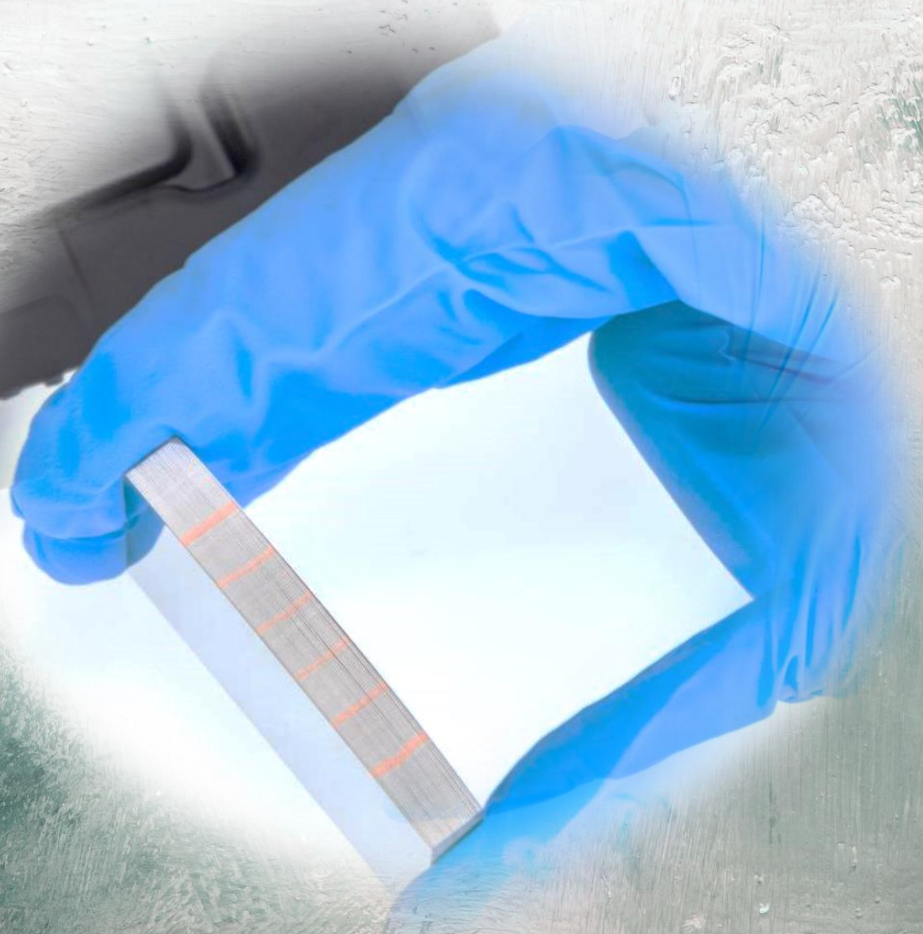


# WireGuard®

**Preforms with integrated spacers  
...for the most effective bondline-control  
and beyond...**



**PFARR**

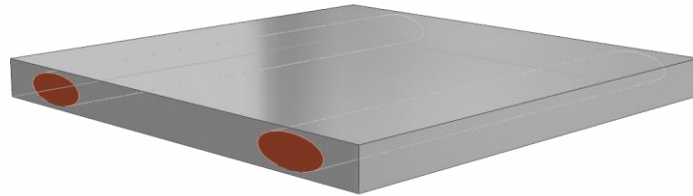
WIR BRINGEN LÖT- IN FORM  
GETTING SOLDER INTO SHAPE



# Concept

in preforms **fully integrated wires** of high melting alloy set into the solder preforms control bondline during soldering as they do not change their state of matter

Layout of WireGuard® - Preforms



## Solder...

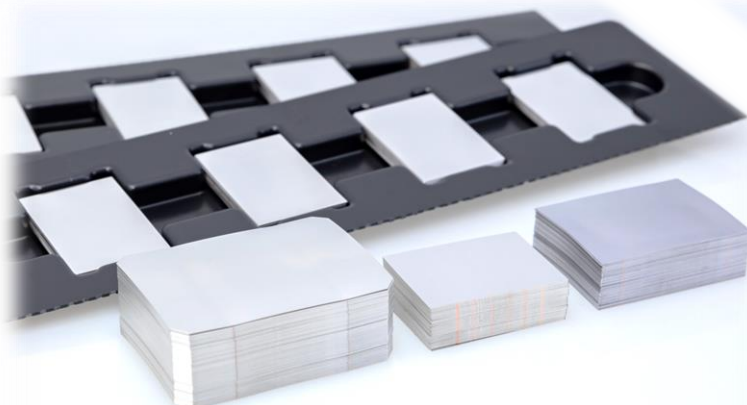
- due to the fully embedded wires, wetting characteristics correspond to those of conventional preforms
- no increased voiding characteristics compared to monolithic solder preforms, due to easy- to- degase layout
- wide range of common solder materials such as Sn or Pb based solders possible

## Wires...

- fully integrated into the solder matrix
- made of metals with a higher melting point than the solder matrix material
- providing bondline control
- reinforcing the solder matrix

# Features

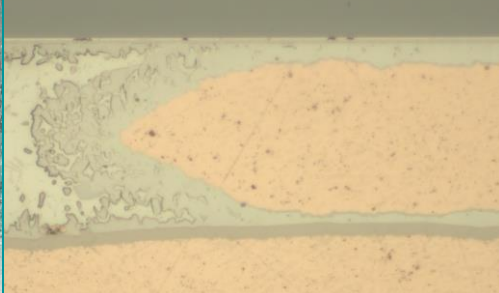
- **95% of initial preform thickness can be controlled through the spacer wires**
- **wide range of lead free and lead containing solder alloys possible**
- as preforms or as ribbon
- **up to 8 wires in one preform**
- for die attach or system soldering (Preform height from 50 µm to 350 µm possible)
- **Possibility of tailoring layout to customers demands**



# Benefits

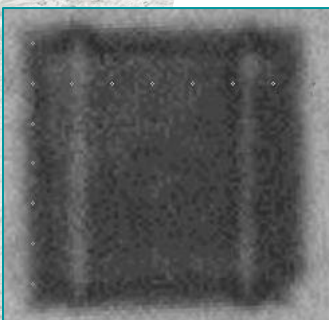
- Most even bondline in soldering
- Wetting and voiding characteristics corresponding with those of monolithic solder preforms
- complex geometrical designs for solder joints are stabilized by non-uniform wire inlays
- local diffusion soldered wire-component-segment provide stability in step soldering and reinforce the joint
- enhanced thermal conductivity

Polished cross section



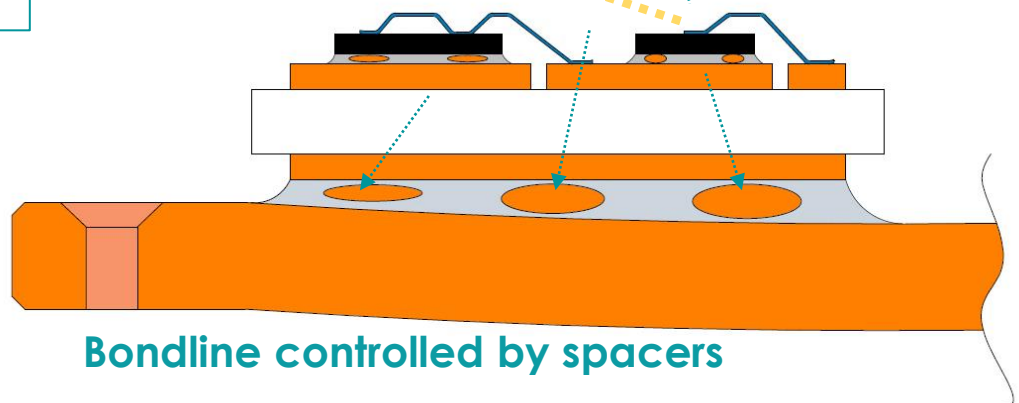
Local diffusion soldering (TLPS)!

C-SAM



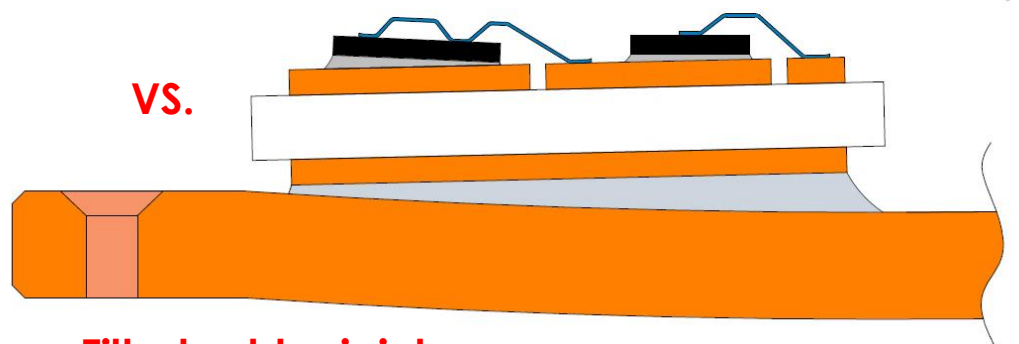
Best in class wetting and minimum voiding characteristics

Non-uniform wire inlays for complex shapes!



Bondline controlled by spacers

VS.



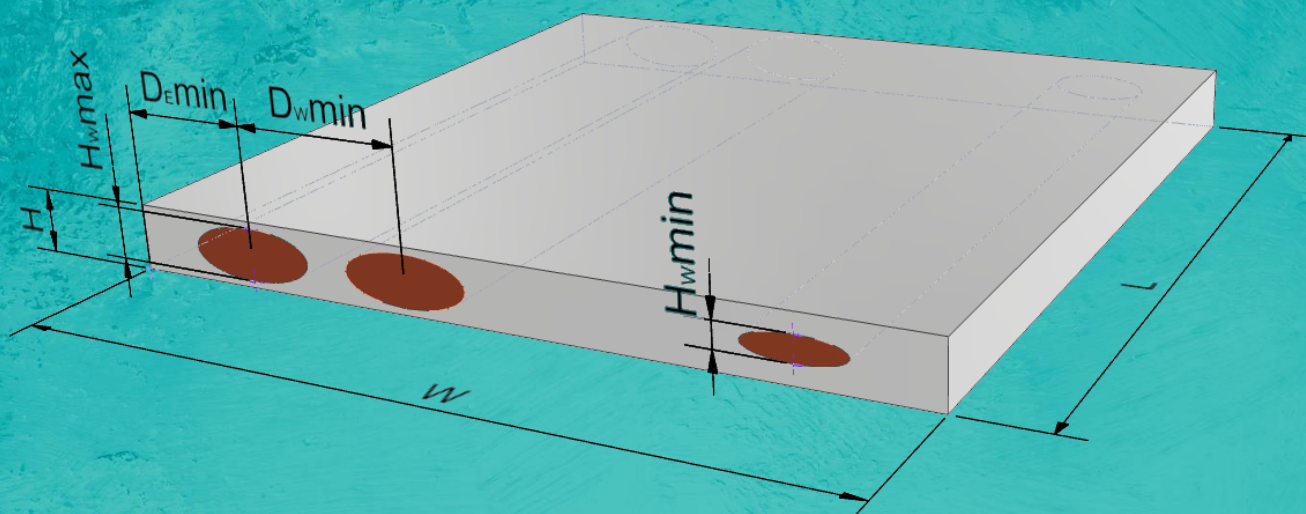
Tilted solder joints – no spacers





# Preform dimensioning

As of February 2023



Tab.: Guidance on possible WireGuard®-Preform dimensions

Abbreviation	Description	Dimensions
H	Preform height	0.050 mm ... 0.350 mm (material dependency)
W	Preform width	7 mm ... 60 mm
L	Preform length	2 mm ... 60 mm
$H_{wmax}$	Maximum height wire	Up to 95% of preform height (material dependency)
$H_{wmin}$	Minimum height wire	50% of preform height (material dependency)
$D_{Emin}$	Minimum clearance wire to preform-edge	~ 1 mm
$D_{wmin}$	Minimum clearance between wire-inlays	~ 4.5 mm

