

20MnCrS5 All

General Information

Case-hardening steel with low carbon content but good hardenability reaching good wear resistance due to high surface hardness after hardening. The small grain size benefits in good ductility and fatigue strength. Suitable for gearboxes and axle gears.

Similar designations

1.7149, SAE 5120, AISI 4820, 1.7147

Chemical composition

Variant	Cast	Di	Weldability		C%	Si%	Mn %	P%	S%	Cr%	Ni%	Mo %	Cu %	Al%
4324	CC	2.9	CEV 0.66 _{max}	Min	0.17	0.15	1.00	-	0.025	1.00	0.10	0.05	-	0.017
			Pcm 0.34 _{max}	Max	0.20	0.40	1.25	0.025	0.040	1.30	0.25	0.07	-	0.030
4326	CC		CEV 0.74 _{max}	Min	0.18	-	1.10	-	0.030	1.25	0.10	0.04	-	0.020
			Pcm 0.42 _{max}	Max	0.22	0.15	1.40	0.035	0.045	1.40	0.25	0.06	-	0.030
20MnCrS5 +H EN ISO 683-3	Std		CEV _{max}	Min	0.17	0.15	1.10	-	0.020	1.00	-	-	-	-
			Pcm _{max}	Max	0.22	0.40	1.40	0.025	0.040	1.30	-	-	0.40	-

Mechanical Properties

Variant	Condition	Format	Dimension [mm]	Hardness
4324	+AR	Round bar	25 < 160	< 270 HB
	+A	Round bar	25 < 160	< 180 HB
4326	+AR	Round bar	25 < 160	< 300 HB
	+A	Round bar	25 < 160	< 180 HB

$R_{p0.2}$ * R_{eh} ** R_{eI}

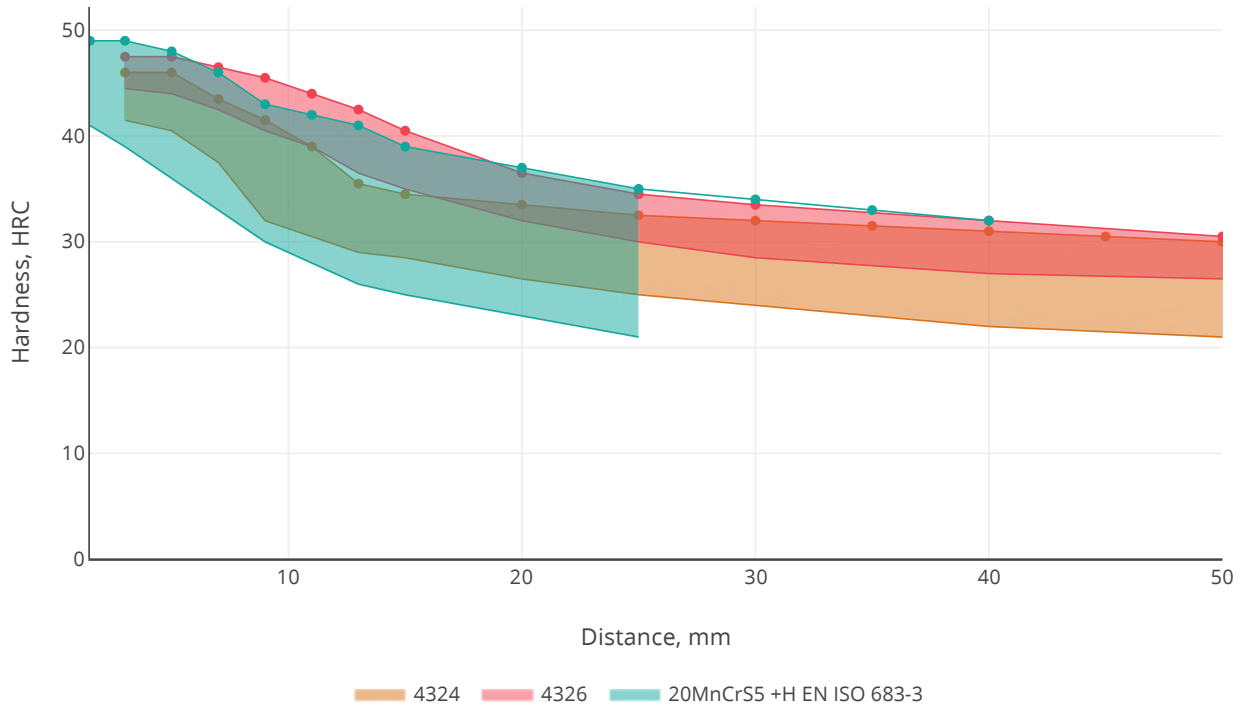
Transformation temperatures

	Temperature °C
MS	385
AC1	731
AC3	831

Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	850-1200°C	Slowly or in air
Annealing	+A	670-710°C	Slowly (15°C/h) until 600°C
Annealing	+FP	630-650°C	Keeping about 3hrs, after that in air
Normalizing	+N	860-890°C	in air
Stress relieve annealing	+SRA	650-680°C	in air
Carburizing	+CA	860-900°C	in air
Hardening	+Q	830-870°C	Quenching in oil or water
Tempering	+T	150-200°C	in air

Hardenability



Other properties (typical values)

Youngs module (GPa)	Poisson's ratio (-)	Shear module (GPa)	Density (kg/m3)
210	0.3	80	7800
Average CTE 20-300°C (µm/m°K)	Specific heat capacity 50/100°C (J/kg°K)	Thermal conductivity Ambient temperature (W/m°K)	Electrical resistivity Ambient temperature (µΩm)
12	460 - 480	40 - 45	0.20 - 0.25

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