

Quality	HS 2-9-1-8	Supply conditions:	<i>Technical card</i>
According to standard	UNI EN ISO 4957: 2002	Annealed HB max 277	Lucefin Group
Number	1.3247		rev. 2018

Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Mo%	V%	W%	Co%
	max	max	max	max					
1,05-1,15 ± 0.03	0,70 + 0.03	0,40 +0.04	0,030 + 0.005	0,030 + 0.005	3,50-4,50 ± 0.10	9,0-10,0 ± 0.10	0,90-1,30 ± 0.05	1,20-1,90 ± 0.10	7,50-8,50 ± 0.10

Product deviations are allowed

Temperature °C

Hot-forming	Stress-relieving after machining and before quenching	Pre-heating	Quenching +Q heatings must be carried out in controlled atmosphere furnace	Tempering +T
1150-950	600-650 furnace cooling to 320, then air	450, pause, then 860, pause, then 1050, pause, then ▲	▲ 1170-1210 oil, polymer, forced air, salt bath (500-550)	530-560 calm air minimum 2 cycles
Soft annealing +A	+TH annealing	All high-speed steels must be annealed after hot-forming	Pre-heating welding	Stress-relieving after welding
820 furnace cooling 600, then air (HB max 277)	890 cooling 22 °C/h (HB 235-270)		not recommended	
			Ac1 Ac3 Ms Mf	
			780 860 160 -10 subcooling	

Hardness in annealed and **cold-drawn** condition can be max HB 327. Hardness in annealed and **cold-rolled** condition can be HB 347
The symbol ▲ indicates temperature rise up to°C ▲

Surface treatments

Nitriding	Steam Oxidation	Chrome-plating Burnishing Lase quenching
520-570	380-520	

Mechanical properties

Table of tempering values obtained at room temperature on round of Ø 15 mm after quenching at 1190 °C in oil

HB	679	679	679	679	679	670	670	679	706	-	-	722	543	482
HRC	61.5	61.5	61.5	61.5	61.5	61	61	61.5	63	67.5	69	64	54	50
R N/mm ²	-	-	-	-	-	-	-	-	-	-	-	-	2010	1760
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

Hardness at elevated temperatures

HRC	68	66	65	62	44
°C	20	315	425	540	650

Thermal Expansion	10 ⁻⁶ .K ⁻¹	▶	11.0	11.5	11.9	12.3	12.4	12.5	12.5	
Modulus of Elasticity long.	GPa		217							
Modulus of Elasticity tang.	GPa		83							
Specific Heat Capacity	J/(Kg.K)		460							
Thermal Conductivity	W/(m.K)		19.0							
Density	Kg/dm ³		7.98							
Specific Electric Resist.	Ohm.mm ² /m		0.65							
Electrical Conductivity	Siemens.m/mm ²		1.54							
°C			20	100	200	300	400	500	600	700

The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C ...

Achievable cutting speeds *carbide insert*

Annealed hot-rolled	0,5 / 1	1 / 4	4 / 8	<i>ap</i> depth of cut mm
	0.1 / 0.3	0.2 / 0.4	0.3 / 0.6	<i>fn</i> feed mm/rev
	210 / 150	160 / 110	110 / 80	<i>Vc</i> cutting speed m/min

EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
HS 2-9-1-8	HS 2-9-1-8	W2Mo9Cr4VCo8	HS 2-10-1-8	Z110DKCWV09-08-04-02-01	BM42		M42