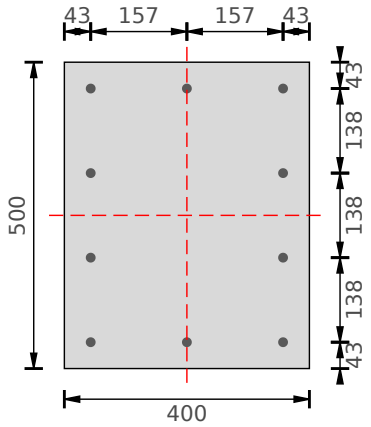
Input Summary

Input	Description	Value
R	**Fire Duration** *Required fire resistance time*	R30
$shape$	**Section Shape** *Section shape*	Rectangular
H	**Height** *Height of the section*	500 mm
B	**Width** *Width of the section*	400 mm
$Cb1$	**Cover C_b** *Concrete cover*	35 mm
num_x	**Num. of Rebar along X** *Rebar quantity between corners along X axis*	1
num_y	**Num. of Rebar along Y** *Rebar quantity between corners along Y axis*	2
d_c	**Rebar d at Corners** *Corner Rebar diameter*	16 mm
d_s	**Rebar d along Sides** *Rebar diameter between corners along sides*	16 mm
fc	**Concrete Strength** *Concrete compressive strength*	30 MPa
fs	**Rebar Yielding** *Reber yielding*	500 MPa
N	**Axial N** *Axial Force (sign + makes compression)*	600 kN
Mx	**Bending M_X** *Bending about X axis (sign + makes top section fiber compressed)*	100 kN-m
My	**Bending M_Y** *Bending about Y axis (sign + makes right section fiber compressed)*	5 kN-m

Section view

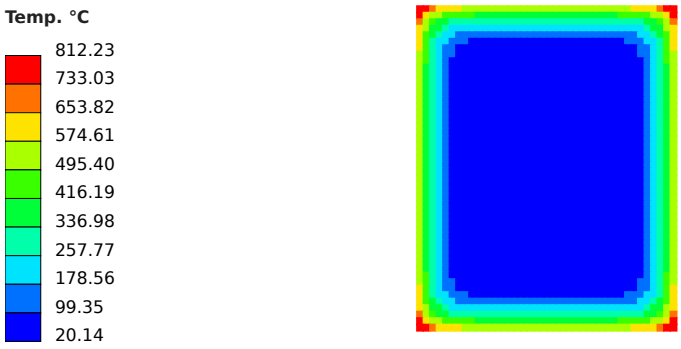


EN 1992-1-2:2004

Temperature distribution in section elements in case of R30

EN 1992-1-2:2004 (ANNEX A)

Temperature in concrete



EN 1992-1-2:2004 (4.2.4.3)

Temperature in reinforcemet

Rebar temperature °C

Rebar 1: 244.73

Rebar 2: 244.73

Rebar 3: 244.73

Rebar 4: 244.73

Rebar 5: 139.82

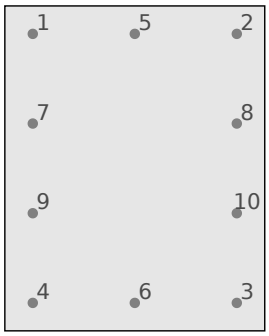
Rebar 6: 139.82

Rebar 7: 139.82

Rebar 8: 139.82

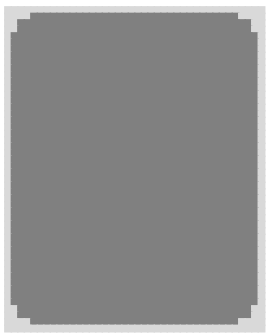
Rebar 9: 139.82

Rebar 10: 139.82



EN 1992-1-2:2004 (ANNEX B)

500 °C isotherm reduced section sizes: B 380 mm. H 480 mm



EN 1992-1-2:2004
EN 1992-1-1:2004

Section strength check in fire action R30

UTILITY: 0.31

Axial + Flexure check

Actual bending moment in section

$$M_{zy} = \sqrt{M_z^2 + M_y^2} = \sqrt{100.00^2 + 5.00^2} = 100.12 \text{ kN-m}$$

$$e_{xy} = M_{zy} / N_{Edx} = 100.12 / 600.00 = 0.16687$$

$$N_{Rd} = \eta \cdot f_{cd} \cdot (A_c - A_{st}) + f_{yd} \cdot A_{st} = 4441.97 \text{ kN}$$

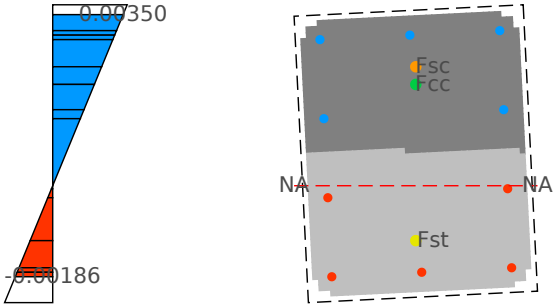
Axial + flexure capacity

$$N_r = 1928.09 \text{ kN}, M_{Rd} = 321.57 \text{ kN-m}$$

$$N_{Edx} = 600.00 \text{ kN} \leq N_r = 1928.09 \text{ kN (Ratio: 0.311)}$$

$$M_{zy} = 100.12 \text{ kN-m} \leq M_{Rd} = 321.57 \text{ kN-m (Ratio: 0.311)}$$

$$N_{Edx} = 600.00 \text{ kN} \leq N_{Rd} = 4441.97 \text{ kN (Ratio: 0.135)}$$



Results Summary

Result Name	Results
UTILITY RATIOS	
Utility Ratio	0.31

About this Calculator

Calculator Name: EN 1992-1-2 Fire Resistance Calculator
Description: Design based on 500°C isotherm method. This method is applicable to a standard fire exposure and any other time heat regimes, which cause similar temperature fields in the fire exposed member.

Powered by SkyCiv

URL: https://platform.skyciv.com/quick-design?uid=3004-fire-resistance-calculator&R=R30&shape=Rectangular&H=500&B=400&Cb1=35&num_x=1&num_y=2&d_c=16&d_s=16&fc=30&fs=500&N=600&Mx=100&My=5

Contact: support@skyciv.com