GLT® – GIRDER LONGITUDINALLY TENSILETESTED

THE INDIVIDUALY TESTED SAFETY GUARANTOR.
01

AT A GLANCE

AREAS OF APPLICATION
- Construction and industrial buildings
- Multi-storey residential buildings
- Single and multiple family houses
- Engineered timber structures

FIELDS OF USE
- Rafter-supporting purlins for building halls
- Rafters and purlins for roof structures
- Wooden beam floors, also visually applied
- Highly-stressed bending beams

ADVANTAGES
- Volume and cost savings of up to 30%
- Simple structural design, like that of glued laminated timber
- Maximum finger joint safety through tensile test
- CE-labelled according to ETA-13/0644
- High loadbearing capacity with a low density
- Transparent glue line of the finger joint
- Cut to an exact length of up to 18 m
- Covered in conventional design software applications
- Available in visual and industrial quality
OVERVIEW

PRODUCT STANDARD/CERTIFICATION
ETA-13/0644

TENSILE TEST
ETA-13/0644

SURFACE QUALITIES
Visual quality
Industrial quality

MAXIMUM CROSS SECTIONS + STEPS
Heights: 120 to 280 mm in 20 mm steps
Widths: 60 mm to 140 mm in 20 mm steps
Lengths: Standard – 13 m
Specific lengths from 2.50 m up to 18.0 m are possible

FESTIGKEITSKLASSEN
GLT®24

WOOD SPECIES
Spruce/fir

CERTIFICATION
The current certificates are available in the download area of our website at HASSLACHER.COM.

SUSTAINABILITY
The HASSLACHER Group stands for a careful use of wood as a resource. Our raw materials come from sustainable and controlled forestry. Our locations are certified according to the strict PEFC™ standards.
YOUR COST ADVANTAGES

COSTS SAVINGS THROUGH PRICE ADVANTAGES
COMPARED TO GLUED LAMINATED TIMBER

GLT® is the cost-efficient alternative to glued laminated timber. Its loadbearing capacity corresponds to that of glued laminated timber. GLT® can therefore be used as a substitute for this timber product.

Example:

Glued laminated timber GL24  120/240 mm  100%
GLT®24   120/240 mm  80%
Cost advantage  20%

Achieving the same performance and loadbearing capacity, you save up to 20% of costs (up to EUR 80 per m³) if compared to glued laminated timber.

COSTS SAVINGS THROUGH VOLUME REDUCTIONS
COMPARED TO SOLID STRUCTURAL TIMBER

The design of GLT® can take place on a higher safety level, as its loadbearing capacity is guaranteed by the patented tensile test procedure.

Example:

Solid structural timber 120/240 mm 100%
GLT®24   100/240 mm  105%
Cost advantage  12%

Due to the pronounced increase of the performance of GLT®, up to 12% of costs (up to EUR 30 per m³) can be saved if compared to solid structural timber.

EXAMPLE OF COST SAVINGS

Rafter-supporting purlin on a hall roof (in total 500 lm are required)
Span = 5.0 m (single span beam)
Clearance e = 1.0 m
Service class 1
Persistent load gk = 0.5 kN/m²
Snow load sk = 2.0 kN/m

<table>
<thead>
<tr>
<th>Building material</th>
<th>GLT®24</th>
<th>Solid structural timber C24</th>
<th>GLUED LAMINATED TIMBER GL24H</th>
<th>GLUED LAMINATED TIMBER GL24C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross section</td>
<td><img src="120/220" alt="GLT®24" /></td>
<td><img src="140/220" alt="Solid structural timber C24" /></td>
<td><img src="120/240" alt="GLUED LAMINATED TIMBER GL24H" /></td>
<td><img src="140/240" alt="GLUED LAMINATED TIMBER GL24C" /></td>
</tr>
<tr>
<td>Costs in EUR/500 lm</td>
<td>EUR 5,150.00</td>
<td>EUR 5,730.00</td>
<td>EUR 7,085.00</td>
<td>EUR 8,065.00</td>
</tr>
<tr>
<td>Ratio in %</td>
<td>-27%</td>
<td>-19%</td>
<td>±0%</td>
<td>+14%</td>
</tr>
</tbody>
</table>
04

GLT® – GIRDER LONGITUDINALLY TENSILETESTED

TRIPLE SECURITY
Which is completely tested, is the safest! Each individual GLT® – girder longitudinally tensiletested as well as its finger joint connections are tested under extreme conditions.

ADVANTAGES
- Safety in the finger joints’ loadbearing behaviour
- Safety in the grading process
- The same design as glued laminated timber
- Up to 20% of material savings if compared to conventional solid construction timber
- Up to 15% in cost savings if compared to glued laminated timber

SAFETY STEP 1:
QUALITY GRADING
Specifically selected and certified sawn timber is produced in our sawmill, where it is technically dried and carefully pre-graded by our specialists.

SAFETY STEP 2:
HIGH-TECH STRENGTH GRADING
Using state-of-the-art X-ray and laser technology, strength-relevant wood defects are detected and eliminated without any compromise.

SAFETY STEP 3:
PATENTED TENSILE TEST
In common, the strength of loadbearing components is only monitored on a random basis – not in case of GLT®. Here, each individual GLT®, without exception, is subjected to the patented tensile test procedure according to ÖNORM B 4125, thus ensuring a complete level of quality.

TENSILE TEST PROCEDURE ACCORDING TO ÖNORM B 4125

<table>
<thead>
<tr>
<th>Entry</th>
<th>Centring</th>
<th>Clamping</th>
<th>Tensile testing</th>
<th>Exit</th>
</tr>
</thead>
</table>

GLT® – GIRDER LONGITUDINALLY TENSILETESTED | HASLACHER NORICA TIMBER
05
TECHNICAL DATA

BONDING
Polyurethane adhesive type I according to EN 301, approved for bonding loadbearing and non-loadbearing timber components, both indoors and outdoors.

MOISTURE CONTENT
15% ±3%

ROHDICHTE
In dependence of the strength class, approximately 450 kg/m³ to 500 kg/m³ in average.

THERMAL CONDUCTIVITY
\( \lambda = 0.13 \text{ W/mK} \)

DIFFUSION RESISTANCE
According to EN ISO 10456
\( \mu = 50 \text{ (dry)} \) to 20 \( \text{ (wet)} \)

FORMALDEHYDE EMISSIONS
E1 according to EN 717-1 (<0.1 ppm)
Polyurethane adhesive is free of formaldehyde.

TENSILE STRESSES DUE TO TESTING
60% of the characteristic tensile strength
GLT²4 8.4 N/mm²

FIRE BEHAVIOUR
D-s2, d0
Dₜ₁-s1, when used as floor covering

STRUCTURAL FIRE RESISTANCE
0.80 mm/min in accordance to EN 1995-1-2

SHRINKAGE AND SWELLING BEHAVIOUR
Perpendicular to the grain direction
\( \alpha_{u,90} = 0.24\% \) per 1\% change in moisture content

Parallel to the grain direction
\( \alpha_{u,0} = 0.01\% \) per 1\% change in moisture content

DIMENSIONAL TOLERANCES
Cross section: in accordance to EN 15497
Twist/warping: in accordance to DIN 4074-1
Length: in accordance to EN 14080

SERVICE CLASSES (EN 1995-1-1)
Service class 1 heated interior
Service class 2 roofed outdoor area
## PACKAGE UNITS

<table>
<thead>
<tr>
<th>Height in mm</th>
<th>t</th>
<th>m³</th>
<th>t</th>
<th>m³</th>
<th>t</th>
<th>m³</th>
<th>t</th>
<th>m³</th>
<th>t</th>
<th>m³</th>
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<tr>
<td>280</td>
<td>2.4</td>
<td>5.24</td>
<td>2.6</td>
<td>5.82</td>
<td>2.6</td>
<td>5.82</td>
<td>2.4</td>
<td>5.24</td>
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<td></td>
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<tr>
<td>240</td>
<td>2.2</td>
<td>4.87</td>
<td>2.4</td>
<td>5.41</td>
<td>2.4</td>
<td>5.41</td>
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<td></td>
<td></td>
<td></td>
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<td>240</td>
<td>2.0</td>
<td>5.15</td>
<td>2.2</td>
<td>4.99</td>
<td>2.2</td>
<td>4.99</td>
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<td>2.4</td>
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<td>5.15</td>
<td>2.6</td>
<td>5.72</td>
<td>2.6</td>
<td>5.72</td>
<td>2.3</td>
<td>5.15</td>
<td>2.7</td>
<td>6.01</td>
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<tr>
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<td>3.0</td>
<td>5.05</td>
<td>2.5</td>
<td>5.62</td>
<td>2.5</td>
<td>5.62</td>
<td>2.3</td>
<td>5.05</td>
<td>2.7</td>
<td>5.90</td>
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<td>3.0</td>
<td>5.05</td>
<td>2.5</td>
<td>5.62</td>
<td>2.5</td>
<td>5.62</td>
<td>2.3</td>
<td>5.05</td>
<td>2.7</td>
<td>5.90</td>
</tr>
<tr>
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<td>2.4</td>
<td>5.24</td>
<td>2.6</td>
<td>5.82</td>
<td>2.6</td>
<td>5.82</td>
<td>2.4</td>
<td>5.24</td>
<td>2.8</td>
<td>6.12</td>
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<tr>
<td>240</td>
<td>4.8</td>
<td>112 x 36</td>
<td>2.6</td>
<td>5.82</td>
<td>2.6</td>
<td>5.82</td>
<td>2.4</td>
<td>5.24</td>
<td>2.8</td>
<td>6.12</td>
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<td>2.3</td>
<td>5.05</td>
<td>2.5</td>
<td>5.62</td>
<td>2.5</td>
<td>5.62</td>
<td>2.3</td>
<td>5.05</td>
<td>2.7</td>
<td>5.90</td>
</tr>
<tr>
<td>120</td>
<td>5.4</td>
<td>108 x 36</td>
<td>108 x 40</td>
<td>60</td>
<td>100 x 36</td>
<td>108 x 40</td>
<td>108 x 40</td>
<td>108 x 40</td>
<td>108 x 40</td>
<td>108 x 40</td>
</tr>
</tbody>
</table>

Information on further cross sections is available on request.

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**06 PRODUCT RANGE**
## Quality Description

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>Visual Quality</th>
<th>Industrial Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>For loadbearing and non-loadbearing components in visual form, such as visible rafters, visible beams, etc.</td>
<td>For loadbearing and non-loadbearing components in non-visual form, e.g. as lightweight timber construction, covered rafters and purlins, etc.</td>
</tr>
<tr>
<td>Wood species</td>
<td>Spruce</td>
<td>Spruce (fir is also permitted) or pine</td>
</tr>
<tr>
<td>Mistletoe infestation</td>
<td>Not permitted</td>
<td>Not permitted</td>
</tr>
<tr>
<td>Moisture content</td>
<td>Maximum of 18%</td>
<td>Maximum of 18%</td>
</tr>
<tr>
<td>Cut type</td>
<td>Separated at the core</td>
<td>Separated at the core</td>
</tr>
<tr>
<td>Bark embedding</td>
<td>Not permitted</td>
<td>To be treated as knots</td>
</tr>
<tr>
<td>Pitch pockets</td>
<td>Up to 5 mm wide, no clusters</td>
<td>Permitted</td>
</tr>
<tr>
<td>Surface</td>
<td>Cleanly planed and chamfered on all sides</td>
<td>Planed and chamfered on all sides, rough areas are permitted</td>
</tr>
<tr>
<td>Dimensional accuracy</td>
<td>Dimensional accuracy of the cross section according to EN 15497, of the length according to EN 390. In case of visual and standard quality, undersize of up to 2 mm is possible.</td>
<td></td>
</tr>
<tr>
<td>Finishes</td>
<td>Trimmed square, dimensional accuracy of length according to EN 390</td>
<td></td>
</tr>
<tr>
<td>Wane</td>
<td>Not permitted</td>
<td>Up to 10% of the cross section’s side</td>
</tr>
<tr>
<td>Knots(^1)</td>
<td>Up to 40% of the cross section’s side(^2)</td>
<td>Up to 40% of the cross section’s side</td>
</tr>
<tr>
<td>Average annual ring width(^3)</td>
<td>Up to 6 mm</td>
<td>Up to 6 mm</td>
</tr>
<tr>
<td>Grain slope</td>
<td>Up to 12 cm/m</td>
<td>Up to 12 cm/m</td>
</tr>
<tr>
<td>Shrinkage cracks</td>
<td>Crack width of up to 3 mm</td>
<td>Permissible crack depth of up to 50%</td>
</tr>
<tr>
<td>Edge cracks</td>
<td>Not permitted</td>
<td>Permitted</td>
</tr>
<tr>
<td>Lightning/frost cracks, ring shake</td>
<td>Not permitted</td>
<td>Not permitted</td>
</tr>
<tr>
<td>Blue stains</td>
<td>Not permitted</td>
<td>Permitted</td>
</tr>
<tr>
<td>Nailing stripes (red, brown)</td>
<td>Not permitted</td>
<td>Permitted</td>
</tr>
<tr>
<td>Red and white rots</td>
<td>Not permitted</td>
<td>Not permitted</td>
</tr>
<tr>
<td>Compression wood/glassy wood/redwood</td>
<td>Up to 40% of the surface</td>
<td>Up to 40% of the surface</td>
</tr>
<tr>
<td>Insect attack</td>
<td>Not permitted</td>
<td>Permissible up to a diameter of 2 mm</td>
</tr>
<tr>
<td>Scope of validity</td>
<td>The specified surface qualities are valid at time of delivery.</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) A knot diameter of up to 40% of the cross section’s height or width is permitted.

\(^2\) Loose knots, falling-out knots, knocked-out and isolated knots with black rimmed knots are permitted up to 20 mm of the knot diameter.

\(^3\) The average annual ring width according to EN 1310 is applicable. Thereby, an area of 25 mm around the pith is not taken into account. For reasons of inevitable grading errors and variability of moisture content within the cross sections, the requirements and grading criteria specified in the table must be complied in 95% of the supplied pieces. In case of mechanical grading, related parameters are according to EN 14081. Therefore, deviations from the ones shown in the table may occur.
# MECHANICAL PROPERTIES

## STRENGTH AND STIFFNESS PROPERTIES ACCORDING TO ETA-13/0644

<table>
<thead>
<tr>
<th>Property</th>
<th>Symbol</th>
<th>Unit</th>
<th>GLT®24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending strength</td>
<td>$f_{m,k}$</td>
<td>N/mm²</td>
<td>24 x $k_{pl}$</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>$f_{t,0,k}$</td>
<td>N/mm²</td>
<td>14 x $k_{pl}$</td>
</tr>
<tr>
<td></td>
<td>$f_{t,90,k}$</td>
<td>N/mm²</td>
<td>0,4</td>
</tr>
<tr>
<td>Compressive strength</td>
<td>$f_{c,0,k}$</td>
<td>N/mm²</td>
<td>21 x $k_{pl}$</td>
</tr>
<tr>
<td></td>
<td>$f_{c,90,k}$</td>
<td>N/mm²</td>
<td>2,5</td>
</tr>
<tr>
<td>Shear strength</td>
<td>$f_{v,k}$</td>
<td>N/mm²</td>
<td>4,0</td>
</tr>
<tr>
<td>Modulus of elasticity</td>
<td>$E_{\text{mean}}$</td>
<td>N/mm²</td>
<td>11,600</td>
</tr>
<tr>
<td></td>
<td>$E_{0,05}$</td>
<td>N/mm²</td>
<td>7,400</td>
</tr>
<tr>
<td></td>
<td>$E_{90,\text{mean}}$</td>
<td>N/mm²</td>
<td>370</td>
</tr>
<tr>
<td>Shear modulus</td>
<td>$G_{\text{mean}}$</td>
<td>N/mm²</td>
<td>690</td>
</tr>
<tr>
<td>Rolling shear modulus</td>
<td>$\rho_{k}$</td>
<td>kg/m³</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>$\rho_{\text{mean}}$</td>
<td>kg/m³</td>
<td>420</td>
</tr>
</tbody>
</table>

1) For GLT® beams the values for bending strength, tensile strength and compressive strength can be multiplied by the factor $k_{pl}$ according to ETA-13/0644.
2) The shear strength must be multiplied by the factor $k_{cr}$ (crack factor).

## DIMENSIONS ACCORDING TO TECHNICAL ASSESSMENT

Design values for tension, compression and bending are determined by $k_{pl} = 1.05$ ... proof-loading coefficient

$$f_{d} = \frac{f_{k} \cdot k_{\text{mod}}}{\gamma_{m}} \cdot k_{pl}$$
# TABLES FOR PRELIMINARY DESIGN

## GIRDER LONGITUDINALLY TENSILE TESTED GLT®24, SINGLE SPAN BEAMS

| Height in mm | 1  | 1.5 | 2  | 2.5 | 3  | 3.5 | 4  | 4.5 | 5  | 6  | 7  | 8  | 9  | 10 | 15 | 20 | 25 |
|--------------|----|-----|----|-----|----|-----|----|-----|----|----|----|----|----|----|----|----|----|----|
| 240          | 7.36 | 6.55 | 6.01 | 5.62 | 5.31 | 5.06 | 4.85 | 4.67 | 4.52 | 4.26 | 4.05 | 3.80 | 3.59 | 3.40 | 2.65 | 2.00 | 1.60 |
| 200          | 6.19 | 5.50 | 5.04 | 4.70 | 4.44 | 4.23 | 4.05 | 3.90 | 3.77 | 3.56 | 3.38 | 3.17 | 2.99 | 2.84 | 2.22 | 1.67 | 1.34 |
| 140          | 4.40 | 3.89 | 3.55 | 3.31 | 3.12 | 2.97 | 2.85 | 2.74 | 2.65 | 2.50 | 2.37 | 2.23 | 2.10 | 1.99 | 1.56 | 1.17 | 0.94 |

### Calculation Example:

Persistent load \( g = 1.80 \text{kN/m}^2 \)
Variable load \( p = 1.70 \text{kN/m}^2 \)
Total load \( q = g + p = 3.4 \text{kN/m} \)
Tabular value 3.5 kN/m
Beam’s span length 4.50 m
Possible cross sections 100/240 mm, 80/280 mm
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HASSLACHER NORICA TIMBER’S PRODUCT PORTFOLIO

Sawn timber

Surfaced timber

Structural finger jointed solid timber & GLT®

Glued solid timber Duo/Trio

Glued laminated timber

Glued ceiling systems

Cross laminated timber

Glued laminated timber – special components

Special products

Pellets

Formwork panels

Pallets & packaging solutions
From wood to wonders.