

**STANDARD REFERENCE:**

EN 10088-3: 2014 (Hot-rolled and bright products)

**RODACCIAI REFERENCES AND COMPARABLE STANDARDS**

EUROPE		ITALY	GERMANY		FRANCE	UK	USA
EN 10088-3: 2005		(UNI 6900: 71)	(DIN 17440 - 85)		(NF A 35-574-90)	(BS 970 pt. 3 -91)	AISI
Grade	N°		Werkstoff	N°			
X12Cr13	1.4006	X 12 Cr 13	X12Cr13	1.4006	Z 10 C 13	410S21	410

**CHEMICAL COMPOSITION (CAST ANALYSIS) (%)**

C	Si / max	Mn / max	P / max	S / max	Cr	Ni / max
0,08÷0,15	1,00	1,50	0,040	0,030	11,5÷13,5	0,75

**MECHANICAL PROPERTIES - Rough turned (1X) in the annealed condition**

Size max (mm)	Heat treatment	Hardness HB max*	Rp 0,2 (MPa) min	Rm (MPa)	A <sub>5</sub> (%) min**	KV (J) min
100	Annealed (+A)	220	-	730 max	-	-
	Quenched + Tempered (+QT 650)	-	450	650÷850	15	25

\* only for guidance

**MECHANICAL PROPERTIES - Cold drawn (2H, 2B) and ground bars (2G) in the solution annealed condition**

Size max (mm)	Annealed		Quenched + Tempered				
	R <sub>m</sub> (MPa) max	HB max*	Heat treatment	Rp 0,2 (MPa) min	R <sub>m</sub> (MPa) max	A <sub>5</sub> (%) min**	KV (J) min
≤ 10	880	280	Quenched + Tempered (+QT 650)	550	700÷1000	9	-
> 10 ≤ 16	880	280		500	700÷1000	9	-
> 16 ≤ 40	800	250		450	650÷930	10	25
> 40 ≤ 63	760	230		450	650÷880	10	25
> 63 ≤ 100	730	220		450	650÷850	15	25

\* Values valid only for size ≥ 5 mm

**MECHANICAL PROPERTIES - Cold drawn wire and coils (2H)**

Tensile strength levels	+C 500	+C 650	+C 800	+C900
R <sub>m</sub> (MPa)	500÷700	650÷850	800÷1000	900÷1100

Note: the desired tensile strength level shall be evaluated depending on diameter required



**MECHANICAL PROPERTIES - Cold drawn wire and coils in the solution annealed condition (2D)**

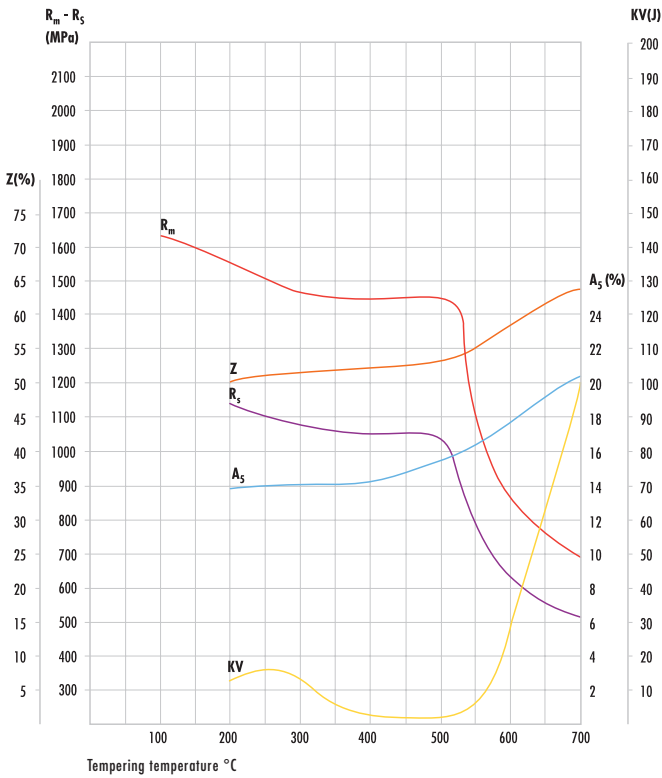
Size	0,50 ≤ d ≤ 1,00	1,00 ≤ d ≤ 3,00	3,00 ≤ d ≤ 5,00	5,00 ≤ d ≤ 16,00
Rm (MPa) max	1100	1050	1000	950
A (%) max	10	10	10	15

Note: If skin passed, Rm might be increased by up to 50 MPa

**WORKING TEMPERATURES RECOMMENDED**

Operation	Hot forgings deformation	Annealing (air)	Quenching in air or oil	Tempering (QT 650)
°C	900±1100	745±825	950±1000	680±780

**TEMPERING CURVE**



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