

# Vedlegg 8

Materialverdier for CLT-elementer

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## CLT - Plate 0° (major Axis)

Name	1 2 3 4 5 6 7 8 9									d brut [mm]	A brut [cm <sup>2</sup> ]	W brut [cm <sup>3</sup> ]	I brut [cm <sup>4</sup> ]	i brut [cm]
	d [mm]													
60 L3s	20	20	20							60	600	600	1.800	1,732
80 L3s	30	20	30							80	800	1.067	4.267	2,309
90 L3s	30	30	30							90	900	1.360	6.075	2,598
100 L3s	30	40	30							100	1.000	1.667	8.333	2,887
120 L3s	40	40	40							120	1.200	2.400	14.400	3,464
160 L5s - 2	30	30	40	30	30					160	1.600	4.267	34.133	4,619
100 L5s	20	20	20	20	20					100	1.000	1.667	8.333	2,887
120 L5s	30	20	20	20	30					120	1.200	2.400	14.400	3,464
140 L5s	40	20	20	20	40					140	1.400	3.267	22.967	4,041
160 L5s	40	20	40	20	40					160	1.600	4.267	34.133	4,619
180 L5s	40	30	40	30	40					180	1.800	5.400	48.600	5,196
200 L5s	40	40	40	40	40					200	2.000	6.667	66.667	5,774
180 L7s	30	20	30	20	30	20	30			180	1.800	5.400	48.600	5,196
200 L7s	20	40	20	40	20	40	20			200	2.000	6.667	66.667	5,774
240 L7s	30	40	30	40	30	40	30			240	2.400	9.600	115.200	6,928
220 L7s - 2	30	30	30	40	30	30	30			220	2.200	8.067	88.733	6,351
240 L7s - 2	40	40	20	40	20	40	40			240	2.400	9.600	115.200	6,928
260 L7s - 2	40	40	30	40	30	40	40			260	2.600	11.267	146.467	7,506
280 L7s - 2	40	40	40	40	40	40	40			280	2.800	13.067	182.933	8,083
300 L8s - 2	40	40	30	40	40	30	40	40		300	3.000	15.000	225.000	8,660
320 L8s - 2	40	40	40	40	40	40	40	40		320	3.200	17.067	273.067	9,238
60 C3s	20	20	20							60	600	600	1.800	1,732
80 C3s	30	20	30							80	800	1.067	4.267	2,309
90 C3s	30	30	30							90	900	1.360	6.075	2,598
100 C3s	30	40	30							100	1.000	1.667	8.333	2,887
120 C3s	40	40	40							120	1.200	2.400	14.400	3,464
100 C5s	20	20	20	20	20					100	1.000	1.667	8.333	2,887
120 C5s	30	20	20	20	30					120	1.200	2.400	14.400	3,464
140 C5s	40	20	20	20	40					140	1.400	3.267	22.967	4,041
160 C5s	40	20	40	20	40					160	1.600	4.267	34.133	4,619

Bearing strength (Ultimate limit states)				Shear $P_{V,k}$ [N/mm <sup>2</sup> ]
Bending $P_{M,k}$ [N/mm <sup>2</sup> ]	Tension $P_{t,0,k}$ [N/mm <sup>2</sup> ]	Compression $P_{c,0,k}$ [N/mm <sup>2</sup> ]	Shear $P_{V,k}$ [N/mm <sup>2</sup> ]	
23,11	9,33	14,00	1,35	
23,63	10,50	15,75	1,31	
23,11	9,33	14,00	1,25	
22,48	8,40	12,60	1,17	
23,11	9,33	14,00	1,14	
23,63	10,50	15,75	1,10	
19,01	8,40	12,60	1,55	
21,11	9,33	14,00	1,47	
22,18	10,00	15,00	1,42	
21,38	10,50	15,75	1,48	
20,15	9,33	14,00	1,40	
19,01	8,40	12,60	1,30	
18,98	9,33	14,00	1,18	
13,06	5,60	8,40	1,20	
15,50	7,00	10,50	1,18	
21,89	10,18	15,27	1,32	
23,22	11,67	17,50	1,38	
22,72	10,77	16,15	1,28	
22,18	10,00	15,00	1,19	
22,02	11,20	16,80	1,35	
21,38	10,50	15,75	1,25	
23,11	9,33	14,00	1,35	
23,63	10,50	15,75	1,31	
23,11	9,33	14,00	1,25	
22,48	8,40	12,60	1,17	
23,11	9,33	14,00	1,14	
19,01	8,40	12,60	1,55	
21,11	9,33	14,00	1,47	
22,18	10,00	15,00	1,42	
21,38	10,50	15,75	1,48	

Deflection/Stiffness (Serviceability limit state)			Buckling	
Bending $E'_{m,mean}$ [N/mm <sup>2</sup> ]	Tension $E'_{t,mean}$ [N/mm <sup>2</sup> ]	Shear $G'_{mean}$ [N/mm <sup>2</sup> ]	factor for radius of inertia $k_i$ [-]	Shear form factor $\kappa$ [-]
12.037	8.333	88	0,832	0,155
12.305	9.375	107	0,873	0,169
12.037	8.333	88	0,832	0,155
11.700	7.500	79	0,801	0,152
12.037	8.333	88	0,832	0,155
12.305	9.375	107	0,873	0,169
9.900	7.500	96	0,870	0,184
10.995	8.333	102	0,871	0,178
11.552	8.929	109	0,879	0,179
11.133	9.375	132	0,918	0,208
10.494	8.333	108	0,891	0,189
9.900	7.500	96	0,870	0,184
8.719	8.333	116	0,978	0,203
6.853	5.000	78	0,854	0,212
8.186	6.250	88	0,874	0,198
11.401	9.091	117	0,983	0,188
12.095	10.417	158	0,928	0,226
11.834	9.615	126	0,901	0,194
11.552	8.929	109	0,879	0,179
11.467	10.000	155	0,934	0,229
11.133	9.375	132	0,918	0,208
12.037	8.333	88	0,832	0,155
12.305	9.375	107	0,873	0,169
12.037	8.333	88	0,832	0,155
11.700	7.500	79	0,801	0,152
12.037	8.333	88	0,832	0,155
9.900	7.500	96	0,870	0,184
10.995	8.333	102	0,871	0,178
11.552	8.929	109	0,879	0,179
11.133	9.375	132	0,918	0,208

CLT - Plate 90° (minor Axis)

Name	d	1	2	3	4	5	6	7	8	9
	[mm]									
80 L3s	20	20	20							
80 L3s	30	20	30							
90 L3s	30	30	30							
100 L3s	30	40	30							
120 L3s	40	40	40							
160 L5s - 2	30	30	40	30	30					
100 L5s	20	20	20	20	20					
120 L5s	30	20	20	20	30					
140 L5s	40	20	20	20	40					
160 L5s	40	20	40	20	40					
180 L5s	40	30	40	30	40					
200 L5s	40	40	40	40	40					
180 L7s	30	20	30	20	30	20	30			
200 L7s	20	40	20	40	20	40	20			
240 L7s	30	40	30	40	30	40	30			
220 L7s - 2	30	30	30	40	30	30	30			
240 L7s - 2	40	40	20	40	20	40	40			
260 L7s - 2	40	40	30	40	30	40	40			
280 L7s - 2	40	40	40	40	40	40	40			
300 L8s - 2	40	40	30	40	40	30	40	40		
320 L8s - 2	40	40	40	40	40	40	40	40		
80 C3s	20	20	20							
80 C3s	30	20	30							
90 C3s	30	30	30							
100 C3s	30	40	30							
120 C3s	40	40	40							
100 C5s	20	20	20	20	20					
120 C5s	30	20	20	20	30					
140 C5s	40	20	20	20	40					
160 C5s	40	20	40	20	40					

d brut	A brut	W brut	I brut	i brut
[mm]	[cm <sup>2</sup> ]	[cm <sup>2</sup> ]	[cm <sup>4</sup> ]	[cm]
80	600	600	1.800	1,732
80	800	1.067	4.267	2,309
90	900	1.350	6.075	2,598
100	1.000	1.667	8.333	2,887
120	1.200	2.400	14.400	3,464
160	1.600	4.267	34.133	4,819
100	1.000	1.667	8.333	2,887
120	1.200	2.400	14.400	3,464
140	1.400	3.267	22.867	4,041
160	1.600	4.267	34.133	4,819
180	1.800	5.400	48.600	5,198
200	2.000	6.667	66.667	5,774
180	1.800	5.400	48.600	5,198
200	2.000	6.667	66.667	5,774
240	2.400	9.600	115.200	6,928
220	2.200	8.067	88.733	6,351
240	2.400	9.600	115.200	6,928
280	2.600	11.267	146.467	7,506
280	2.800	13.067	182.933	8,083
300	3.000	15.000	225.000	8,660
320	3.200	17.067	273.067	9,238
80	600	600	1.800	1,732
80	800	1.067	4.267	2,309
90	900	1.350	6.075	2,598
100	1.000	1.667	8.333	2,887
120	1.200	2.400	14.400	3,464
100	1.000	1.667	8.333	2,887
120	1.200	2.400	14.400	3,464
140	1.400	3.267	22.867	4,041
160	1.600	4.267	34.133	4,819

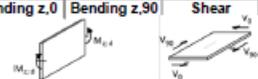
Bearing strength (Ultimate limit states)			
Bending	Tension	Compression	Shear
F <sub>m,90,k</sub>	F <sub>t,90,k</sub>	F <sub>c,90,k</sub>	F <sub>v,90,k</sub>
[N/mm <sup>2</sup> ]	[N/mm <sup>2</sup> ]	[N/mm <sup>2</sup> ]	[N/mm <sup>2</sup> ]
2,67	4,67	7,00	1,33
1,50	3,50	5,25	1,00
2,67	4,67	7,00	1,23
3,84	5,60	8,40	1,34
2,67	4,67	7,00	1,12
1,50	3,50	5,25	0,84
8,32	5,60	8,40	0,81
5,78	4,67	7,00	0,68
4,24	4,00	6,00	0,58
5,25	3,50	5,25	0,73
6,93	4,67	7,00	0,71
8,32	5,60	8,40	0,68
7,56	4,67	7,00	1,08
13,68	8,40	12,60	1,00
11,33	7,00	10,50	0,96
4,64	3,82	5,73	0,58
2,33	2,33	3,50	0,49
3,32	3,23	4,85	0,49
4,24	4,00	6,00	0,49
4,25	2,80	4,20	0,65
5,25	3,50	5,25	0,61
2,67	4,67	7,00	1,33
1,50	3,50	5,25	1,00
2,67	4,67	7,00	1,23
3,84	5,60	8,40	1,34
2,67	4,67	7,00	1,12
8,32	5,60	8,40	0,81
5,78	4,67	7,00	0,68
4,24	4,00	6,00	0,58
5,25	3,50	5,25	0,73

Deflection/Stiffness (Serviceability limit state)			Buckling	
Bending	Tension	Shear	factor of radius of inertia	Shear form factor
E <sup>*</sup> <sub>m,90,mean</sub>	E <sup>*</sup> <sub>t,90,mean</sub>	G <sup>*</sup> <sub>v,90,mean</sub>	k <sub>90,j</sub>	κ
[N/mm <sup>2</sup> ]	[N/mm <sup>2</sup> ]	[N/mm <sup>2</sup> ]	[-]	[-]
463	4.167	230	3.000	0,833
195	3.125	173	4.000	0,833
463	4.167	230	3.000	0,833
800	5.000	276	2.500	0,833
463	4.167	230	3.000	0,833
195	3.125	173	4.000	0,833
2.600	5.000	53	1.387	0,155
1.505	4.167	44	1.664	0,155
948	3.571	38	1.941	0,155
1.367	3.125	35	1.512	0,159
2.006	4.167	44	1.441	0,152
2.600	5.000	53	1.387	0,155
2.623	4.167	55	1.260	0,187
5.700	7.500	108	1.147	0,208
4.427	6.250	81	1.188	0,189
1.099	3.409	36	1.761	0,152
405	2.083	24	2.268	0,159
666	2.885	30	2.062	0,152
948	3.571	38	1.941	0,155
1.033	2.500	31	1.555	0,171
1.367	3.125	35	1.512	0,159
463	4.167	230	3.000	0,833
195	3.125	173	4.000	0,833
463	4.167	230	3.000	0,833
800	5.000	276	2.500	0,833
463	4.167	230	3.000	0,833
2.600	5.000	53	1.387	0,155
1.505	4.167	44	1.664	0,155
948	3.571	38	1.941	0,155
1.367	3.125	35	1.512	0,159

### CLT - Shear panels and deep beams

Name	1 2 3 4 5 6 7 8 9									d brut [mm]	A brut [cm <sup>2</sup> ]	Bearing strength (Ultimate limit states)			Deflection/Stiffness (Serviceability limit sta			
	d [mm]														Bending z,0	Bending z,90	Shear	E* <sub>m,0,mean</sub> [N/mm <sup>2</sup> ]
60 L3s	20	20	20								60	600	16,00	8,00	2,67	8.333	4.167	518
80 L3s	30	20	30								80	800	18,00	6,00	2,00	9.375	3.125	518
90 L3s	30	30	30								90	900	16,00	8,00	2,67	8.333	4.167	518
100 L3s	30	40	30								100	1.000	14,40	9,60	3,20	7.500	5.000	518
120 L3s	40	40	40								120	1.200	16,00	8,00	2,67	8.333	4.167	518
160 L5s - 2	30	30	40	30	30						160	1.600	18,00	6,00	2,00	9.375	3.125	518
100 L5s	20	20	20	20	20						100	1.000	14,40	9,60	3,20	7.500	5.000	518
120 L5s	30	20	20	20	30						120	1.200	16,00	8,00	2,67	8.333	4.167	518
140 L5s	40	20	20	20	40						140	1.400	17,14	6,88	2,29	8.929	3.571	518
160 L5s	40	20	40	20	40						160	1.600	18,00	6,00	2,00	9.375	3.125	518
180 L5s	40	30	40	30	40						180	1.800	16,00	8,00	2,67	8.333	4.167	518
200 L5s	40	40	40	40	40						200	2.000	14,40	9,60	3,20	7.500	5.000	518
180 L7s	30	20	30	20	30	20	30				180	1.800	16,00	8,00	2,67	8.333	4.167	518
200 L7s	20	40	20	40	20	40	20				200	2.000	9,60	14,40	3,20	5.000	7.500	518
240 L7s	30	40	30	40	30	40	30				240	2.400	12,00	12,00	3,50	6.250	6.250	518
220 L7s - 2	30	30	30	40	30	30	30				220	2.200	17,45	6,55	2,18	9.091	3.409	518
240 L7s - 2	40	40	20	40	20	40	40				240	2.400	20,00	4,00	1,33	10.417	2.083	518
260 L7s - 2	40	40	30	40	30	40	40				260	2.600	18,46	5,54	1,85	9.615	2.885	518
280 L7s - 2	40	40	40	40	40	40	40				280	2.800	17,14	6,88	2,29	8.929	3.571	518
300 L8s - 2	40	40	30	40	40	30	40	40			300	3.000	19,20	4,80	1,60	10.000	2.500	518
320 L8s - 2	40	40	40	40	40	40	40	40			320	3.200	18,00	6,00	2,00	9.375	3.125	518
60 C3s	20	20	20								60	600	16,00	8,00	2,67	8.333	4.167	518
80 C3s	30	20	30								80	800	18,00	6,00	2,00	9.375	3.125	518
90 C3s	30	30	30								90	900	16,00	8,00	2,67	8.333	4.167	518
100 C3s	30	40	30								100	1.000	14,40	9,60	3,20	7.500	5.000	518
120 C3s	40	40	40								120	1.200	16,00	8,00	2,67	8.333	4.167	518
100 C5s	20	20	20	20	20						100	1.000	14,40	9,60	3,20	7.500	5.000	518
120 C5s	30	20	20	20	30						120	1.200	16,00	8,00	2,67	8.333	4.167	518
140 C5s	40	20	20	20	40						140	1.400	17,14	6,88	2,29	8.929	3.571	518
160 C5s	40	20	40	20	40						160	1.600	18,00	6,00	2,00	9.375	3.125	518

Bearing strength (Ultimate limit states)



Deflection/Stiffness (Serviceability limit sta

