

**STANDARD REFERENCE:**

EN ISO 683-2: 2018 (Hot-rolled products) | EN 10277: 2018 (Bright products)

**RODACCIAI REFERENCES AND COMPARABLE STANDARDS**

EUROPE		ITALY	GERMANY		FRANCE	UK	USA
EN 10083-3: 2006 EN 10277-5: 2008		(UNI 7847-79)	(DIN 17200-86)		(NF A 38-556-84)	(BS 970 pt.3-96)	ASTM A 29
Grade	N°		Werkstoff	N°			
37CrS4	1.7038	38Cr4	37CrS4	1.7038	38C4	530M36	1060

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

C	Si	Mn	P / max	S	Cr	Cu / max	Al
0,34÷0,41	0,10÷0,40	0,60÷0,90	0,025	0,020÷0,040	0,90÷1,20	0,40	0,020÷0,050

**MECHANICAL PROPERTIES - AS ROLLED CONDITION**

Size mm	HB max to condition		Quenched and tempered (+QT)				
	Treated to improve shearability (+S)*	Soft annealing (+A)	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa)	A <sub>5</sub> (%) min	Z (%) min	KV (J) min
≤ 16	255	235	750	950÷1150	11	35	-
> 16 ≤ 40	255	235	630	850÷1000	13	40	35
> 40 ≤ 100	255	235	510	750÷900	14	40	35

\*Depending on the chemical composition of the cast, and on the dimension, particularly in the case of the +HH grades, soft annealing may be necessary

**MECHANICAL PROPERTIES - BRIGHT PRODUCTS CONDITION**

Spessore mm	as Rolled + Turned (+A+SH)	Quenched+Tempered + Turned (+QT+SH)**				Quenched+Tempered + Cold Drawn (+QT +C)*			as Rolled + Cold Drawn (+A +C)*
	Hardness HB max	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa)	A <sub>5</sub> (%) min	KV (J) min	R <sub>p0,2</sub> (MPa) min*	R <sub>m</sub> (MPa)*	A <sub>5</sub> (%) min*	Hardness HB max
≥ 5 ≤ 10	-	-	-	-	-	730	950÷1150	8	290
> 10 ≤ 16	-	-	-	-	-	710	950÷1150	8	280
> 16 ≤ 40	235	630	850÷1000	13	35	600	850÷1050	9	275
> 40 ≤ 63	235	510	750÷900	14	35	530	750÷950	10	270
> 63 ≤ 100	235	510	750÷900	14	35	520	750÷950	11	270

\*For reference only \*\*This values are valid also for Cold Drawn - Quenched + Tempered Condition (+C +QT)  
 For size <5 mm the mechanical properties may be agreed at the time of enquiry and order



**WORKING TEMPERATURES RECOMMENDED**

Operation	Hot forgings deformation	Isothermal annealing	Soft annealing	Quenching in water or oil	Tempering
°C	850÷1150	850÷880 → 675	680÷720	825÷865	540÷680

**HARDNESS LIMITS (JOMINY TEST)**

Limits of range	Hardness HRC at a distance from quenched end of test pieces (mm)															
	1,5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	
+H	Max	59	59	58	57	55	52	50	48	42	39	37	36	35	34	33
	Min	51	50	48	44	39	36	33	31	26	24	22	20	-	-	-
+HH	Max	59	59	58	57	55	52	50	48	42	39	37	36	35	34	33
	Min	54	53	51	48	44	41	39	37	31	29	27	25	24	23	22
+HL	Max	56	56	55	53	50	47	44	42	37	34	32	31	30	29	28
	Min	51	50	48	44	39	36	33	31	26	24	22	20	-	-	-

