ELSOLD® **Bars and Ingots**

Increasing miniaturisation, stricter requirements with regard to long-term reliability of complex electronic products, components and related extended performance features thereof make highest demands on soldering quality. ELSOLD® soft solders are therefore produced only from carefully selected virgin-grade base metals. ELSOLD® soft solders cover the entire range of electronic applications: machine solders, high temperature solders, special solders (low-melting alloys, solders for static baths).

ELSOLD® **Bars and Ingots with lead**

Alloy	Melting Range [°C]	Operation temperature [°C]	Delivery Form	Dimensions [mm]	Weight [ca. kg]	Order number
Sn63Pb37P	183	240-260	Ingots	50x20x490	4.0	EL03 0129
Sn63Pb37P	183	240-260	Triangular bars	8/10x400	0.2	EL03 0017
Sn63Pb37P	183	240-260	Ingots	50x18x600	4.5	EL03 0133
Sn63Pb37	183	240-260	Ingots	50x20x490	4.0	EL03 0235
Sn63Pb37	183	240-260	Triangular bars	8/10x400	0.2	EL03 0393
Sn60Pb40P	183-190	240-260	Triangular bars	8/10x400	0.2	EL03 0013
Pb95Sn3Ag2	304-310	> 450	Triangular bars	8/10x400	0.2	EL03 0026
Pb95Sn3Ag2P	304-310	> 450	Triangular bars	8/10x400	0.2	EL03 0285
Pb92Sn8(Sb)	280-305	350-450	Triangular bars	8/10x400	0.2	EL03 0262
Bi50Pb31.3Sn.18.7	96	150-180	Wire	2/3x400	0.2	EL03 0192
Deoxidisation tablets, lead free, bottled		50 tablets				EL13 0042
Deoxidisation tablets, lead free, bottled		800 tablets				EL13 0043

Deoxidisation tablets (for solder baths with or without lead)
- To reduce dross formation
- The oxidation of the solder is slowed down by a very thin protective layer
- Recommended dosage: 3 to 5 tablets for every 10 kgs solder

Picture: Deoxidisation tablets delivery forms

Bottle
50 tablets

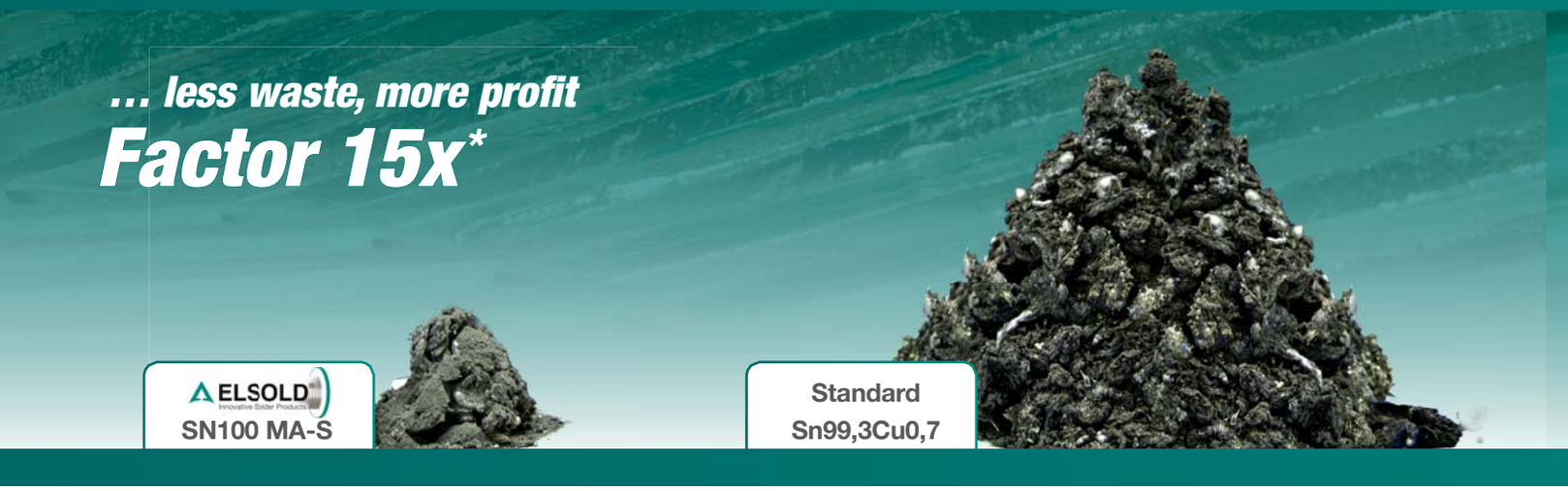
Bottle
800 tablets

Picture: Bars and Ingots delivery forms

Triangular bars

Extruded bars

Ingots



ELSOLD® SN100(Ag) MA-S micro-alloy solder with Ni, Ge and P

In addition to a complete range of high quality solder alloys, ELSOLD® now offers a world class innovation - the micro-alloy **ELSOLD® SN100(Ag) MA-S**. This patented solder (EP 1 273 384 A1) is manufactured in a revolutionary process called „Frischen“ or “Freshening” which can be described as an ultra-grade cleaning operation. This proprietary technique results in a highly pure and highly stabile solder alloy with a much lower tendency to oxidize during soldering in a open environment / atmosphere solder equipment. Typical solder defects such as bridging and solder spikes are almost non-existent. Compared with Sn99,3Cu0,7, our new lead free micro-alloy solder boasts the lowest amount of dross formation while soldering, thereby making it extremely economical!
The tables and graphs on the following pages show the enormous potential for slowing down production soldering losses and reducing costs! The numerous advantages of the revolutionary **ELSOLD® SN100 MA-S** can be summarized as follows: Good solderability, fine-grained & shiny solder joints, reduced errosion of solder pot & solder tools, reduced leaching and the lowest dross formation resulting in the best cost effciency!

ELSOLD® SN100 MA-S Bars and Ingots, lead-free

Alloy	Melting Range [°C]	Operation temperature [°C]	Delivery Form	Dimensions [mm]	Weight [ca. kg]	Order number
SN100 MA-S	227-230	255-285	Triangular bars	8/10x400	0,2	EL04 0027
SN100 MA-S	227-230	255-285	Ingots	20x20x335	1,0	EL04 0030
SN100 MA-S	227-230	255-400	Ingots w. eye	50x20x490	3,0	EL04 0028
SN100 MA-S Refill SC02	232-234	255-285	Triangular bars	8/10x400	0,2	EL04 0032
SN100 MA-S Refill SC02	232-234	255-285	Ingots	20x20x335	1,0	EL04 0034
SN100 MA-S Refill SC02	232-234	255-285	Ingots w. eye	50x20x490	3,0	EL04 0035
SN100Ag0,3 MA-S	217-227	255-285	Triangular bars	8/10x400	0,2	EL04 0036
SN100Ag0,3 MA-S	217-227	255-285	Ingots	20x20x335	1,0	EL04 0038
SN100Ag0,3 MA-S	217-227	255-285	Ingots w. eye	50x20x490	3,0	EL04 0040
SN100Ag1 MA-S	217-223	255-285	Triangular bars	8/10x400	0,2	EL04 0041
SN100Ag1 MA-S	217-223	255-285	Ingots	20x20x335	1,0	EL04 0042
SN100Ag1 MA-S	217-223	255-285	Ingots w. eye	50x20x490	3,0	EL04 0045
SN100Ag3 MA-S	217-219	255-285	Triangular bars	8/10x400	0,2	EL04 0046
SN100Ag3 MA-S	217-219	255-320	Ingots	20x20x335	1,0	EL04 0048
SN100Ag3 MA-S	217-219	255-320	Ingots w. eye	50x20x490	3,0	EL04 0049

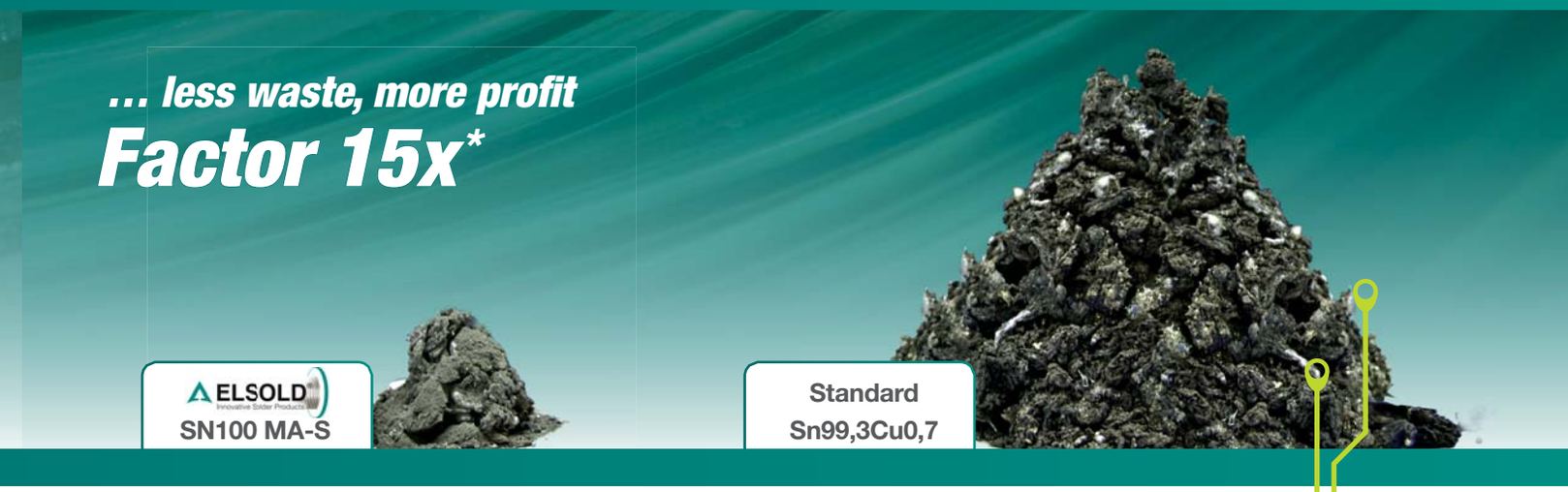
All lead-free SN-100(Ag) MA-S alloys alloys are naturally available in bar, solid and cored wire.

Your advantages:
- good solderability
- fine-grained & shiny solder joints
- reduced errosion of solder pot & solder tools
- reduced leaching
- lowest dross formation
- best cost effciency

*Factor 15x less solder dross taken after 8 hours in a dynamic solder bath at 290°C

... less waste, more profit

Factor 15x*



ELSOLD
SN100 MA-S

Standard
Sn99,3Cu0,7

Highlight

micro-alloy solder SN100(Ag) MA-S
Solder bars, 3-edge solder rods and solder blocks

- in all lead free SN(Ag)Cu alloys
- highest purity [first melt]
- excellent solderability and wettability
- lowest oxidation build up
- lowest dross formation

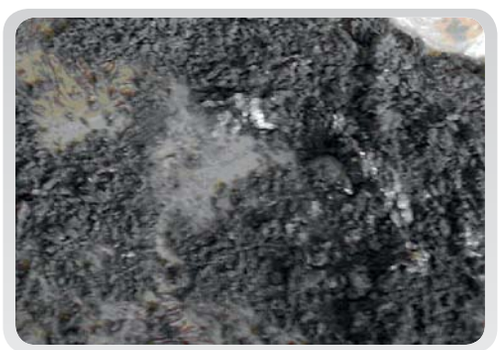
leadfree

Features: lead free solder micro-alloy SN100(Ag) MA-S

The special manufacturing process of **SN100 MA-S** eliminates unwanted impurities leading to a highly pure and stabile alloy which shows a reduced tendancy to oxidize. This proprietary manufacturing process guarantees an outstanding level of purity without contamination. Such alloys show a high stability and remain fluidly liquid thereby reducing typical solder defects such as solder peaks and solder bridging. The soldering results are outstanding and quality fluctuations are kept to an absolute minimum.

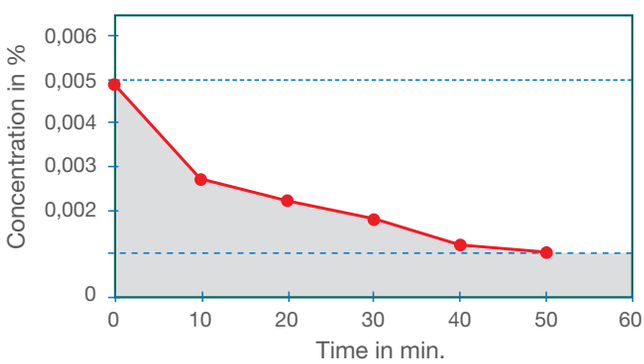
One simple look at the molten solder bath surface after 8 hours and before dross removal clearly shows the difference between and SnCu0,7.

SN100 MA-S



SnCu0,7

FRESHENING – Reduction of Impurities in SN100 MA-S



Dross formation of „freshening“ **SN100 MA-S** compared to a non-“freshening“ material

Dross formation in 4h at 450 °C (non-dynamic bath)	
SN100 MA-S	2,3 %
SnAg0,3Cu0,7P	6,5 %

*Factor 15x less solder dross taken after 8 hours in a dynamic solder bath at 290°C

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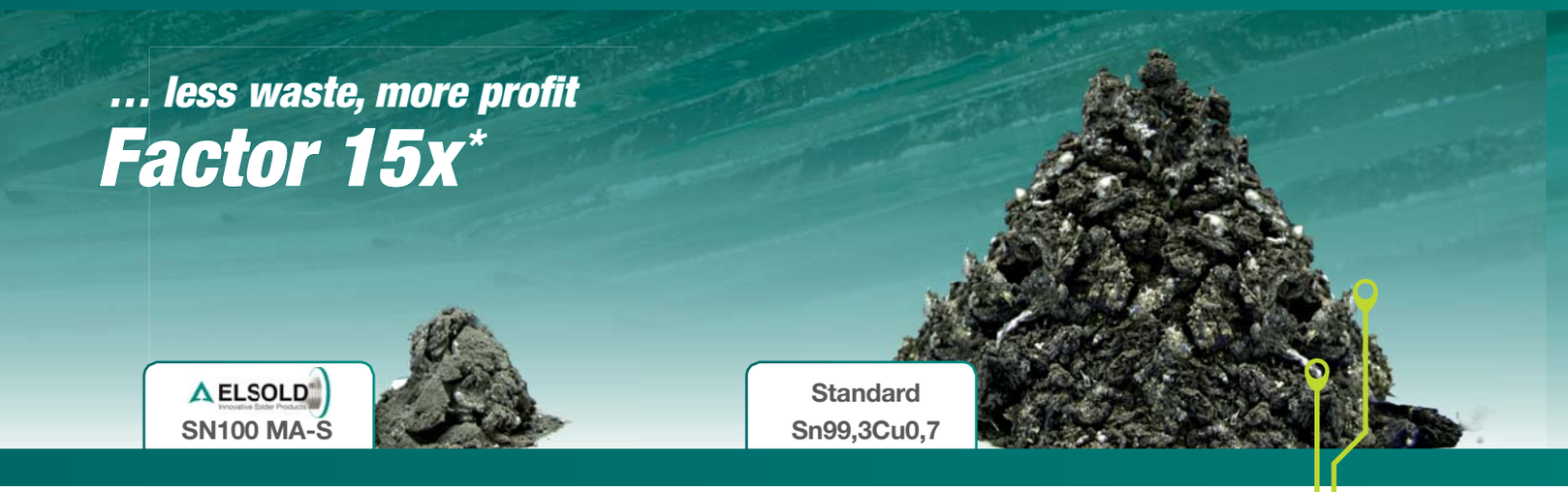
Factor 15x*



Highlight

ELSOLD® SN100 MA-S

- good solderability
- fine-grained & shiny solder joints
- reduced errosion of solder pot & solder tools
- reduced leaching
- lowest dross formation
- best cost effciency

leadfree

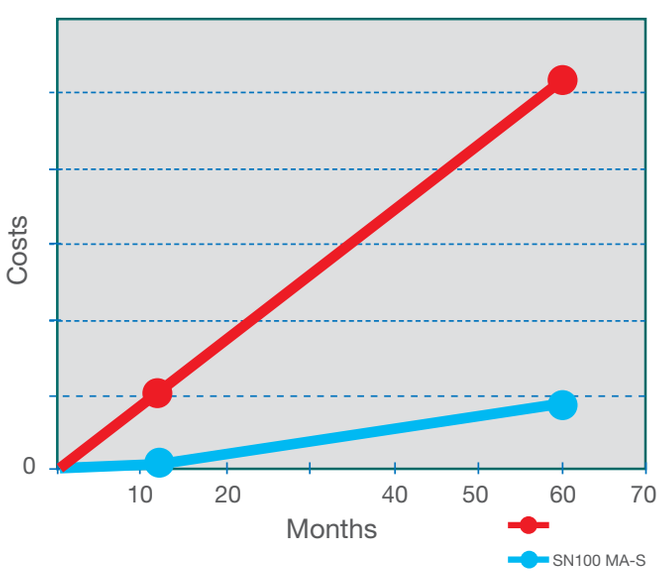
Drive down your production losses...

Factor 15x*

Comparison of dross quantities

The tremendous advantage of **SN100 MA-S** can best be seen in a dynamic wave soldering process. At 290°C the dross formation on the wave can be reduced by a factor of 15!

Costs due to dross related losses



Based on the positive effects of "Freshening" and the influence of the micro-alloy additives, dross formation with **SN100 MA-S** is up to 93% reduced compared to non-"freshening" SnCu0,7 alloys without micro-additives.

This means not only fantastic savings due to using less expensive solder, but also savings due to a reduced service requirement of the wave soldering machine!

Cost savings based on reduced dross formation in a dynamic solder bath

Dross formation of SN100 MA-S in comparison to SnCu0,7 at 290 °C in a **dynamic** solder bath (8h)

Dross formation in 8 hours at 290 °C (dynamic solder bath)	
SN100 MA-S	1,5 %
Sn99,3Cu0,7	22,6 %

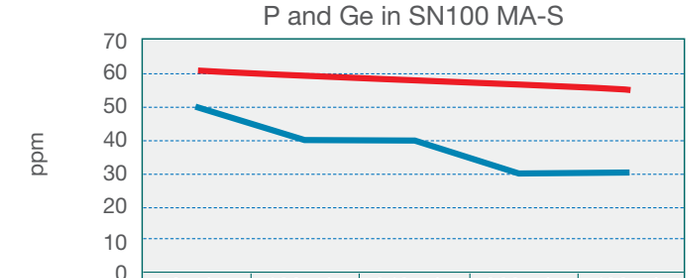
When using **ELSOLD® SN100(Ag)** MA-S for lead free wave soldering in an open or atmosphere machine, the dross formation can be reduced up to 93%! This immense savings has an even greater payoff when using cost intensive silver alloys..

*Factor 15x less solder dross taken after 8 hours in a dynamic solder bath at 290°C

ELSOLD® SN100(Ag) MA-S micro-alloy solder with Ni, Ge and P

In addition to the well known positive characteristics of SnCu / SnAgCu alloys, it is the outstanding cost / performance ratio that makes **SN 100 MA-S** truly stand out. When using lead free alloys in an open or atmosphere wave solder machine, the dross formation can be larger than the required amount of solder in the product. This means that the manufacturing process of a product requires up to 3-times the amount of solder that ends up being built into the product! With **ELSOLD® SN100 MA-S**, the dross formation is so reduced that the same product can be manufactured with a far lower solder requirement. This enormous savings has an even greater payoff when using cost intensive silver alloys.

P and Ge in SN100 MA-S



	0 min	120 min	240 min	360 min	480 min
Phosphor	50	40	40	30	30
Germanium	61	59	58	57	55

A solder bath analysis will clearly substantiate that the value added outstanding properties of **ELSOLD® SN100 MA-S** remain stabile over a very long period of time.

The solder bath remains stable. The concentration of all elements remain stable in the observed period of time. Actually, only a very slight amount of Germanium (6 ppm) and Phosphor (20 ppm) could be observed.

Typical analysis of SN100 MA-S

Composition	analytical results	prescriptive limits as of DIN EN ISO 9453 [%]
Sn - Tin	Rest	residual
Cu - Copper	0,70	0,5 – 0,9
Ni - Nickel	0,03	undetermined
Ge - Germanium	0,006	undetermined
P - Phosphor	0,004	undetermined
Ag - Silver	0,02	0,10
Pb - Lead	0,03	0,10
Sb - Antimon	0,003	0,10
Cd - Cadmium	0,0005	0,002
Zn - Zinc	0,0005	0,001
Al - Aluminium	0,0005	0,001
Bi - Bismuth	0,02	0,10
As - Arsenic	0,01	0,03
Fe - Iron	0,002	0,02
Co - Cobalt	0,002	undetermined
Au - Gold	0,001	0,05
In - Indium	0,004	0,10

*Factor 15x less solder dross taken after 8 hours in a dynamic solder bath at 290°C

Highlight

Solder Bars, Triangular Bars and Ingots

- all alloys with or without lead
- highest purity, virgin grade
- excellent soldering and wetting properties
- minimal oxides
- minimal dross generation
- also available as micro-alloyed (SAC) SC

leadfree

ELSOLD® Bars and Ingots, lead-free

Alloy	Melting Range [°C]	Operation temperature [°C]	Delivery Form	Dimensions [mm]	Weight [ca. kg]	Order number
Sn99.3Cu0.7	227	255-285	Triangular bars	8/10x400	0.2	EL04 0351
Sn99.3Cu0.7 MA	227	255-285	Triangular bars	8/10x400	0.2	EL04 6005
Sn99.3Cu0.7P	227	255-400	Triangular bars	8/10x400	0.2	EL04 0358
Sn96.5Ag3Cu0.5	217-219	255-285	Triangular bars	8/10x400	0.2	EL04 0403
Sn96.5Ag3Cu0.5	217-219	255-285	Ingots	20x20x335	1.0	EL04 6001
Sn95.5Ag3.8Cu0.7	217	255-285	Triangular bars	8/10x400	0.2	EL04 0374
Sn95.5Ag3.8Cu0.7	217	255-285	Ingots	50x20x490	3.0	EL04 0406
Sn97Ag3	221-232	255-285	Ingots	50x20x490	3.0	EL04 0397
Sn96.5Ag3.5	221	255-285	Triangular bars	8/10x400	0.2	EL04 0156
Sn96.2Ag3.8	221-238	255-285	Ingots	50x18x600	4.0	EL04 0411
Sn96.2Ag3.8	221-238	255-285	Triangular bars	8/10x400	0.2	EL04 0389
Sn96Ag4	221-238	255-285	Ingots	50x20x490	3.0	EL04 0419
Sn96.5Ag3.5P	221	255-320	Ingots	50x20x490	3.0	EL04 0408

- ELSOLD® alloys comply with standards DIN EN 29453, DIN EN 61190-1-3 and ELSOLD® own standards
- further forms available upon request, such as thick and wide rods, flat tapes, thin rods and bars, threads, solid wires etc.
- all alloys can be supplied in deoxidised form on request

All lead-free alloys are available as ELSOLD® MA® (micro-alloyed)

Your advantages:
- fine-grained structure facilitates visual inspection
- low erosion of copper allows lead-free tinning of thin wires and circuit paths, multiple joints and repairs
- Significant cost saving though low chemical attack on material soldering tips and equipment