BauBuche Beech laminated veneer lumber

Structural physics

Pollmeier

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Cover photo: Francesco Mattuzzi

3.1 Structural-physical properties

Fire safety

Fire behaviour	Euroclass D-s2, do	Commission Decision (EU) 2017/2293

Euroclass B-s1, do as per EN 13501-1 can be achieved by applying a fire retardant coating. At the moment, products of Teknos Deutschland GmbH (TEKNOSAFE 2467-00, transparent and Teknosafe 2457-00, opaque white) are approved for the coating of BauBuche. The application must always follow the instructions of the currently valid technical data sheet.
More information can be found on www.teknos.com.

Charring rate	$\beta 0$ = 0.65 mm/min	for flat elements
	βn = 0.70 mm/min	for bar-shaped elements

Energy efficiency and thermal insulation

Thermal conductivity	λ = 0.17 W/(m K)	EN ISO 10456
Thermal inertia, specific heat storage capacity	cp = 1600 J/(kg K)	EN ISO 10456
Diffusion resistance	μ = 75 – 200	

Hygiene, health and environment

Formaldehyde	E1	EN 717-1
Certificate of origin	PEFC	

Density

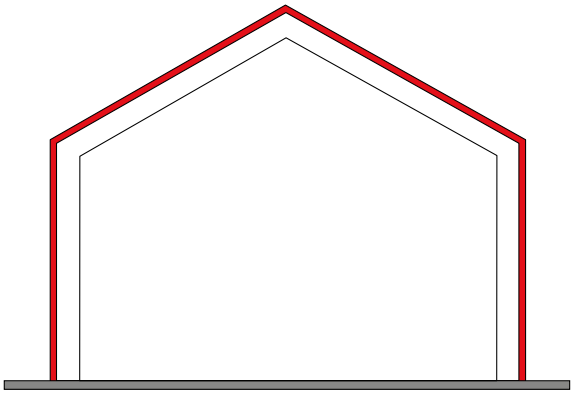
Characteristic density	ρ_k = 730 kg/m³
Mean density	ρ_{mean} = 800 kg/m³
Density for load calculations	ρ = 800 kg/m³

3.2 Durability

Durability class	5 (not durable)	EN 350-2
Service classes	1 and 2	EN 1995-1-1 (EC 5)

Service class 1

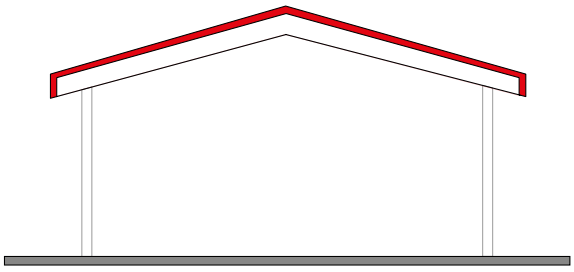
Service class 1 is characterised by wood moisture content of max. 12 % at a temperature of 20 °C and relative humidity of 65 % that is only exceeded for a few weeks per year.



Wood moisture content < 12 %
Indoors, heated and
unheated rooms

Service class 2

Service class 2 is characterised by wood moisture content of max. 20 % at a temperature of 20 °C and relative humidity of 85 % that is only exceeded for a few weeks per year.

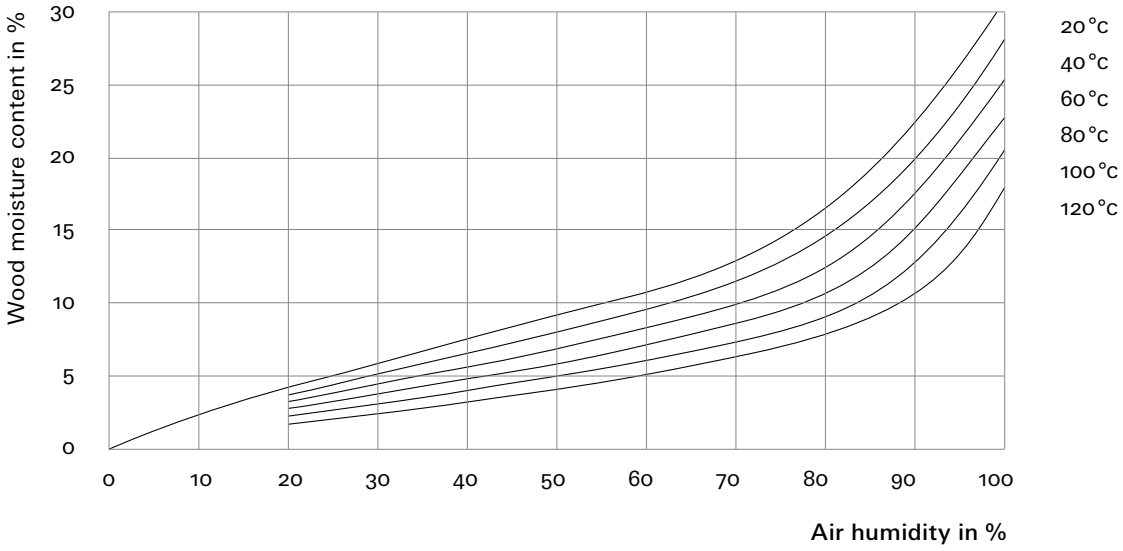


Wood moisture content < 20 %
Outdoors, covered by roof, not protected
against the elements or constant dampness

3.3 Equilibrium moisture content

The equilibrium moisture content of BauBuche depends on the ambient conditions (temperature and air humidity) and does not significantly differ from that of other wood types.

Timber is a hygroscopic material, which means that it absorbs moisture from the ambient air and releases moisture into the ambient air. Depending on the climate conditions, an equilibrium is reached, known as the equilibrium moisture content. For timber products used in construction, the equilibrium moisture contents are all within narrow band (see table).



Typical equilibrium moisture contents

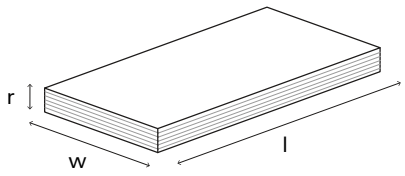
Indoor, heated:	6 – 12 %
Indoor, not heated:	9 – 15 %
Outdoor, under roof:	12 – 20 %

During production, the moisture content of BauBuche is approx. 6 % (+/- 2 %). Changes in the moisture content during machining and construction that occur before the equilibrium moisture content is achieved in the finished building might cause swelling and shrinking behaviour that must be taken into account.

3.4 Swelling and shrinking

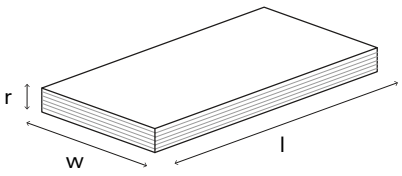
Below the fibre saturation level (approx. 35% wood moisture content), the material tends to swell and shrink as the wood moisture content changes. The rate of swelling/shrinking is denoted as the ratio between the rate of change in dimension and the rate of change in wood moisture content (in %/%). The wood moisture content of BauBuche is 6% (+/- 2%) ex works.

Board BauBuche Q



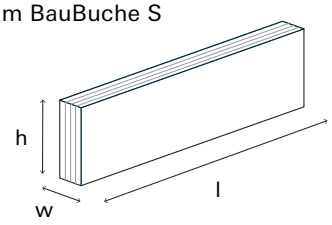
Δr = 0.45%/%
Δw = 0.03%/%
Δl = 0.01%/%

Board BauBuche S



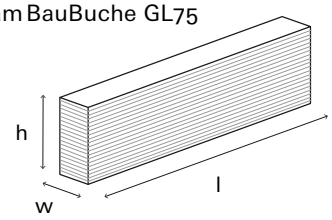
Δr = 0.45%/%
Δw = 0.40%/%
Δl = 0.01%/%

Beam BauBuche S



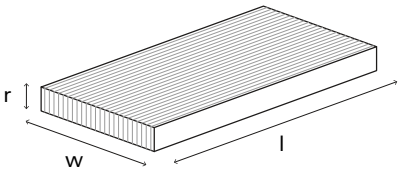
Δh = 0.40%/%
Δw = 0.45%/%
Δl = 0.01%/%

Beam BauBuche GL75



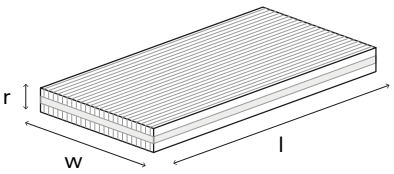
Δh = 0.45%/%
Δw = 0.40%/%
Δl = 0.01%/%

BauBuche Panel



Δr = 0.40%/%
Δw = 0.45%/%
Δl = 0.01%/%

BauBuche Panel X



Δr = 0.65%/%
Δw = 0.17%/%
Δl = 0.10%/%

Calculation of change in dimension – length (example):
ΔL = Δl * ΔU * L
ΔL = change in length in mm
Δl = differential swelling in longitudinal direction
ΔU = differential wood moisture content
L = initial length (reference length)
The differential wood moisture content is the difference between the equilibrium moisture content of the installed timber (Ue) and the wood moisture content during production (Up).
ΔU = Ue – Up

Sample calculation:
Material: BauBuche GL75
Dimensions: W x H x L 200 mm x 600 mm x 10000 mm
Equilibrium moisture content: Ue = 10% (indoor, heated)
ΔU = Ue – Up = 0.10 – 0.07 = 0.03
Dimensional change:
ΔW = Δw * ΔU * B = 0.40 * 0.03 * 200 mm = 2.4 mm
ΔW = Δw * ΔU * B = 0.45 * 0.03 * 600 mm = 8.1 mm
ΔL = Δl * ΔU * L = 0.01 * 0.03 * 10000 mm = 3 mm

3.5 Sound insulation

The sound insulation properties of BauBuche are similar to those of other timber construction materials. For single-layer construction elements, the sound insulation properties are primarily determined by the density of the material. The mean density of BauBuche is 800 kg/m³.

Sound insulation values that are appropriate in modern timber buildings with separate housing units can only be achieved with multi-layer constructions. In this case, the type of the timber material is no longer the determining factor.

For sound insulation values of floor constructions (beam-supported, hollow-box, solid floors), refer to the relevant literature. In all cases, the sound insulation performance is mainly determined by the floor construction placed on the load-bearing structure, and/or the construction and panelling on the ceiling below the floor.