



DESIGN AND INSTALLATION GUIDE

**VAARO
FIRE™**

VAARO FIRE™



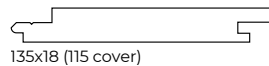
Abodo Vaaro® Fire is an ultra-durable, fire compliant* timber available as a complete coated, tested product range – all from one trusted manufacturer.

Vaaro® Cladding



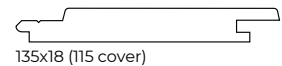
Standard made to order profiles (mm)

WB12



135x18 (115 cover)

○ WB18



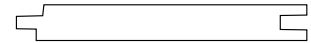
135x18 (115 cover)

TC21



137x18 (127 cover)

○ TC27



137x18 (127 cover)

Vaaro® Screening



Standard made to order profiles (mm)

○ BSF/D4S



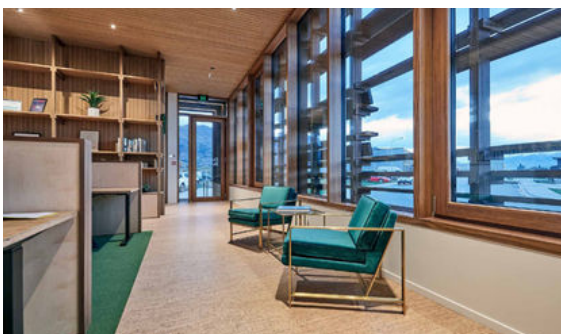
65x18

○ BSF/D4S



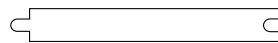
138x18

Vaaro® Panelling



Standard made to order profiles (mm)

○ TC21



137x18 (127 cover)

○ TC27



137x18 (127 cover)

Note / images and profiles shown here may vary slightly from the finished product depending on regional availability.

Abodo Vaaro[®] Key Advantages

Fire Performance	Vaaro has been extensively tested worldwide to major fire standards*, in coated and uncoated forms, before and after weathering
Leach Resistance	Very high leach resistance in exterior applications
Durability	Excellent long term resistance to fungal decay, including a 40 Year Durability Warranty (subject to warranty conditions)
Coatings	Fully tested with Abodo Protector semi-transparent coating range**
Sustainability	Made from high grade FSC [®] certified rapidly renewable New Zealand plantation timber
Processing	Can be re-machined after treatment, up to 4mm – subject to conditions***

Suitable for exterior and interior applications

Increased density and hardness

Low dimensional movement

Low-corrosivity to most metals

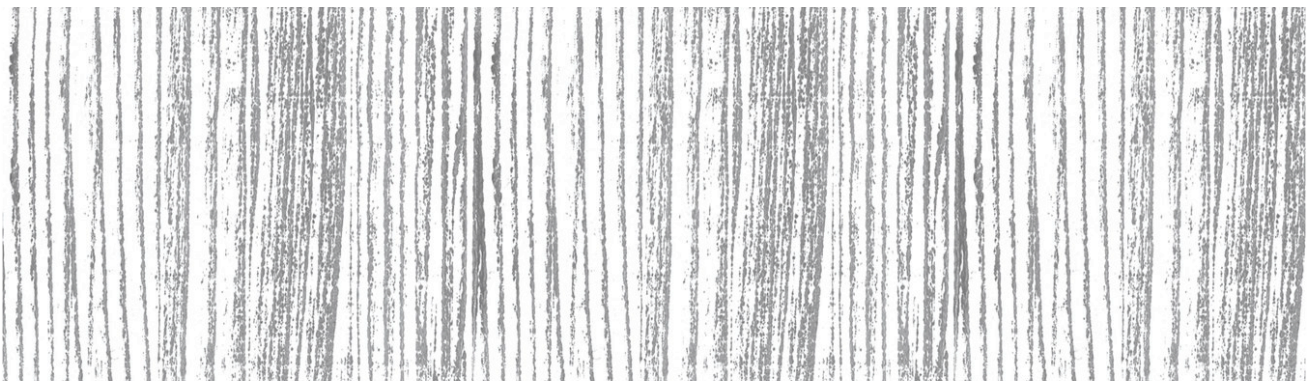
All from a single manufacturer



* Abodo's Vaaro has been tested to and has achieved AS/NZS 3837:1998 Type A and ISO 9705:2003 Group 1-S (NZ), AS 3959:2018 BAL29 and AS 5637.1:2015 Group 1 (AU), B-s2, d0 (LVG) / B-s1, d0 (Flatsawn) (EN 13501-1:2018) DRF EXT INT1 INT2 (EN 16755:2017) (UK+EU), and ASTM E84 Class A (USA) fire compliance standards.

** Testing may vary across markets.

*** Maximum 1mm off the face and 3mm of the back with minimum 18mm nominal thickness for a finished board.

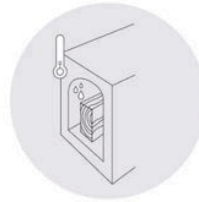


The Making of Vaaro®

Abodo Vaaro Fire is made in New Zealand from Abodo's signature heat tempered, rapidly renewable timber – and then infused with a special resin-based, fire retardant treatment.



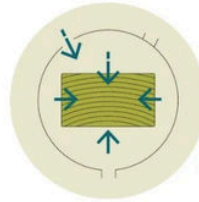
Vaaro® Process Snapshot:



01

Thermal modification

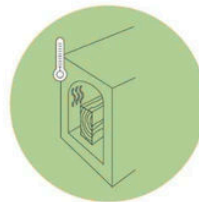
Kiln dried Radiata pine is thermally modified using Abodo's 230°C custom schedule. The three-step thermal modification process uses only heat and steam to impart increased stability, durability and colour to the base timber material.



02

Vacuum-pressure impregnation

The resin-based fire retardant solution is then vacuum-pressure impregnated into the timber cells with full cross section penetration.



03

Heat curing in kiln

The impregnated wood is then thermally cured using a proprietary drying schedule to harden and fix the polymer into the wood cells.

Many fire retardant chemicals are hygroscopic and will leach out of the timber over time, due to weathering. To prevent this from happening Vaaro® uses thermosetting resin to help lock the fire retardant into the timber cell structure.

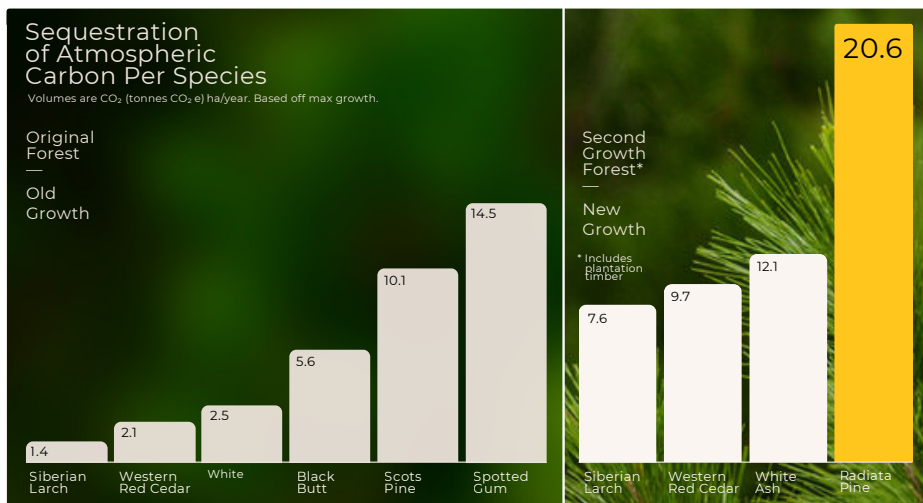


° Vaaro treatment pressure vessel.

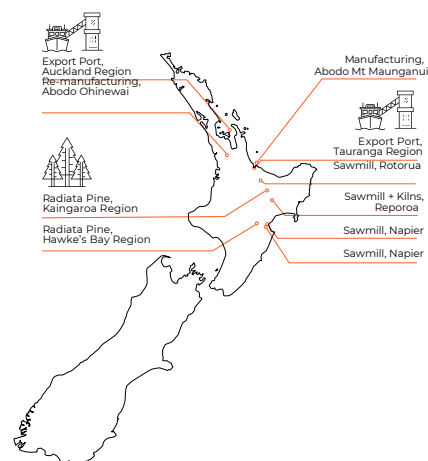
Global Gold Standard Forestry Sources

The base material for Vaaro® is high grade New Zealand Radiata pine timber that is sourced from rapidly renewable FSC® certified plantations. World class forestry practices, high productivity and close rotation making this the ultimate renewable carbon storing resource.

Additionally, New Zealand is consistently rated as one of the top countries in the world for transparency according to Transparency International's Corruption Perceptions Index.



Abodo Locations + Sources



Testing + Compliance Standards



Vaaro® has been tested to major international fire compliance standards*, in coated and uncoated forms, before and after weathering. The accelerated weathering procedures used emulate long term exterior exposure, demonstrating world-leading fire performance and excellent leach resistance properties. Following is a summary of testing completed at this point in time.

* Abodo's Vaaro has been tested to and has achieved AS/NZS 3837:1998 Type A and ISO 9705:2003 Group 1-S (NZ), AS 3959:2018 BAL29 and AS 5637.1:2015 Group 1 (AU), B-s2, d0 (LVG) / B-s1, d0 (Flatsawn) (EN 13501-1:2018) DRF EXT INT1 INT2 (EN 16755:2017) (UK+EU), and ASTM E84 Class A (USA) fire compliance standards.

Testing Summary

Market	Classification	Standard	Test Method	Minimum Tested Thickness	Protector™ Coated	Uncoated
UK/Europe	Class B-s1, d0 (Flatsawn) Class B-s2, d0 (Vertical Grain) INT1, INT2, EXT	EN 13501-1:2018 EN 16755:2017 and EN927-3	Closed Facade EN 13823:2020+A1:2022 and ISO 11925-2:2020 + accelerated weathering to EN 16755:2017 Annex B (full wall – SBI test) after 1-year + natural weathering to EN927-3	18mm	Yes	Yes
USA	Class A (Vertical Grain)	a) Section 2303.2 2021 International Building Code, referencing ASTM E84, Extended 20 minutes. b) ASTM E2768-11 (2018) Standard Test Method for Extended Duration Surface Burning Characteristics of Building materials (30min Tunnel test). c) UBC No8-1 and SFM 12-7-A-5 per Chapter 7A of the 2019 California Building Code – Ignition Resistant Material 30 minute test	ASTM E84 and E2768-11(2018) + accelerated weathering according to ASTM D 2898-10 Method A	18mm	-	Yes
New Zealand	Group 1-S (Vertical Grain/ Flatsawn)	NZBC C/VM2: Verification Method: Framework for Fire Safety Design	ISO 19705 EN13823:2020	10mm	Yes	Yes
New Zealand	Type A (Vertical Grain)	NZBC Acceptable Solutions C/AS2, in accordance with Table C1.3: Classification of cladding materials	ISO 5660-1:2002 + accelerated weathering to ASTM D 2898 (B)	18mm	Yes	Yes
Australia	BAL29 (Vertical Grain/ Flatsawn)	AS3959:2018 Appendix F Bushfire Resisting Timber	AS/NZS 3837:1998 + accelerated weathering to ASTM D 2898 (B)	18mm	Yes	Yes
Australia	Group 1 (Vertical Grain)	AS 5637.1:2015, as required by NCC Specification 7: Fire Hazard properties: S7C4 FI 4894 and FAR 4055	ISO 19705:2003	10mm	-	Yes

Notes: All tests conducted with profiles of minimum 18mm thickness apart from NZ/AU ISO 9705 Group 1/Group 1-S test that was 10mm thickness.

This table is a summary of results only and is given for guidance purposes only. It should not be used as means of final compliance. Always consult with a professional Fire Engineer prior to commencement of design and construction to ensure compliance with local regulations. Testing certificates available on request.

New Zealand

ISO 5660 Cone Calorimeter + ASTM 2898 Weathering

Test facility: BRANZ, New Zealand

Vaaro timber in 600mm lengths was subjected to accelerated weathering in a weathering booth according to ASTM D 2898. Samples were then cut, conditioned and tested using cone calorimeter test method according to ISO 5660-1 and AS/NZS 3837:1998

Classification (Vertical Grain) Type A Cladding

New Zealand/Australia

ISO 9705 – Full Scale Room Test For Surface Products

Test Facility: BRANZ, New Zealand

Vaaro 10mm panelling was installed into a small room (with walls and a ceiling) and a heat was created in accordance with ISO 9705. The results were then assessed in accordance with ISO 9705:1993/AU ISO 9705:2003.

Classification (Vertical Grain) Group 1-S (NZ), Group 1 (AU)

Australia

AS3959:2018 Appendix F – Bushfire Resisting Timber

Test facility: BRANZ, New Zealand

Vaaro timber was subjected to accelerated weathering in a weathering booth according to ASTM D 2898. Samples were then tested using cone method according to AS/NZS 3837:1998.

Classification (Vertical Grain) BAL29



○ ASTM 2898 accelerated weathering chamber.



○ ISO 5660-1 cone calorimeter.

USA

ASTM E84 Tunnel Test

Test facility: QAI, USA

Vaaro timber in the form of 8' length boards underwent pre-weathering according to ASTM D 2898-10 Method A. A 24' test wall was then built with full length Vaaro boards, a flame created up the wall and properties measured in accordance with ASTM E84 extended 30 minutes (ASTM E2768-11: 2018).

Flame spread classification (Vertical Grain, uncoated)	Class A
Flame spread index	0
Smoke	35



○ ASTM E84 tunnel test.

United Kingdom/European Union

EN 13823 European Single Burn Item (SBI) Test

Test facility: RISE, Sweden

Vaaro timber underwent accelerated weathering in the form of complete wall panels in accordance with EN 16755:2017.

In a separate test, full length boards underwent natural pre-weathering according to EN927-3.

Natural pre-weathering, in our opinion, is more reflective of a real-world application, compared with many products that have been tested using small sized samples and the cone calorimeter method.

Test walls were built into a corner formation, heat source was applied and properties measured in accordance with EN 13823.

Classification UK/EU – Closed Facade

	EN 13823 SBI	EN 16755:2017 Accelerated Weathering	EN 927-3 Natural Weathering
Vertical Grain	Class B-s2, d0	INT1 – INT2 – EXT	INT1 – INT2 – EXT



○ EN13823 SBI Test.



○ EN927-3 natural weathering.

Durability

Fire Retardancy Lifespan

The Vaaro® fire retardant treatment is highly resistant to leaching because the fire retardant is locked in with a resin polymer that is permanently fixed into the timber cell structure. The fire retardant does not decompose within the wood over time.

The resin formulation also enhances long-term weathering performance by reducing moisture movement through the timber. As a result, the fire retardant performance is expected to be maintained for the service life of the timber product.

Long-term exterior fire performance is not warranted. However, Vaaro products are supplied in accordance with current fire-testing and compliance requirements, as specified by applicable local building regulations.

Resistance to Fungal Attack

The Vaaro modification process greatly enhances resistance to fungal decay, achieving a Durability Class 1 classification for above ground use and indicative service life of 40 plus years in exterior cladding applications. Interior applications can expect a service life in line with that of the building.

Resistance to Insect Attack

Vaaro has demonstrated enhanced resistance to Formosan termite attack, one of the most aggressive subterranean termite species.

Testing was conducted by the LSU AgCenter Wood Durability Laboratory, USA in accordance with AWWA E1-23, Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites (AWWA, 2024).

Results

Sample	Mass Loss
Untreated P. Radiata (control)	98.69%
Vaaro	12.61%



○ Termite trial result.

Decay Testing

Entwicklungs – und Prüflabor Holztechnologie GmbH (EPH), Germany conducted testing of the product according to both EN113-2 above ground and CEN/TS15083-2 in-ground conditions equivalent to 'UC4'.

Durability Test Result – Extract from EPH Test Report 2223026/3

EN 113-2:2020 (Durability of wood and wood-based products – Test method against wood destroying basidiomycetes – Part 2: Assessment of inherent or enhanced durability).

Test Fungus	Mean Dry Mass Loss (n = 30) [%]	Median Dry Mass Loss (n = 30) [%]	Percentage of Specimens in Durability Classes [%]					Durability Classification
			DC 1	DC 2	DC 3	DC 4	DC 5	
<i>C. puteana</i>	0,5 ± 0,2	0,5	100	0	0	0	0	1
<i>R. placenta</i>	0,5 ± 0,1	0,5	100	0	0	0	0	1
<i>T. versicolor</i>	0,4 ± 0,3	0,4	100	0	0	0	0	1

Extract from EPH Test Report 2223026/4

CEN/TS 15083-2:2005 (Durability of wood and wood products – determination of natural durability of solid wood against wood decay fungi, test methods – part 2: soft rot fungi).

Final Durability Classification According to EN350:2016: DC1 "very durable".

EPH Assessment: "According to EN 350 (Annex B) it can be stated that the product performs similarly or better in ground contact as the very durable heartwood of Doussié, Merbau, Padouk or Iroko."

Environmental Compliance

EU REACH Compliant

Vaaro® is not classified as harmful to health or the environment under the European Union REACH regulation (1907/2006) limit value for chemical content.

Vaaro does not contain added heavy metals, halogens or sulphates.

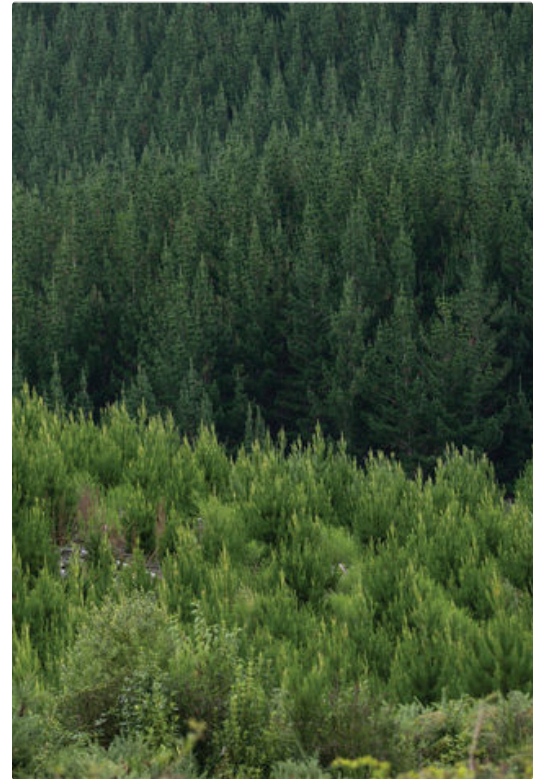
Emissions

Vaaro meets the requirements of:

- Super E0/F**** (JIS A1460)
- E1 (EN1717-1)
- California Department of Public Health (CDPH) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2" and ISO 10580:2010 "Test method for volatile organic compound (VOC) emissions – resilient, textile and laminate floor coverings".

Results

- VOC's & Aldehydes: Pass
- TVOC's: <0.5 mg/m³



Product Details Summary

Storage

- Keep product dry and out of the weather or under plastic wrap, elevated minimum 100mm off the ground on even flat surface strapped on least four bearers.
- Keep product strapped until installation time.
- Avoid storing in direct sunlight as UV can change the colour of the timber.
- Avoid moisture entry into timber packets as this can lead to water damage and mould growth. If this happens ensure that the timber is allowed to dry out by allowing airflow between timber boards, and placing under cover, out of the weather.
- Moisture content of timber at supply is approximately 8%. The moisture content may increase up to 12-14% in humid environments. Vaaro® should not be installed if above 16%.
- For interior applications, acclimatise the timber by sitting it in the room it will be installed in, ensuring it will remain dry with plastic wrap removed for at least 14 days.
- Some movement and surface cracking can be expected as part of the natural weathering process of timber.
- Installed product indicates acceptance of the product and quality.

Handling

Vaaro wood is not classified as dangerous goods however still requires to be handled as with any treated wood product.

See below guidelines and Safety Data Sheet for the treated wood. For more information visit www.epa.gov, or in accordance with local regulations.

- Wear recommended personal protective equipment when handling treated wood.
- Wear a dust mask and goggles when cutting or sanding timber to protect against dust inhalation.
- If machining timber, ensure adequate mechanical extraction to remove wood dust.
- Wear clean gloves when working with timber to protect against splinters, sensitisation and protect from finger marks.
- All sawdust and construction debris should be cleaned up and disposed of after construction.
- Wash work clothes separately from other household clothing before re-use.
- Vaaro timber should not be used where it may come into direct or indirect contact with drinking water, except for uses involving incidental contact such as freshwater docks and bridges.
- Do not use Vaaro timber under circumstances where the timber may become a component of food, animal feed, or beehives.
- If the timber is to be used in an interior application and becomes wet during construction, it should be allowed to dry before being covered or enclosed.

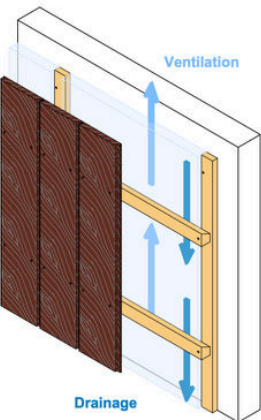
Installation

Vaaro® must be installed in above ground applications only, in accordance with good building practice and codes, paying attention to ensuring suitable ground clearance (minimum 100mm above ground), drainage and ventilation in the finished project. Projects should be designed, approved and installed in accordance with federal, state and local regulation governing construction in your area.

Exterior cladding should be installed onto a drained cavity system in accordance with local regulations and test report limitations..

Rip sawing, thickening and planing are not permitted unless authorised by Abodo or its distributors.

Please refer to product-specific specification and installation details prior to commencement of project.



○ Typical indicative cladding wall build up.

Coating

Vaaro® timber may be installed uncoated, though exposed end grains must be sealed with approved end grain sealer in exterior applications. If left uncoated some variation in colour across external facades from brown to grey can be expected, depending on the level of weather exposure in certain areas.

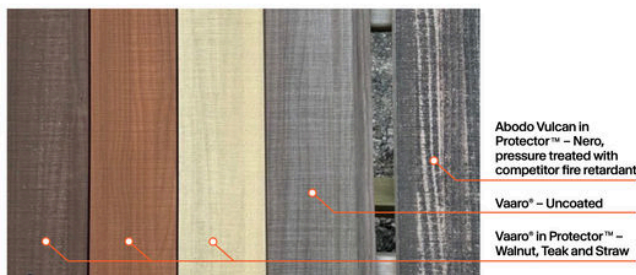
Vaaro has been tested with Abodo Protector coating that is available in a range of colours. This is the only fully tested exterior coating system with this timber. If maintenance is of concern, Protector Clear, Patina, White or Bare (Clear with 5% White) are recommended to allow the timber to silver off naturally while providing protection.

The timber generally accepts coatings well including water and oil borne stains and/or paints, however compatibility testing prior to application and/or further fire compliance testing may be required prior to specification. Please check with the coating manufacturer prior to specification or application.

Preparation of smooth dressed timber by sanding is recommended prior to coating.

Comparative Coating Performance

Protector™ coating performance after 12 months natural weathering



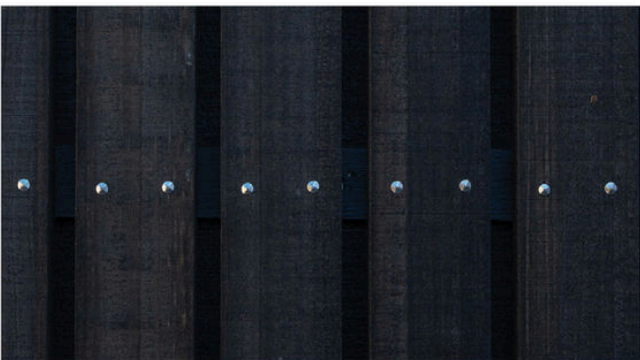
Fasteners/Corrosion

Vaaro timber has approximate pH 5.5 that is similar to untreated Radiata pine, therefore presents low corrosivity risk for most metals.

Fasteners and hardware should be chosen to suit the environmental conditions and service life in accordance with building standards. In most exterior circumstances regular corrosion resistant hardware and flashings can be used unless specific corrosive conditions exist e.g. salt spray where stainless steel must be used.

Abodo recommends stainless steel fixings in exterior applications. In general, Vaaro may be freely placed in direct contact with other building materials such as claddings, flashings, insulation, wiring and plumbing however always check with material manufacturer before specification.

For interior applications regular fixings and fittings can be used.



Disposal

- Vaaro wood is not classified as dangerous goods.
- All sawdust and construction debris should be cleaned up and disposed of after construction.
- Sorting may be carried out as normal wood in municipal recycling or recovery stations at heating plants.
- May be disposed of in landfills or burned in commercial or industrial incinerators or boilers in accordance with federal, state, and local regulations.
- May only be incinerated in municipal heating installations mixed with untreated wood. Offcuts and sawdust should not be burnt in domestic woodfires or barbecues.
- Vaaro can be reused for other purposes where ordinary wood is generally used in construction according to D-s2, d0 (EN13823).
- Vaaro must not be processed downstream as animal bedding, mulch or biofuel.

Disposal Summary for EU

Waste code	170201
EWG code	WOOD
Hazardous waste	No
ADR/Dangerous goods	No
NTRA, AB	No
Recycling material	Yes
Disposal material	Yes/No

Technical Data

Average density (20°C, 65% RH)	696 kg/m ³	DIN 52182
Equilibrium Moisture Content (EMC) (20°C, 65%RH)	7.5%	
Durability	Class 1	EN 350:2016, EN 113-2:2020 + water leaching procedure, EN 84:2020
Anti swell efficiency (tangential)	21.4%	DIN 52184
Anti swell efficiency (radial)	17.1%	DIN 52184
Formaldehyde emissions	0.2 mg/L	JIS A1460 – Super E0/F****, E1 (EN717-1)
VOC emissions	<0.5 mg/m ³	PASS (CDPH-IAQ V1.1 2010, CDPH-IAQ V1.2 2017 and ISO 10580:2010)
Swelling (tangential)	6.20%	DIN 52184
Swelling (radial)	3.10%	DIN 52184
Impact bending strength	7.6 kJ/m ²	DIN 52189-1
Modulus of Rupture (MOR)	51.9 N/mm ²	DIN 52186, EN 408
Modulus of Elasticity (MOE)	14.831 N/mm ²	DIN 52186, EN 408
Brinell hardness	25.0 N/mm ²	EN 1534
Indicative pH	5.5	
Durability warranty	40 Years	Subject to warranty conditions

Disclaimer:

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