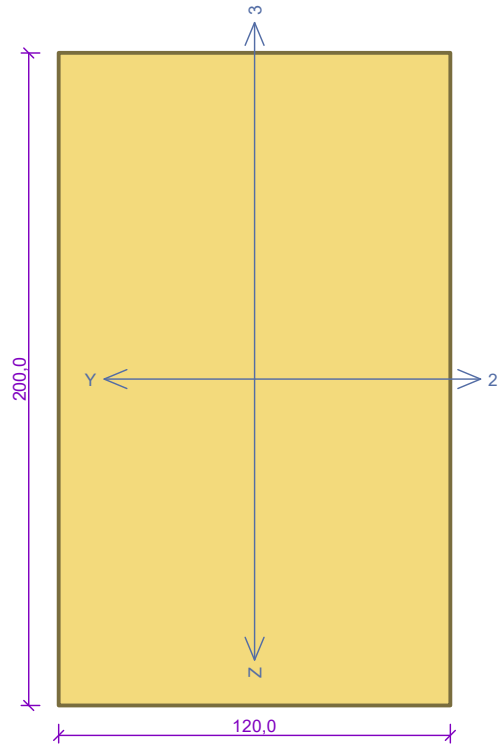
Column S1



Standard **EN 1995-1-2/Czech Rep.**.

Reliability of timber in fire : $\gamma_{M,fi}$ = 1,000

Section: Rectangle 120x200
Dimensions:
Cross-section height h = 200,0 mm
Cross-section width b = 120,0 mm

Material: C24 - coniferous
Material characteristics:

Bending strength	$f_{m,k}$	:	24,0	MPa
Tensile strength in fibre direction	$f_{t,0,k}$	:	14,0	MPa
Compressive strength in fibre direction	$f_{c,0,k}$	:	21,0	MPa
Shear strength	$f_{v,k}$	:	4,0	MPa
Compressive strength perpendicular to fibres	$f_{c,90,k}$	:	2,5	MPa
Tensile strength perpendicular to fibres	$f_{t,90,k}$	:	0,4	MPa
Elastic modulus	$E_{0,mean}$	:	11000	MPa
5% elastic modulus quantile	$E_{0.05}$	:	7400	MPa
Shear modulus	G_{mean}	:	690	MPa
Characteristic value of density	ρ_k	:	350,0	kg/m^3

Calculation uses coefficient k_h for increasing tensile and bending strength.

Internal forces in system of cross-section coordinates:
Load with maximal utilization
Load 01

N = -52,000 kN
M_y = 0,000 kNm M_z = 0,000 kNm
V_z = 0,000 kN V_y = 0,000 kN

Fire detail:
Protected cross-section, exposed to heat on all sides
Fire protection:
Mineral wool
Total thickness h_{ins} = 30,0 mm
Bulk density ρ_{ins} = 150,0 kg/m^3
Length of fasteners l_f = 60,0 mm

Buckling:
Calculation with buckling
Sector length for buckling L_z = 2,600 m
Buckling length factor k_z = 1,000 Buckling length $L_{cr,z}$ = 2,600 m
Sector length for buckling L_y = 2,600 m
Buckling length factor k_y = 1,000 Buckling length $L_{cr,y}$ = 2,600 m

Results
Check in required fire resistance time t = 30,0 min:
Method of reduced cross-section
Charring depth $d_{char,n}$ = 14,4 mm
Decisive load: Load 01
Internal forces: N = -52,000 kN; M_y = 0,000 kNm; M_z = 0,000 kNm; V_z = 0,000 kN; V_y = 0,000 kN

Buckling compression check:
Resistance: $N_{R,t,fi}$ = 73,249 kN
| -0,710 | < 1 **Pass**

Section ok

PASS

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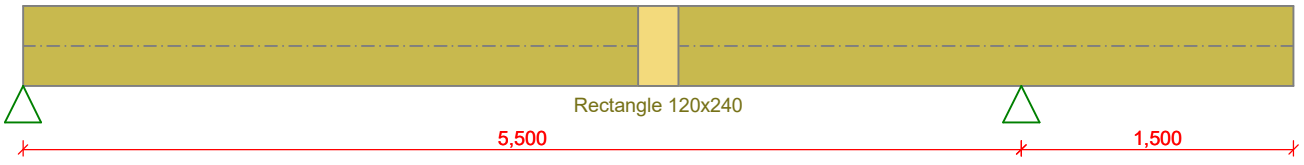
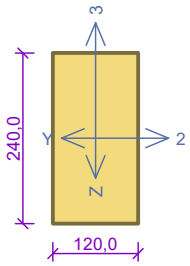
Beam T5





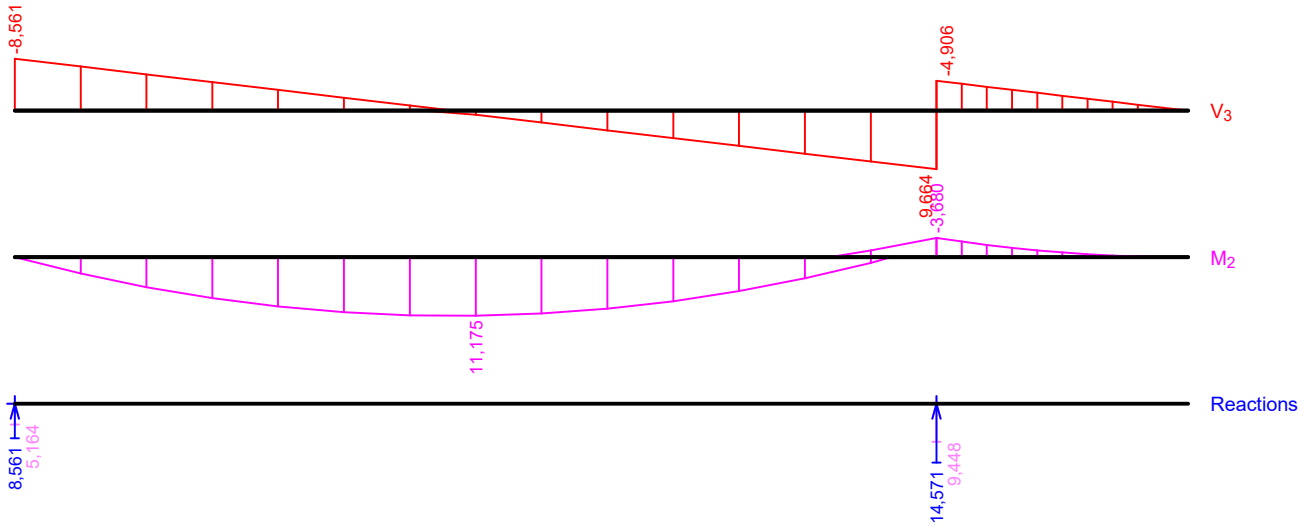
Standard **EN 1995-1-2/Czech Rep.**.

Material: S10 (C24) - coniferous
Calculation uses coefficient k_h for increasing tensile and bending strength.

Load

$f_{g,1}$ =	0,121	kN/m	γ_f =	1,35
$f_{g,2}$ =	2,000	kN/m	γ_f =	1,35
$f_{q,3}$ =	2,300	kN/m	γ_f =	1,5
$f_{q,4}$ =	2,300	kN/m (0,000 - 5,500m)	γ_f =	1,5
$f_{q,5}$ =	2,300	kN/m (5,500 - 7,000m)	γ_f =	1,5

Buckling:
Buckling M_y:
l_{z1} = 7,000 m
Beam and load type: Beam with distributed load
Load position: On the top
Fire detail:
Unprotected cross-section, exposed to heat from three sides



Results
Check in required fire resistance time t = 15,0 min:
Method of reduced cross-section
Charring depth $d_{char,n}$ = 12,0 mm
Decisive load: Q4:G1+G2
Internal forces: M_y = 11,175 kNm; V_z = 0,434 kN
Bending moment check:
Resistance: $M_{y,R,t,fi}$ = 18,383 kNm
0,608 < 1 **Pass**

Shear forces check:
Resistance: $V_{R,t,fi}$ = 42,534 kN
0,010 < 1 **Pass**

Section ok

PASS

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