

**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°			
<b>KV35</b>	C35E	1.1181	C35	Ck 35	1.1181	-	-	1035
	C35R	1.1180		Cm 35	1.1180			

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

	Europe	C	Si / max	Mn	P / max	S	Cr / max	Mo / max	Ni / max	Al	Pb
<b>KV35</b>	C35E					≤ 0,035				-	-
<b>R33S</b>	C35R	0,32±0,39	0,40	0,50±0,80	0,035	0,020±0,040	0,40	0,10	0,40	-	-
<b>R35Pb</b>	C35Pb					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)	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa) min	A <sub>5</sub> (%) min	Z (%) min	KV (J) min	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa) min	A <sub>5</sub> (%) min
≤ 16		-	430	630÷780	17	40	35	300	550	18
> 16 ≤ 40	it can be sheared without heat treatment	-	380	600÷750	19	45	35	270	520	19
> 40 ≤ 100		-	320	550÷700	20	50	35	270	520	19
> 100 ≤ 160		-	-	-	-	-	-	245	500	19
> 160 ≤ 250		-	-	-	-	-	-	245	500	19

**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	R <sub>m</sub> (MPa)	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	R <sub>p0,2</sub> (MPa) min	R <sub>m</sub> (MPa)	A <sub>5</sub> (%) min
≥ 5 ≤ 10	-	-	-	-	-	600	800÷950	9	510	650÷1000	6
> 10 ≤ 16	-	-	-	-	-	560	750÷900	9	420	600÷950	7
> 16 ≤ 40	154±207	520÷700	370	600÷750	19	500	700÷850	10	320	580÷880	8
> 40 ≤ 63	154±207	520÷700	320	550÷700	20	430	590÷740	11	300	550÷840	9
> 63 ≤ 100	154±207	520÷700	320	550÷700	20	360	550÷700	12	270	520÷800	9

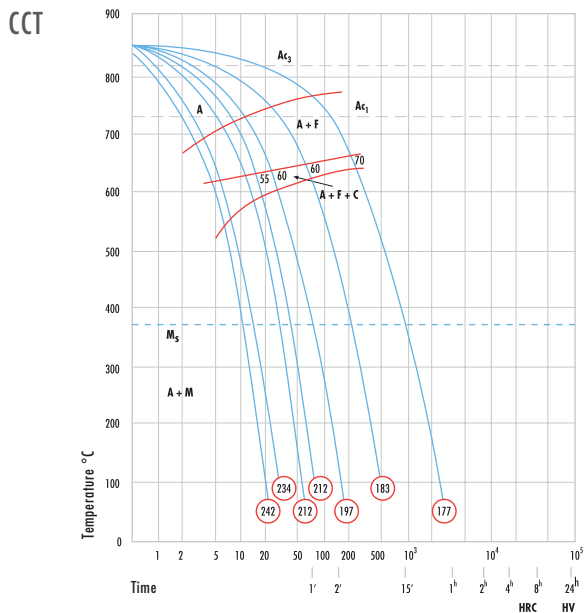
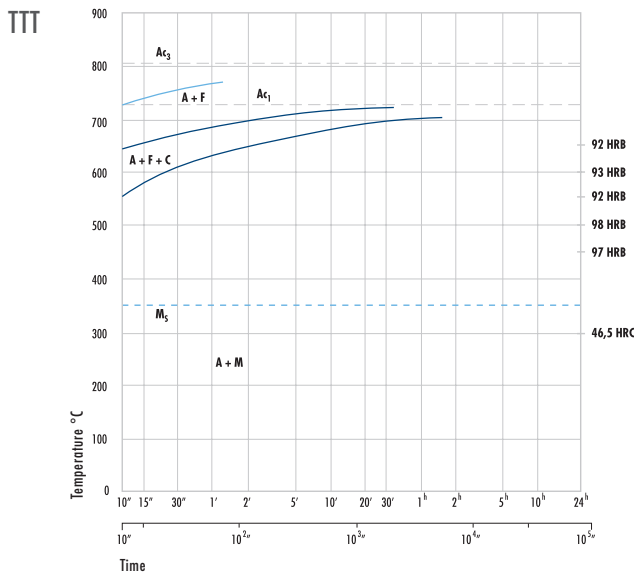
\*For reference only \*\*This values are valid also for Cold Drawn - Quenched + Tempered Condition (+C +QT)  
For size <5 mm the mechanical properties may be agreed at the time of enquiry and order

**WORKING TEMPERATURES RECOMMENDED**

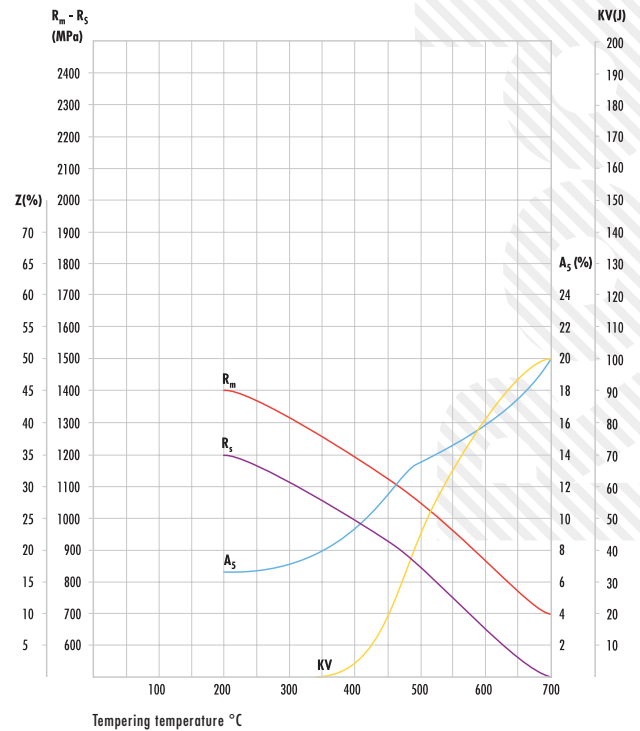
Operation	Hot forgings deformation	Normalizing	Soft annealing	Quenching in water	Tempering
°C	850÷1150	860÷900	650÷700	840÷880	550÷660

## 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
<b>+H</b>																
<b>Max</b>	58	57	55	53	49	41	34	31	28	27	26	25	24	23	20	-
<b>Min</b>	48	40	33	24	22	20	-	-	-	-	-	-	-	-	-	-



## TEMPERING CURVE



rev. 04/2013

**DIRECT-HARDENING**  
**NOT ALLOYED**

Rodacciai name

**KV35 - R35Pb**

3103