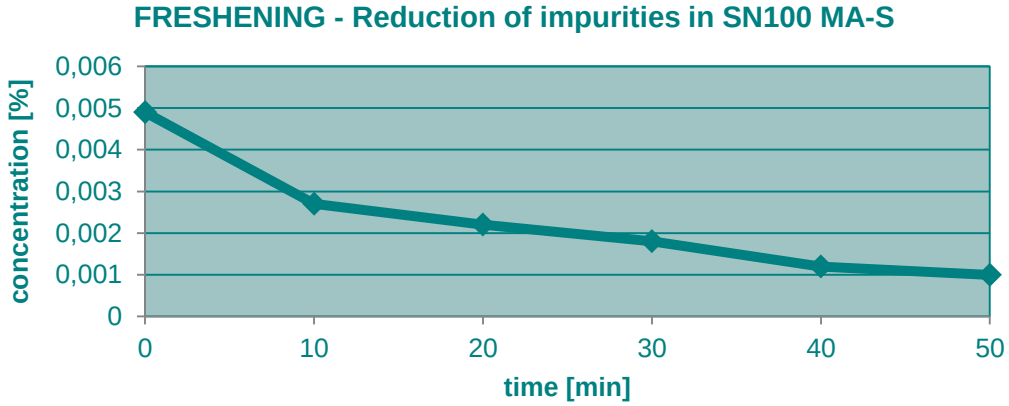
In addition to a complete range of high quality solder alloys, ELSOLD® now offers a world class innovation - the micro-alloys ELSOLD® SN100(Ag) MA and ELSOLD® SN100(Ag) MA-S. These solders are manufactured in a revolutionary process called “Frischen“ or “Freshening” which can be described as an ultra-grade cleaning operation. This proprietary technique results in a highly pure and highly stabile solder alloy with a much lower tendency to oxidize during soldering. 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!

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

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

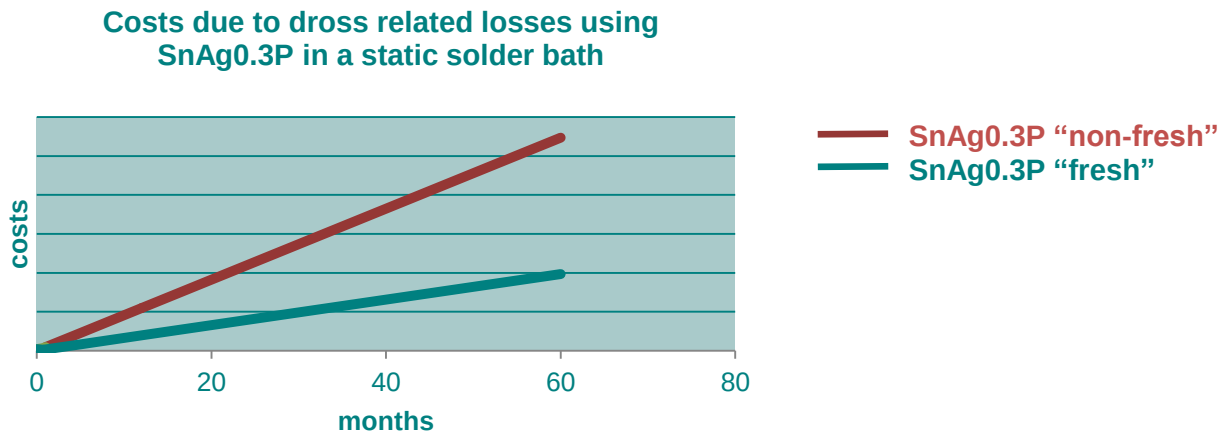
The special manufacturing process of SN100 MA-S eliminates unwanted impurities leading to a highly pure and stabile alloy which shows a reduced tendency to oxidize. This proprietary manufacturing process guarantees an outstanding level of purity without contamination. Such alloys show a high stability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



Dross formation in 4 h at 450 °C (static bath)	
SnAg0.3P, "fresh"	2.3 %
SnAg0.3P, non-"fresh"	6.5 %

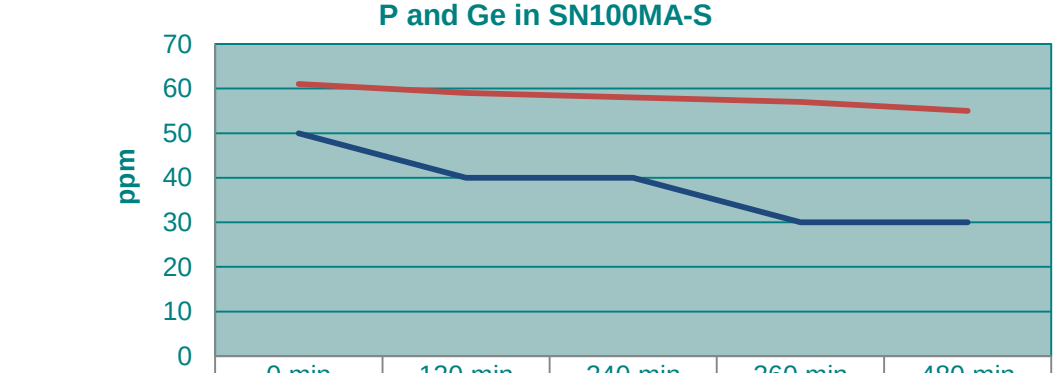
Dross formation of "fresh" SnAg0.3P compared to a non-"fresh" material at 450 °C (static bath)

One tremendous advantage of “Freshening” can be seen with the stability of the alloys to resist oxidation. Under equivalent conditions, the dross formation of "fresh" SnAg0.3P alloys is a factor of nearly 3 times less than with non-"fresh" SnAg0.3P alloys.



Long term stability of SN100 MA-S

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 is larger than the required amount of solder in the product. This means that the manufacturing process of a product requires 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.



	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 ELSOLD® SN100 MA-S remain stable over a very long period of time.

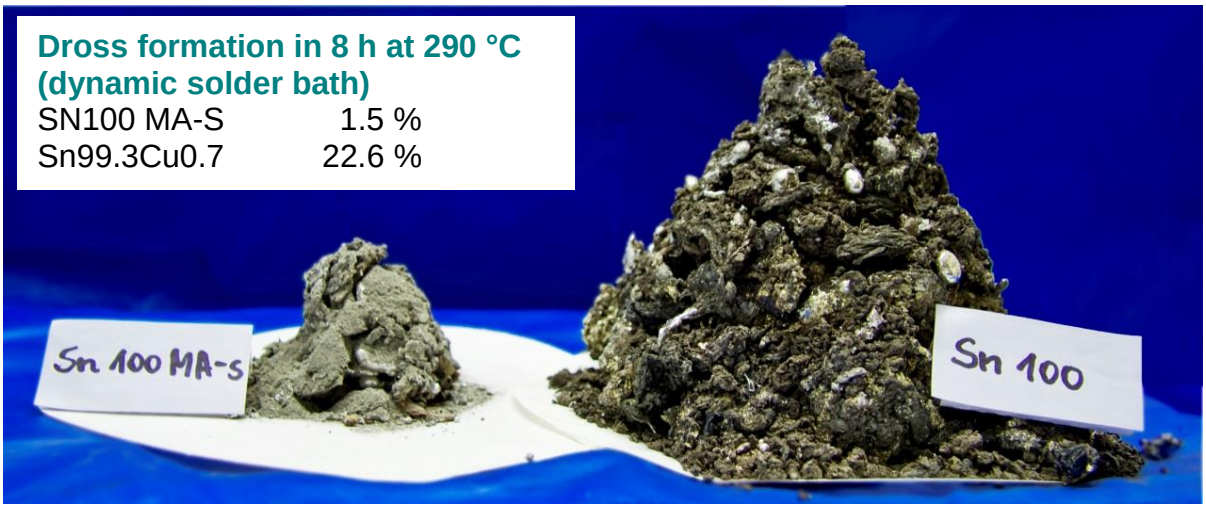
Analysis results of SN100 MA-S dynamic dross test over 8 h at 290 °C

Elementname	Element symbol	Initial state	Conc. after 2 h	Conc. after 4 h	Conc. after 6 h	Conc. after 8 h
Tin	Sn	Rest	Rest	Rest	Rest	Rest
Copper	Cu	0.67	0.69	0.,69	0.69	0.70
Silver	Ag	0.0002	0.0002	0.0002	0.0002	0.0002
Nickel	Ni	0.035	0.035	0.035	0.035	0.035
Germanium	Ge	0.0061	0.0059	0.0058	0.0057	0.0055
Phosphor	P	0.005	0.004	0.004	0.003	0.003
Lead	Pb	0.017	0.017	0.017	0.017	0.017
Antimon	Sb	0.004	0.004	0.004	0.004	0.004
Arsen	As	0.018	0.018	0.018	0.018	0.018
Iron	Fe	<0.001	<0.001	<0.001	<0.001	<0.001
Indium	In	0.003	0.003	0.003	0.003	0.003
Bismut	Bi	0.011	0.011	0.011	0.011	0.011
Cadmium	Cd	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zink	Zn	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Aluminium	Al	0.0001	0.0001	0.0001	0.0001	0.0001
Gold	Au	0.0001	0.0001	0.0001	0.0001	0.0001
Cobalt	Co	<0.001	<0.001	<0.001	<0.001	<0.001

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.

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! 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!



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

Solder bath surface after 8 hours and before dross removal

SN100 MA-S

SnCu0.7

Solder bath surface after 8 hours and after dross removal

SN100 MA-S

SnCu0.7

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

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.

ELSOLD® SN100 MA-S

Good solderability
Fine-grained & shiny solder joint surfaces
Reduced errosion of solder pot & solder tools

Reduced leaching
Lowest dross formation
Best cost effciency

Typical Analysis of SN100 MA-S

Element	Typical analysis amt.	Max. allowable limit DIN EN ISO 9453 [%]
Sn - Tin	Rest	Rest
Cu - Copper	0.70	0.5 – 0.9
Ni - Nickel	0.03	n.a.
Ge - Germanium	0.006	n.a.
P - Phosphor	0.004	n.a.
Ag - Silver	0.02	0.10
Pb - Blei	0.03	0.10
Sb - Antimon	0.003	0.10
Cd - Cadmium	0.0005	0.002
Zn - Zink	0.0005	0.001
Al - Aluminium	0.0005	0.001
Bi - Bismut	0.02	0.10
As - Arsen	0.01	0.03
Fe - Iron	0.002	0.02
Co - Cobalt	0.002	n.a.
Au - Gold	0.001	0.05
In - Indium	0.004	0.10

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