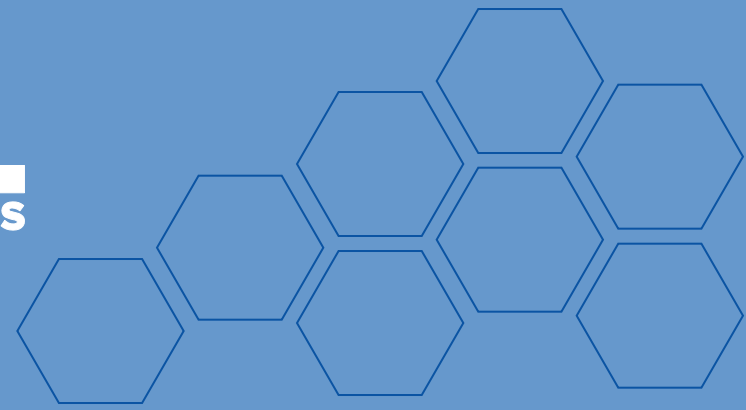
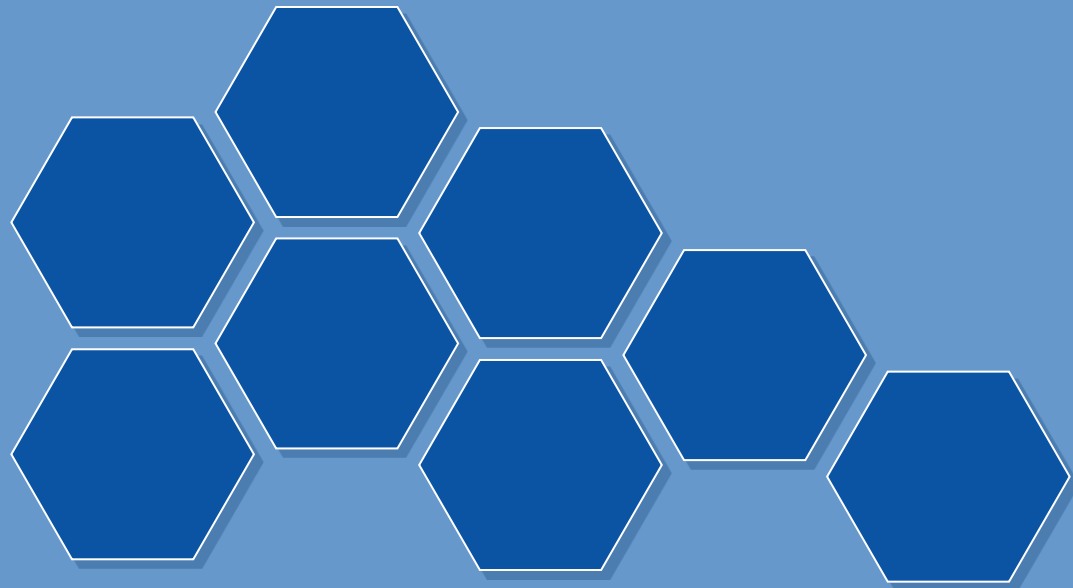
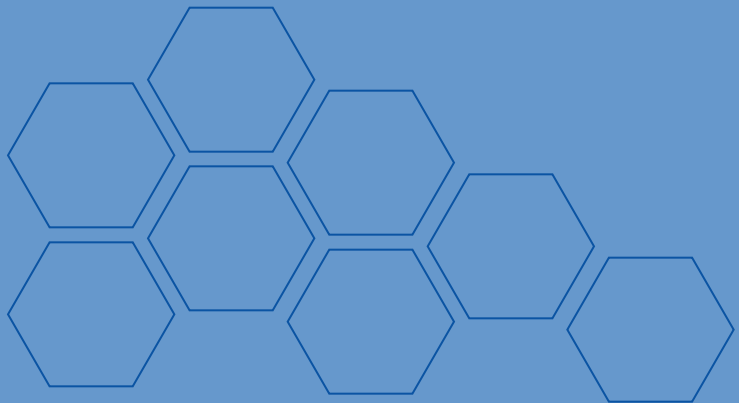


**THAI**  
TECHNOLOGIES



# Koele LED brandt het best



# Introductie

- Wie en wat is Thal Technologies?
- Uitleg LED eigenschap mbt temperatuur
- Demonstratie met droog ijs
- LED types en inbouw, koeling principes
- Is de LED of de driver het kritische component?

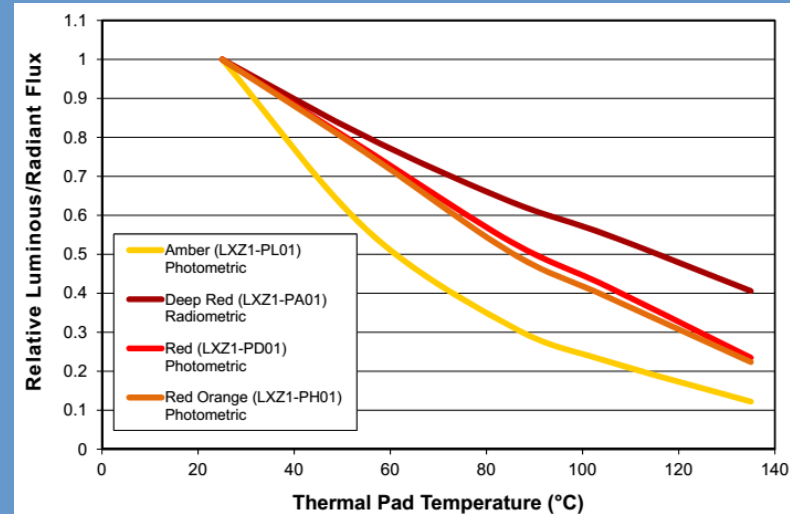
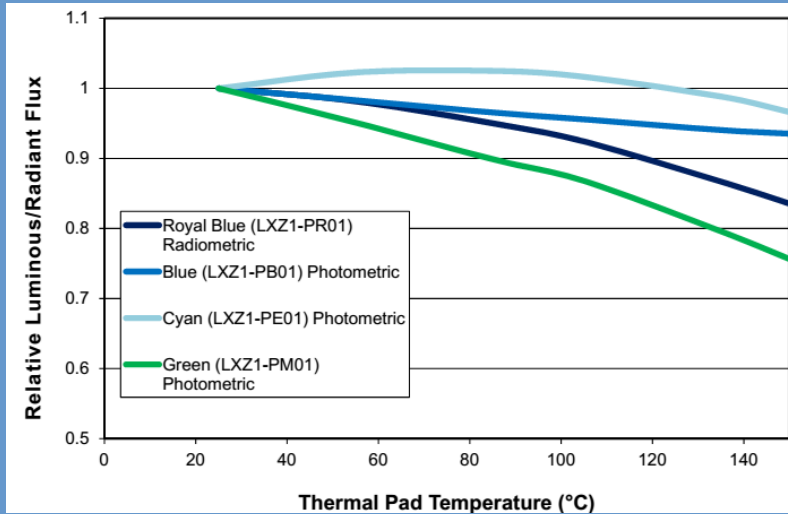


# Thal Technologies

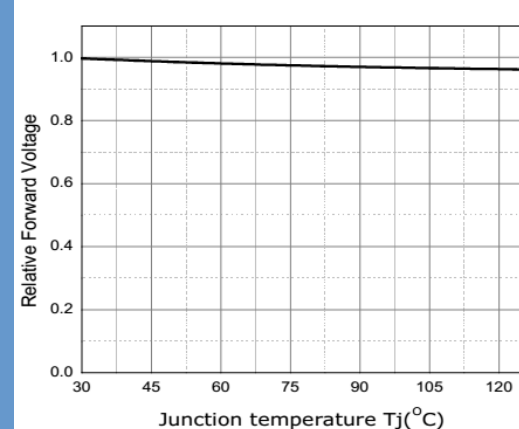
- Ontstaan uit Universal Science BV
- Thermal management materialen
- LED modules
- LED Solution provider en knowledge centre



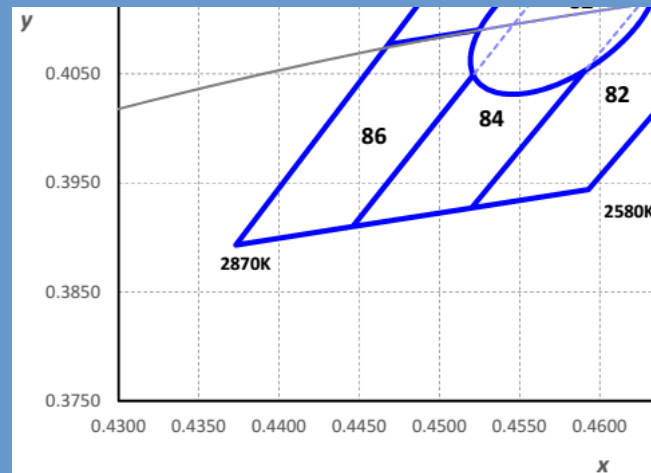
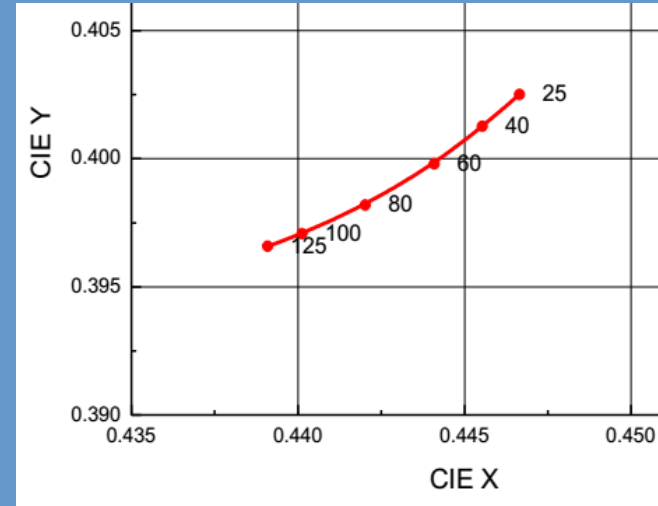
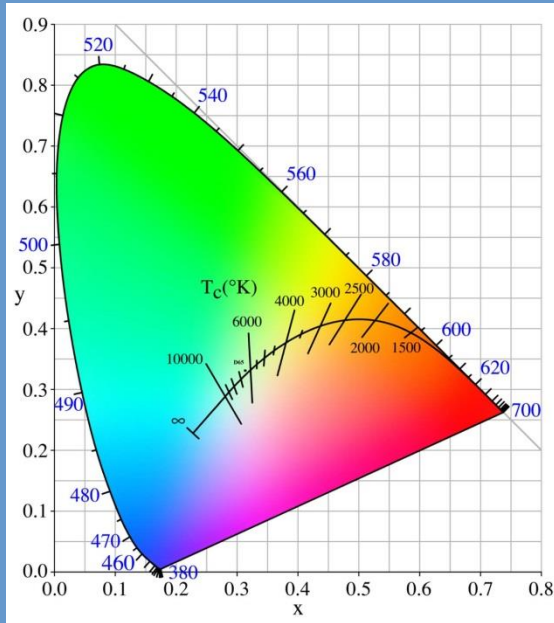
# LED eigenschap versus temperatuur: “Droop”

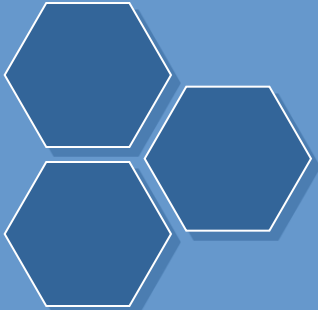


7. Junction Temperature vs. Relative Forward Voltage,  $I_f=65\text{mA}$

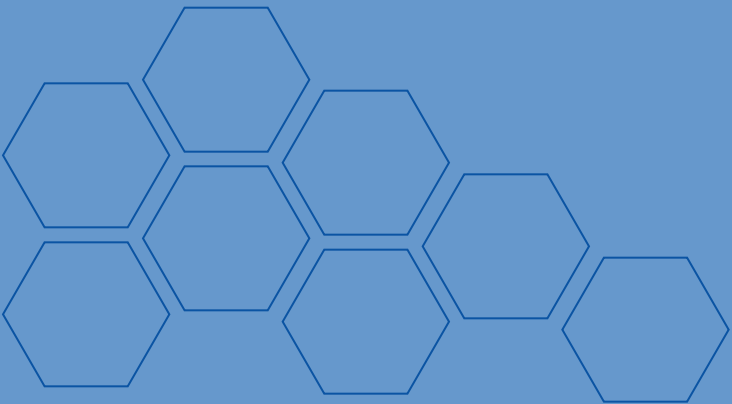


# LED eigenschap versus temperatuur: Colour shift white

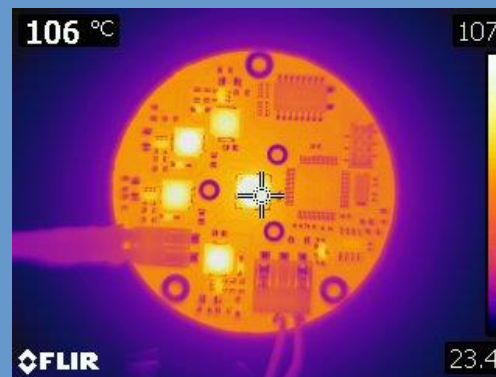
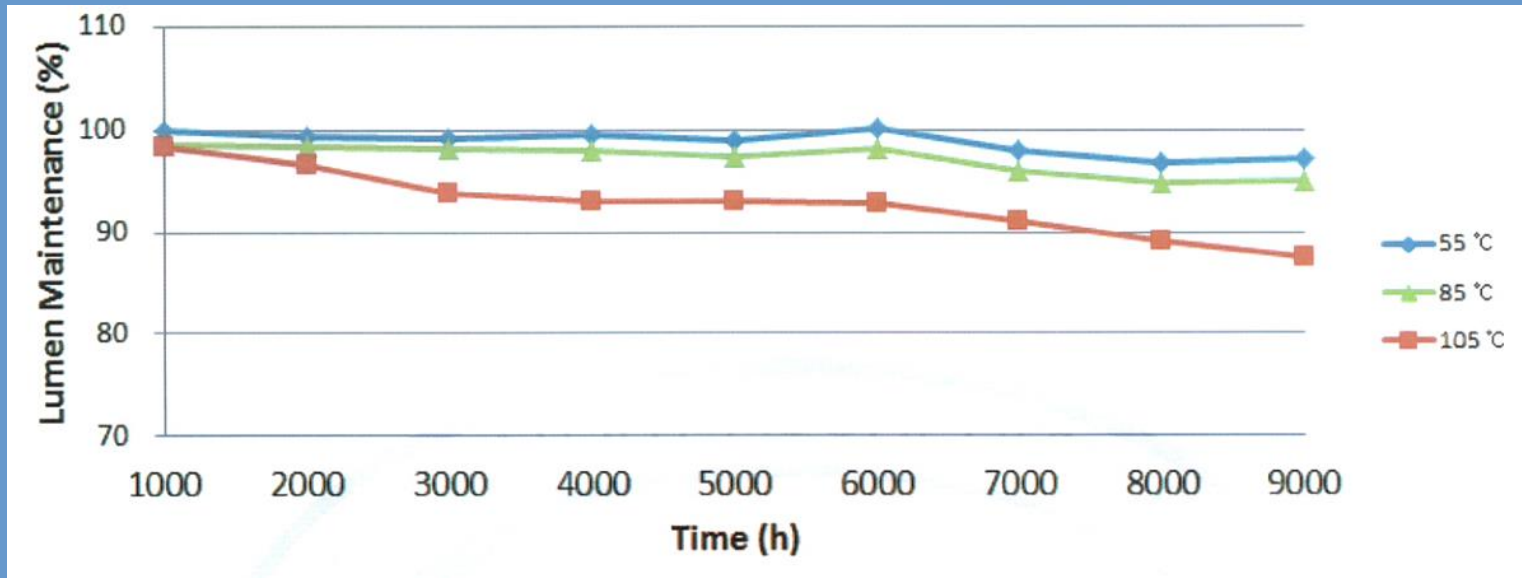




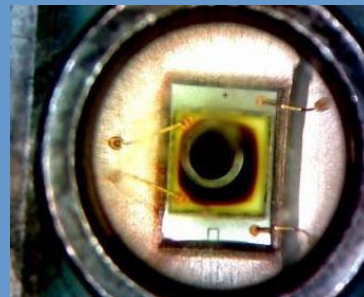
# Experiment met amber LED



# Invloed van temperatuur op Levensduur

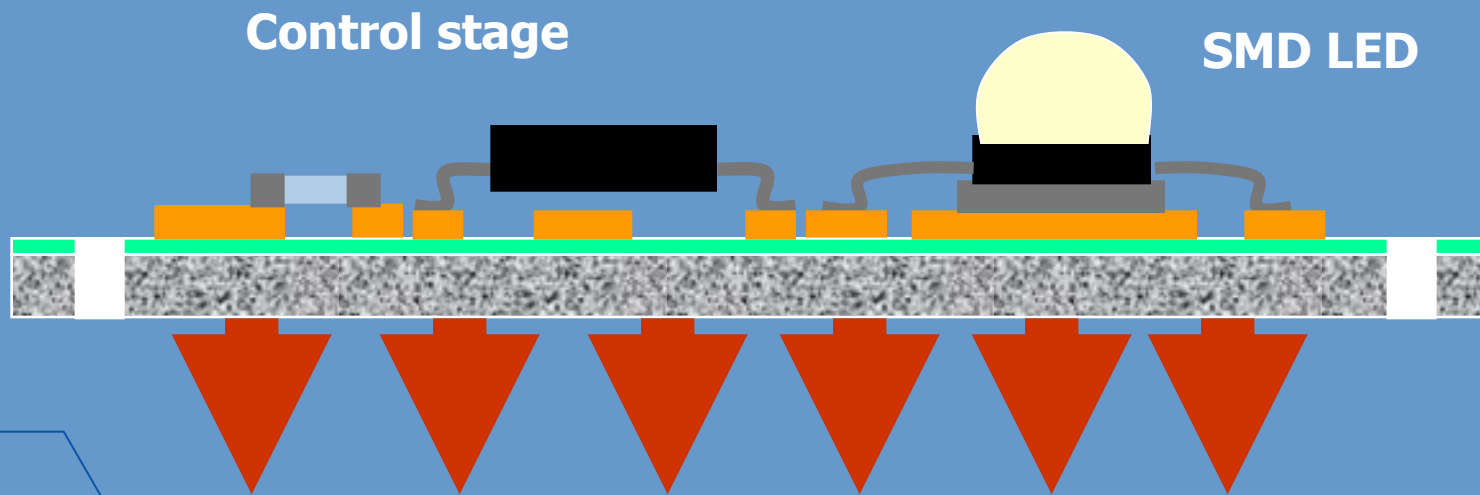


# Niet alles is wat het lijkt

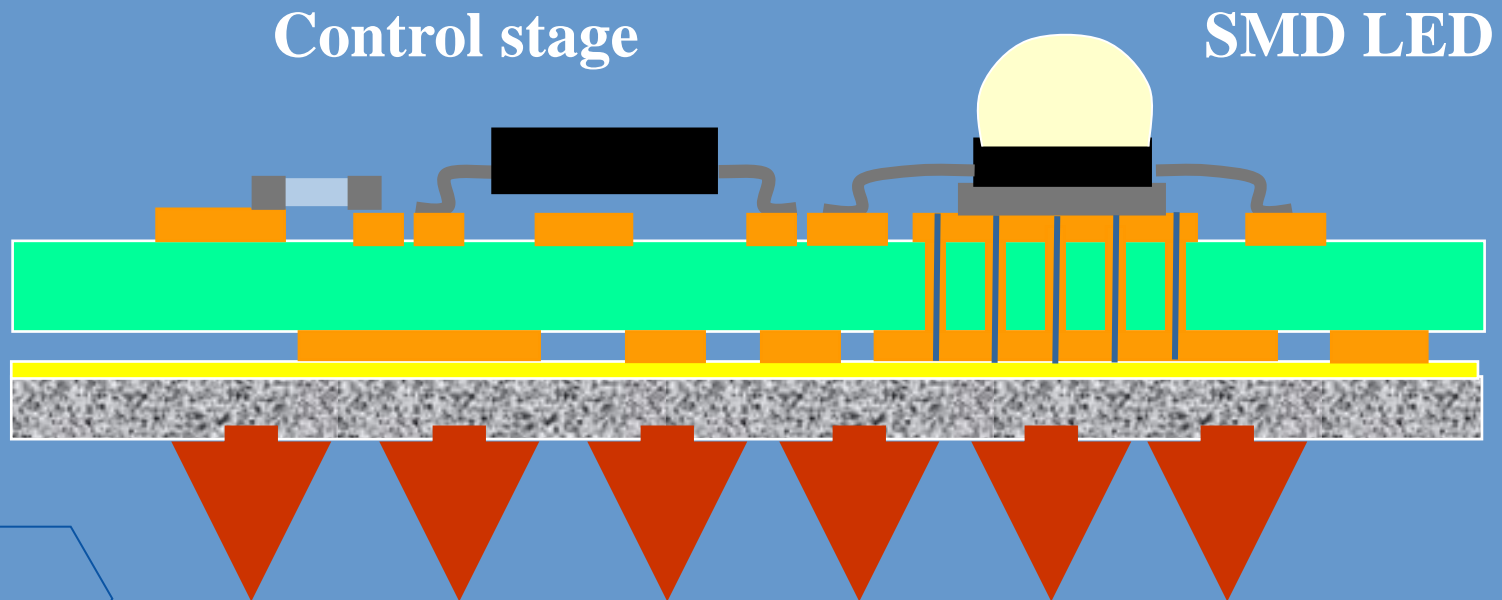


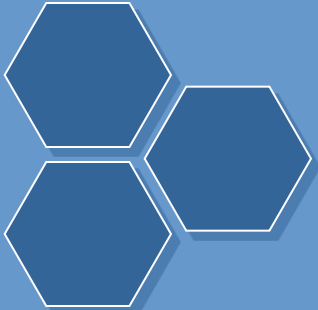


# Koeling via Aluminium base Printplaat



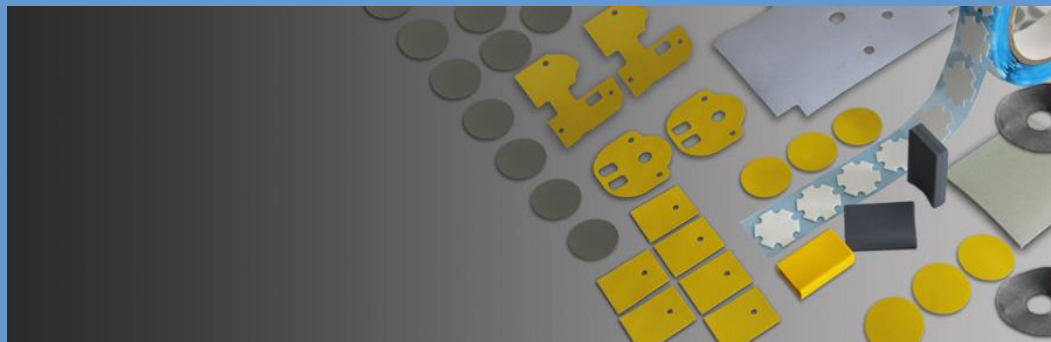
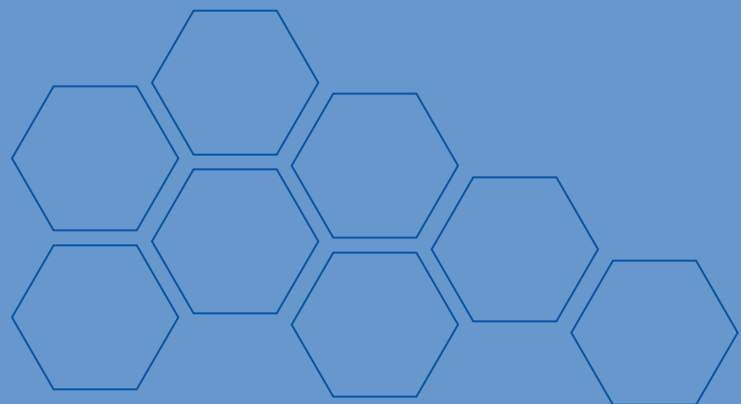
# Koeling door de Printplaat naar Koel vlak

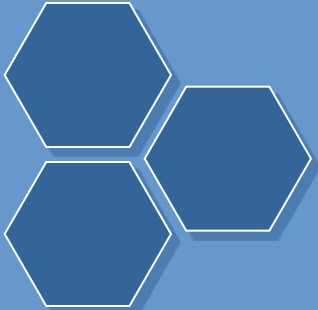




# Thermal interface materiaal

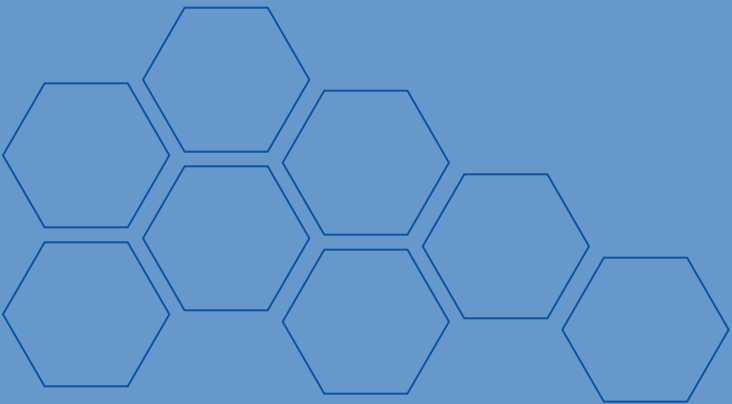
- Doel: Goed contact tussen PCB en koelvlak en/of isolatie
  - COB → thermische pasta of phase change
  - Metal core PCB → grafietfolie, tape
  - FR4 PCB → dunne gapfiller, tape

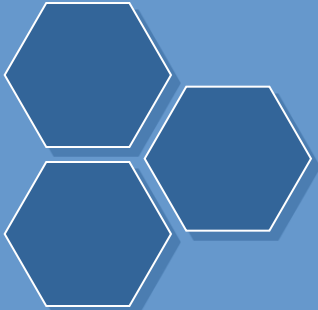




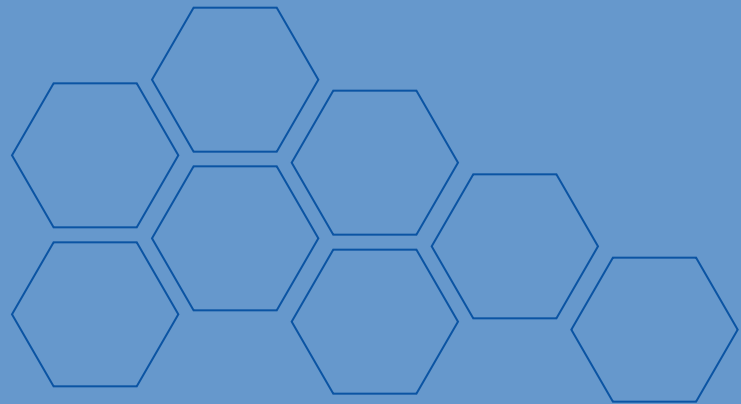
# Heatsinks

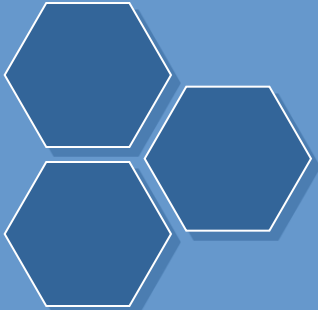
- Doel: Koel oppervlak vergroten
  - Extrusie
  - Gietaluminium
  - Actieve koeling, fan of jet koeling
  - Vaak is de behuizing het koellichaam.





# Vragen ?





# Bedankt

