

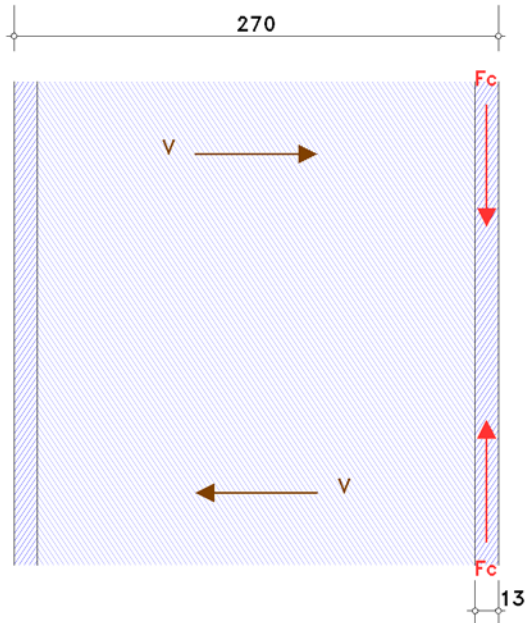
POS. 29: FLANGE AND WEB IN COMPRESSION

4H-EC3GK version: 1/2012-1k

beam or column flange and web in compression

Basic component 7

EC 3-1-8 (12.10), NA: Germany



beam / column:

profile depth $h = 270.0$ mm, flange thickness $t_f = 13.0$ mm, steel grade S 275

section class 1 (design plastic moment resistance, plastic rotation capacity)

plastic section modulus $W_{pl} = 1112.000$ cm³

elastic section modulus referring to cross-section fibre with max. normal stress $W_{el,min} = 1012.593$ cm³

moment-shear force-interaction: shear force $V_{Ed} = 346.00$ kN, shear area $A_v = 3174.00$ mm²

material safety factor: $\gamma_{M0} = 1.00$

stress:

Lk 1 : $F_{c,f,Ed} = 1000.0$ kN

design resistance

stress due to bending with shear force: $V_{Ed} \geq V_{pl,Rd}/2 = 252.0$ kN \Rightarrow reduction of yield strength !

$f_y^* = (1-\rho) \cdot f_y = 236.7$ N/mm² with $\rho = 0.139$

design moment resistance $M_{c,Rd} = M_{pl,Rd} = (W_{pl} \cdot f_y) / \gamma_{M0} = 263.21$ kNm

design resistance of beam/column flange and web in compression

$F_{c,f,Rd} = M_{c,Rd} / (h - t_f) = 1024.18$ kN

verification

Lk 1: $F_{Ed} = 1000.0$ kN < $F_{Rd} = 1024.2$ kN \Rightarrow utilization = 0.976 < 1 **ok.**