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°**			
16MnCr5	1.7131	16MnCr5	16MnCr5	1.7131	16 MC 5	590H17	-
16MnCrS5	1.7139		16MnCrS5	1.7139			

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

EUROPE	C	Si	Mn	P / max	S	Cr	Cu / max	Al	Pb
16MnCr5	0,14÷0,19	0,15÷0,40	1,00÷1,30	0,025	≤ 0,035	0,80÷1,10	0,40	0,020÷0,050	-
16MnCrS5					0,020÷0,040				-
16MnCrS5Pb					0,020÷0,040				0,15÷0,30

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

Treated to improve sherability (+S)	Annealed to maximum hardness requirements (+A)	Treated to hardness range (+TH)		Treated to ferrite-pearlite structure and hardness range (+FP)		+ N normalizad
(≤ 255)	≤ 207	≥ 156	≤ 207	≥ 140	≤ 187	138 ÷187

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	-	260	-	-
> 10 ≤ 16	-	250	-	-
> 16 ≤ 40	207	245	140÷187	140÷240
> 40 ≤ 63	207	240	140÷187	140÷235
> 63 ≤ 100	207	240	140÷187	140÷235

*+A = annealed to maximum hardness requirement
**+FP = treated to ferrite-perlite structure and hardness range
For size <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

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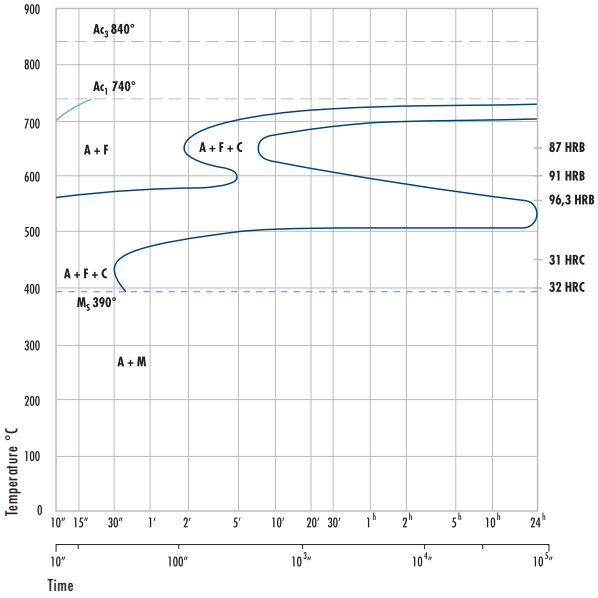
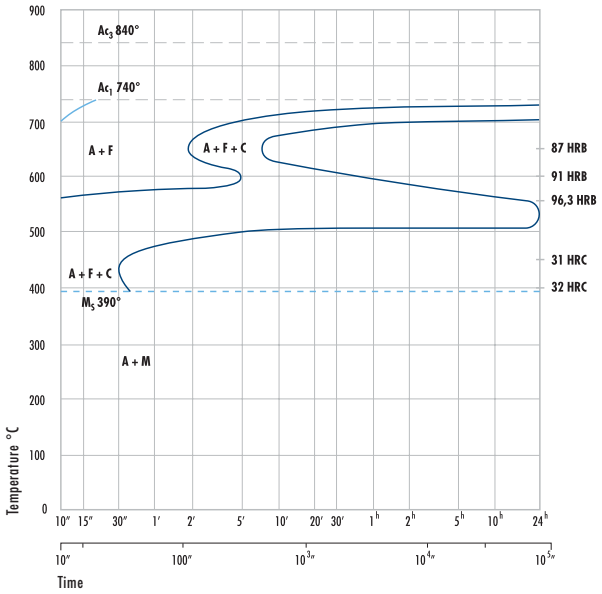
HARDNESS LIMITS (JOMINY TEST)

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	47	46	44	41	39	37	35	33	31	30	29	28	27
	Min	39	36	31	28	24	21	-	-	-	-	-	-	-
+HH	Max	47	46	44	41	39	37	35	33	31	30	29	28	27
	Min	42	39	35	32	29	26	24	22	20	-	-	-	-
+HL	Max	44	43	40	37	34	32	30	28	26	25	24	23	22
	Min	39	36	31	28	24	21	-	-	-	-	-	-	-

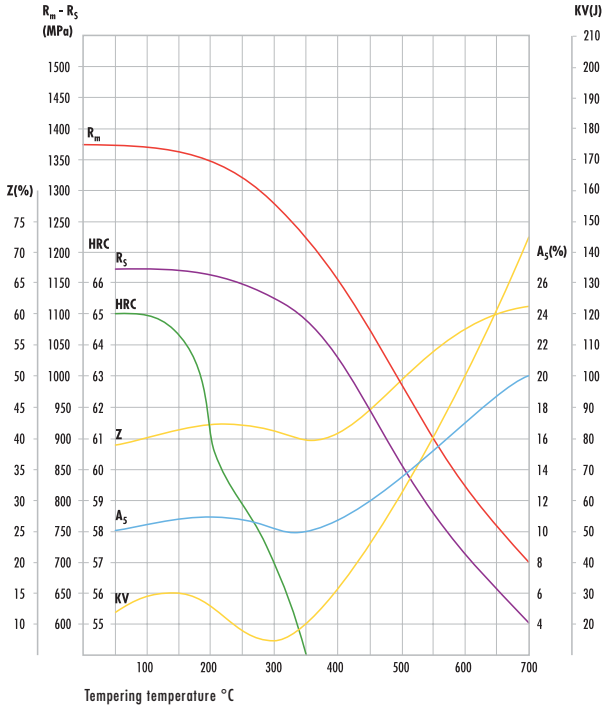
TTT



CCT



TEMPERING CURVE



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