

Quality ASTM A 105
According to standards ASTM A 105M -05
Number

Chemical composition

C% max	Si%	Mn%	P% max	S% max	Cu% max	Ni% max	Cr% max	Mo% max	V% max	Nb% max
0,35	0,10-0,35	0,60-1,05	0,035	0,040	0,40	0,40	0,30	0,12	0,08	0,02

The sum of copper (Cu), chromium (Cr), nickel (Ni) and molybdenum (Mo) should not exceed 1,00%

The sum of chromium (Cr) and molybdenum (Mo) should not exceed 0,32%

For each reduction of 0,01% under max carbon value (0,35), it is admitted a 0,06% increase of manganese over its max value (1,05%) up to 1,35%

On request, this steel grade may be supplied Calcium (Ca) treated

Min Al content 0,020% (to be certified)

Carbon Equivalent CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/ 15 max 0,47

Temperature°C

Hot-forming	Normalizing	Quenching	Tempering	Stress-relieving
1150-850	843-927 air cooling	880-930 oil / polymer water	593 air cooling	50° under the temperature of tempering
Soft annealing	Normalizing and Tempering	Isothermal annealing	Pre-heating welding	Stress-relieving after welding (PWHT)
700 air cooling	843-927 air 593 air	860 furnace cooling to 660, then air	250 AC1	590 furnace cooling MS Mf

Mechanical properties

Forged values as reference Heat treatments must guarantee the reported values ASTM A 105M -05

all dimension mm Testing at room temperature (longitudinal)

	R N/mm2 min	Rp 0.2% N/mm2 min.	A% L min.	A% T min.	C% L min.	C% T min.	Kv J min.	HB max
T	485		250		22	30		187

Forged over 4540 Kg may be ordered according to ASTM A 266/A 266M ① | 03a

	N/mm2 min.	N/mm2 min.	A% L min.	A% T min.	C% L min.	C% T min.	Kv J min.	HB max
T	415-585	205	23	20	38	30		121-170

T= max heat-treated thickness. Test specimen should correspond to the 1/4 T

Minimum values at high temperatures

Rp 0.2 N/mm2 °C	248	228	219	212	202	190	184	178
	38	93	149	204	260	316	343	371

Mechanical properties (longitudinal testing)

Heat treatment	_ product mm	Test At °C +	R N/mm2	Rp 0.2 N/mm2	A %	C-Z %	Kv 0 jC J	Kv -18 jC J	Kv -46 jC J	Product
Normalizing 920°C	90	20	603	485	30	69.5	56-64-57			Hot-rolled
Normalizing 920°C	90	400	312	217						Hot-rolled
Normalizing 900°C	240	20	578	417	32.4	63.8	111-136-133			Hot-rolled
Normalizing 900°C	240	400	506	248						Hot-rolled
Normalizing 900°C	400	20	470	309	39.2	69	181-222-220			Forged
Normalizing 900°C	400	400	424	206						Forged
Quenched end tempered	95	20	579	403	35.6	68.6	210-203-207			Hot-rolled
Quenched and tempered	95	400	520	325						Hot-rolled
Natural	90	20	580	400	28	63	20-18-18	14/12/12	10/08/08	Hot-rolled

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K.	B.S.	RUSSIA GOST	USA AISI/SAE
C21	20G	A 105						