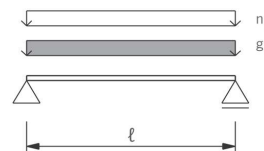


Single span beam - vibration



Minimum panel thickness of various fire resistance classes.

| Dead load | Imposed load | Span of single - span beam | | | | | | | | |
|-----------|--------------|----------------------------|-------|--------|--------|--------|----------|----------|--------|----------|
| | | 3.0m | 3.5m | 4.0m | 4.5m | 5.0m | 5.5m | 6.0m | 6.5m | 7.0m |
| g_k^* | n_k | | | | | | | | | |
| kN/m | kN/m | | | | | | | | | |
| 1,0 | 1,0 | 80 L3 | 80 L3 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 220 L7/2 |
| | 2,0 | | 90 L3 | 100 L3 | | 120 L3 | 140 L5 | 180 L5 | 200 L5 | |
| | 2,8 | | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 3,5 | | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 4,0 | | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| 1,5 | 1,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,8 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 3,5 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 4,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| 2,0 | 1,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,8 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 3,5 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 4,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| 2,5 | 1,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,8 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 3,5 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 4,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| 3,0 | 1,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,8 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 3,5 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 4,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |

Service class 1, Imposed load category A ($\psi_0 = 0.7$; $\psi_1 = 0.5$; $\psi_2 = 0.3$), $k_{mod} = 0.8$

*In the table the CLT self weight is already taken into account.

Serviceability:

a) Quasi-constant design situation: $zul w_{fin} = 250$

b) Infrequent design situation: $zul w_{q,inst} = 300$;

$zul w_{fin} - w_{g,inst} = 200$;

$k_{def} = 0.6$

c) Vibration according to EN 19951-1-1 and Kreuzinger & Mohr

($f_1 > 8$ Hz or $f_1 > 5$ Hz with $a = 0.4$ m/s², $V < V_{grenz}$, $W_{EF} < 1$ mm)

D = 2%, 5 cm cement screed, b = 1.2 * l

Loading - bearing capacity:

a) verification of bending stresses;

b) Verification of shearing stresses;

$k_{mod} = 0.8$

Fire resistance

$v_{1,j} = 0.63$ mm/min

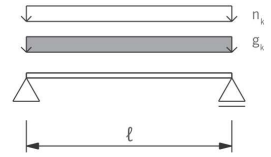
$v_{2,j} = 0.86$ mm/min

| |
|-----|
| R0 |
| R30 |
| R60 |
| R90 |

This table specifies the required thicknesses for the normal design situation (R0).

The table is only for preliminary estimate purpose and is not a substitute for a structural analysis.

Single span beam - deformation



Minimum panel thickness of various fire resistance classes.

| Dead load | Imposed load | Span of single - span beam | | | | | | | | |
|-----------|--------------|----------------------------|--------|----------|----------|----------|----------|----------|----------|----------|
| | | 3.0m | 3.5m | 4.0m | 4.5m | 5.0m | 5.5m | 6.0m | 6.5m | 7.0m |
| g_k^* | n_k | | | | | | | | | |
| kN/m | kN/m | | | | | | | | | |
| 1,0 | 1,0 | 80 L3 | 80 L3 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 160 L5/2 | 180 L5 |
| | 2,0 | | 90 L3 | 100 L3 | | 120 L3 | 140 L5 | | 180 L5 | 200 L5 |
| | 2,8 | 80 L3 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 200 L5 | 220 L7/2 | |
| | 3,5 | | 90 L3 | 100 L3 | 140 L5 | | | | | |
| | 4,0 | | 90 L3 | 120 L3 | 120 L3 | | | | | 160 L5/2 |
| 5,0 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 200 L5 | 220 L7/2 | | | |
| 1,5 | 1,0 | 80 L3 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 |
| | 2,0 | 80 L3 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | |
| | 2,8 | | | | | | | | | 100 L3 |
| | 3,5 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 | |
| | 4,0 | | | | | | | | | 100 L3 |
| 5,0 | 120 L3 | | | | | | | | | 160 L5/2 |
| 2,0 | 1,0 | 80 L3 | 100 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 80 L3 | 100 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | |
| | 2,8 | | | | | | | | | |
| | 3,5 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | | |
| | 4,0 | | | | | | | | 100 L3 | |
| 5,0 | 120 L3 | | | | | | | | 160 L5/2 | 200 L5 |
| 2,5 | 1,0 | 90 L3 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 |
| | 2,0 | 90 L3 | 120 L3 | 120 L3 | | | 140 L5 | 180 L5 | | |
| | 2,8 | | | | 90 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 |
| | 3,5 | 120 L3 | 140 L5 | | | | | | | |
| | 4,0 | 100 L3 | 140 L5 | 160 L5/2 | | | | | | |
| 5,0 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 200 L5 | 220 L7/2 | | | | |
| 3,0 | 1,0 | 90 L3 | 120 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 | |
| | 2,0 | 90 L3 | | 120 L3 | | | | | | 140 L5 |
| | 2,8 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 | | |
| | 3,5 | | | | | | | | 120 L3 | 140 L5 |
| | 4,0 | | | | | | | | 100 L3 | 120 L3 |
| 5,0 | 100 L3 | 120 L3 | 140 L5 | 160 L5/2 | 180 L5 | 200 L5 | 220 L7/2 | | | |

Service class 1, Imposed load category A ($\psi_0 = 0.7$; $\psi_1 = 0.5$; $\psi_2 = 0.3$), $k_{mod} = 0.8$

*In the table the CLT self weight is already taken into account.

Serviceability:

- a) Quasi-constant design situation: $zul w_{fin} = 250$
- b) Infrequent design situation: $zul w_{q,inst} = 300$;
- $zul w_{fin} - w_{g,inst} = 200$;
- $k_{def} = 0.6$

Loading - bearing capacity:

- a) verification of bending stresses;
- b) Verification of shearing stresses
- $k_{mod} = 0.8$

Fire resistance

HFA 2011

$v_1 = 0.65$ mm/min

| |
|-----|
| R0 |
| R30 |
| R60 |
| R90 |

This table specifies the required thicknesses for the normal design situation (R0).

The table is only for preliminary estimate purpose and is not a substitute for a structural analysis.