

# REDCUBE PRESS-FIT, THR, SMD, PLUG

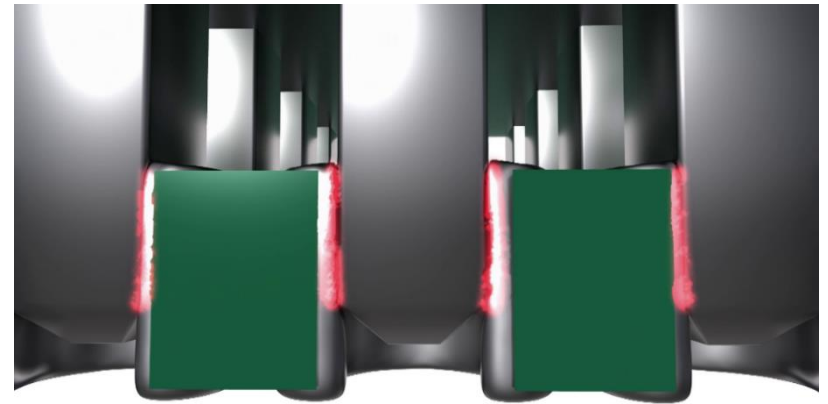
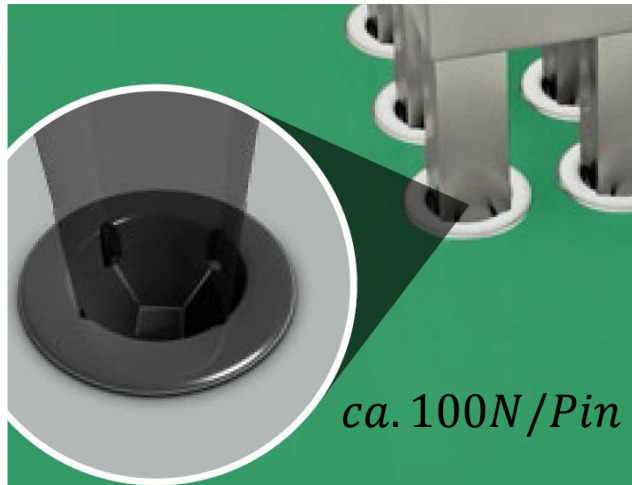


**4power!**

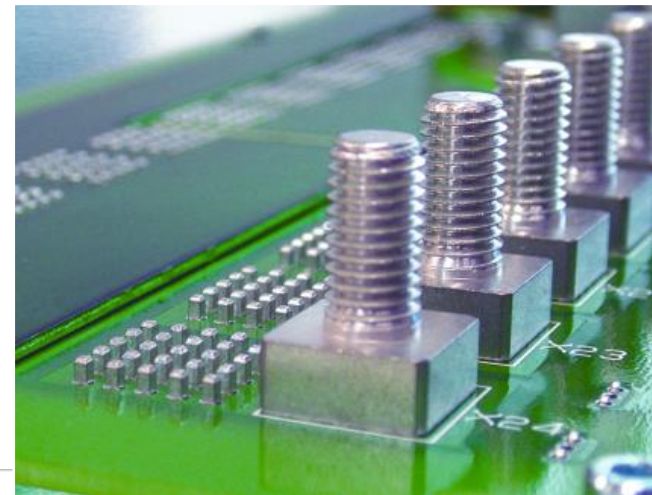
#redCUBE

*WE speed up  
the future*

## Wie funktioniert eigentlich Einpresstechnik?

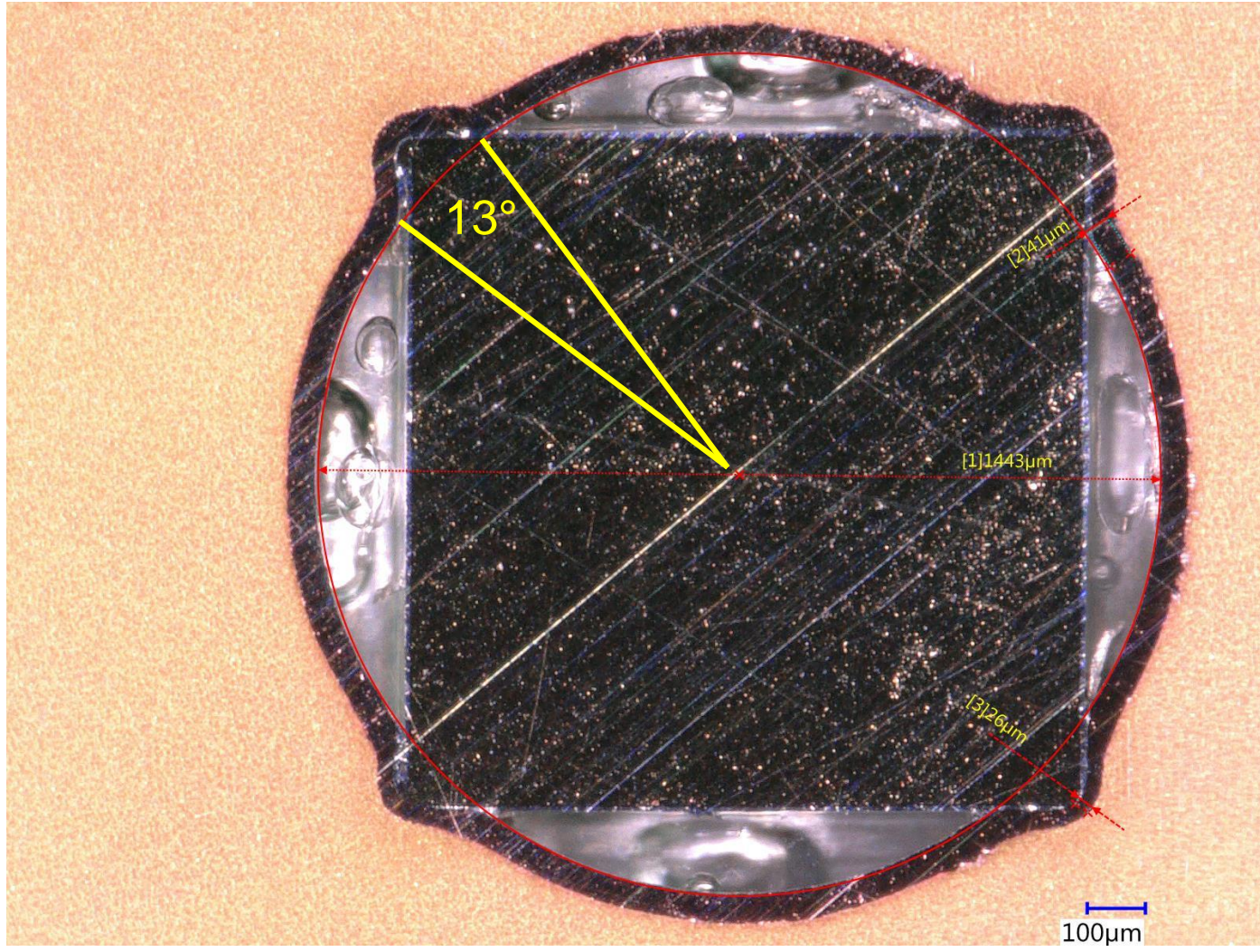


- lötfreie,
- gasdichte,
- leistungsfähige elektrische Verbindung





# Durchschnittlicher Anbindungswinkel 10-15°



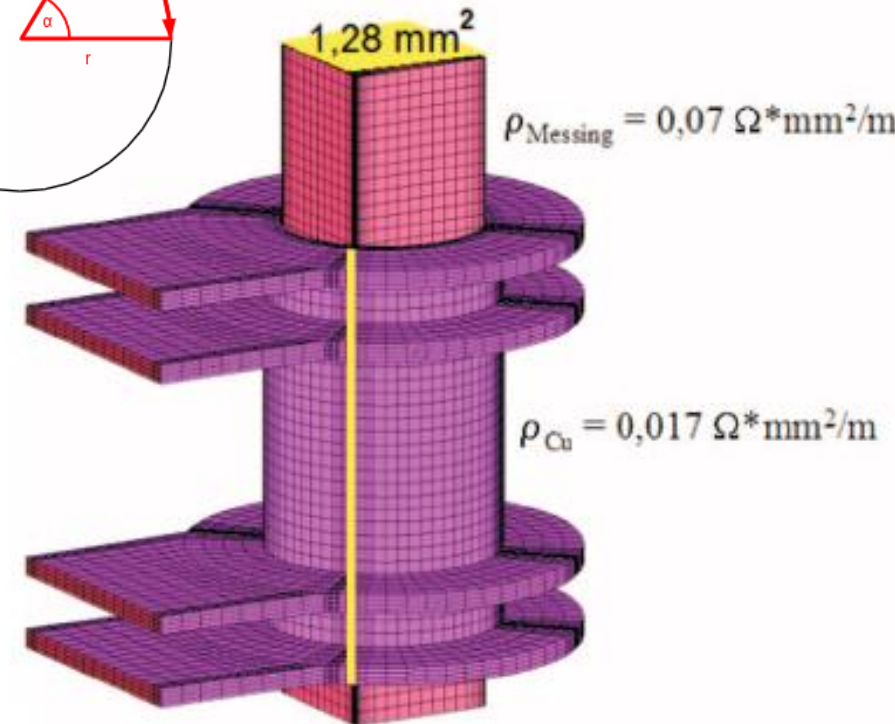
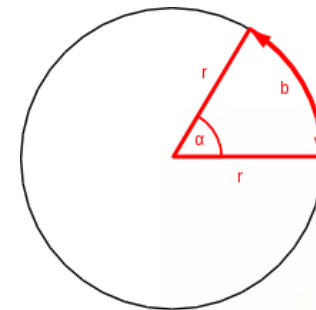
## Kontaktfläche einer massiven Einpresszone

$$A_{Gesamt} = 4 \cdot (l \cdot d \cdot \pi \cdot \frac{\alpha}{360^\circ})$$

$$A_K = 2,0\text{mm} \cdot 1,475\text{mm} \cdot \pi \cdot \frac{13^\circ}{360^\circ} = 0,34\text{mm}^2$$

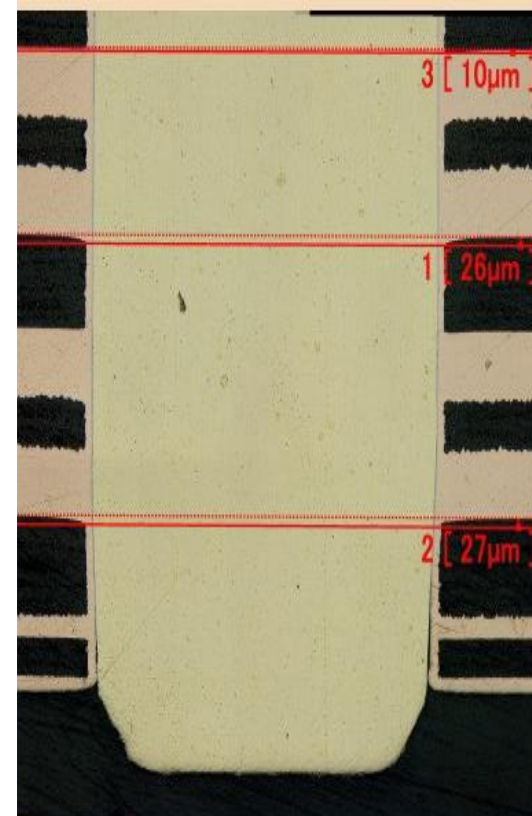
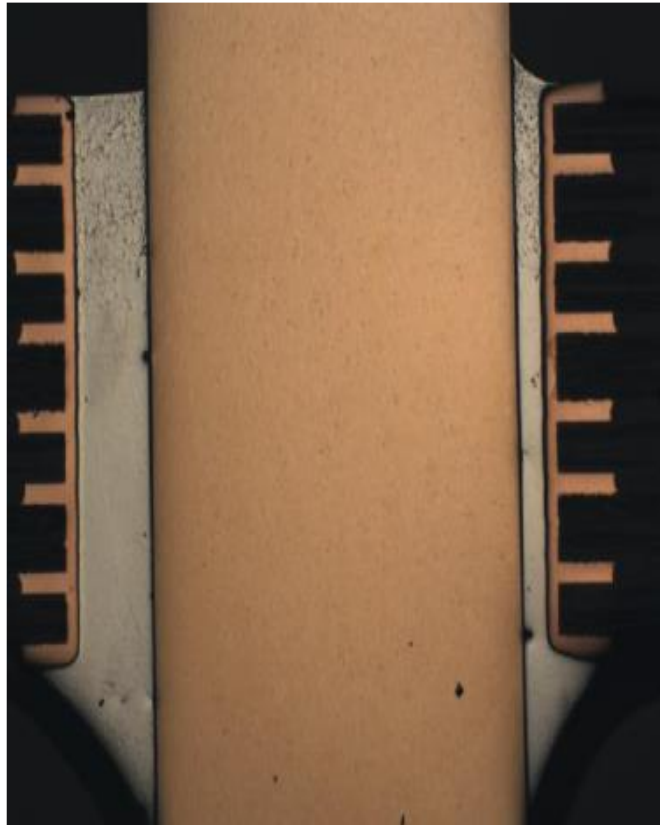
$$A_{Gesamt} = 4 \cdot 0,34\text{mm}^2 = 1,36\text{mm}^2$$

$$1,28\text{mm}^2 < 1,36\text{mm}^2$$

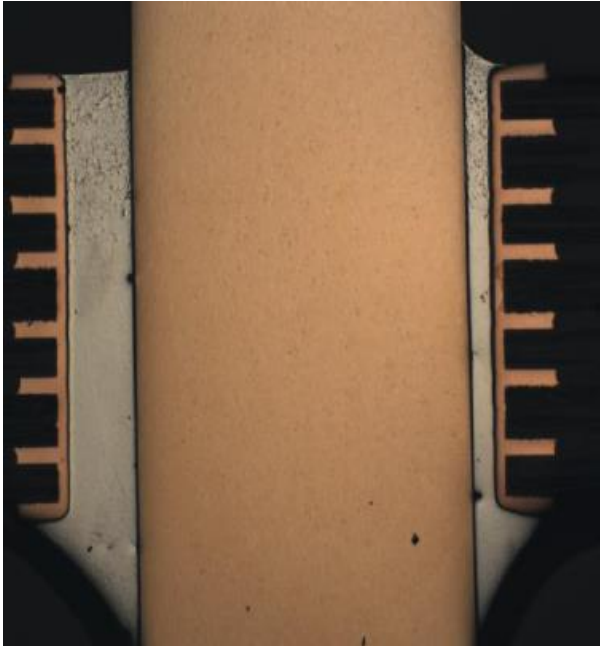


Kontaktfläche an die Durchkontaktierung > Querschnitt des Pins

# Zuverlässigkeit der Einpresszone

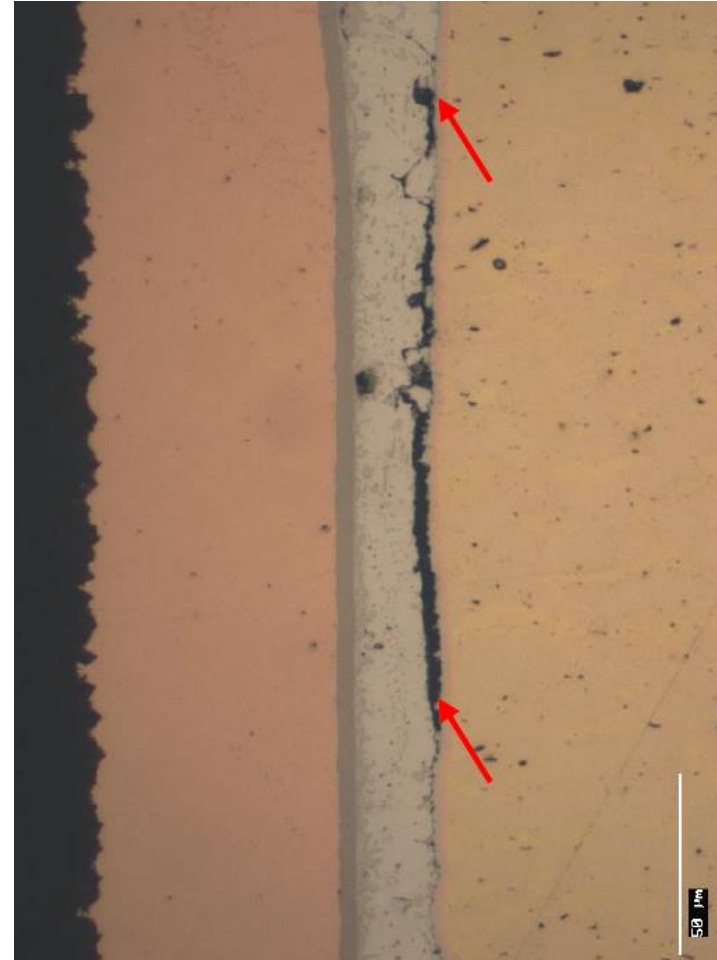


## Problem einer kalten Lötstelle...

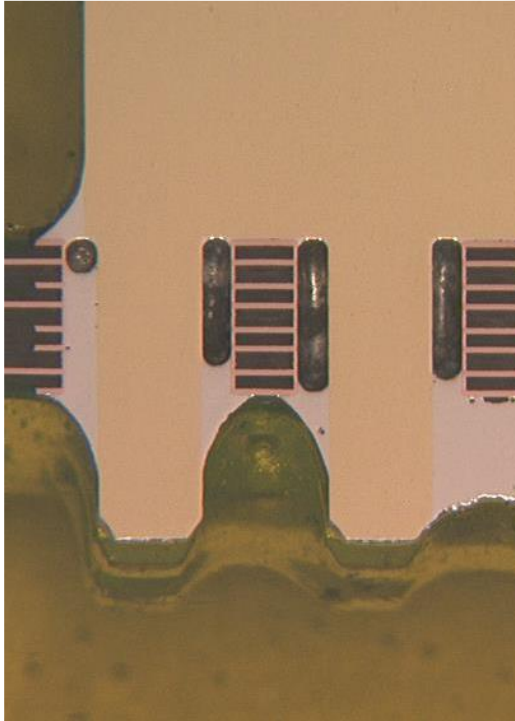


Ausdehnungskoeffizient:

- **Kupfer:**  $16.5 \times 10^{-6}/K$
- **Messing:**  $18.4 \times 10^{-6}/K$
- **Zinn:**  $26.7 \times 10^{-6}/K$

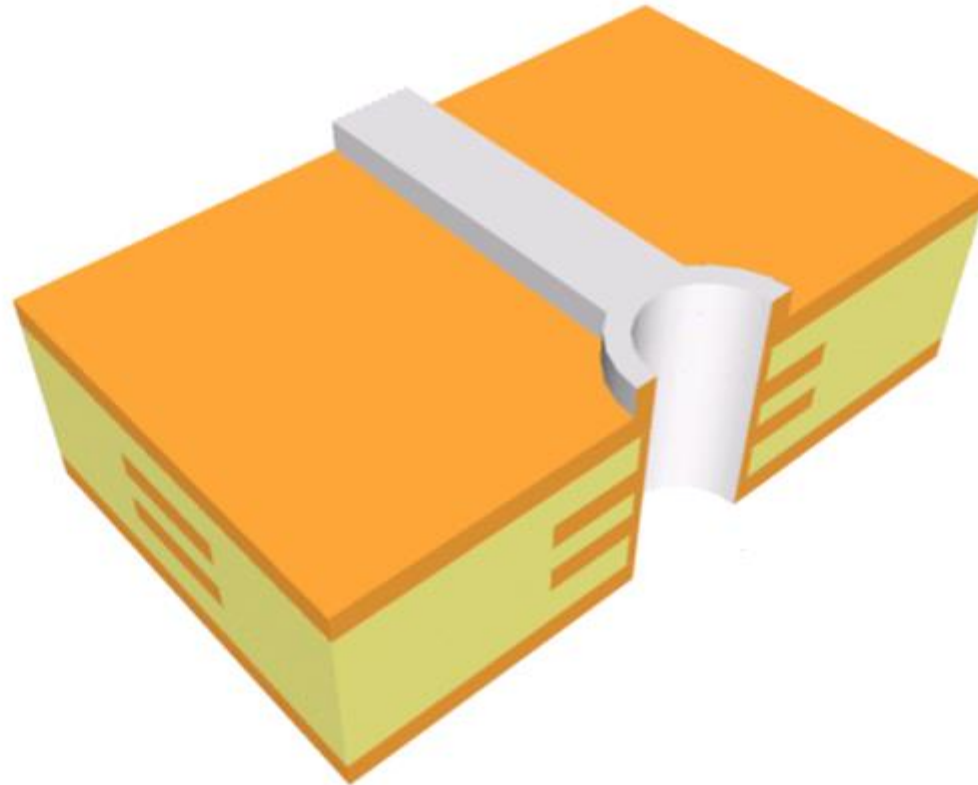


# Fehlerbild einer kalten Lötstelle





## Anforderungen an die Leiterplatte

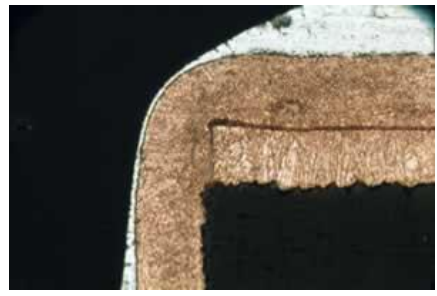
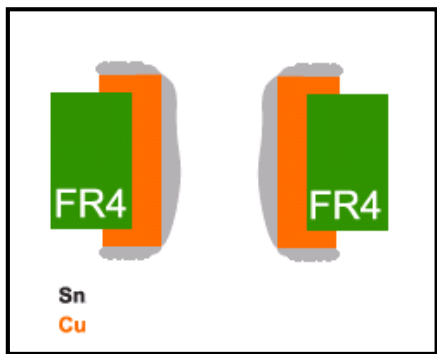
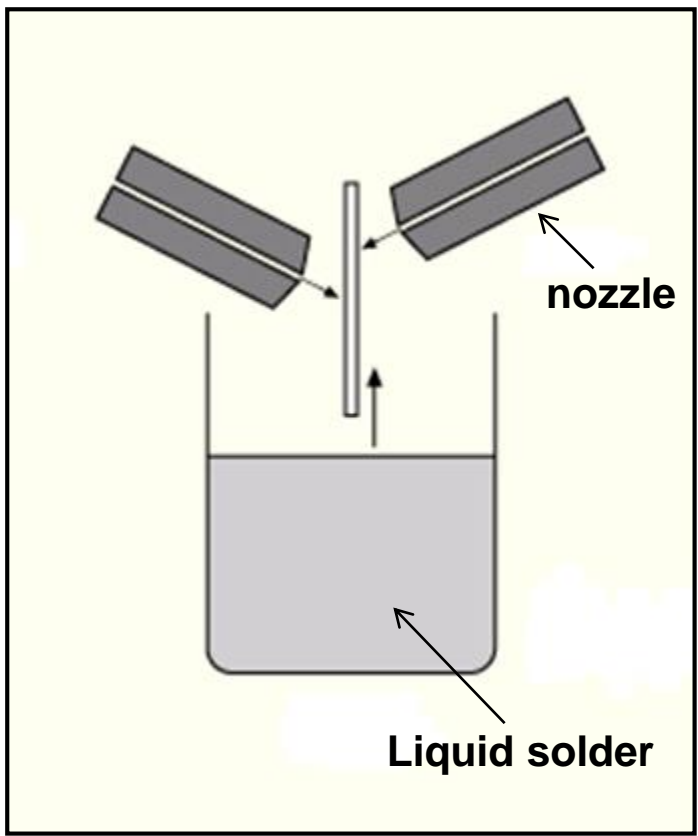
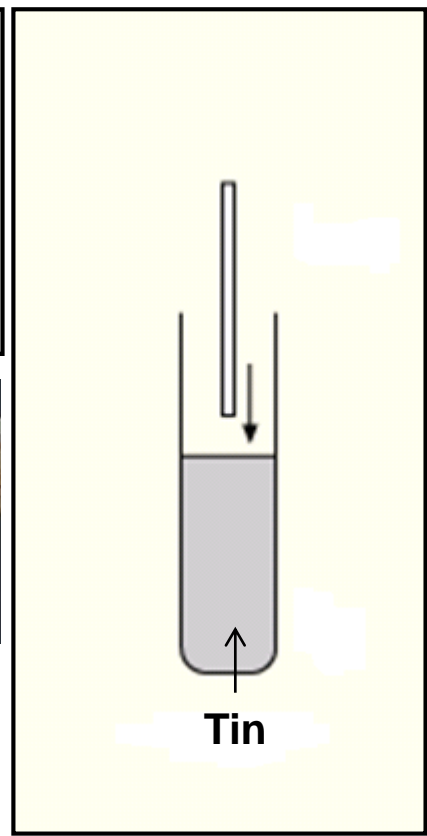
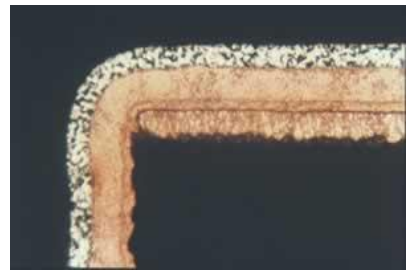
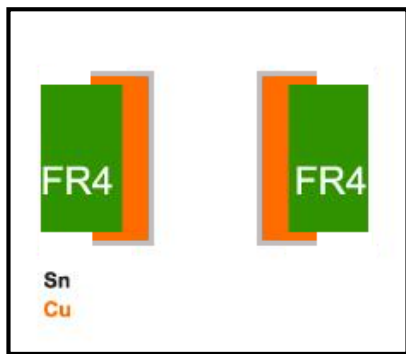


- Bohrtiefe (Pore Depth) 30-40µm
- max. 15µm Zinn(Sn), optimal 2µm

# Oberfläche der Leiterplatte

## Chemical tin plating(Sn)

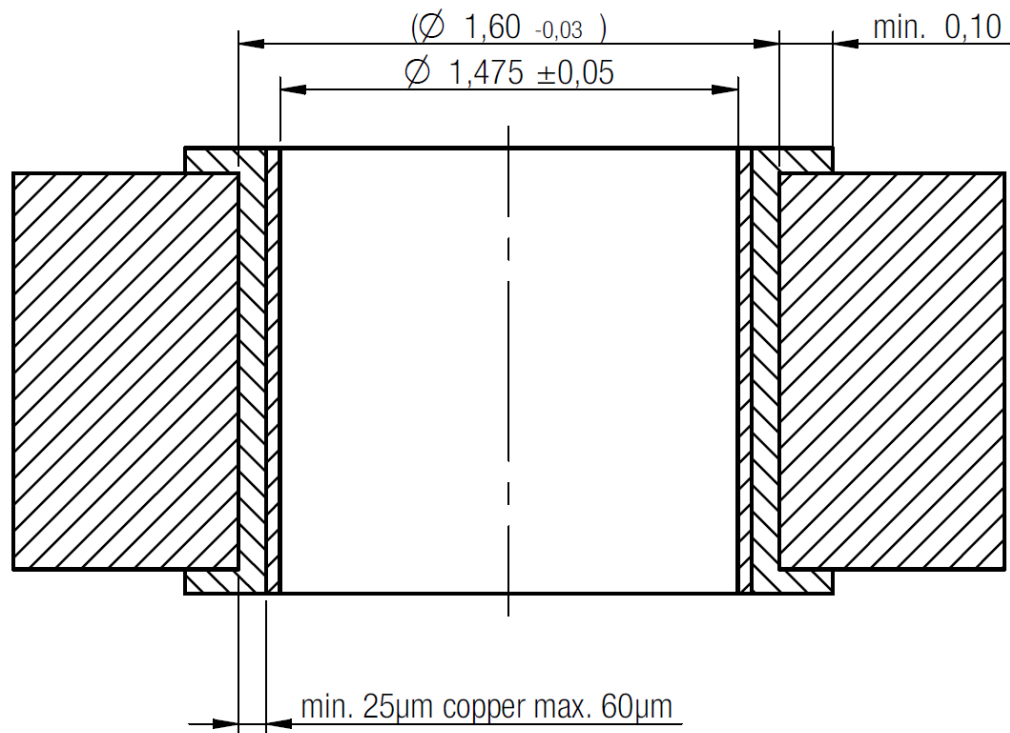
## Hot-Air-Levelling (HAL)



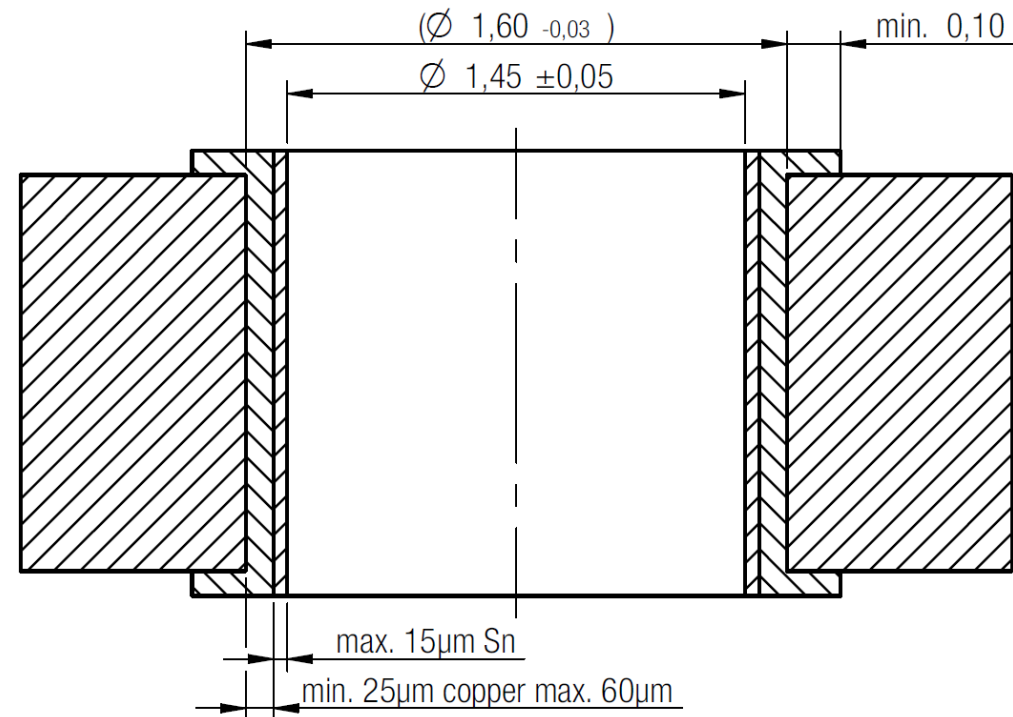
# Leiterplattenspezifikationen

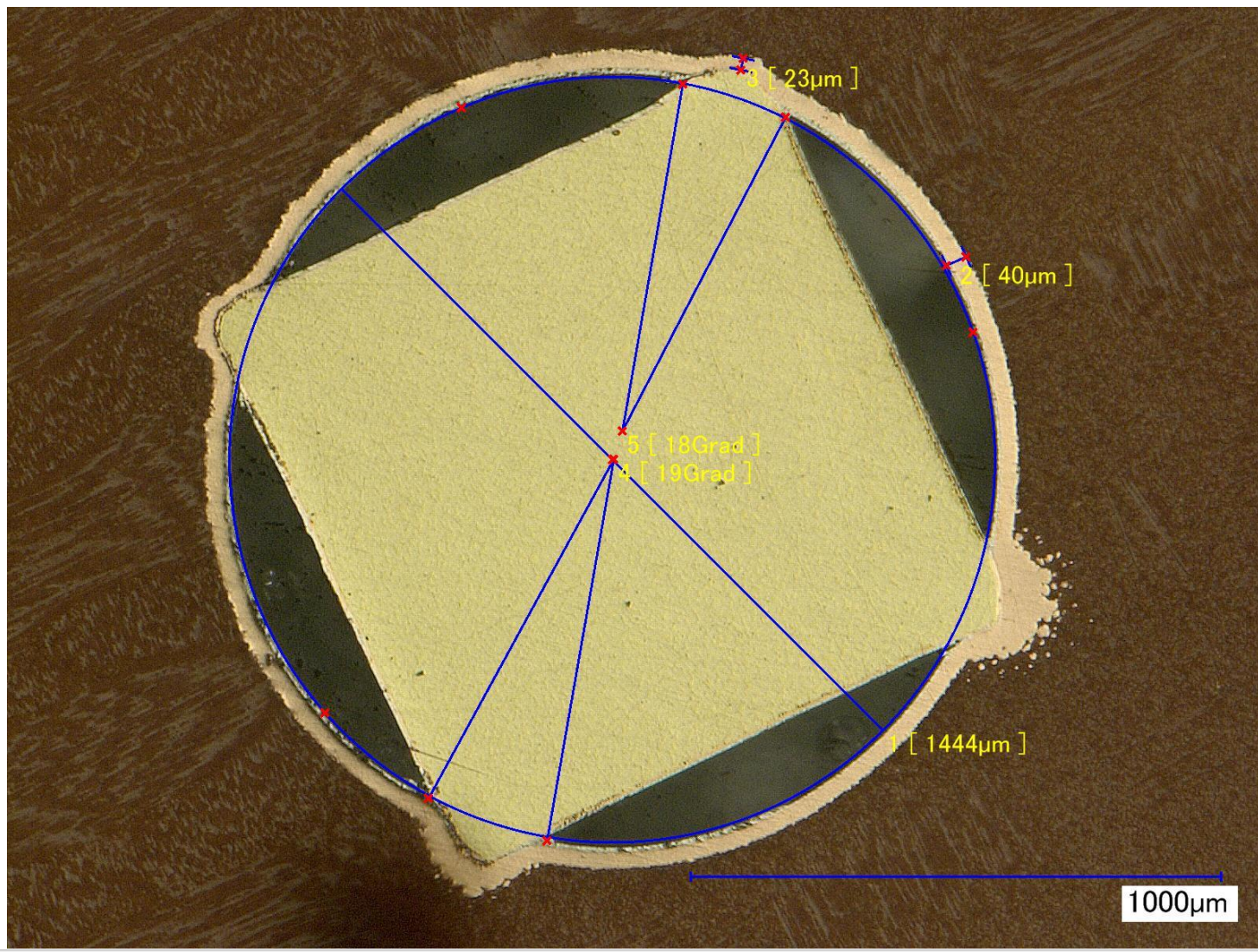


## Chemische Oberflächen (Sn, NiAu)

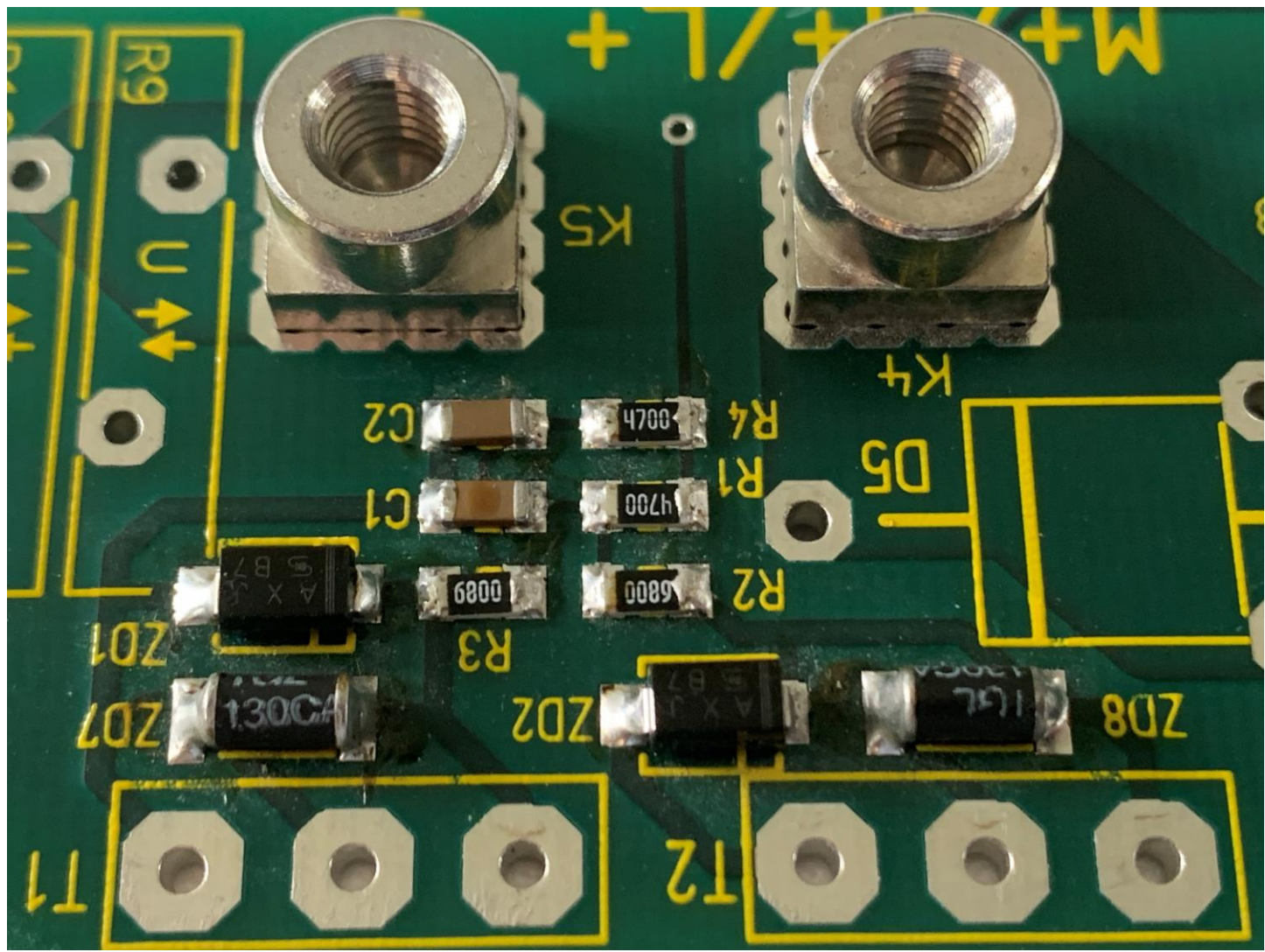


## HAL





# Was muss ich beim Layout beachten?

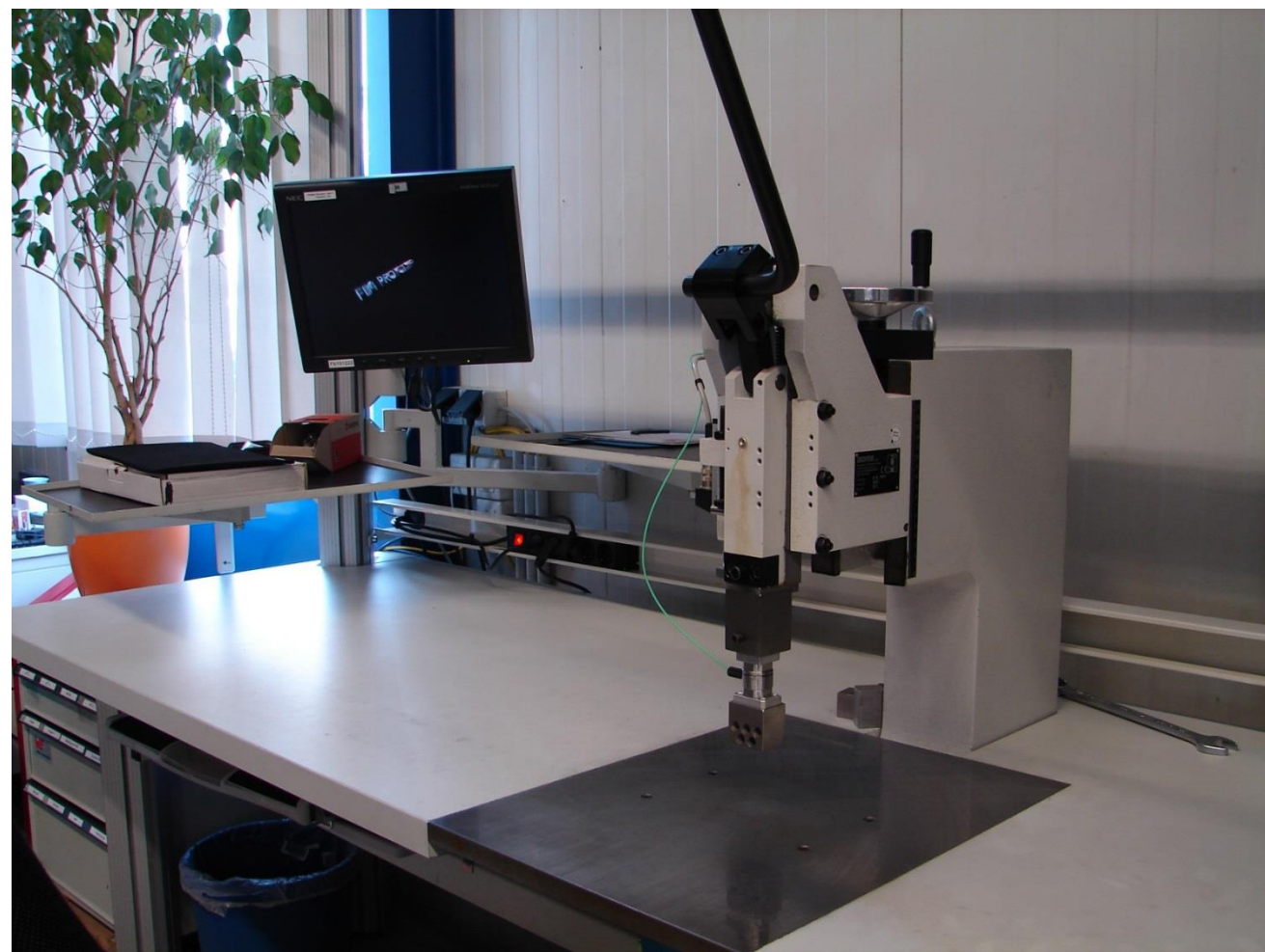
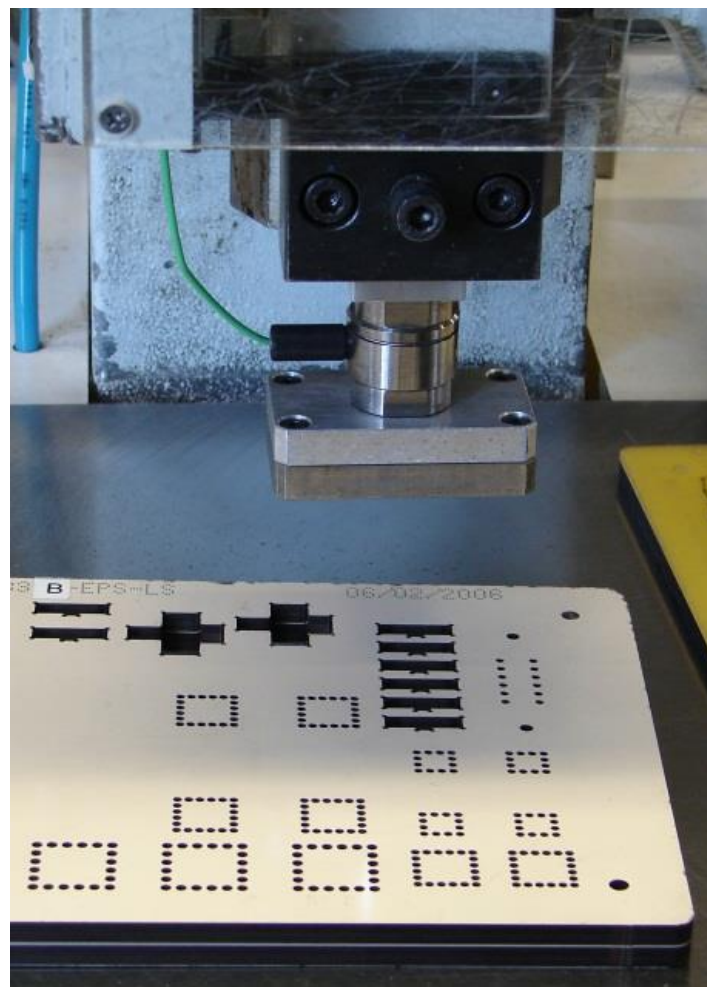


# Einpressvorgang



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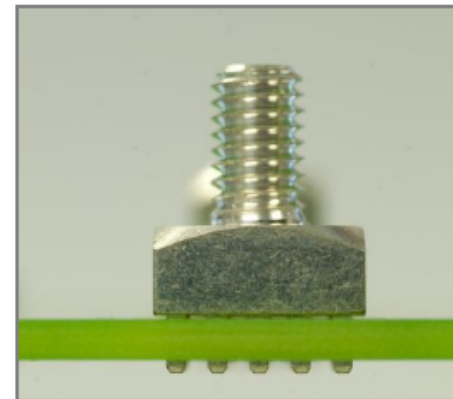
## Einpresskraftüberwachung



# Verarbeitungsprozess

## REDCUBE PRESS-FIT

- Material: Messing
- Oberfläche: verzinkt
- Haltekräfte nach IEC 352-5
- Einpresskraft: min. 40 N pro Pin
- Ausziehkraft: min. 30 N pro Pin
- Leiterplattendicke: 1.6 – 3.2 mm
- Einpressgeschwindigkeit: 100-250 mm/min



### Empirisch ermittelte Einpresskräfte:

*Einpresskräfte in "N" für einen massiven Pin	PCB Beschichtung								
	Chemisch Zinn			ENIG			HAL		
	Ø1.425 mm	Ø1.475 mm	Ø1.525 mm	Ø1.425 mm	Ø1.475 mm	Ø1.525 mm	Ø1.40 mm	Ø1.45 mm	Ø1.50 mm
PCB Dicke in mm									
1.6	120-220	80-160	40-130	140-250	100-200	60-170	140-250	100-200	50-170
2.4	170-330	110-240	60-200	200-400	130-300	70-250	200-400	130-300	70-250
3.2	220-460	140-340	80-280	260-500	170-420	80-360	260-500	170-420	80-360



**Vielen Dank!**

