

Material Grade: **20MnCr5**  
 Material Condition(s): **Untreated**  
 Surface Finish: **As rolled**

Associated Standard: **BS EN 10084**

Description:

Case hardening steel used extensively for both carburising and carbonitriding, demonstrating reasonably high hardenability and excellent forgeability. This grade is also has excellent weldability, however care should be taken to avoid weld cracking. Machinability is approximately 80% that of mild steel.

Typical applications: **Gears, pins, shafts, camshafts, drive wheels, clutch plates**

Typical conditions: **no designation or +U - as rolled**  
**+A - soft annealed**  
**+N - normalised**  
**+TH - treated to specific hardness range**  
**+H - with additional hardenability test**  
**+HH - with enhanced hardenability test**

**1. STEELMAKING**

	<u>C</u>	<u>Si</u>	<u>Mn</u>	<u>S*</u>	<u>P</u>	<u>Cr</u>
Min	0.17		1.10			1.00
Max	0.22	0.40	1.40	0.035	0.025	1.30

(\* grade variation 20MnCr5S has S range of 0.020-0.040%)

**2. MECHANICAL PROPERTIES**

Test type		Tensile and hardness test (at room temperature)					
		Yield (Re)	0.2 % proof	UTS (Rm)	Elong (A)	R of A (Z)	Hardness
Variation	Unit	N/mm <sup>2</sup>	N/mm <sup>2</sup>	N/mm <sup>2</sup>	%	%	HB
20MnCr5 + A	Min						
	Max						217
20MnCr5 + N	Min						140
	Max						201

**3. TYPICAL JOMINY HARDENABILITY - grade 20MnCr5+H**

Jominy reported in 1/16"

	<u>1.5</u>	<u>3</u>	<u>5</u>	<u>7</u>	<u>9</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>
HRC max	49	49	48	46	43	42	41	39	37	35	34	33	32
HRC min	41	39	36	33	30	28	26	25	23	21			