

Suitability of TMT for façade cladding and shading elements

The main aspects of the use of TMT for façade cladding and shading elements are the increased durability against wood-destroying fungi, the good dimensional stability as well as the absence of resins (relevant, for example, in the case of TMT made from larch). The durability of most TMT products is in the range of classes DC 1 „very durable“ to DC 3 „moderately durable“; equilibrium moisture as well as swelling and shrinkage measures are reduced by approx. 50 %. The reduced strength

and embrittlement of the wood as a result of the modification can be limiting.

Information specifically on TMT with regard to its use in façades can be found in the ThermoWood® Handbook of the International ThermoWood Association (ITWA). Detailed information on façade (in German) use can be found in the „Fachregeln des Zimmererhandwerks 01 Außenwandbekleidungen aus Holz“, edited by Holzbau Deutschland.

Special features compared to untreated wood

Wood property	Explanation
Biological durability	increased compared to wood-destroying fungi, durability class depending on the wood species and treatment intensity; infestation by wood-discolouring organisms possible (see TMT-Leaflet 02)
Swelling/shrinkage	usually reduced by approx. 50 %
Dimensional stability	remaining swelling potential (width) and low installation moisture should be considered
Stability in shape	significantly improved; advantageous e.g. with slim-shaped profiles
Cracking	possible in principle; may be favoured by increased brittleness
Shades	greys like native wood, possibly faster; see TMT-Leaflet 02
pH	reduced; discolouration possible in contact with ferrous metals
Ingredients	Degradation products from the modification can be washed out by precipitation

Durability, use class

Façade cladding and shading elements are generally to be assigned to use class (UC) 3.1 according to EN 335. Recommendations for the durability of non-load-bearing components are contained in DIN 68800 1, Table E.1. The following table contains

information (excerpt) from this.

With durability classes in the range of DC 2 „permanent“ and DC 3 „moderately durable“ according to EN 350, TMT has sufficient durability for this application.

Component/exposure (examples)	Use class according to EN 335	Recommended minimum durability of wood with an expected service life (normal protection level)	
		up to 30 years	more than 30 years
Façade	UC 3.1	4	4
Façade, heavily exposed (low drying capacity, e.g. heavily shaded)	UC 3.1/3.2	3-4	3-4

Wood quality

The following wood quality is recommended for TMT profiles:

- Oblique growth ring (half-rift), no pith or juvenile wood

- Even, moderate annual ring width
- No or little fiber deviation, no coarse and only sound knots

Reaction to fire, classification

TMT – like other modified timber – is generally to be regarded as treated timber. It is not possible to classify reaction to fire without further testing on the basis of bulk density and thickness alone. The classification of reaction to fire is carried out in accordance with EN 13501-1 on the basis of test results, in parti-

cular the SBI test in accordance with EN 13823.

Subject to test results for specific TMT products, a similar reaction to fire behaviour to that of untreated wood is to be expected. Experience from tests shows that TMT has a less favourable smouldering behaviour.

Surface treatment

A surface coating of TMT for façade cladding and shading elements is not absolutely necessary; in most cases, non-surface-treated components are used. If a coating is to be applied, the coating agent for this must be approved by the manufacturer. In advance, it should be checked at which intervals maintenance could be useful or necessary and how this can be done. Low layer thicknesses offer less protection, but are easier to renovate (e.g. thin and medium-layer glazes are suitable).

The thermal modification increases the durability against wood-destroying fungi; this does not apply to the same extent to the resistance to wood-discolouring fungi or mould and blue stain fungi, because TMT does not contain any biocidal substances. Therefore, under unfavourable circumstances (e.g. frequent condensation of moisture on the surface), an infestation by mould or blue stain fungi and possibly also by algae can occur.

Construction

- Due to the low pH values of TMT, dark complex compounds can form in contact with ferrous metals and the presence of moisture, as is known for tannin-rich woods (oak, larch). Therefore, corrosion-resistant fasteners should be used.
- Holes should be pre-drilled (screw $\varnothing + 1$ mm) and countersunk; distance laterally ≥ 25 mm, from the end ≥ 50 mm

- The suitability of mounting clips should be approved or pre-checked by the manufacturer of the system.
- Façade cladding is subjected to suction in the event of increased wind loads, so it is important to ensure that there is sufficient screw pull-through resistance or to check it. Sufficient screw pull-out strength applies to the substructure or the fastening of the cladding elements to it.

Shading elements

The same statements and recommendations apply to the use of TMT in shading elements as for façade cladding. Shading elements are often screwed concealed, so that suitable fasteners

must be used here; if necessary, the screw pull-out strength must be checked. The use of TMT can be advantageous for very slim profiles and large fastening distances.

Bibliography

EN 335:2013, Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products

EN 350:2016, Biological durability of wood and wood-based products - Testing and classification of the durability against biological agents of wood and wood-based materials

DIN 68800-1:2019-06, Wood protection - Part 1: General

Fachregeln des Zimmererhandwerks 01 „Außenwandbekleidungen aus Holz“. Holzbau Deutschland – Bund Deutscher Zimmermeister im Zentralverband des Deutschen Baugewerbes [Hrsg.]

International Thermowood Association: ThermoWood® Handbook (www.thermowood.fi)

Leaflet „New Findings on Wooden Façades“. Holzforschung Austria, Vienna (www.holzforschung.at)



Dr. rer. silv. Wolfram Scheiding

+49 351 4662 280
wolfram.scheiding@ihd-dresden.de

**Institut für Holztechnologie
gemeinnützige GmbH**
Zellescher Weg 24
01217 Dresden

+49 351 4662 0
info@ihd-dresden.de
www.ihd-dresden.com

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