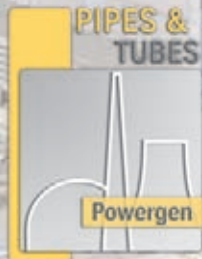


# Powergen

## Longitudinally Welded Large Diameter Steel Pipes in Grade 91/92



### SPECIALTY · SPECIALTY · SPECIALTY · SPECIALTY · SPECIALTY

We offer on the basis of an exclusive sales agreement with Eisenbau Krämer longitudinally welded high alloy boiler pipes for high-pressure service at high temperatures, especially suited for hot and cold reheat pipes, as follows:

#### Specification

Longitudinally welded large diameter pipes following to DIN EN 10217-5 and according to ASTM A 691

#### Grades

X10CrMoVNb9-1 Grade 91 **EBKpower91**

X10CrWMoVNb9-2 Grade 92 **EBKpower92**

#### Heat Treatment (after welding)

Normalized (>1.040°C or 1.904°F) and tempered

#### Size Range

Outer diameter D	406 – 1.500 mm	16" – 60"
Inner Diameter d	400 – 1.430 mm	16" – 56"
Wall thickness T	9,52 – 35 mm	0,4" – 1,4"
Length L	up to 13,2 m	43 ft.

Other sizes upon request.

#### Your Benefits

- Advantage in price and delivery time
- Suitable as well for use as mother pipe for bends
- Creep rupture resistance tested for over 20.000 h
- Special dimensional tolerances on request

**ThyssenKrupp Mannex GmbH**  
Hatzper Straße 30  
45149 Essen-Bredeney, Germany  
Phone: +49 201 844 537769  
e-Fax: +49 201 8456 537769  
powergen@thyssenkrupp.com  
www.tk-mannex.com

**ThyssenKrupp Mannex**



# POWERGEN Reference List/Pipes in Grade 91 resp. X10CrMoVNb9-1

## Longitudinally Welded High Alloy Pipes for High-Temperature Service\*

Year	Country	Material Standard	Pressure P [bar]	Temperature t [°C]	Outside Diameter D [mm]	Wall-thickness T [mm]	Remarks
2001	Spain	Gr. 91 Cl. 42	30	582	660,0 914,0	15,90 21,75	Power Plant Baja de Biscaya, CCGT hot reheat and turbine bypass
2002	Italy	Gr. 91 Cl. 42	40	454	610,0 610,0	15,00 17,00	Power Plant Ferrera Erbognone, CCGT hot reheat
2002	Italy	Gr. 91 Cl. 42	40	454	610,0 610,0	15,00 17,50	coal fired Power Plant Brindisi, III and IV hot reheat
2002	Belgium	Gr. 91 Cl. 42			660,0	33,00	Power Plant header pipes, CCGT
2002	Brazil	Gr. 91 Cl. 42			457,0	15,88	Refinery, Conduction Pipes
2003	Turkey	Gr. 91 Cl. 42	34	572	711,0 711,0 711,0 610,0	15,88 20,30 26,00 12,5/15	Power Plant Baymina Ankara, CCGT hot reheat
2004	Spain	Gr. 91 Cl. 42			660,0 711,0	20,00 22,00	Power Plant Castelnou, CCGT hot reheat
2004	Italy	Gr. 91 Cl. 42			711,0 864,0	23,83 30,18	Power Plant Termoli, CCGT hot reheat
2005	Spain	Gr. 91 Cl. 42	30	571	610,0 457,0	17,48 12,70	Power Plant Sagunto, CCGT hot reheat
2006	Germany	X10CrMoVNb9-1 EN 10028-2	44	535	d 450,0	Tmin 15,0	Lignite fired Power Plant Weisweiler Unit G+ H hot reheat
2007					d 540,0	Tmin 16,0	
					d 680,0	Tmin 20,0	
					d 760,0	Tmin 23,0	
2007	Brazil	Gr. 91 Cl. 42	105	520	610,0	36,50	Steel works TK CSA Companhia Siderúrgica, high-pressure steam transfer line
					2008	Germany	X10CrMoVNb9-1
2008	Egypt	A 387 Gr. 91 A 691 Cl. 42			711,0	15,88	Power Plant
					762,0	15,88	
					609,6	14,27	
2009	Germany/NL	X10CrMoVNb9-1			780,0	30,00	RWE STKW Westfalen/Eemshaven
2009	Italy	A 387 Gr. 91 A 691 Cl. 42			610,0	17,00	ANSALDO Tourano Power Plant
					711,0	16,50	
					813,0	18,50	
2009	Italy	A 387 Gr. 91 A 691 Cl. 42			610,0	17,00	ANSALDO Aprilia Power Plant
					711,0	16,50	
					813,0	18,50	
2010	Germany	X10CrMoVNb9-1			1.140,0	30,00	KW Neurath HZÜ Hot Reheat
					806,0	23,00	
					720,0	20,00	
					572,0	16,00	
					480,0	15,00	

\*Exclusive Sales Agreement with Eisenbau Krämer

Sold tonnage: about 25.000 tons

## Chemical Composition

Chemical Composition	X10CrMoVNb9-1 chemical composition acc. to EN 10028-2:2009	Grade 91 chemical composition acc. to ASTM A387-06a	X10CrMoVNb9-2 chemical composition acc. to prEN 10216-2:2009	Grade 92 chemical composition acc. to ASTM A335-06
Steel number	1.4903	1.4903	1.4901	1.4901
C	0,08–0,12	0,08–0,12	0,07–0,13	0,07–0,13
Si	≤0,50	0,20–0,50	≤0,50	≤0,50
Mn	0,30–0,60	0,30–0,60	0,30–0,60	0,30–0,60
P max	0,02	0,02	0,02	0,02
S max	0,005	0,01	0,01	0,01
Al	≤0,040	≤0,02	≤0,040	≤0,02
N	0,030–0,070	0,030–0,070	0,030–0,070	0,030–0,070
Cr	8,00–9,50	8,00–9,50	8,5–9,5	8,5–9,5
Cu	≤0,30	–	–	–
Mo	0,85–1,05	0,85–1,05	0,30–0,60	0,30–0,60
Nb	0,06–0,10	0,06–0,10	0,04–0,09	0,04–0,09
Ni	≤0,30	≤0,40	≤0,40	≤0,40
Ti	–	≤0,01	–	≤0,01
V	0,18–0,25	0,18–0,25	0,15–0,25	0,15–0,25
B	–	–	0,001–0,006	0,001–0,006
W	–	–	1,5–2,00	1,5–2,00
Zr max	–	0,01	–	0,01

## Mechanical Properties

Mechanical Properties	X10CrMoVNb9-1	Grade 91	X10CrMoVNb9-2	Grade 92
Yield Strength Re (MPa)	≥450	≥415	≥440	≥440
Tensile Strength Rm (MPa)	630–830	≥585	620–850	≥620