



# SOFT SOLDER MATERIALS/PREFORMS



**PFARR**

WIR BRINGEN LÖTE IN FORM  
GETTING SOLDER INTO SHAPE





## » SOFT SOLDER MATERIALS/PREFORMS

Today's high tech applications, manufactured and assembled by our customers, require customised, engineered materials; components which have to meet the highest levels of quality and purity. They must guarantee functions and characteristics, even under extreme conditions.

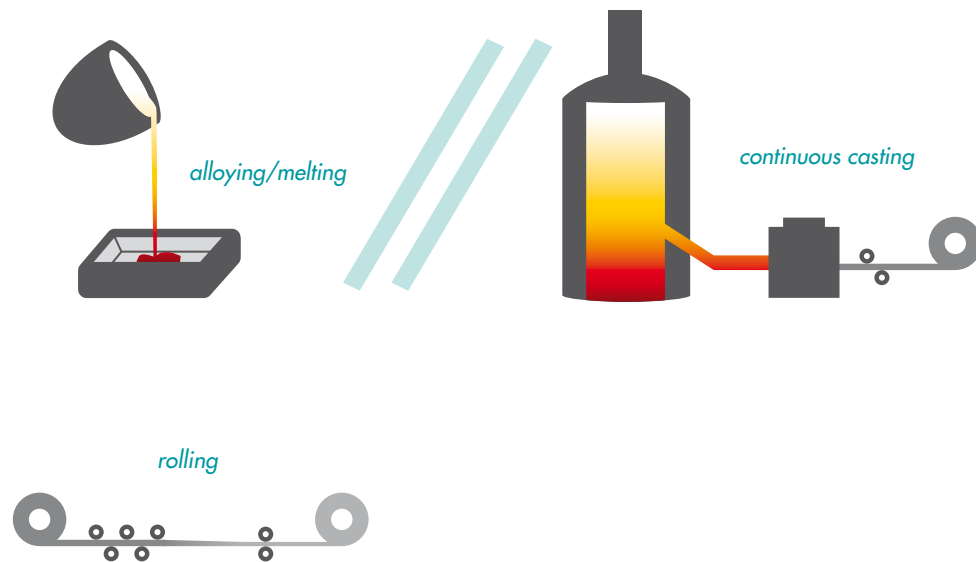
## MANUFACTURED FROM HIGH PURITY RAW METALS

To achieve 100 % performance, the specifications for materials used in joining parts have to be considered from the very beginning of the production process. Semi-fabricated materials, ribbons, preforms and wires manufactured by PFARR as desoxygenated soft solder materials.

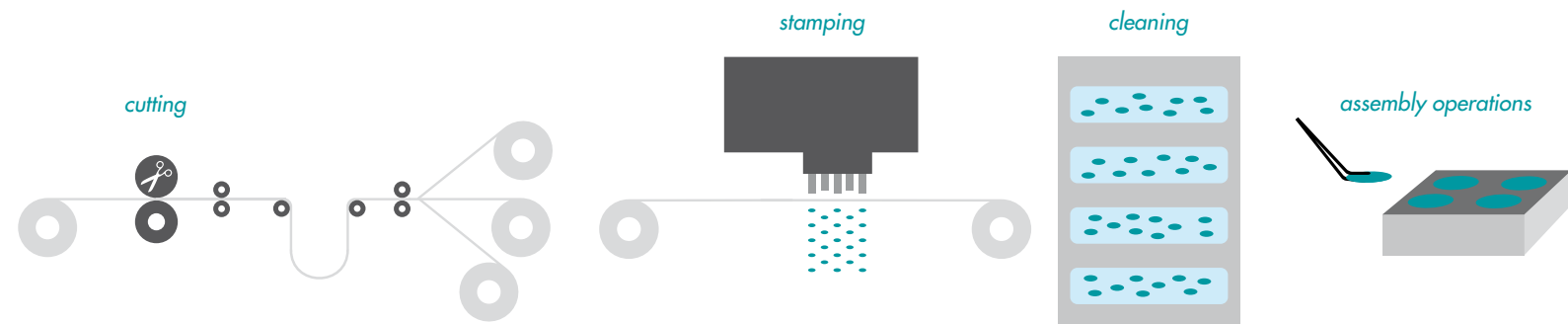
## PROVIDE FUNCTION AND PERFORMANCE



# » MANUFACTURING PROCESSES



THE BENEFITS ARE YOURS!

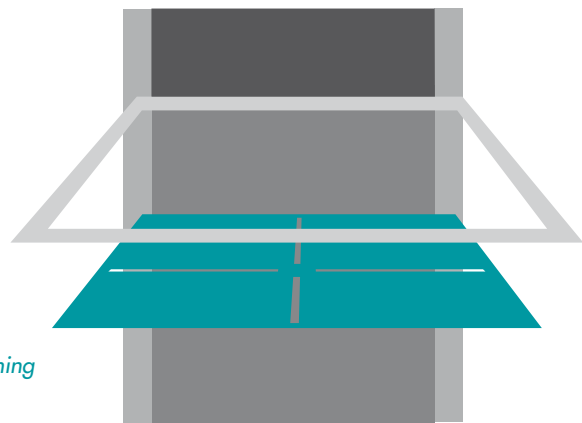
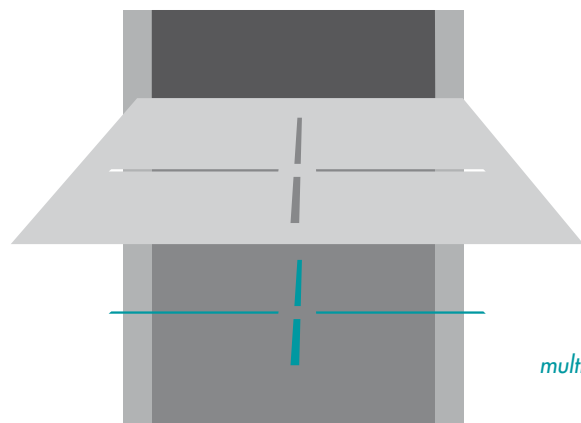


VARIETY

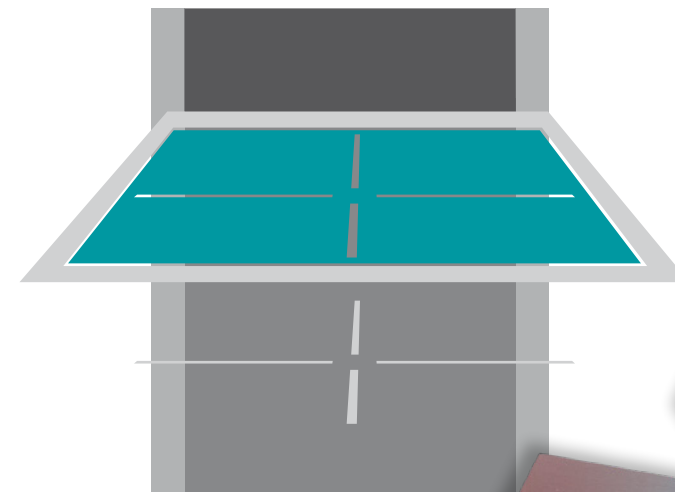
There are two different methodes: One-step punching and Multi-step punching. Both technologies can be used.

Advantages and disadvantages have to be analysed before the tooling technology used can be decided.

## » ADVICE PROVIDED BY THE EXPERTISE OF PFARR



*multi-step-punching*



*one-step-punching*





## LIST OF ALLOYS

Lead-free soft solders

alloy composition	melting range [°C]	density [g/m³]
In Sn(48)	118	7.30
Bi Sn(42)	139	8.58
In Ag(3)	143	7.377
In 99.99%	157	7.31
Landal-Seal®	217	7.41
Sn Ag(3.8) Cu(0.7)	217	7.414
Sn Ag(3) Cu(0.5)	217 – 220	7.40
Sn Ag(3.5)	221	7.43
Sn Cu(3) In(1) Ag(0,1)	224	7.32
Sn Ag(25) Sb(10)	227 – 297	7.90
Sn 99.99 %	232	7.28
Sn Sb(1)	233 – 235	7.274
Sn Sb(5)	235 – 240	7.25
Sn Sb(8)	246 – 252	7.28
Sn Sb(10)	246 – 252	7.216
Au Sn(20)	280	14.518

Lead-containing soft solders

alloy composition	melting range [°C]	density [g/m³]
Sn Pb(36) Ag(2)	179	8.41
Sn Pb(37)	183	8.40
Pb Sn(5) Ag(1.5)	297 – 302	11.04
Pb Sn(5) Ag(2.5)	299 – 303	11.02
Pb Ag(2.5) Sn(2)	299 – 304	11.196
Pb Sn(5)	308 – 312	11.06

## COMPOSITION TOLERANCES

Lead-free soft solders

alloy	tolerances				
	Sn	Ag	Cu	In	Sb
In Sn(48)	± 0.5 %			± 0.5 %	
In Ag(3)		± 0.5 %		± 0.5 %	
Sn Ag(3.8) Cu(0.7)	± 0.7 %	± 0.5 %	± 0.2 %		
Sn Ag(3) Cu(0.5)	± 0.75 %	± 0.5 %	± 0.25 %		
Sn Ag(3.5)	± 0.5 %	± 0.5 %			
Sn Cu(3) In(1)	± 0.8 %		± 0.5 %	± 0.3 %	
Sn Ag(25) Sb(10)	± 0.5 %	± 0.5 %			± 0.5 %
Sn Sb(1)	± 0.2 %				± 0.2 %
Sn Sb(5)	± 0.2 %				± 0.2 %
Sn Sb(8)	± 0.5 %				± 0.5 %
Sn Sb(10)	± 0.5 %				± 0.5 %

Lead-containing soft solders

alloy	tolerances		
	Sn	Pb	Ag
Sn Pb(36) Ag(2)	± 1.0 %	± 0.5 %	± 0.5 %
Sn Pb(37)	± 0.5 %	± 0.5 %	
Pb Sn(5) Ag(1.5)	± 0.5 %	± 0.8 %	± 0.3 %
Pb Sn(5) Ag(2.5)	± 0.5 %	± 1.0 %	± 0.5 %
Pb Ag(2.5) Sn(2)	± 0.5 %	± 1.0 %	± 0.5 %
Pb Sn(5)	± 0.5 %	± 0.5 %	



## PRECISION

## PROCESS CAPABILITY

ribbons/foils				
	min		max	
	mm	inch	mm	inch
thickness	0.04	0.00157	5.0	0.19685
width	0.8	0.03150	120.0	4.72441

squares/rectangles				
	min		max	
	mm	inch	mm	inch
length	0.7	0.02756	120.0	4.72441

discs				
	min		max	
	mm	inch	mm	inch
diameter	0.4	0.01575	120.0	4.72441

washers				
inner diameter		outer diameter		
mm	inch	mm	inch	
≥ 0.45	≥ 0.01772	1.4 – 120.0	0.05512 – 4.72441	

All indicated values are dependent on the specific material properties.  
Technical material support is available on request.

## ALLOY PURITY

minimum raw material purity	≥ 99.99 % (4N)
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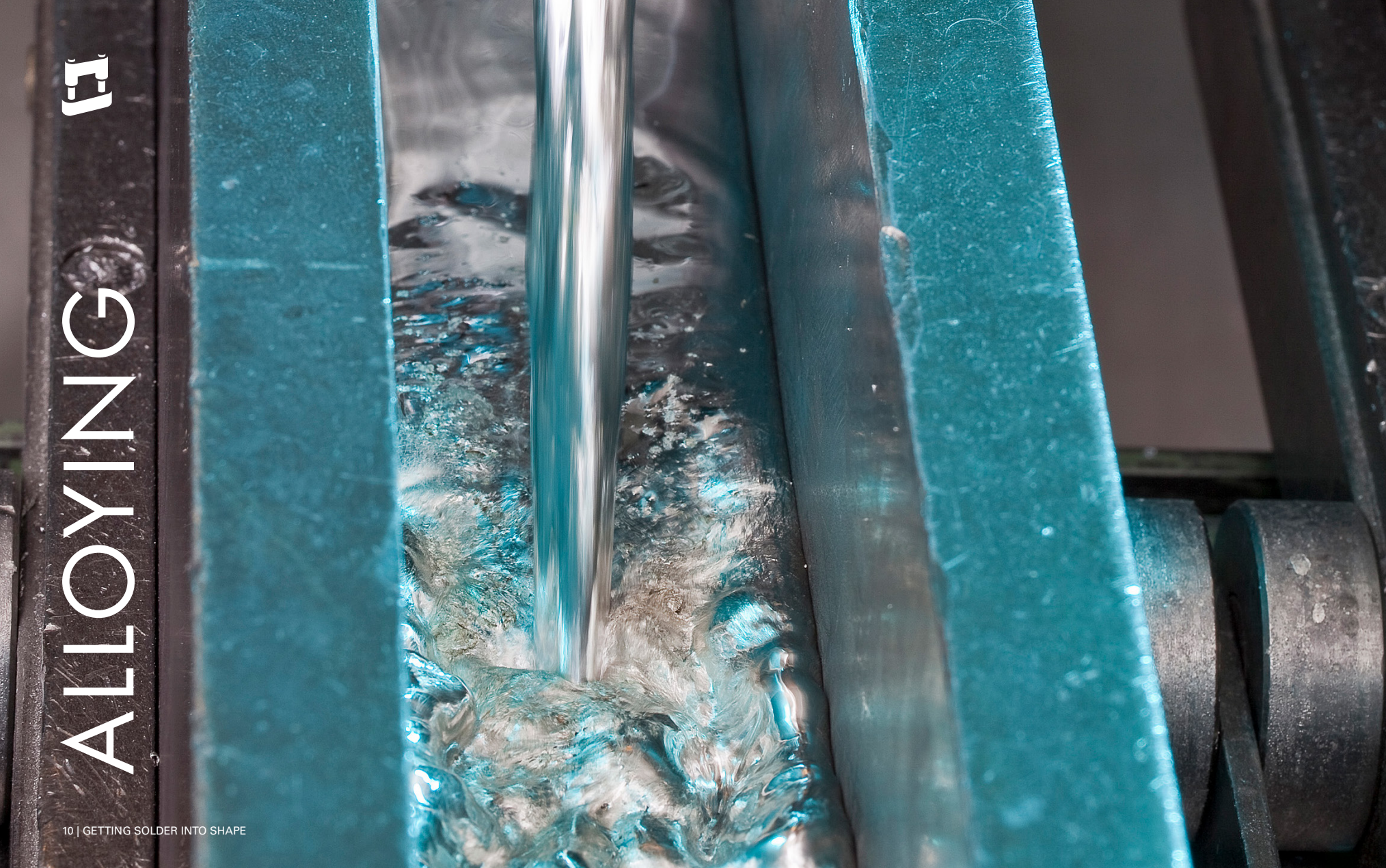
## FLEXIBILITY



# PRODUCTS







## » SOLDERING – ONE OF THE OLDEST JOINING TECHNOLOGIES IN HUMAN HISTORY

Soldering is an ancient technology dating back to at least 5000 BCE; and probably much earlier. The metals then known, like Gold, Silver and Copper, were used to create cult and religious artefacts, with solder widely used as a joining material. In so-called reactive or diffusion soldering, Copper salts are reduced in

the CO atmosphere of a wood-burning oven. There the Copper content reacts with Gold and Silver to form an alloy capable of being soldered. The resulting eutectic solder has a lower melting point than the pure metals Gold, Silver or Copper.





MOSFET'S  
BIPOLAR TRANSISTORS  
(GTOS AND THYRISTORS)

IGBT



DIODE

# FINAL APPLICATIONS

## » DECENTRALISED POWER GENERATION

- windmills
- solar parks

## » ENERGY TRANSMISSION

- power generation
- power distribution

## » MOTION APPLICATIONS

- industrial machines
- hybrid cars
- E-vehicles
- E-trains

## » AND MUCH MORE





# TECHNICAL SUPPORT



## » OPTIMUM CONTACT: THE BASIS FOR THE HIGHEST QUALITY



In co-operation with your engineers, PFARR provides its know-how and state-of-the-art equipment to analyse and optimise materials and processes.

With signed agreements in place between PFARR and its partners, third parties such as technical institutes and laboratories can be involved as and when necessary.

YOU CAN PROFIT FROM THIS!





## » CUSTOMER SERVICE ANNOUNCEMENT TYPES OF PACKAGING



PFARR Solder Preforms are available in any types of packaging still obtainable on the market. Such as in cans, bags, bottles and on reel.

Recommendation:  
to reduce long exposure to air hence oxidation problems, Solder Preforms should generally be packed in batches corresponding to a daily consumption.

Shelf life:  
stored properly, unopened parts have a PFARR guaranteed shelf-life of twelve months from the date of manufacture, (Refer to General Conditions of Sale at [www.pfarr.de](http://www.pfarr.de) )

PACKAGING METHODES				
Type	Preforms Flatness	Handling	Costs	Benefit
Bulk material	●	Manual Semi-automatic	Friendly	Costs saving, for no ambitious requirements
Stacked pack	● ●	Manual Semi-automatic	Effective	Excellent costs-benefit ratio for high preforms requirements
Waffle pack	● ● ●	Semi-automatic	Very Intense	Optimal solution for very high preforms requirements
Tape and Reel	● ●	Fully-automatic	Intense	Most suitable packaging for fully-automatic assembly lines



# OUR VISION AND MISSION

As a global player and competent partner, PFARR manufactures and supplies technical materials to assemble your discrete electronic, power electronic modules as also optoelectronic devices.

We provide technical support to optimize materials as also existing processes.

In Co-operation with your development- and engineering teams PFARR also offers the development of new solder materials.

YOU CAN COUNT ON US!

» ENGINEERED MATERIALS BY  
PFARR IN YOUR APPLICATION  
FOR HIGH PERFORMANCE







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