

STANDARD REFERENCE:

EN ISO 683-1: 2018 (Hot-rolled products) | EN 10277: 2018 (Bright products)

RODACCIAI REFERENCES AND COMPARABLE STANDARDS

EUROPE		ITALY	GERMANY		FRANCE	UK	USA
EN 10083-2: 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°			
C35E	1.1181	C35	Ck 35	1.1181			
C35R	1.1180		Cm 35	1.1180			1035

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

EUROPE	C	Si	Mn	P / max	S	Cr / max	Mo / max	Ni / max	Cu / max	Al	Pb
C35E					≤ 0,035					-	-
C35R	0,32÷0,39	0,10÷0,40	0,50÷0,80	0,025	0,020÷0,040	0,40	0,10	0,40	0,30	-	-
C35RPb					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)	Rp _{0,2} (MPa) min	R _m (MPa) min	A ₅ (%) min	Z (%) min	KV (J) min	Rp _{0,2} (MPa) min	R _m (MPa) min	A ₅ (%) min
≤ 16		-	430	630÷780	17	40	25	300	550	18
> 16 ≤ 40	it can be sheared without heat treatment	-	380	600÷750	19	45	25	270	520	19
> 40 ≤ 100		-	320	550÷700	20	50	25	270	520	19
> 100 ≤ 160		-	-	-	-	-	-	245	500	19
> 160 ≤ 250		-	-	-	-	-	-	245	500	19

MECHANICAL PROPERTIES - BRIGHT PRODUCTS CONDITION

Size mm	Rolled+Turned (+SH)		Quenched+Tempered+Turned (+QT +SH)*				Quenched+Tempered+Cold Drawn (+QT +C)			Cold Drawn (+C)		
	Hardness HB	R _m (MPa)	Rp _{0,2} (MPa) min	R _m (MPa)	A ₅ (%) min	KV (J) min	Rp _{0,2} (MPa) min	R _m (MPa)	A ₅ (%) min	Rp _{0,2} (MPa) min	R _m (MPa)	A ₅ (%) min
≥ 5 ≤ 10	-	-	-	-	-	-	525	750÷950	9	510	650÷1000	6
> 10 ≤ 16	-	-	-	-	-	-	490	700÷900	9	420	600÷950	7
> 16 ≤ 40	156÷204	520÷700	370	600÷750	19	35	455	650÷850	10	320	580÷880	8
> 40 ≤ 63	156÷204	520÷700	320	550÷700	20	35	400	570÷770	11	300	550÷840	9
> 63 ≤ 100	156÷204	520÷700	320	550÷700	20	35	385	550÷750	12	270	520÷800	9

*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

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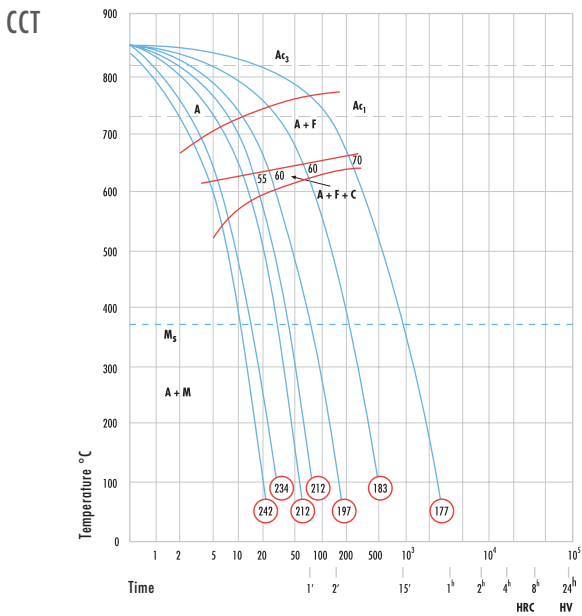
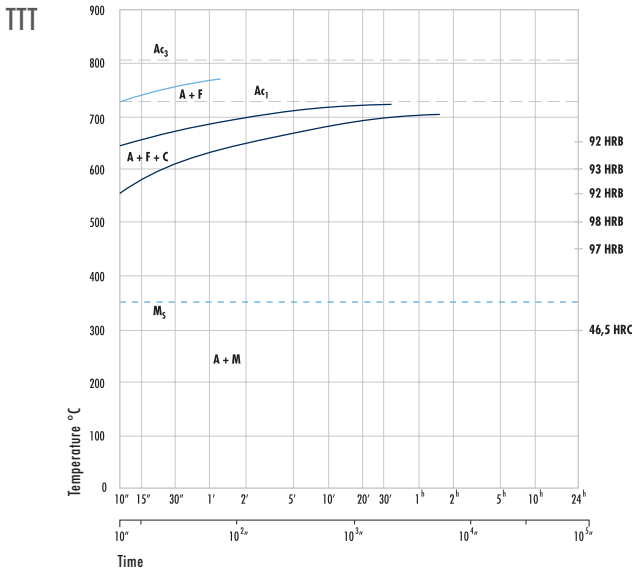
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QUENCHING AND TEMPERING
 NOT ALLOYED

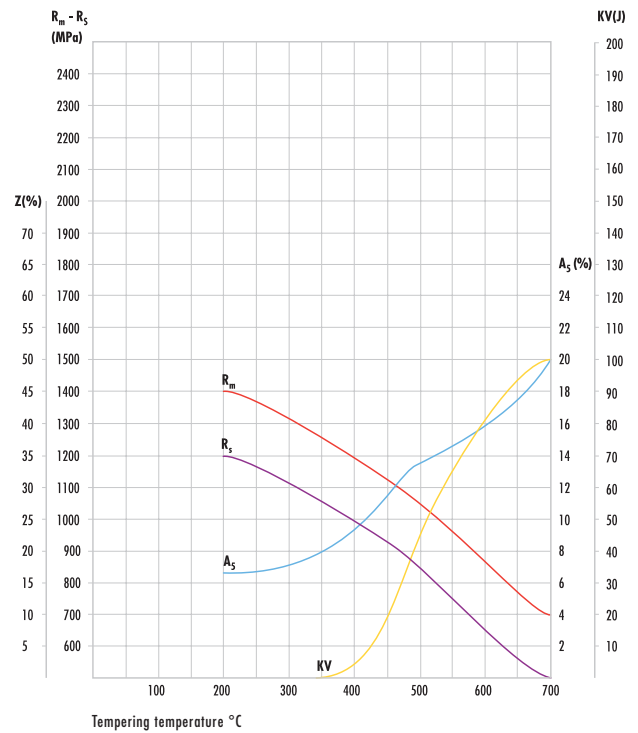
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HARDNESS LIMITS (JOMINY TEST)

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	58	57	55	53	49	41	34	31	28	27	26	25	24	23	20	-
	Min	48	40	33	24	22	20	-	-	-	-	-	-	-	-	-	-



TEMPERING CURVE



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