

Non-alloy structural steels according to European standard

Mechanical properties

Standard	Minimum yield strength R_{eH}						Tensile strength R_m		Minimum elongation A $L_0=5,65 \cdot S_0$ %				Notch impact test, longitudinal		
	MPa						MPa						Temperature °C	Min. absorbed energy ¹⁾ J	
	Nominal thickness (mm)						Nominal thickness (mm)		Nominal thickness (mm)						
	≤16	>16	>40	>63	>80	>100	≥3	>100	≥3	>40	>63	>100			
	≤40	≤63	≤80	≤100	≤140		≤100	≤140	≤40	≤63	≤100	≤140			
EN 10025-2: 2004	S235JR												+20	27	
	S235J0	235	225		215		195	360-510	350-500	26	25	24	22	0	27
	S235J2*												-20	27	
	S275JR												+20	27	
	S275J0	275	265	255	245	235	225	410-560	400-540	23	22	21	19	0	27
	S275J2*													-20	27
	S355JR													+20	27
	S355J0													0	27
	S355J2	355	345	335	325	315	295	470-630	450-600	22	21	20	18	-20	27
	S355K2													-20	40
	S450J0	450	430	410	390	380	380	550-720	530-700	17				0	27
	E295*	295	285	275	265	255	245	470-610	450-610	20	19	18	16		
E335*	335	325	315	305	295	275	570-710	550-710	16	15	14	12			
E360*	360	355	345	335	325	305	670-830	650-830	11	10	9	8			

¹⁾ For sections with a nominal thickness >100 mm the values shall be agreed

* Available upon agreement

Chemical composition

Standard		Ladle Analysis												
		C max. %			Mn max. %	Si ⁶⁾ max. %	P max. %	S max. %	N ²⁾ max. %	Cu max. %	Other ⁷⁾ max. %	CEV ⁴⁾ max. %		
		Nominal thickness (mm)										Nominal thickness (mm)		
		≤ 16	>16 ≤40	>40 ³⁾								≤30	>30 ≤40	>40 ≤140
EN 10025-2: 2004	S235JR	0,17	0,17	0,20	1,40	-	0,040 ⁶⁾	0,040	0,012	0,55	-	0,35	0,35	0,38
	S235J0	0,17	0,17	0,17	1,40	-	0,035	0,035	0,012	0,55	-	0,35	0,35	0,38
	S235J2 ^{*/5)}	0,17	0,17	0,17	1,40	-	0,030	0,030	-	0,55	-	0,35	0,35	0,38
	S275JR	0,21	0,21	0,22	1,50	-	0,040 ⁶⁾	0,040	0,012	0,55	-	0,40	0,40	0,42
	S275J0	0,18	0,18	0,18	1,50	-	0,035	0,035	0,012	0,55	-	0,40	0,40	0,42
	S275J2 ^{*/5)}	0,18	0,18	0,18	1,50	-	0,030	0,030	-	0,55	-	0,40	0,40	0,42
	S355JR	0,24	0,24	0,24	1,60	0,55	0,040 ⁶⁾	0,040	0,012	0,55	-	0,45	0,47	0,47
	S355J0	0,20	0,20 ¹⁾	0,22	1,60	0,55	0,035	0,035	0,012	0,55	-	0,45	0,47	0,47
	S355J2 ⁵⁾	0,20	0,20 ¹⁾	0,22	1,60	0,55	0,030	0,030	-	0,55	-	0,45	0,47	0,47
	S355K2 ⁵⁾	0,20	0,20 ¹⁾	0,22	1,60	0,55	0,030	0,030	-	0,55	-	0,45	0,47	0,47
	S450J0 ⁵⁾	0,20	0,20 ¹⁾	0,22	1,70	0,55	0,035	0,035	0,025	0,55	⁸⁾	0,47	0,49	0,49
	E295*						0,045	0,045	0,012					
	E335*						0,045	0,045	0,012					
	E360*						0,045	0,045	0,012					

- 1) For nominal thickness >30 mm: C = 0,22% max.
- 2) The max. value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0,020% or if sufficient other N binding elements are present.
The N binding elements shall be mentioned in the inspection document.
- 3) For nominal thickness >100 mm: C content upon agreement.
- 4) $CEV = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15$; see § 7.2.5 of EN 10025-2:2004 concerning special requirements for S275 and S355.
- 5) Fully killed steel containing nitrogen binding element in amounts sufficient to bind the available nitrogen (for example min. 0,02% Al). If other elements are used, they shall be reported in the inspection document.
- 6) Upon agreement: Si = 0,14---0,25% and P ≤ 0,035% max. for capability of forming a zinc layer during hot-dip galvanization (class 3).
- 7) If other elements are added, they shall be mentioned on the inspection document.
- 8) The steel may show a Nb content of max. 0,05%, a V content of max. 0,13% and a Ti content of max. 0,05%.

* Available upon agreement.