1.2162/21MNCR5

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NAZWA GATUNKU: 1.2162/21MNCR5

NAZWA: COLD WORK TOOL STEEL

NORM: ISO 4957

APPLICATION

Steel susceptible to tools with a high surface hardness and tough core, dies and punches for cold metal forming, plastic moulds.

CHEMICAL COMPOSITION:

C	Si	Mn	P	S	Cr	Mo	W	V	Co	Ni
0,18-0,24	0,15-0,35	1,10-1,40	Max 0,030	Max 0,030	1,00 – 1,30	–	–	–	–	–

MECHANICAL PROPERTIES:

Hardness after	Tempering ºC	Symbol	Value
Soft annealing	–	HB	≤217
Quenching[1] with 820 ºC in water	–	HRC	62
Quenching[1] with 820 ºC in water and tempering [1] after carburising	180	HRC	≥60
	200	HRC	60
	250	HRC	58.5
	300	HRC	57
	350	HRC	55
	400	HRC	53.5
	450	HRC	52
	500	HRC	50.5

PHYSICAL PROPERTIES:

Property	Unit	Value
Density. ρ	$g*cm^{-3}$	7.85
Thermal expansion. $\alpha_{20\text{-}100ºC)}$	K^{-1}	$11.9*10^{-6}$
Thermal conductivity. $\lambda_{20ºC)}$	$W*m^{-1}*K^{-1}$	52

TECHNOLOGICAL TREATMENT PROCESSES:

Technological treatment processes			Possible application	Temperature. °C
Hot forming	Forging		+	1100-850
	Rolling		+	1100-850
Treatment	Heat treatment	Quenching	+	810-830
		Tempering	+	170-190
	Precipitation strengthening	Supersaturation	–	–
		Ageing	–	–
	Annealing	Softening	+	660-700
		Stress relieving	+	600-680
Thermochemical treatment	Nitriding		–	880-950
	Other		–	880-920

INTERNATIONAL STEEL GRADES:

ISO		EN		Russia	
21MnCr5	ISO 4957:1999	21MnCr5	EN ISO 4957:1999	–	–
US		Japan		China	
–	–	–	–	–	–