

Material properties



Material	P 355 GH (European Union / EN)
Group	Structural and constructional steels
Subgroup	EN 10028-2 Flat products for pressure purposes
Comment	Non-alloy and alloy steels with specified elevated temperature properties
Application	Steam boilers, pressure vessels

Yield Stress[MPa]			
Dimension	Min	Max	Approx
Flat products; Normalized or normalizing rolling; <=16 mm	355	-	-
Flat products; Normalized or normalizing rolling; > 16 <= 40 mm	345	-	-
Flat products; Normalized or normalizing rolling; > 40 <= 60 mm	335	-	-
Flat products; Normalized or normalizing rolling; > 60 <= 100 mm	315	-	-
Flat products; Normalized or normalizing rolling; > 100 <= 150 mm	395	-	-

Tensile Stress[MPa]			
Dimension	Min	Max	Approx
Flat products; Normalized or normalizing rolling; <=16 mm	510	650	-
Flat products; Normalized or normalizing rolling; > 16 <= 40 mm	510	650	-
Flat products; Normalized or normalizing rolling; > 40 <= 60 mm	510	650	-
Flat products; Normalized or normalizing rolling; > 60 <= 100 mm	490	630	-
Flat products; Normalized or normalizing rolling; > 100 <= 150 mm	480	630	-

Elongation A5 [%]			
Dimension	Min	Max	Approx
Flat products; Normalized or normalizing rolling; <=16 mm	21.0	-	-
Flat products; Normalized or normalizing rolling; > 16 <= 40 mm	21.0	-	-

Elongation A5 [%]			
Dimension	Min	Max	Approx

Flat products; Normalized or normalizing rolling; > 40 <= 60 mm	21.0	-	-
Flat products; Normalized or normalizing rolling; > 60 <= 100 mm	20.0	-	-
Flat products; Normalized or normalizing rolling; > 100 <= 150 mm	20.0	-	-

Impact [J]			
Dimension	Min	Max	Approx

Flat products; Normalized or normalizing rolling; <=16 mm Impact Test: KV (0°C)	27	-	-
Flat products; Normalized or normalizing rolling; > 16 <= 40 mm Impact Test: KV (0°C)	27	-	-
Flat products; Normalized or normalizing rolling; > 40 <= 60 mm Impact Test: KV (0°C)	27	-	-
Flat products; Normalized or normalizing rolling; > 60 <= 100 mm Impact Test: KV (0°C)	27	-	-
Flat products; Normalized or normalizing rolling; > 100 <= 150 mm Impact Test: KV (0°C)	27	-	-

Chemical Composition [%]			
Criterion	Min	Max	Approx

C	0.1000	0.2200	-
Si	-	0.6000	-
Mn	1.0000	1.7000	-
P	-	0.0300	-
S	-	0.0250	-
Cr	-	0.3000	-
Mo	-	0.0800	-
Ni	-	0.3000	-
V	-	0.0200	-
Ti	-	0.0300	-
Nb	-	0.0100	-
Al	0.0200	-	-

Chemical Composition [%]			
Criterion	Min	Max	Approx

Cu	-	0.3000	-
Cr+Ni+Cu+Mo	-	0.7000	-

Mechanical Properties on Elevated Temperatures				
Temperature °C	0.2% Yield Stress [MPa]	1% Yield Stress [MPa]	Tensile Strength [MPa]	Hardness HRc

200	255	-	-	-
300	215	-	-	-
350	200	-	-	-
400	180	-	-	-
450	135	-	-	-
500	-	-	-	-

Creep Repture Strength[MPa]			
Temperature °C	1000 h	10 000 h	100 000 h

200	-	-	-
300	-	-	-
350	-	-	-
400	-	-	-
450	-	140	85
500	-	75	40

Heat Treatment

--

Hot working 1100-850°C; Normalizing 890-950°C, 520-580°C Stress relieving.

Cross Reference Table		
Material	Standard	Country

P 355 GH	AFNOR NF	France
SA-414 Grade G	ASME	USA
A 414 Grade G	ASTM	USA
A 612	ASTM	USA

Cross Reference Table

Material	Standard	Country
P 355 GH	B.S.	United Kingdom
P 355 GH / 19 Mn 6	DIN	Germany
C 15 Pb / C15GPb	DIN	Germany
1.0473	EN	European Union
KL 7	MSZ	Hungary
P 355 GH	NBN	Belgium
19 Mn 6 KW	ONORM	Austria
C 15 Pb	SNV	Switzerland
2101	SS	Sweden
2102	SS	Sweden
K 510	STAS	Romania
R 52	STAS	Romania
A 52 Grado RA II	UNE	Spain
A 52 Grado RC I	UNE	Spain
P 355 GH	UNI	Italy
K03103	UNS	USA
K03300	UNS	USA
1.0473	WN	Germany
1.0403	WN	Germany