LAMINERIES MATTHEY
NOTZ group advanced metal solutions

BrushForm® 158

		DIN	EN Nr.	UNS (ASTM)	AISI	LMSA
Designation	**CuNi15Sn8**	-	-	C72900	-	**B860 / B865**

Chemical composition

Cu*	Ni	Sn	Pb
Balance	14.50 - 15.50	7.50 - 8.50	≤ 0.02

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.
*The presence of other trace elements is possible, however the total amount shall not exceed 0.5% in weight.

Main technical properties and features

A copper-nickel-tin alloy, which can be cold worked and heat-treated to reach very high tensile strengths or hardness's and in addition it has an excellent corrosion resistance. The Materion alloy BrushForm® 15) is produced using a rapid solidification technique: the EquaCast® process that avoids an excessive chemical segregation. It is suitable for stamping before or after heat treatment (spinodal decomposition). BrushForm® 158 is delivered in various tempers: soft annealed, cold worked and mill hardened. The bendability of the temper TB00, TD01, TD02 and TM00 is excellent in good and bad way. BrushForm® 158 is particularly resistant to thermal stress relaxation and to alternate stresses (high fatigue strength). It also offers remarkable dimensional stability after the spinodal decomposition (no-distortion, caused by differential shrinkage).

Typical uses

BrushForm® 158 offers a range of mechanical and physical properties making it ideal for the production many parts used in various field of applications field, such as the connector industry (spring contacts, clips, etc.) the watch industry (hands, wheels, bridge, etc.) and the automotive industry.

Typical manufacturing range

		Thickness (mm)	Width (mm)	Length (mm)
Rolled products	Strip in coils [1]	0.010 - 2.000	1.5 - 200.0	-
	Strip as sheets [1]	0.010 - 1.500	10.0 - 200.0	100 - 3000

[1] Not all our production possibilities are presented here. Other dimensions or product forms available upon request. Some combinations of thicknesses and widths are not possible.

Physical properties

Modulus of elasticity	kN/mm^2	128
Poisson ratio		0.3
Density	g/cm^3	9.00
Melting point / Melting range	°C	950 - 1115
Linear dilatation coefficient	10^{-6}·/ °C	16
Thermal conductivity at 20°C	W/m °K	28
Electrical resistivity	μΩcm	25.0 - 16.7
Electrical conductivity	MS/m	4 - 6
Electrical conductivity	% IACS	6 - 10
Magnetic properties		Non-magnetic (slightly diamagnetic to slightly paramagnetic μ = 1.0000 ± 0.005)

Heat treatment

BrushForm® 158 alloy can be heat treated by spinodal decomposition. The annealing temperature is in the range 700 - 800ºC.

Spinodal decomposition temperature (ºC)	Time (h)
320 - 370	2 - 4

Mechanical properties of strips

Explanations

TB00	Solution heat treated
TD01 - 08	Solution heat treated + cold formed
TX00	TB00+ thermal treatment at **customer plant** (370 °C / 2h - 4h)
TS01 - TS08	TD01 - TD08 + thermal treatment (spinodal decomposition) at **customer plant** (TS01 - TS04: 370 °C / 2h-4h; TS08: 350 °C / 2h - 4h)
TM00 - 12	Mill-hardened (no further heat treatment is needed)

Temper			Heat treatment	$Rp_{0.2}$ (N/mm²)	R_m (N/mm²)	A_{50mm} (%)	Hardness HV	R/t (90°) T/L [1]	R/t (180°) T/L [1]
TB00	R440	H100	-	170 - 310	440 - 590	> 32	100 - 160	0 / 0	0 / 0
TD01	R510	H150	-	350 - 480	510 - 690	> 18	150 - 220	0 / 0	0 / 0
TD02	R590	H170	-	450 - 580	590 - 760	> 8	170 - 240	0 / 0	0 / 0
TD03	R660	H190	-	620 - 800	660 - 830	-	190 - 260	-	-
TD04	R690	H200	-	650 - 820	690 - 900	-	200 - 280	2 / 3	0 / 0
TD08	R840	H250	-	700 - 950	840 - 1000	-	250 - 330	5 / 10	4 / 7

Mill Hardened temper			Heat treatment	$Rp_{0.2}$ (N/mm²)	R_m (N/mm²)	A_{50mm} (%)	Hardness HV	R/t (90°) T/L [1]	R/t (180°) T/L [1]
TM00	R655	H190	Mill-hardened tempers. No further heat treatment is needed.	520 - 660	760 - 860	> 20	190 - 270	0 / 0	0-0.5/ 0-1.0
TM02	R725	H215		620 - 760	830 - 920	> 15	250 - 290	0-0.5/ 0-0.5	0-0.5 / 1-2
TM04	R795	H245		720 - 860	900 - 980	> 10	260 - 310	0-2 / 0-2	1.2 / 2-3
TM06	R895	H270		830 - 1000	970 - 1070	> 5	280 - 330	1-4 / 1-7	1-6 / 2-10
TM08	R1035	H305		960 - 1170	1030 -1230	> 3	300 - 390	-	-
TM10	R1205	H370		1140 - 1345	1205 - 1400	> 1	370 - 450	-	-
TM12	R1240	H380		1205 min.	1240 min.	-	380 min.	-	-

[1] Minimum bend radius at 90°and 180º. R = radius, t = strip thickness, G = "Good way", perpendicular to rolling direction and B =" Bad way", parallel to rolling direction.

Heat treatment at customer's plant

Temper				Heat treatment	$Rp_{0.2}$ (N/mm²)	R_m (N/mm²)	A_{50mm} (%)	Hardness HV
TX00	R720	H200	soft + hardened	2h - 4h / 350 °C	410 - 700	720 - 960	10 min.	200 - 300
TS01	R850	H250	¼ hard + hardened	2h - 4h / 350 °C	620 - 810	850 - 1050	6 min.	250 - 330
TS02	R900	H260	½ hard + hardened	2h - 4h / 350 °C	720 - 880	900 - 1080	5 min.	260 - 340
TS04	R1000	H290	hard + hardened	2h - 4h / 350 °C	900 - 1050	1000 - 1180	3 min.	290 - 380
TS08	R1100	H320	spring + hardened	2h - 4h / 350 °C	1050 - 1210	1100 - 1360	-	320 - 430

Tolerances (strip and foil)

Thickness

The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.

Our "LMSA Precision" and "LMSA Extreme" tolerances are available upon request.

Thickness (mm)		EN Standard		Lamineries MATTHEY		
≥	<	10140 Precision	10258 Precision	LMSA Standard	LMSA Precision	LMSA Extreme
-	0.025	-	-	-	-	± 0.001
0.025	0.050	-	-	± 0.003	± 0.002	± 0.0015
0.050	0.065	-	± 0.003	± 0.003	± 0.0025	± 0.002
0.065	0.100	-	± 0.004	± 0.004	± 0.0035	± 0.003
0.100	0.125	± 0.005	± 0.006	± 0.005	± 0.004	± 0.003
0.125	0.150	± 0.005	± 0.006	± 0.005	± 0.005	± 0.004
0.150	0.250	± 0.010	± 0.008	± 0.008	± 0.006	± 0.004
0.250	0.300	± 0.010	± 0.009	± 0.009	± 0.007	± 0.005
0.300	0.400	± 0.010	± 0.010	± 0.010	± 0.007	± 0.005
0.400	0.500	± 0.015	± 0.012	± 0.012	± 0.008	± 0.006
0.500	0.600	± 0.015	± 0.014	± 0.014	± 0.010	± 0.007
0.600	0.800	± 0.015	± 0.015	± 0.015	± 0.010	± 0.007
0.800	1.000	± 0.015	± 0.018	± 0.018	± 0.012	± 0.009
1.000	1.200	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012
1.200	1.250	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012
1.250	1.500	± 0.020	± 0.020	± 0.020	± 0.015	± 0.014

Width

Our width tolerances "Standard" is +0.2, -0.0 (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.

Camber

Our tolerance "LMSA Standard" respects the EN Standard 1654 (Length of measurement 1000 mm).
Other tolerances upon request.

Width (mm)		Camber max. (mm/m)			
		LMSA Standard		LMSA Extreme	
>	≤	≤ 0.5 mm	> 0.5 mm	≤ 0.5 mm	> 0.5 mm
3	6	12	-	6	-
6	10	8	10	4	5
10	20	4	6	2	3
20	250	2	3	1	1.5

Surface

Special surface qualities upon request

Flatness

Special requirement on the longitudinal or transversal flatness upon request

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