

Product group

Open-die forgings for hydropower engineering

Application

Components for pelton, francis and pump turbines



PRODUCT EXAMPLES

- Turbine-runner discs
- Steel bars for wicket gates, nozzles and other components
- Turbine shafts
- Hollow parts and rings (inc. seamless-rolled rings)

TREATMENT OPTIONS

Open-die forged, heat-treated, pre-machined, 100% ultrasonically inspected

MATERIAL

Corrosion and acid-resistant, soft martensitic Cr-Ni-Mo steels from GMH Gruppe production with excellent low-temperature toughness

X3CrNiMo13-4

Standard		DIN EN 10088; DIN EN 10250-4 (1.4313)								
Chem. composition		ASTM/ASME A/SA 182, 336, 479, 965 (F6NM, UNS 41500)								
		C	Si	Mn	P	S	Cr	Mo	Ni	N
		≤ 0.05	≤ 0.70	≤ 1.50	≤ 0.04	≤ 0.015	12.0-14.0	0.30-0.70	3.5-4.5	≥ 0.02
Properties		QT650			QT780					
		DIN EN 10250-4		SWG Reference	DIN EN 10250-4		SWG Reference			
		Rp0.2 (MPa)	≥ 520		600-700	≥ 620		730-830		
		Rm (MPa)	650-830		690-790	780-980		830-930		
		A5(%)**	≥ 12		21-23	≥ 12		18-20		
		CVN (J) RT**	≥ 50		200	≥ 50		180		
		CVN (J) -20°C**	-		170	-		130		
				1	2	3	4	5		
		Weldability		■	■	■	■			
		Machinability		■	■	■	■			
		Corrosion resistance		■	■	■	■			
		Low-temperature toughness		■	■	■	■			

X4CrNiMo16-5-1

Standard		DIN EN 10088; DIN EN 10250-4 (1.4418)								
Chem. composition		-								
		C	Si	Mn	P	S	Cr	Mo	Ni	N
		≤ 0.06	≤ 0.70	≤ 1.50	≤ 0.04	≤ 0.030	15.0-17.0	0.80-1.50	4.0-6.0	≥ 0.02
Properties		QT760			QT900					
		DIN EN 10250-4		SWG Reference	DIN EN 10250-4		SWG Reference			
		Rp0.2 (MPa)	≥ 550		650-750	≥ 700		850-950		
		Rm (MPa)	760-960		810-910	900-1100		950-1050		
		A5(%)**	≥ 14		19-22	≥ 14		18-20		
		CVN (J) RT**	≥ 70		190	≥ 60		140		
		CVN (J) -20°C**	-		140	-		100		
				1	2	3	4	5		
		Weldability		■	■	■	■			
		Machinability		■	■	■	■			
		Corrosion resistance		■	■	■	■			
		Low-temperature toughness		■	■	■	■			

1 = low; 2 = moderate; 3 = good; 4 = very good; 5 = excellent

* as per DIN EN 10250-4
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Ihr Kontakt:

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