

STANDARD REFERENCE:

UNI EN 10083-2:2006 (Hot-rolled products) | UNI EN 10277-5: 2008 (Bright products)

RODACCIAI REFERENCES AND COMPARABLE STANDARDS

	EUROPE		ITALY	GERMANY		FRANCE	UK	USA
	UNI EN 10083-2: 2006 UNI 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°			
KV40	C40E	1.1186	C40	Ck 40	1.1186	XC 38	080M40	1040
R40S	C40R	1.1189		Cm 40	1.1189			

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

	Europe	C	Si / max	Mn	P / max	S	Cr / max	Mo / max	Ni / max	Al	Pb
KV40	C40E					≤ 0,035				-	-
R40S	C40R	0,37÷0,44	0,40	0,50÷0,80	0,035	0,020÷0,040	0,40	0,10	0,40	0,020÷0,050	-
R40Pb	C40R Pb					0,020÷0,040				0,020÷0,050	0,15÷0,30

MECHANICAL PROPERTIES - AS ROLLED CONDITION

Size mm	HB max to condition:		Quenched and tempered (+QT)					Normalized (+N)		
	Treated to improve shearability (+S)	Soft annealing (+A)	Rp0,2 (MPa) min	Rm (MPa) min	A5 (%) min	Z (%) min	KV (J) min	Rp0,2 (MPa) min	Rm (MPa)	A5 (%) min
≤ 16		-	460	650÷800	16	35	30	320	580	16
> 16 ≤ 40	it can be sheared without heat treatment	-	400	630÷780	18	40	30	290	550	17
> 40 ≤ 100		-	350	600÷750	19	45	30	290	550	17
> 100 ≤ 160		-	-	-	-	-	-	260	530	17
> 160 ≤ 250		-	-	-	-	-	-	260	530	17

MECHANICAL PROPERTIES - BRIGHT PRODUCTS CONDITION

Size mm	as Rolled + as Rolled + Turned (+SH)		Quenched + Tempered + Turned (+QT +SH)**			Quenched + Tempered + Cold Drawn (+QT +C)			Cold Drawn (+C)		
	Hardness HB	Rm (MPa)	Rp0,2 (MPa) min	Rm (MPa)	A5 (%) min	Rp0,2 (MPa) min*	Rm (MPa)	A5 (%) min	Rp0,2 (MPa) min	Rm (MPa)	A5 (%) min
≥ 5 ≤ 10	-	-	-	-	-	600	800÷1000	8	540	700÷1000	6
> 10 ≤ 16	-	-	-	-	-	560	750÷950	8	460	650÷980	7
> 16 ≤ 40	163÷211	550÷710	400	630÷780	18	500	680÷900	9	365	620÷920	8
> 40 ≤ 63	163÷211	550÷710	350	600÷750	19	450	620÷820	10	330	590÷840	9
> 63 ≤ 100	163÷211	550÷710	350	600÷750	19	370	600÷800	11	290	550÷820	9

*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

HARDNESS LIMITS (JOMINY TEST)

Limits of range	Hardness HRC at a distance from quenched end of test pieces (mm)															
	1	2	3	4	5	6	7	8	9	10	11	13	15	20	25	30
+H Max	60	60	59	57	53	47	39	34	31	30	29	28	27	26	25	24
Min	51	46	35	27	25	24	23	22	21	20	-	-	-	-	-	-

WORKING TEMPERATURES RECOMMENDED

Operation	Hot forgings deformation	Normalizing	Soft annealing	Quenching in oil or water	Tempering
°C	850÷1150	860÷900	650÷700	840÷880	550÷660