

Symbol	Values	Unit	Symbol description	Section
MEMBER: 146 ; COORDINATE: x = 0.58 L = 4.61 m				
Cross-section properties: HEA 340				
Ax	13350.00	mm ²	Cross-section area	
Ay	11041.50	mm ²	Shear area - y-axis	
Az	4497.75	mm ²	Shear area - z-axis	
x	1272000.00	mm ⁴	Torsional constant	
y	276900000.00	mm ⁴	Moment of inertia of a section about the y-axis	
z	74360000.00	mm ⁴	Moment of inertia of a section about the z-axis	
Wply	1850000.00	mm ³	Plastic section modulus about the y (major) axis	
Wplz	755900.00	mm ³	Plastic section modulus about the z (minor) axis	
h	330.00	mm	Height of cross-section	
b	300.00	mm	Width of cross-section	
t _f	16.50	mm	Flange thickness	
t _w	9.50	mm	Web thickness	
r _y	144.02	mm	Radius of gyration - y-axis	
r _z	74.63	mm	Radius of gyration - z-axis	
A _{nb}	1.00		Net area to gross area ratio	(6.2.2.2)
Eta	1.00		Factor for A _v calculation	(6.2.6.(3))
Material:				
Name			S 275 (S 275)	
f _y	275.00	MPa	Design yield strength of material	(3.2)
f _u	430.00	MPa	limit tensile stress - characteristic value	(3.2)
γ _{M0}	1.00		Partial safety factor	(6.1.(1))
γ _{M1}	1.00		Partial safety factor	(6.1.(1))
γ _{M2}	1.25		Partial safety factor	(6.1.(1))
Designations of additional codes:				
EN112			EN 1991-1-2:2003 - Fire loads on a structure	
EN312			EN 1993-1-2:2005 - Steel structures - fire design	
EN313			EN 1993-1-3:2005 - Steel structures from cold-formed sections	
EN315			EN 1993-1-5:2005 - Steel structures - plated elements	
EC111			ECCS No111:2001 - Guidebook with recommendations for fire calculations	
ENV311			ENV 1993-1-1:1992 - Steel structures - general code	
Class of section				
c _f	118.25	mm	flange width	(Table 5.2)
t _f	16.50	mm	flange thickness	(Table 5.2)
c _f /t _f	7.17		Flange slenderness	(Table 5.2)
K _{LF}	1		Flange class	(5.5.2)
c _w	243.00	mm	Web height	(Table 5.2)
t _w	9.50	mm	Web thickness	(Table 5.2)
c _w /t _w	25.58		Web slenderness	(Table 5.2)
α _{fa}	0.06		Relative extent of the compressed plastic zone	(Table 5.2)
ψ	-1.30		Stress or strain ratio	(Table 5.2)

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KLW	1		Web class	(5.5.2)
(hw/tw) _{lim}	66.56		limit slenderness of a web for shear	EN315(5.1)
hw/tw	31.26		web slenderness for shear	EN315(5.1)
KL _{SZ}	Plastic		Web class (shear)	EN315(5.1)
KL	1		Section type	(5.5.2)
Parameters of lateral-torsional buckling analysis:				
General method [6.3.2.2]				
L _{cr,upp}	2.20	m	Lateral buckling length of upper flange	active
L _{cr,low}	6.60	m	Lateral buckling length of lower flange	inactive
C1	1.00		Factor for M _{cr} calculations	ENV311(F.1.2.(5))
C2	0.00		Factor for M _{cr} calculations	ENV311(F.1.2.(5))
C3	1.00		Factor for M _{cr} calculations	ENV311(F.1.2.(5))
w	7067027500.00	mm ⁶	Warping constant	(6.3.2.2)
z _g	0.00	mm	Distance from the point where the load is applied to the shear center	ENV311(F.1.2.(1))
M _{cr}	5318.93	kN*m	Critical moment for lateral-torsional buckling	ENV311(F.1)
λ _{LT}	0.31		Non-dimens. slend. ratio for lat.-tors. buckling	(6.3.2.2.(1))
Curve _{LT}	a		Lateral buckling curve	(6.3.2.2.(2))
α _{LT}	0.21		Imperfection factor for lateral buckling curves	(Table 6.3)
η _{LT}	0.56		Coefficient for calculation of XLT	(6.3.2.2.(1))
XLT	0.98		Reduction factor for lateral-torsional buckling	(6.3.2.2.(1))
Internal forces at characteristic points of cross section				
N _{Ed}	-559.68	kN	axial force N _{Ed}	
M _{y,Ed}	359.64	kN*m	bending moment M _{y,Ed}	
V _{z,Ed}	-0.00	kN	shear force V _{z,Ed}	
Design forces:				
N _{t,Rd}	3671.25	kN	Design tension resistance	(6.2.3)
M _{b,Rd}	496.19	kN*m	Design buckling resistance moment	(6.3.2.1)
About the y axis of cross-section				
M _{y,pl,Rd}	508.75	kN*m	Design plastic resistance moment	(6.2.5.(2))
M _{y,el,Rd}	461.50	kN*m	Design elastic resistance moment	(6.2.5.(2))
M _{y,c,Rd}	508.75	kN*m	Design moment resistance	(6.2.5.(2))
MN _{y,Rd}	495.17	kN*m	Reduced design plastic resistance moment	(6.2.9.1)
V _{z,c,Rd}	714.11	kN	Design plastic shear resistance	(6.2.6.(2))
Verification formulas:				
Section strength check:				
JFS[N _t]	0.15		N _{Ed} /N _{t,Rd}	(6.2.3.(1))
JFS[M _y]	0.71		M _{y,Ed} /M _{y,c,Rd}	(6.2.5.(1))
JFS[N _t M _y]	0.73		M _{y,Ed} /MN _{y,Rd}	(6.2.9.1.(2))
JFS[V _z]	0.00		V _{z,Ed} /V _{z,c,Rd}	(6.2.6.(1))
Global stability check of member:				
JFB[M _y]	0.72		M _{y,Ed} /M _{b,Rd}	(6.3.2.1.(1))
Ratio:				

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RAT	0.73		Efficiency ratio	Section OK