service across Europe since the early nineties, and with the backing of the above mentioned evidence of performance under the current standard requirements as well as in ongoing long-term trials, we herewith confirm that LOCTITE-PURBOND adhesives are reliable and save to be used for bonding engineered wood products for use in all service conditions including service class 3.

Henkel-Purbond, June 2015

[1] A. Fischer, K. Richer (2004), Inspection of 1KPUR / PRF bond lines at selected timber bridges in Grindelwald / Be (CH), Walde / Ag (CH) and Gross Bieberau (D), EMPA Dübendorf.

MONASH University

CONFIRMATION

The one-component polyurethane adhesive line

PURBOND® HB S-LINE

was tested in accordance with AS/NZS 4364:2010 at the various laboratories detailed in attachment A and as listed below, the adhesives line above are classified as Type I adhesives as defined in AS/NZS 4364:2010.

Test reports:

MPA, Otto-Graf Institute, Stuttgart D:	901 2027 000 Rk
NTI, Treteknisk, Oslo NO:	325086-LM01
Monash University, Timber Engineering Centre:	PURBOND/07/010, 07/010

Signed,

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ABN 12 377 614 012 CRICOS provider number 00008C

Laminata

Proudly NZ made.

Mt Pokaka Timber Products Ltd

Acoustic Engineering

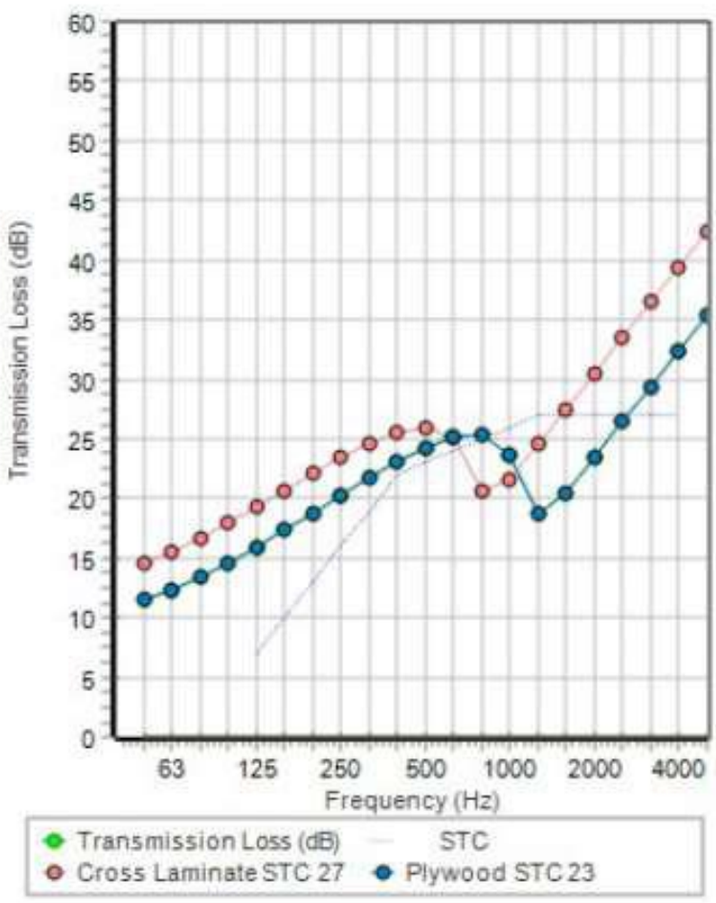
We source our logs from FSC, plantation Radiata Pine forests in Northland, New Zealand. These forests account for the highest wood density in pine across New Zealand ranging between 420 - 460 Kg p/m3, through the combination of this and the tongue and groove design in the panels it achieves an acoustic rating of STC30 or 15.1kg/m2.

15.1KG/M2

STC30

Figure 1: Transmission Loss of Cross Laminated 30mm Panel Relative to 18mm Plywood Panel

frequency (Hz)	TL(dB)	TL(dB)
50	12	
63	12	12
80	13	
100	15	
125	16	16
160	17	
200	19	
250	20	20
315	22	
400	23	
500	24	24
630	25	
800	25	
1000	24	22
1250	19	
1600	20	
2000	23	23
2500	26	
3150	29	
4000	32	32
5000	35	



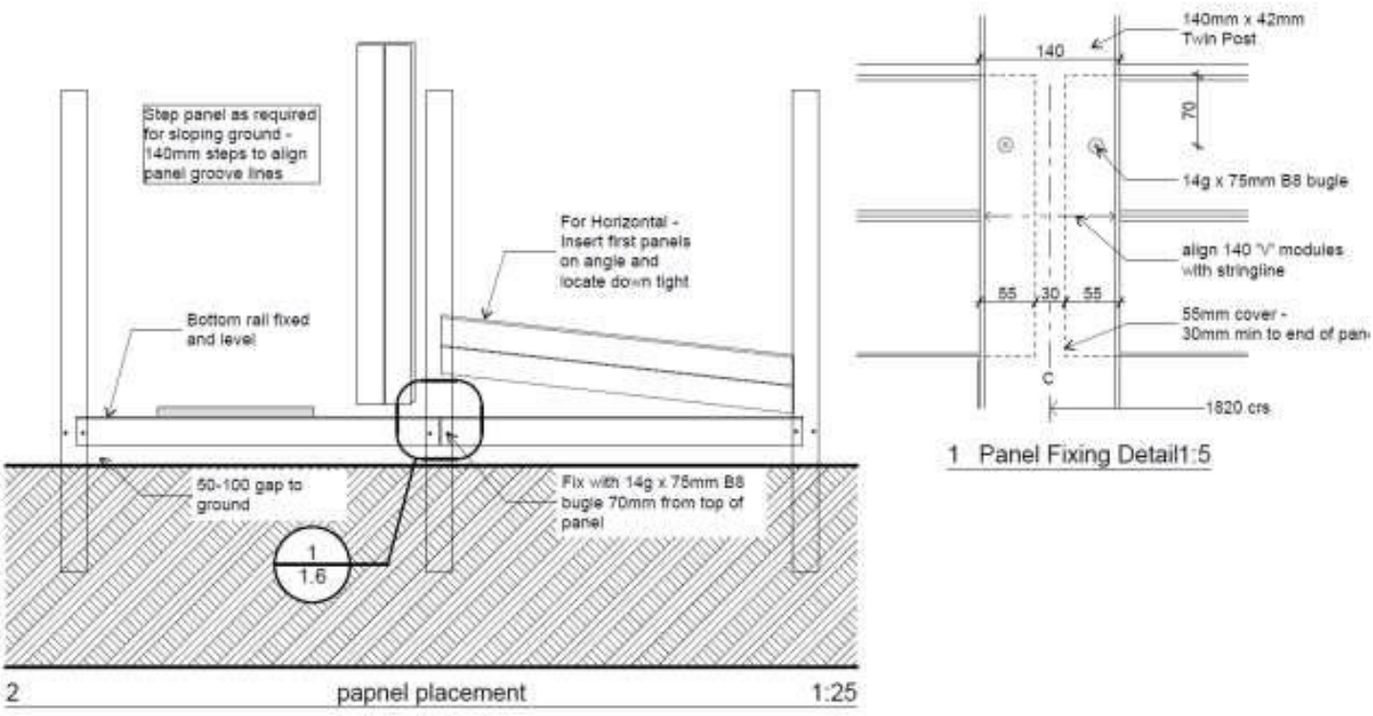
3.2 Construction Detail – Fencing Assembly

The proposed fencing will consist of twin posts providing a channel for the cross laminated timber fencing panels. The tongue and grove fencing panels are proposed to include a base board with 50 – 100 mm gap to the ground, see figure 2 below. This construction detail will result in up to a 3dB degradation to the effectiveness of the acoustic mitigation.

The acoustic fencing height is indicated in the installation manual of 1820mm high and 1970mm high for horizontal panel and vertical panel constructions respectively. This may provide up to a 4 to 5dB (7 to 8dB without gap at based of the fence) reduction respectively. We note that this estimate is based on a flat environment with source and receiver in relatively close proximity to the acoustic fencing. The fencing performance is dependent on several factors unique to each site, including but not limited to topography of the site, relative distance from source and receiver, length and height of fencing, etc.

The overall performance of the proposed construction, with no more than a 100mm gap at the base, will meet the 3dB LAeq(24h) reduction with either construction and meet the 5dB LAeq(24h) reduction with the 1970mm high, vertical panel construction.

Figure 2: Fencing Installation Detail



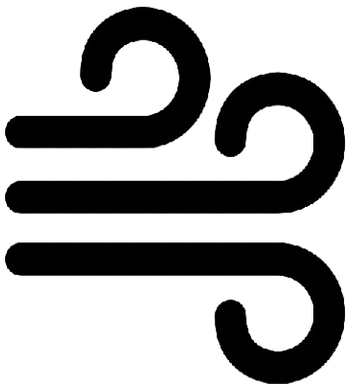
4. CONCLUSION

The cross laminated timbre panel fencing construction material is suitable for producing acoustic fencing exceeding the recommended minimum density of 10 kg/m2.

The proposed fencing construction detail includes a base gap of up to 100mm. whilst not recommended from an acoustic perspective, the reduction in performance may remain within acceptable limits, relative to the recommended reduction of traffic noise specified in the NZS6806:2010. This may be required to be confirmed on a case by case basis. This degradation may be offset with increasing the fencing height, subject to engineering restrictions.

Noise barriers and wind loading

With a growing demand for taller fences and noise barriers Laminata has had designs engineered for both 2m and 3m high systems. Through additional strengthening the fencing has acheived high windzone ratings for both options.



68 M/S
245 KM/HR

PK ENGINEERING
CHARTERED PROFESSIONAL ENGINEERS

Our ref: 18-130

Tuesday 22 August 2018

Isaac Lindsay
Laminata

Dear Mr Lindsay

RE: Laminata Motorway Fence

I have carried out structural design on the 2.0m high Laminata Fences for Motorways. I can confirm that this design for 2/140x45 timber post with 800mm deep by 300mm diameter footing will be able sustain the maximum wind speed 44 m/s or 158 km/hr. The detail for this case is shown in calculation sheet page 5. For 3/140x45 timber post, the fence can take the maximum wind speed of 68m/s or 245 km/hr with 1100mm deep by 400mm diameter footings. The detail is shown in page 9.

Should you require any further information please contact me.

Yours sincerely,

PK.

Pradeep Kumar.
B.E hons, NZCE, MIPENZ,
IntPE, CPEng.
(Structural, Geotechnical)
Chartered Professional Engineer.

Level 1 National Bank Building 90 Kerikeri Road Kerikeri New Zealand
Telephone: 09 407 3255 Fax: 09 407 3256 Email: pk.engin@xtra.co.nz

Child Care and Schools.

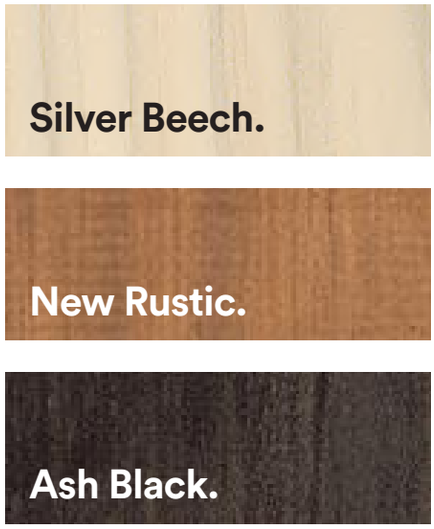
A combination of environmentally preferable treatment, seamless tongue and groove surfaces (No rails or climbable surfaces) and engineered documentation to back up the performance of the product makes the Laminata system ideal for childcare and schooling projects.

Paint and Protect.

To protect your new fence, shed or gate, we recommend coating it with Cabots water based stain. Cabots stain is designed to rejuvenate and transform the colour of exterior timber, delivering a more durable and attractive result.

Storage & Handling.

- Kiln-dried MCA treated timber should be stored out of the weather.
- We recomend storing inside a warehouse or leaving the protetive wrap on until product is used.



Our Commitment.

We at Laminata Outdoor Ltd are passionate about the benefits of MicroPro (MCA) treated MiniCLT.

We believe we are challenging conventional construction methods with products that are kitsetable and DIY friendly. We are continually innovativing and bringing to the market new and better ways to build with wood.

Laminata®

Fencing for early childhood care and education centres

Key features & benefits:

- Nature inspired design embracing the biophilic effects of wood such as decreased stress response and increased cognitive abilities
- Environmentally preferable MicroPro timber treatment is GreenGuard certified for play areas used by children of all ages (birth - 18 years old)
- Non-climbable design without rails, toeholds or footholds
- MiniCLT planks are versatile in application (indoors & outdoors) with an acoustic rating of 30mm for increased noise reduction
- Seamless tongue and groove connectivity allows for hazard free, non-abrasive surfaces
- Smooth planks have the potential for personalised design and/or modification to suit the character of the EDE centre
- Durable, safe, easy to maintain and suitable for a range of ages
- Easy installation resulting in time and cost efficiencies

Play well with wood.

Find out more.
www.laminata.nz

Laminata

Live well with wood.

Available through your local building merchant or as an installed solution by your local installer.

Find out more.
www.laminata.nz

Get a quote.
app.laminata.nz

Ask us.
0508 526 462