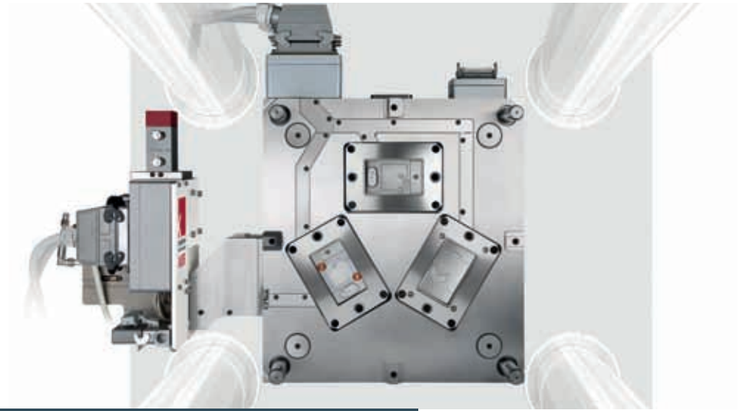
MADE OF SOLDER

MATERIALS FOR AN INNOVATIVE, INTEGRATIVE PROCESS TECHNOLOGY

The IMKS® process, the integrated metal plastic injection molding, mainly developed by Krallmann group, is an innovative solution of modern production technology. Process chains are shortened, production becomes faster and more economic, new scopes of design and technical solutions are possible.



tool with IMKS injection molding unit

Metallic structures, as conductive paths, are integrated in plastic parts and electronic components as resistors or LED are connected, directly within the primary shaping process and within one single machine. Cables, pcbs, pressed screens and their production, placement and connection processes are not necessary anymore, if the electrical function is directly integrated. Furthermore, their needed space and the resulting limitations of design are omitted.

application - demonstration of direct integration of conductive paths and electronic components in plastic parts

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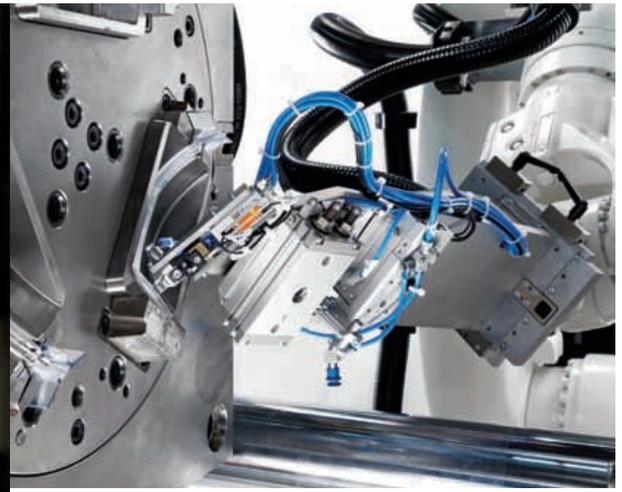

ELSOLD® INJECTIN FOR IMKS® INJECTION MOLDING

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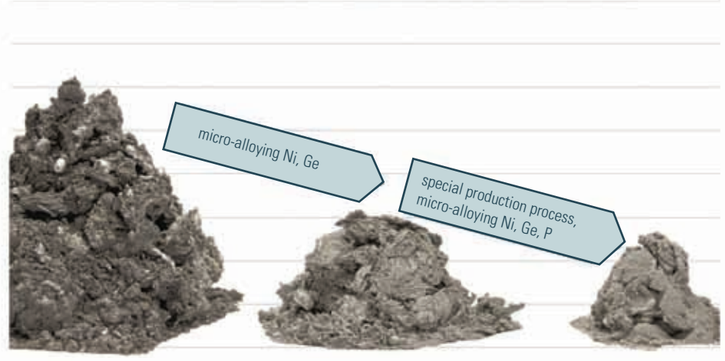
MICRO- ALLOYING - A RELIABLE SOLUTION

For the IMKS® process solder alloys as Sn99.3Cu0.7 and Sn96.5Ag3.0Cu0.5 are most suitable for the metal component, which is injected on the plastic component: A well-fitting melting temperature, highest conductivity and a reliability, which is proofed by decades in joining technology. For perfect results, concerning product and process, **ELSOLD®** optimized these soldering materials and developed the new InjecTin alloys. Especially micro-alloying elements offer reliable solutions for challenges of IMKS® process.

Possible effects like iron leaching causing erosion of melting pot and machine components are significantly reduced by Nickel. Oxidation of solder alloy, dross formation and consequently material loss and process problems, are reduced by one to two magnitudes by the use of Germanium and Phosphor, forming a nano protection layer, and a special production process of **ELSOLD®** alloys.

REDUCTION OF DROSS FORMATION



Comparison of dross formation of Sn99.3Cu0.7, with and without micro-alloying with Ni and Ge, and **ELSOLD®** InjecTin alloys.

ELSOLD® INJECTIN ALLOYS FOR IMKS INJECTION® MOLDING

- Micro-alloyed with Ni, Ge & P
- Special production process for best properties
- Best uidity
- Lowest oxidation and dross formation
- Fine microstructure - improved mechanical properties and smooth surfaces
- Longer lifetime of crucible and machine components

ALLOY	MELTING TEMPERATURE(°C)	ADVANTAGE
InjecTin Sn99.3Cu0.7	227	Highest cost-eectiveness
InjecTin Sn96.5Ag3.0Cu0.5	217-219	Highest reliability

DELIVERY FORMS	DIMENSIONS	WEIGHT
Bars	25 x 12 x 400 mm	0,8 kg
Triangular bars	8/10 x 400 mm	0,2 kg
Wire / Spool	Ø: 1,5 mm l 3,0 mm l 4,0 mm	1 kg l 4 kg l 10 kg

Krallmann GRUPPE

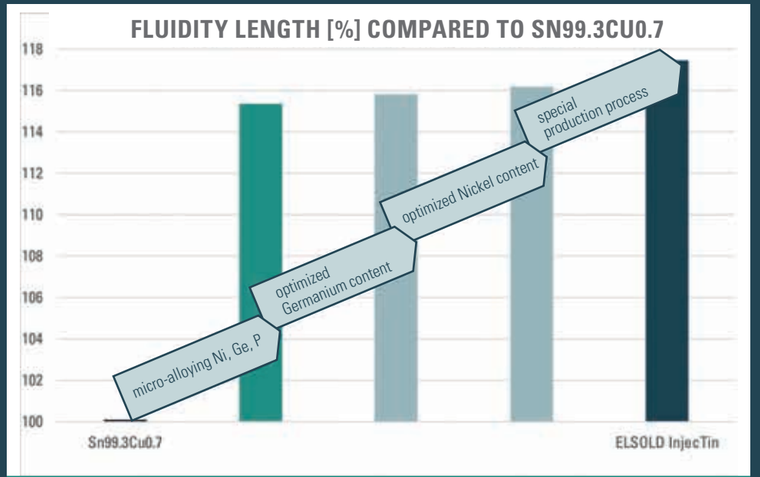
In cooperation with Krallmann group.

ELSOLD® INJECTIN

OPTIMIZATION OF FLUIDITY OF SOLDER ALLOY

Fluidity is a fundamental material property for injection molding. Also this property is optimized by alloy and process development of **ELSOLD®** InjecTin. Fluidity, characterized by fluidity length, is significantly improved by special **ELSOLD®** production process and use of micro-alloying elements, especially by a content of Nickel and Germanium optimized for IMKS® process, in comparison to standard soldering alloy Sn99.3Cu0.7.

To sum up, **ELSOLD®** InjecTin is the material, which fulfills all requirements of innovative IMKS® process: Lowest dross formation, longest lifetime of machines by non-aggressive metal and highest fluidity for best injection results.



Signicantly improved uidity of **ELSOLD®** InjecTin alloys for IMKS® process by micro-alloying and special production process