

**STANDARD REFERENCE:**

UNI 7845-78 (Hot-rolled products)

**RODACCIAI REFERENCES AND COMPARABLE STANDARDS**

EUROPE		ITALY	GERMANY		FRANCE	UK	USA
EN 10083-3: 2006 EN 10277-5: 2008		(UNI 7845-78)	(DIN 17200-86)		(NF A 35-552-86)	(BS 970 pt.3-96)	ASTM A 29
Grade	N°		Werkstoff	N°			
-	-	36CrMn5	-	-	-	-	-

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

ITALY	C	Si	Mn	P / max	S / max	Cr	Al	Pb
36CrMn5	0,33÷0,40	0,15÷0,40	0,80÷1,10	0,035	0,035	1,00÷1,30	0,020÷0,050	-
36CrMn5Pb								0,15÷0,30

**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	KCU (J) min
≤ 16	255	230	685	880÷1080	12	-
> 16 ≤ 40	255	230	590	780÷930	13	25
> 40 ≤ 100	255	230	540	740÷880	14	25

**MECHANICAL PROPERTIES - BRIGHT PRODUCTS CONDITION\***

Size 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	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa)	A <sub>5</sub> (%) min	Hardness HB max
≥ 5 ≤ 10	-	-	-	-	700	900÷1100	7	290
> 10 ≤ 16	-	-	-	-	700	900÷1100	8	280
> 16 ≤ 40	230	590	780÷930	13	600	780÷930	8	275
> 40 ≤ 63	230	540	740÷880	14	540	740÷880	9	270
> 63 ≤ 100	230	540	740÷880	14	500	740÷880	10	265

\*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**

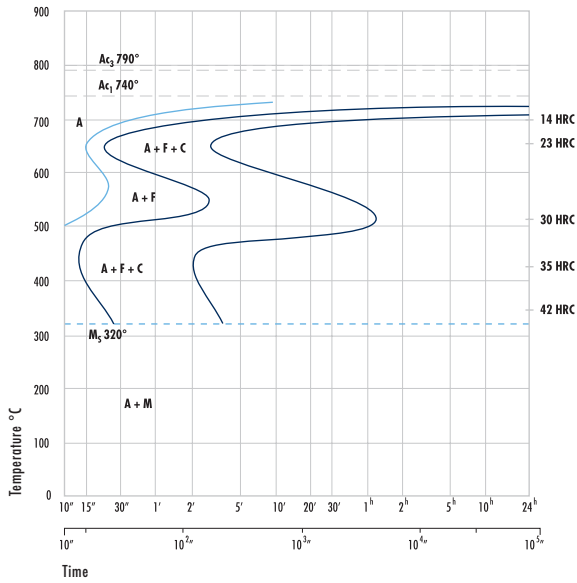
Operation	Hot forgings deformation	Isothermal annealing	Soft annealing	Quenching in water or oil	Tempering
°C	850÷1150	800÷920 → 650	680÷720	840÷860	550÷650



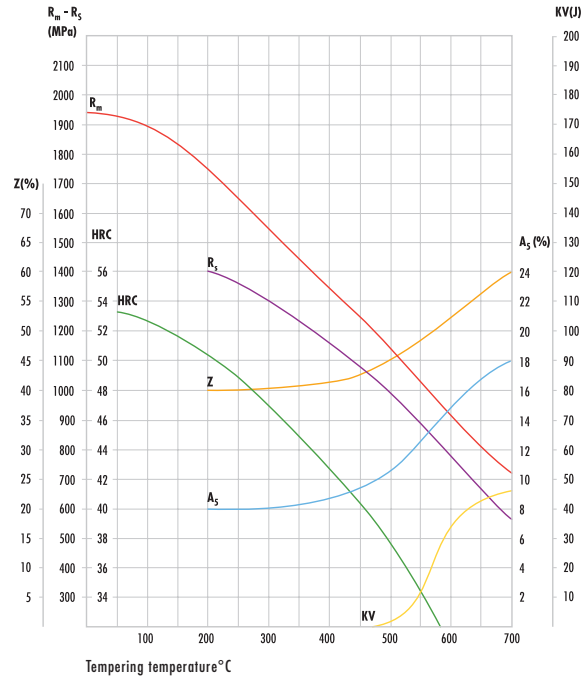
**HARDNESS LIMITS (JOMINY TEST)**

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	58	58	57	56	55	54	54	53	50	48	46	45	44	43	43
	Min	50	49	48	47	44	41	39	37	34	32	31	30	29	28	27

**TTT**



**TEMPERING CURVE**



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Mark Rodacciai

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**QUENCHING AND TEMPERING  
ALLOYED**

**RKS - RKSPB**

