

1.4906, X12CrMoWVNbN10-1-1, T505SC - Steels of Blade for Steam and Gas Turbine Datasheet

[1.4906, X12CrMoWVNbN10-1-1](#) - Alloy special steel for elevated temperatures for larger forgings, acc to SEW 555:2001-01 and Siemens MAT238053 and TLV925812 This TLV is valid for steel bars with a 0.2% proof strength of 750 N/mm² minimum. Referenced Documents EN 10083-1, EN 10308, EN 10204, DIN EN ISO 6892-1, DIN EN ISO 148-1

Manufacturing - General

Electric slag remelted (ESR) steel has to be used. The use of any other steel secondary treatment is to be agreed in advance with the purchaser. Cast ingot is to be used as initial material for production of the bars.

The bars can either be rolled or forged provided that the requested mechanical properties are fulfilled. Bars shall be delivered in quenched and tempered condition. A martensitic microstructure shall be obtained over the entire cross-section of the bar.

Chemical Composition

Grade	Chemical composition WT %													
	C	Si	Mn	P	S	Cr	Ni	Mo	W	V	Nb	N	Al	As
1.4906, X12CrMoWVNbN10-1-1 acc. to MAT238053	0.10-0.14	max. 0.10	0.40-0.60	max. 0.015	max. 0.007	10.00-11.00	0.60-0.80	1.00-1.20	0.95-1.10	0.15-0.25	0.04-0.06	0.04-0.06	max. 0.012	max. 0.012
	B	Cu	Sb	Sn	Ti									
	10 ppm				max. 0.015									
1.4906, X12CrMoWVNbN10-1-1 acc. to TLV925812	0.11-0.13	max. 0.12	0.40-0.50	max. 0.010	max. 0.005	10.2-10.8	0.7-0.8	1.0-1.1	0.95-1.05	0.15-0.25	0.04-0.06	0.045-0.06	max. 0.01	-

Mechanical Properties

1.4906 Mechanical properties acc. to MAT238053 - Thickness* max. 1500mm

* Diameter for shafts and hub thickness for discs.

- Tensile strength R_m MPa: Min 800-950
- Proof strength $R_{p0.2}$ MPa: Min 700 (A 50 MPa lower value applies for the core zones.)
- Elongation after fracture A %: T/Q min. 15/13 ($L_0 = 5.65\sqrt{S_0}$)
- Red of area A%: T/Q min. 45/40

- KV J (+20°C): T/Q min. 30/25
- Hardness HB: ca 280

1.4906 Mechanical properties acc. to TLV 9258 12 - Dia.* max. 100mm

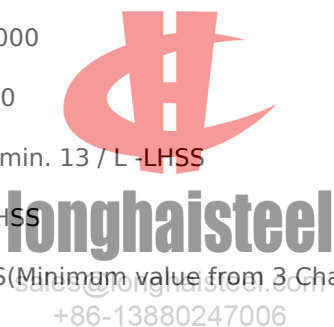
* The values for the smallest side length (a) shall be reached

- Tensile strength R_m MPa: max 1000
- Proof strength $R_{p0.2}$ MPa: 750-830
- Elongation after fracture A %: L min. 14 / T -LHSS
- Red of area A%: L min. 50 / T -LHSS
- KV J (+20°C): L min. 40 / T -LHSS (Minimum value from 3 Charpy V-notch specimens wechat:specialsteel)
- Hardness HB30: 265-310

1.4906 Mechanical properties acc. to TLV 9258 12 - Dia.* min. 100mm

* The values for the smallest side length (a) shall be reached

- Tensile strength R_m MPa: max 1000
- Proof strength $R_{p0.2}$ MPa: 750-830
- Elongation after fracture A %: T min. 13 / L -LHSS
- Red of area A%: T min. 40 / L -LHSS
- KV J (+20°C): T min. 24 / L -LHSS (Minimum value from 3 Charpy V-notch specimens wechat:specialsteel)
- Hardness HB30: 265-310



Physical Properties

Heat Treatment

1.4906, X12CrMoWVNbN10-1-1 Hardening acc. to MAT238053

- 1050°C ±10°C for at least 12 h. Cooling in oil.
- Tempering I: 570°C ±10°C, furnace cooling to 400°C, thereafter cooling in air.
- Tempering II: 690°C ±10°C, furnace cooling to 400°C, thereafter cooling in air.

The duration of tempering I must be same as the duration of the immediately following tempering II (± 1 h)

1.4906, X12CrMoWVNbN10-1-1 Hardening acc. to TLV 9258 12 - wechat:specialsteel

The hardening temperature has to be between 1050°C and 1100°C (air or liquid quenching) After hardening the forging must be cooled down to a temperature max. 100°C in the center to guarantee complete transformation into martensite throughout in the whole section.

A two-step tempering treatment must be performed considering the following: The first tempering step must be carried out between 570° and 680°C. The temperature for the second tempering step must be between 680 and 720°C. If bars need to be straightened after the heat treatment, a stress relieving treatment shall be performed after completion of the entire



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straightening process. Stress relieving is to be carried out at 20-50K below the tempering temperature with a subsequent slow cooling rate. wechat: specialsteel

Welding Properties

Machining Properties

Similar or Equivalents Steel Grade



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