

**STANDARD REFERENCE:**

EN ISO 683-3: 2018 (Hot-rolled) | EN 10277: 2018 (Bright products)

**RODACCIAI REFERENCES AND COMPARABLE STANDARDS**

EUROPE		ITALY	GERMANY		FRANCE	UK	USA
EN 10084: 2008 EN 10277-4: 2008		(UNI 7846-78)	(DIN 17210-84)		(NF A 35-551-86)	(BS 970 pt.1-96)	ASTM A 29
Grade	N°		Werkstoff	N°			
20MnCr5	1.7147	20MnCr5	20MnCrS5	1.7149	20 MC 5	-	-
20MnCrS5	1.7149						

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

EUROPE	C	Si	Mn	P / max	S	Cr	Cu / max	Al	Pb
20MnCr5					≤ 0,035				-
20MnCrS5	0,17±0,22	0,15±0,40	1,10±1,40	0,025	0,020±0,040	1,00±1,30	0,40	0,020±0,050	-
20MnCrS5Pb					0,020±0,040				0,15±0,30

**MECHANICAL PROPERTIES - AS ROLLED CONDITION - Hardness (HB) in the condition**

Treated to improve sheraibility (+S)	Annealed to maximum hardness requirements (+A)	Treated to hardness range (+TH)	Treated to ferrite-pearlite structure and hardness range (+FP)	+ N normalized
≤ 255	≤ 217	≥ 170	≤ 217	140 ± 201

**MECHANICAL PROPERTIES - BRIGHT PRODUCT CONDITION**

Size mm	+A* + Turned (+A +SH)	+A* + Cold drawn (+A+C)	FP** + Turned (+FP +SH)	FP** + Cold drawn (+FP +C)
	Hardness HB max	Hardness HB max	Hardness HB	Hardness HB
≥ 5 ≤ 10	-	270	-	-
> 10 ≤ 16	-	260	-	-
> 16 ≤ 40	217	255	152±201	152±250
> 40 ≤ 63	217	250	152±201	152±245
> 63 ≤ 100	217	250	152±201	152±245

\*+A = annealed to maximum hardness requirement

\*\*+FP = treated to ferrite-perlite structure and hardness range

For size &lt;5 mm the mechanical properties may be agreed at the time of enquiry and order

**WORKING TEMPERATURES RECOMMENDED**

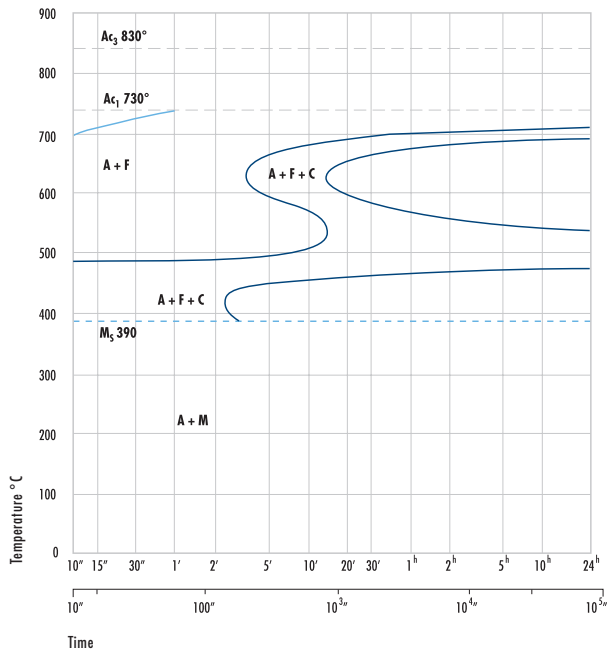
Operation	Hot forgings deformation	Carburizing temperature	Core quenching temperature	Case quenching temperature	Tempering
°C	900±1150	880±980	860±900	780±820	150±200



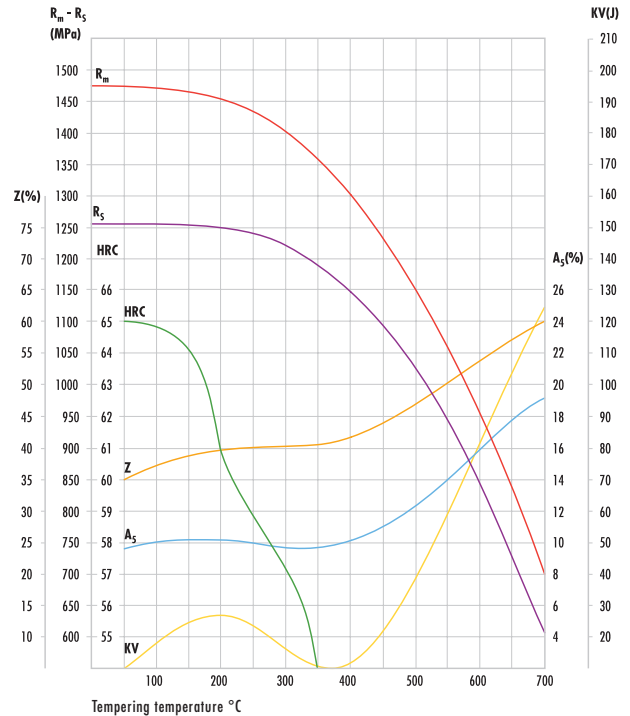
**HARDNESS LIMITS (JOMINY TEST)**

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	
+H	Max	49	49	48	46	43	42	41	39	37	35	34	33	32
	Min	41	39	36	33	30	28	26	25	23	21	-	-	-
+HH	Max	49	49	48	46	43	42	41	39	37	35	34	33	32
	Min	44	42	40	37	34	33	31	30	28	26	25	24	23
+HL	Max	46	46	44	42	39	37	36	34	32	30	29	28	27
	Min	41	39	36	33	30	28	26	25	23	21	-	-	-

**TTT**



**TEMPERING CURVE**



rev. 10/2018

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Download APP

**CASE-HARDENING STEELS**  
ALLOYED

**RM20 - RM20PB**

