



INFORMATION SHEET

**GLUED LAMINATED TIMBER AND
GLUED SOLID TIMBER
AS PER EN 14080:2013**

GLUED LAMINATED TIMBER

Previously, structural use of timber has been restricted to the four glued laminated timber strength classes stipulated by the standards, namely GL 24, GL 28, GL 32 and GL 36.

In the revised, harmonised standard, a new strength class model has been introduced for glued laminated timber. Here, the strength of glued laminated timber depends on the one hand on the tensile strength of the lamellae and on the other, on the bending strength or tensile strength of the finger joints. This new model produces both modified glued laminated timber lay-ups as well as new strength classes.

The strength class designation for glued laminated timber is comprised of the letter combination GL (stands for glulam) and the numerical value of the characteristic bending strength expressed in N/mm².

Regarding the cross-section lay-up a differentiation is made between a homogeneous lay-up (marked with the suffix “h”) and a combined lay-up (marked

with the suffix “c”). For that reason, the glued laminated timber classes are usually designated as, e.g., GL 24h or GL 28c.

Due to the new strength model, the previous highest strength class GL 36 as per EN 1194 cannot be manufactured in a cost-effective way anymore, so it is no longer listed in the standard. Table 2 and Table 3 show the characteristic values of the glued laminated timber strength classes as stipulated in EN 14080:2013.

Glued laminated timber of higher strength classes can be manufactured in large quantities with a combined lay-up only. High-strength lamellae are used in areas with high tensile stress and compression loads and segments with low strengths are laid out in the interior area of the beam. Common strength classes are therefore GL 20h, GL 24h, GL 28c, GL 30c and GL 32c. Homogeneous glued laminated timber of higher strength classes should only be used if the static circumstances make this necessary.



The best technology enables the manufacture of glued laminated timber in the following strength classes:

	GL 20h	GL 24h	GL 28c	GL 30c	GL 32c
Widths	60-120 mm	60-280 mm	100-280 mm	100-280 mm	100-280 mm
Heights	120-480 mm	120-1280 mm	120-1280 mm	120-1280 mm	120-1280 mm
Grading classes	T10	T14	T22 (T14)	T22 (T14)	T26 (T14)

Table 1 · On request: Strength classes GL 28h, GL 30h, GL 32h

	Strength classes of glued laminated timber with homogeneous lay-up					
Strength classes in N/mm²	Symbol	GL 20h	GL 24h	GL 28h	GL 30h	GL 32h
Bending	$f_{m,g,k}$	20	24	28	30	32
Tension	$f_{t,0,g,k}$	16	19,2	22,3	24	25,6
	$f_{t,90,g,k}$	0,5				
Compression	$f_{c,0,g,k}$	20	24	28	30	32
	$f_{c,90,g,k}$	2,5				
Shear and torsion	$f_{v,g,k}$	3,5				
Rolling shear	$f_{r,g,k}$	1,2				
Stiffness characteristics in N/mm²						
Modulus of elasticity	$E^0_{0,g,mean}$	8 400	11 500	12 600	13 600	14 200
	$E^0_{0,g,05}$	7 000	9 600	10 500	11 300	11 800
	$E^0_{90,g,mean}$	300				
	$E^0_{90,g,05}$	250				
Shear	$G^0_{g,mean}$	650				
	$G^0_{g,05}$	540				
Rolling shear modulus	$G^0_{r,g,mean}$	65				
	$G^0_{r,g,05}$	54				
Density in kg/m³						
Characteristic density	$\rho_{g,k}$	340	385	425	430	440
Mean density	$\rho_{g,mean}$	370	420	460	480	490

Table 2: Characteristic values for various glued laminated timber strength classes with homogeneous lay-up

		Strength classes of glued laminated timber with combined lay-up				
Strength classes in N/mm²	Symbol	GL 20c	GL 24c	GL 28c	GL 30c	GL 32c
Bending	$f_{m,g,k}$	-	-	28	30	32
Tension	$f_{t,0,g,k}$	-	-	19,5	19,5	19,5
	$f_{t,90,g,k}$					
Compression	$f_{c,0,g,k}$	-	-	24	25,5	24,5
	$f_{c,90,g,k}$					
Shear and torsion	$f_{v,g,k}$					
Rolling shear	$f_{r,g,k}$					
Stiffness characteristics in N/mm²						
Modulus of elasticity	$E^0_{0,g,mean}$	-	-	12 500	13 000	13 500
	$E^0_{0,g,05}$	-	-	10 400	10 800	11 200
	$E^0_{90,g,mean}$					
	$E^0_{90,g,05}$					
Shear	$G^0_{g,mean}$					
	$G^0_{g,05}$					
Rolling shear modulus	$G^0_{r,g,mean}$					
	$G^0_{r,g,05}$					
Density in kg/m³						
Characteristic density	$\rho_{g,k}$	-	-	390	390	400
Mean density	$\rho_{g,mean}$	-	-	420	430	440

Table 3: Characteristic values for various glued laminated timber strength classes with combined lay-up

GLUED SOLID TIMBER

In EN 14080:2013, the glued solid timbers were regulated as a standard for the first time. With the coming into force of this standard, the CE marking of glued solid timbers is obligatory starting 08.08.2015.

The difference to glued laminated timber is that the lamellae have a thickness greater than 45 mm. According to EN 14080:2013, glued solid timbers can be made of up to 5 lamellae with a thickness of more than 45 to 85 mm. The segments of the glued laminated timbers are either visually sorted according to the squared timber criteria in ÖNORM DIN 4074-1 or mechanically sorted and allocated to the C-classes in EN 338. The strength and stiffness characteristics of the glued solid timbers can thus be taken from EN 338.

		Strength class
Strength characteristics in N/mm²	Symbol	C 24
Bending	$f_{m,0,k}$	24
Tension parallel to grain	$f_{t,0,k}$	14
Tension perpendicular to grain	$f_{t,90,k}$	0,4
Compression parallel to grain	$f_{c,0,k}$	21
Compression perpendicular to grain	$f_{c,90,k}$	2,5
Shear	$f_{v,k}$	4,0
Stiffness characteristics in N/mm²		
Mean modulus of elasticity when bending parallel to grain	$E_{m,0,mean}$	11,0
Characteristic modulus of elasticity when bending parallel to grain	$E_{m,0,k}$	7,4
Mean modulus of elasticity when bending perpendicular to grain	$E_{m,90,mean}$	0,37
Mean shear modulus	G_{mean}	0,69
Density in kg/m³		
Characteristic density	ρ_k	350
Mean density	ρ_{mean}	420

Standard dimensions

	Thickness mm	Height mm			Length m
		160	180	200	
Piece/Packet	120	■ 21	■ 18	■ 18	6,0 - 18,0
Piece/Packet	140		■ 18	■ 18	6,0 - 18,0



MARKING AND DECLARATION OF PERFORMANCE



Starting 8 August 2015, glued laminated timber and glued solid timber may only be produced in accordance with the specifications in EN 14080:2013. Likewise, the marking on the component and the accompanying documents must meet the specifications in EN 14080:2013. Glued laminated timber that was produced before 8 August 2015 in accordance with the requirements stated in EN 14080:2005 can still be placed in the market with the applicable CE marking. Furthermore, for all products the declarations of performance from the manufacturer shall be issued in accordance with the European Construction Products Regulation.



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