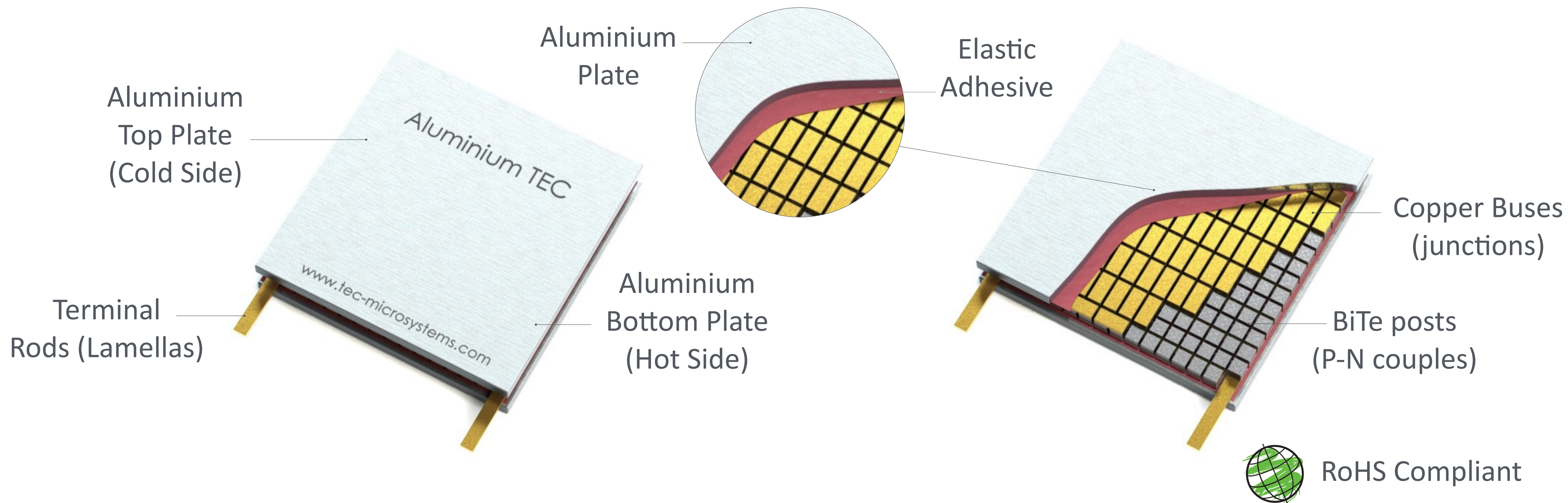




1MA10 SERIES ALUMINIUM THERMOELECTRIC COOLERS CONSTRUCTION

Internal Assembly Solder by default: Sn-Sb, $T_{\text{melt}}=230^{\circ}\text{C}$





1MA10 SERIES ALUMINIUM THERMOELECTRIC COOLERS

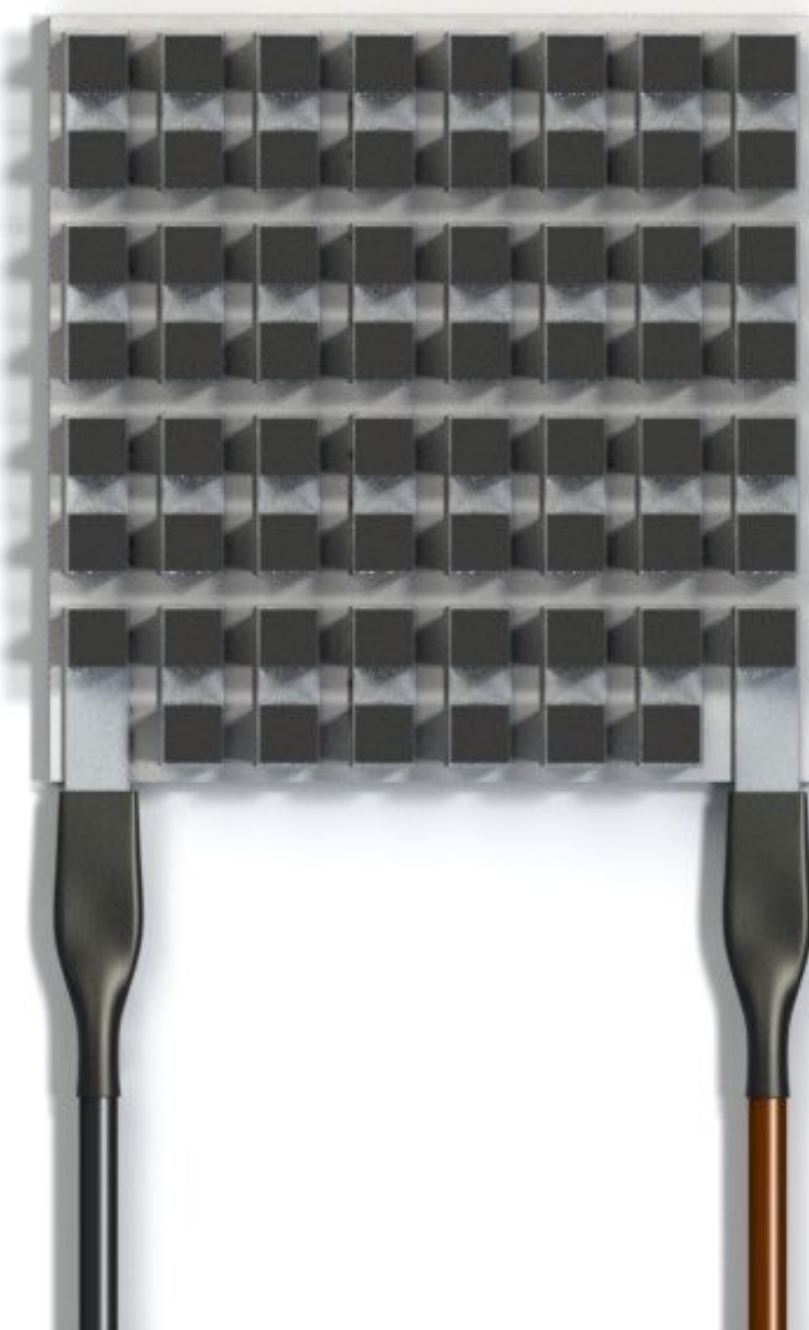
"Classical" 20x20mm²
TE Cooler

Advanced Aluminium
TEC 1MA10 Series

Max 10W/cm²

Max Cooling Capacity
Q_{max} 30 - 40W

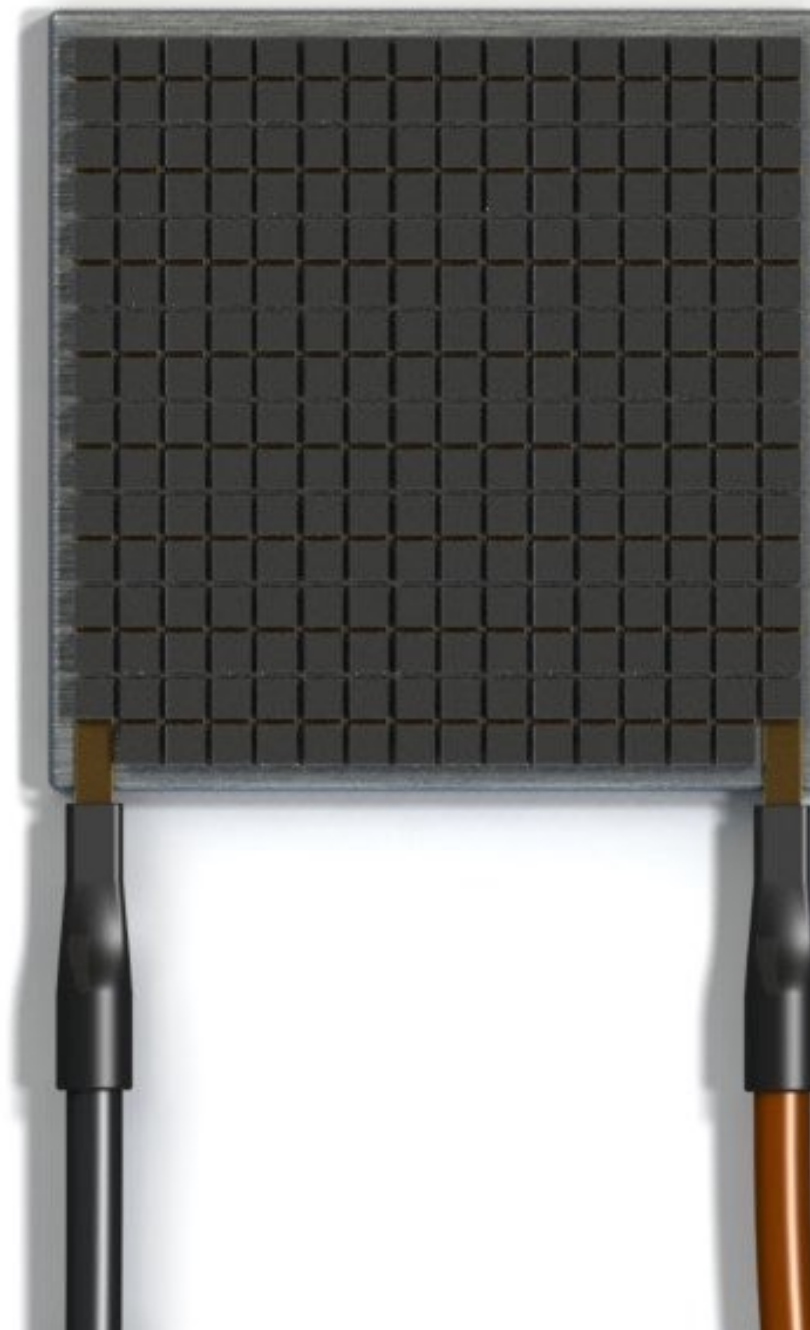
Al₂O₃ Ceramic Plates



Up to **30W**/cm²

3x Cooling Capacity
(Q_{max} = 115W)

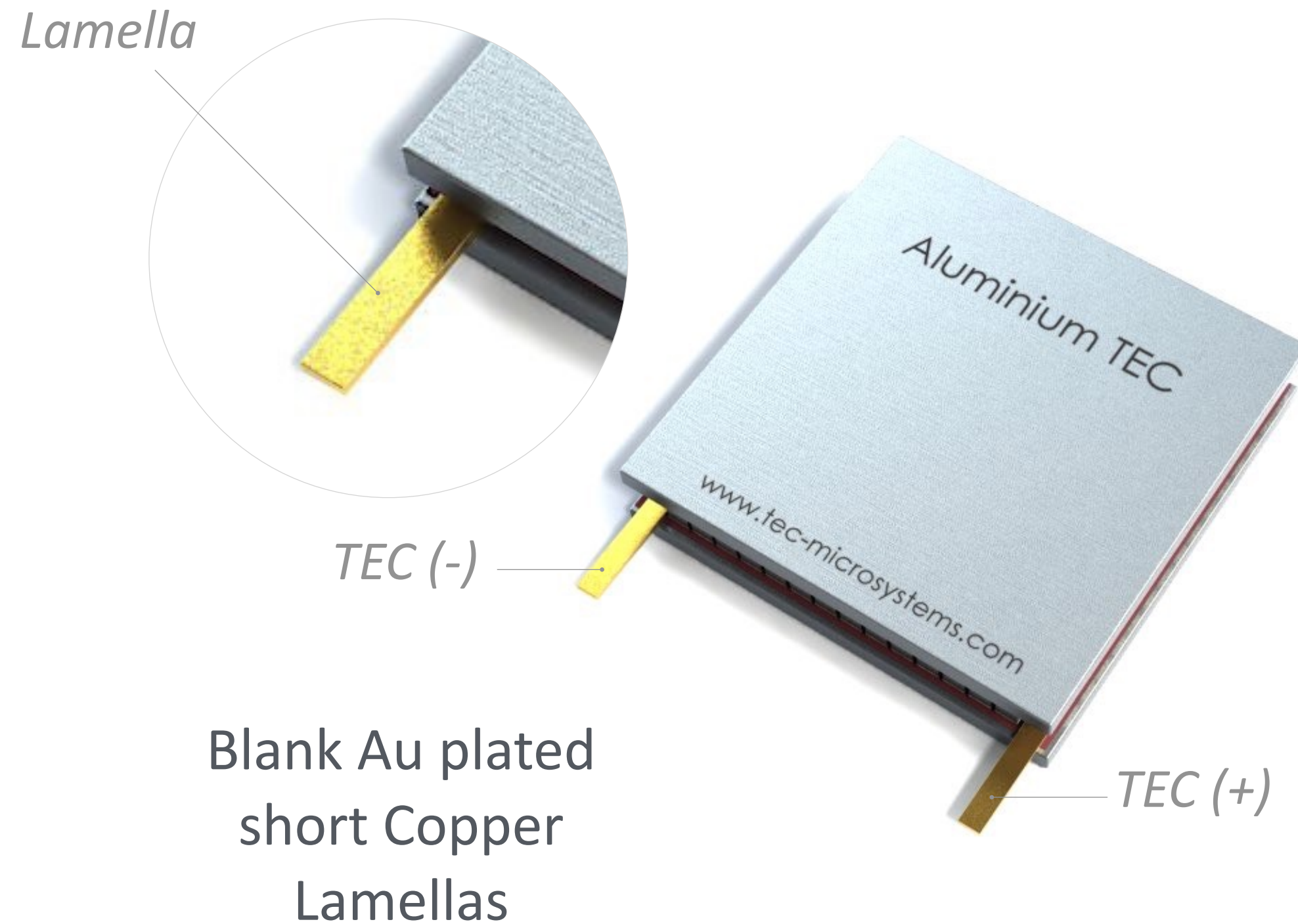
Aluminium Plates
(perfect CTE with
heatsinks)



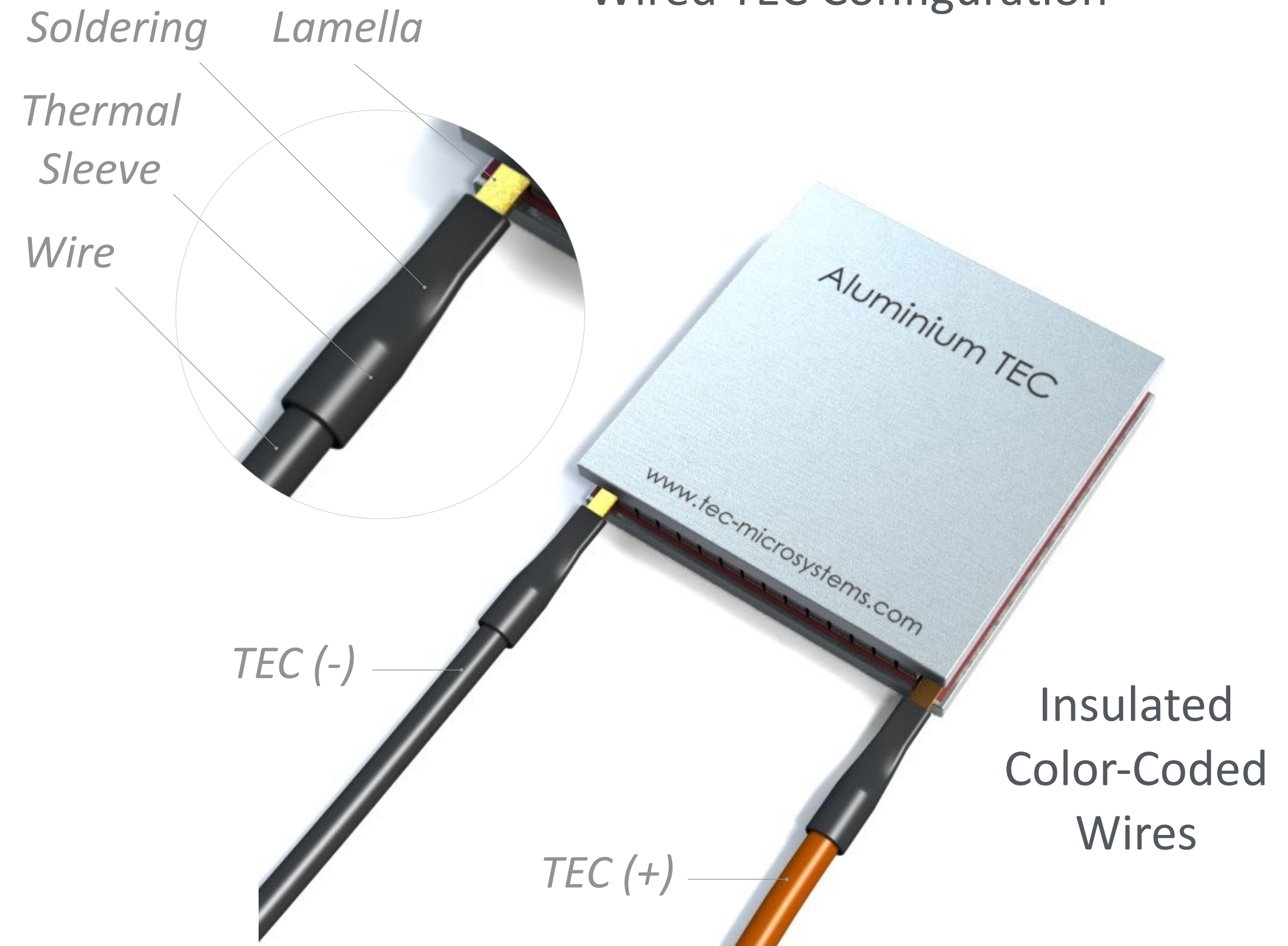


1MA10 SERIES ALUMINIUM TEC STANDARD TERMINAL CONNECTION METHODS

Core TEC Configuration



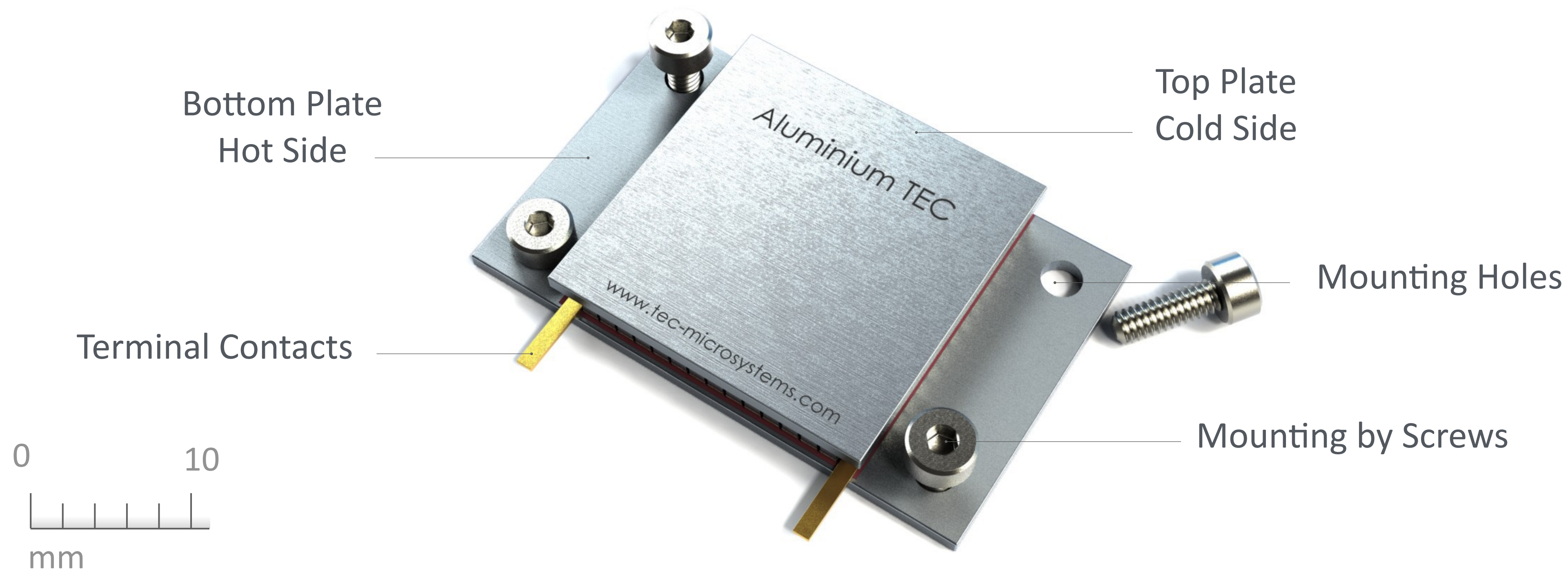
Wired TEC Configuration





1MA10 SERIES ALUMINIUM TEC ADVANCED MOUNTING SOLUTION

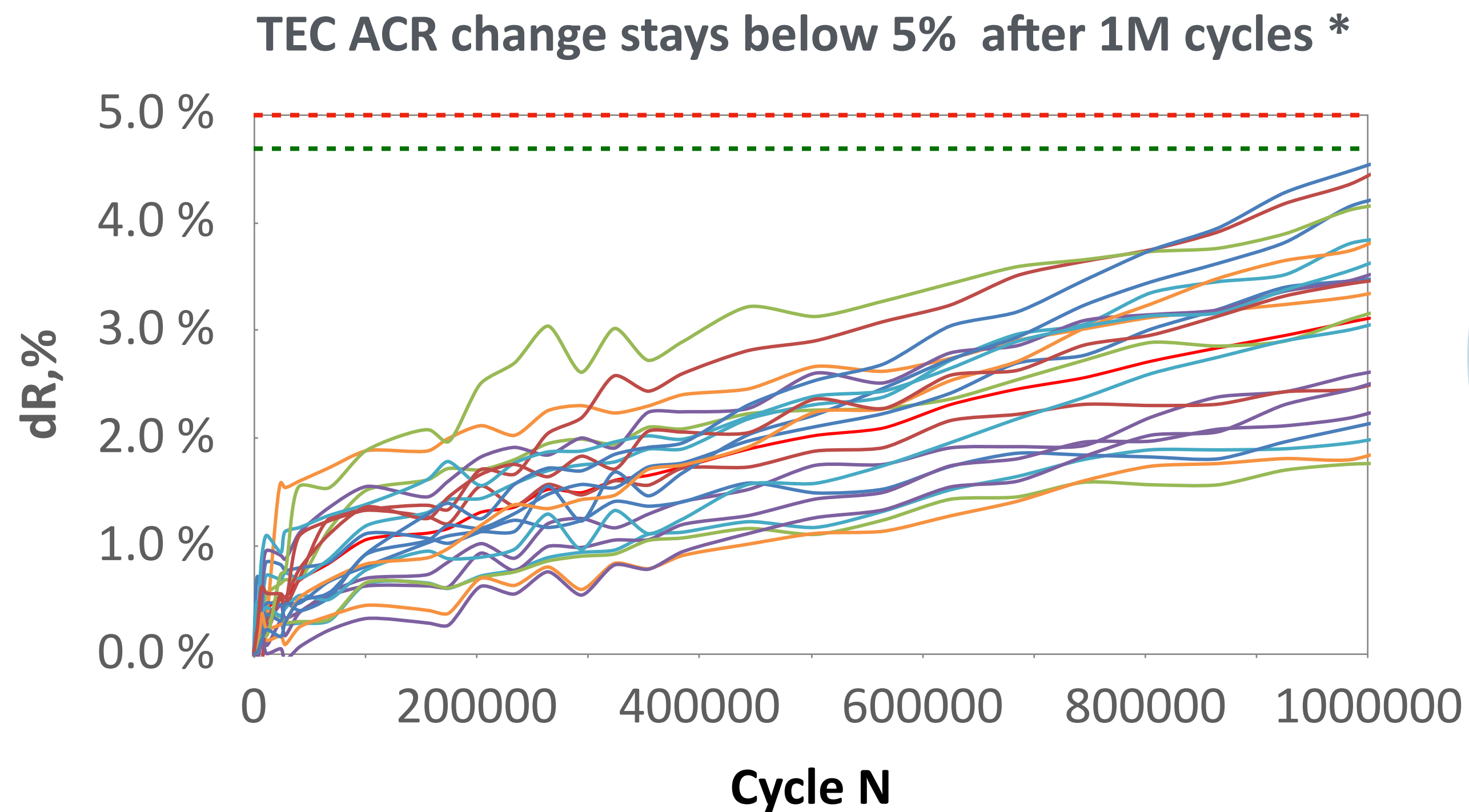
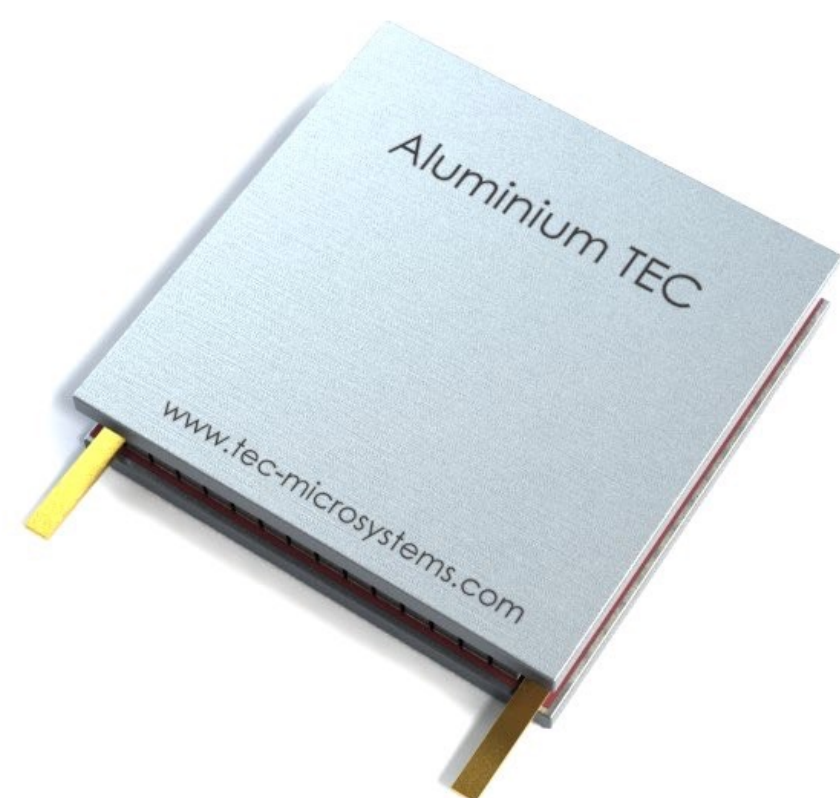
Aluminium TEC Hot Side modification for simple mechanical mounting (example)



Perfect solution for replaceable TEC elements (for example in DNA Cyclers)



1MA10 SERIES ALUMINIUM TECS - IDEAL FOR CYCLING APPLICATIONS

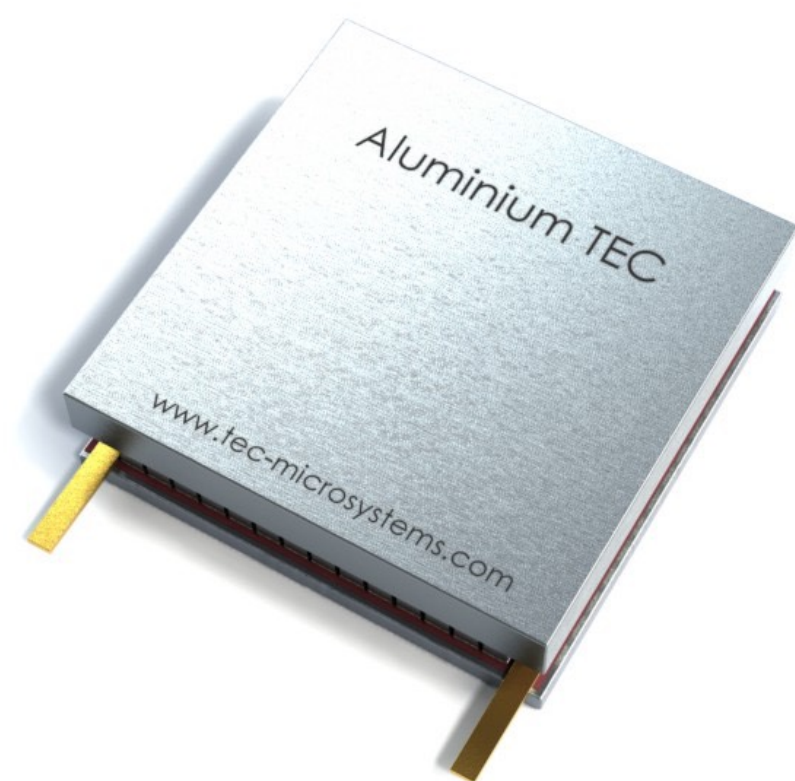


* - 5% ACR Change as Criteria of Failure is used by Telcordia GR-468 Standard. In practice it doesn't mean TEC stops to operate. It continues to work, but with some changes in performance and power consumption.

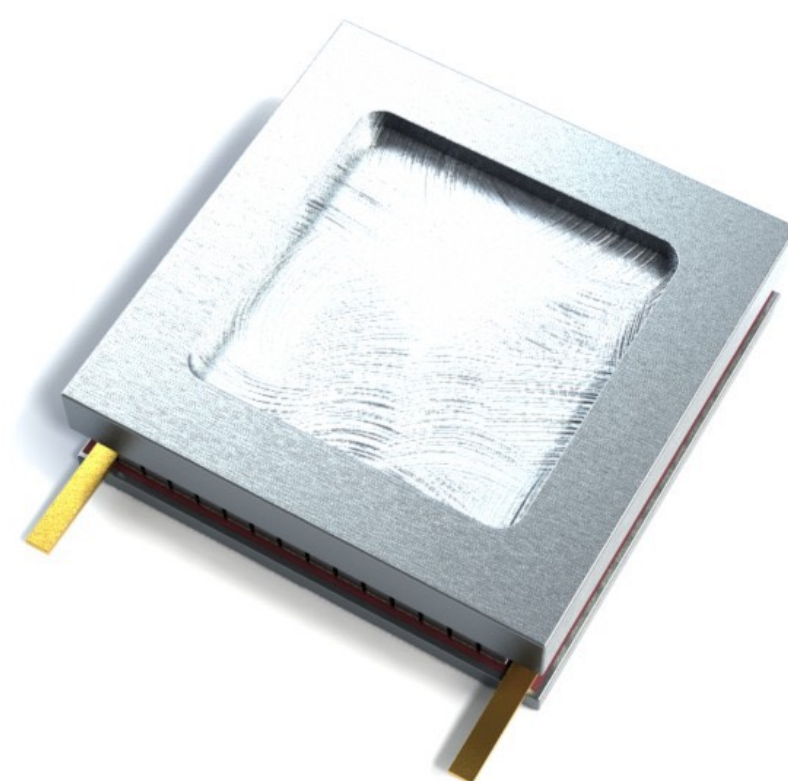


1MA10 SERIES ALUMINIUM TEC ADVANCED MANUFACTURING OPTIONS

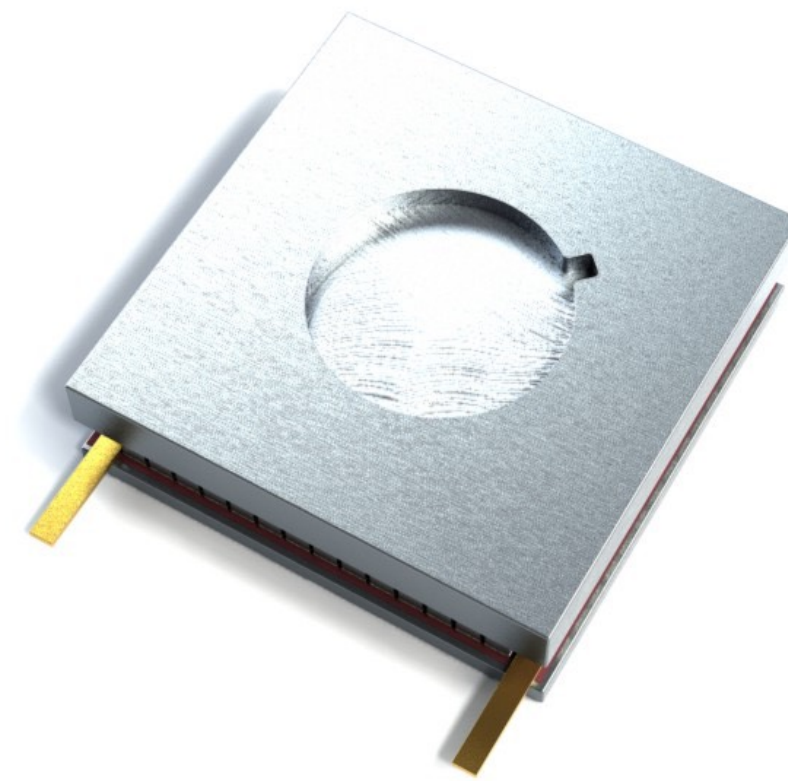
Easy to machine Aluminium TEC plates create a new dimension in TEC optimisation for application



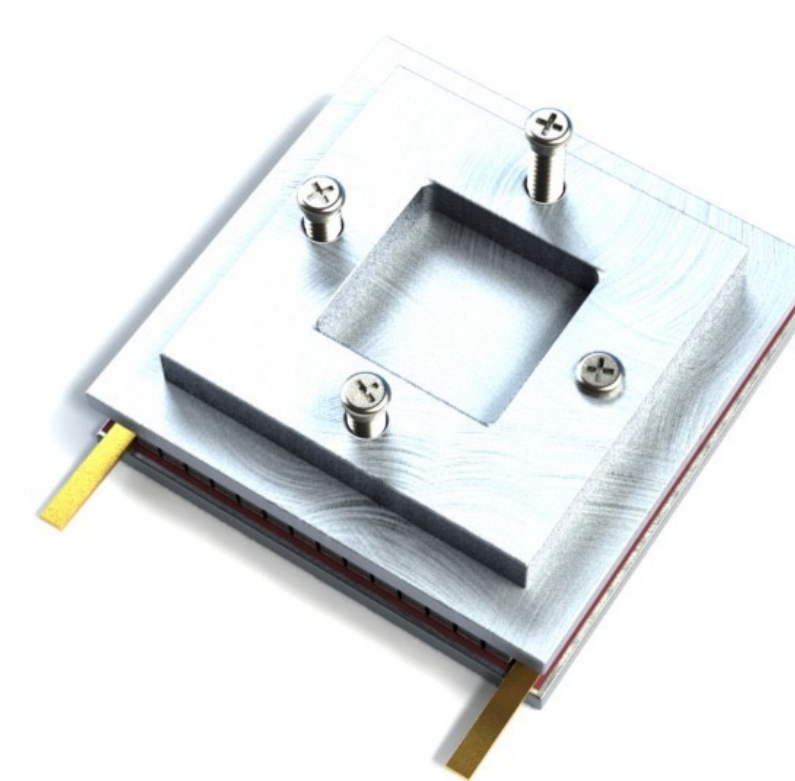
Variable thickness
of Aluminium plates



Advanced TEC plates
machining



TEC partial and
through- holes

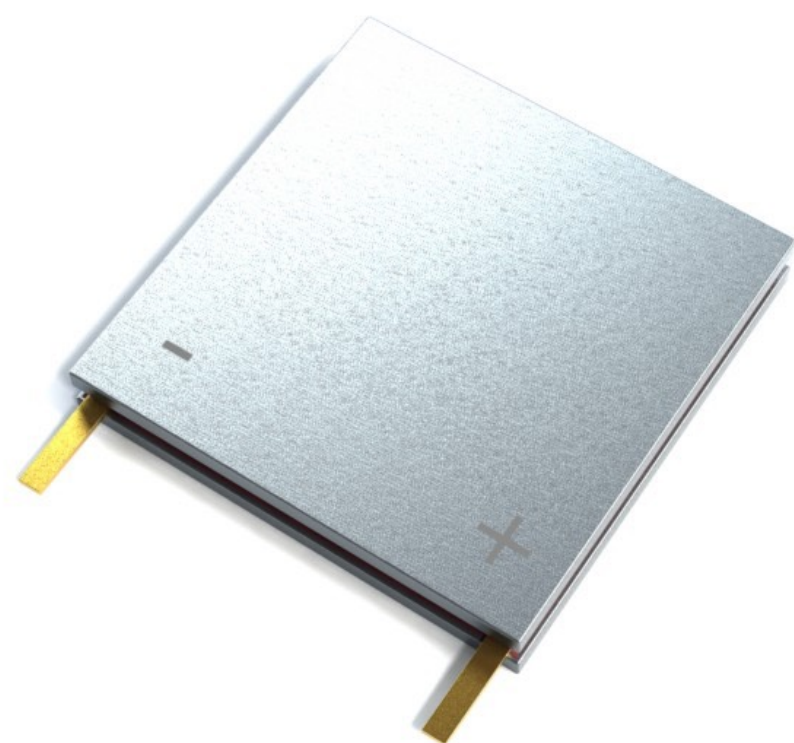


Advanced 3D surface
and mounting solutions

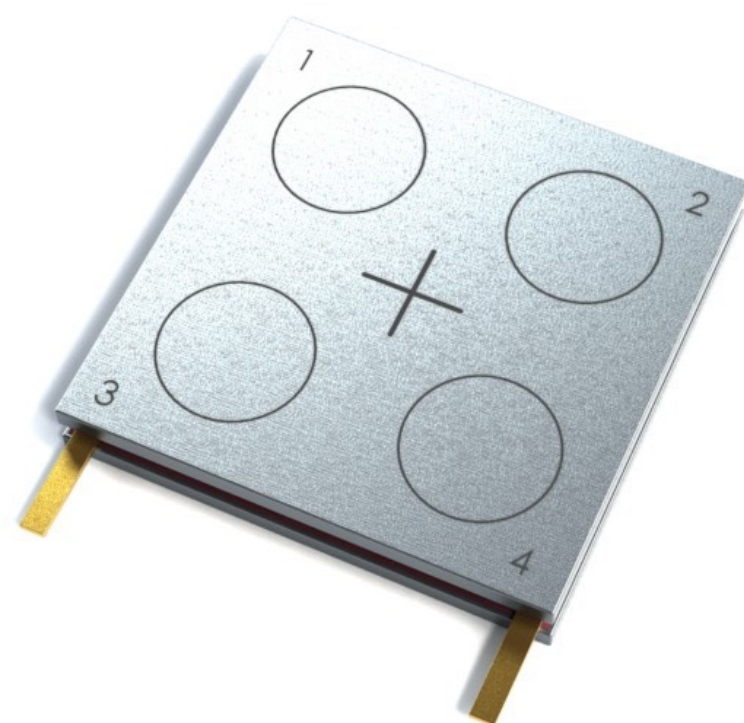


1MA10 SERIES ALUMINIUM TECs LASER ENGRAVING OPTIONS

Aluminium plates are easy to process with laser engraving - text, serial numbers, position marks



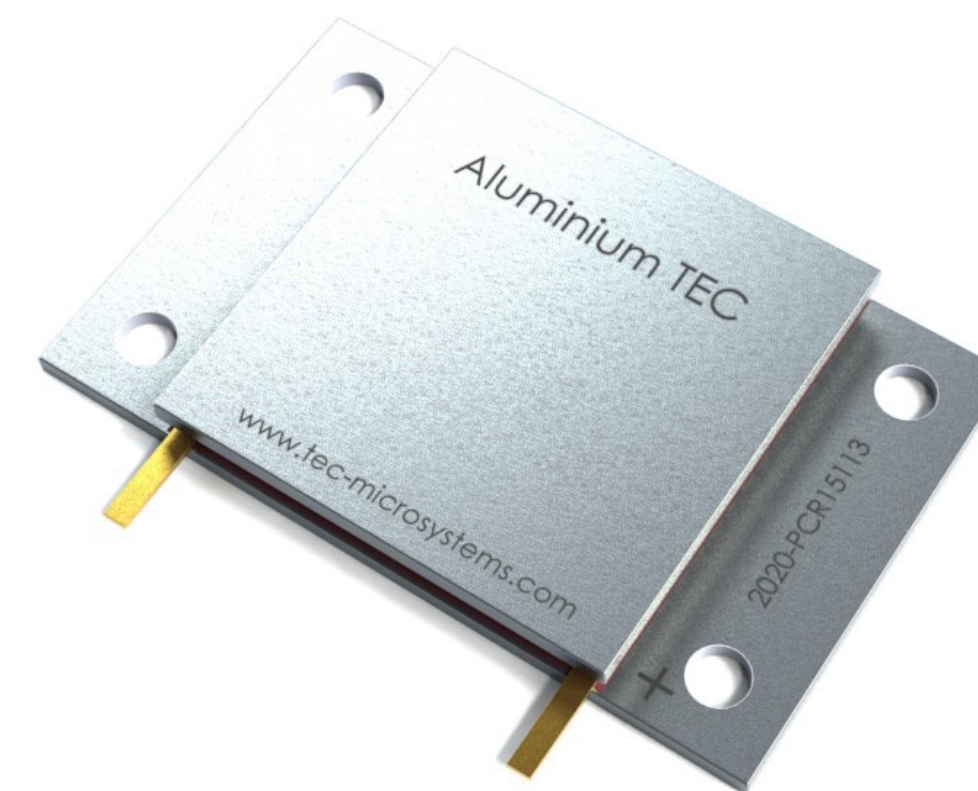
TEC Polarity
labels



Positioning marks
for mounting



Batch numbers for
QC and traceability

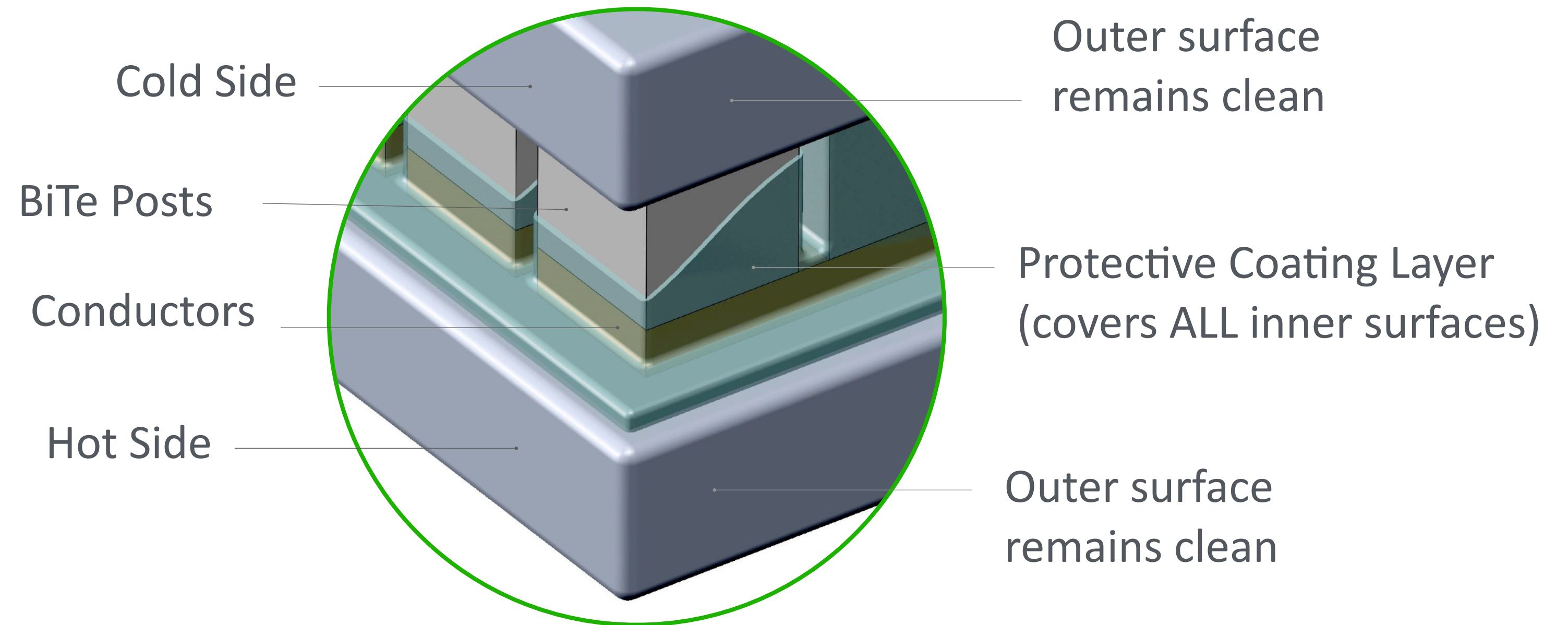
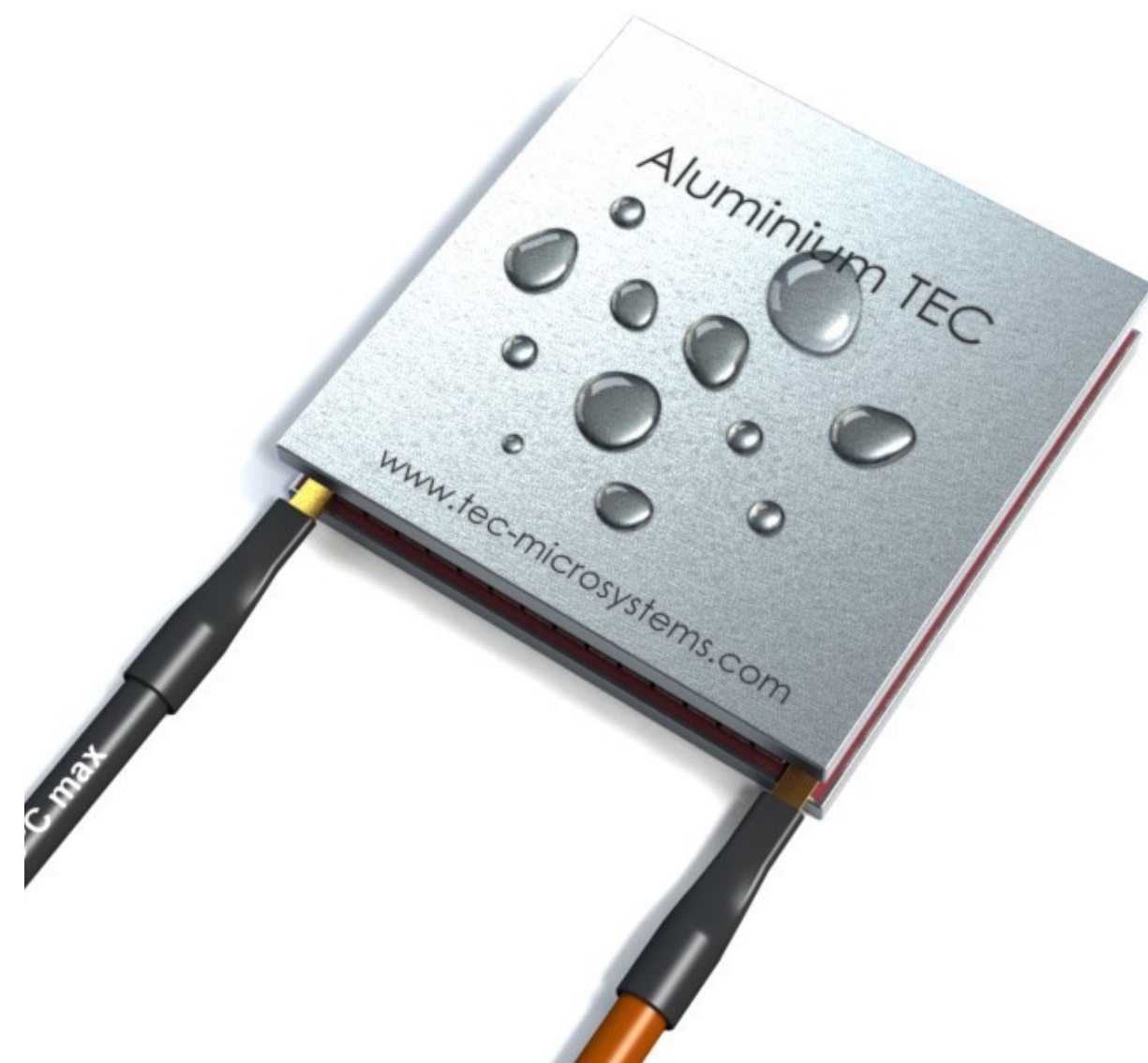


Applicable for all
TEC sides



1MA10 SERIES ALUMINIUM TEC ADVANCED PROTECTIVE COATING

For applications with Dew Point and condensation risks TECs can be provided with a protective coating



- Thin fluoropolymer protective layer
- Covers ALL inner TEC surfaces

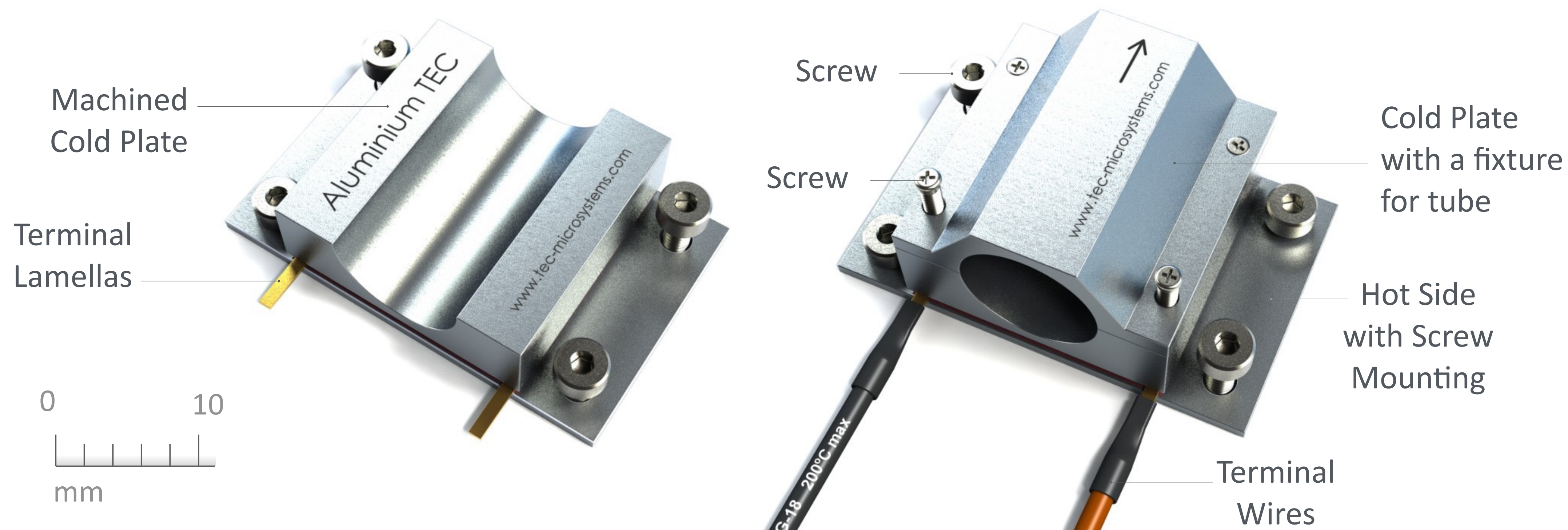
- No impact on TEC performance
- Withstands up to 220°C processing

- No-toxic composition
- VOC-free



1MA10 SERIES ALUMINIUM TEC ADVANCED MANUFACTURING OPTIONS

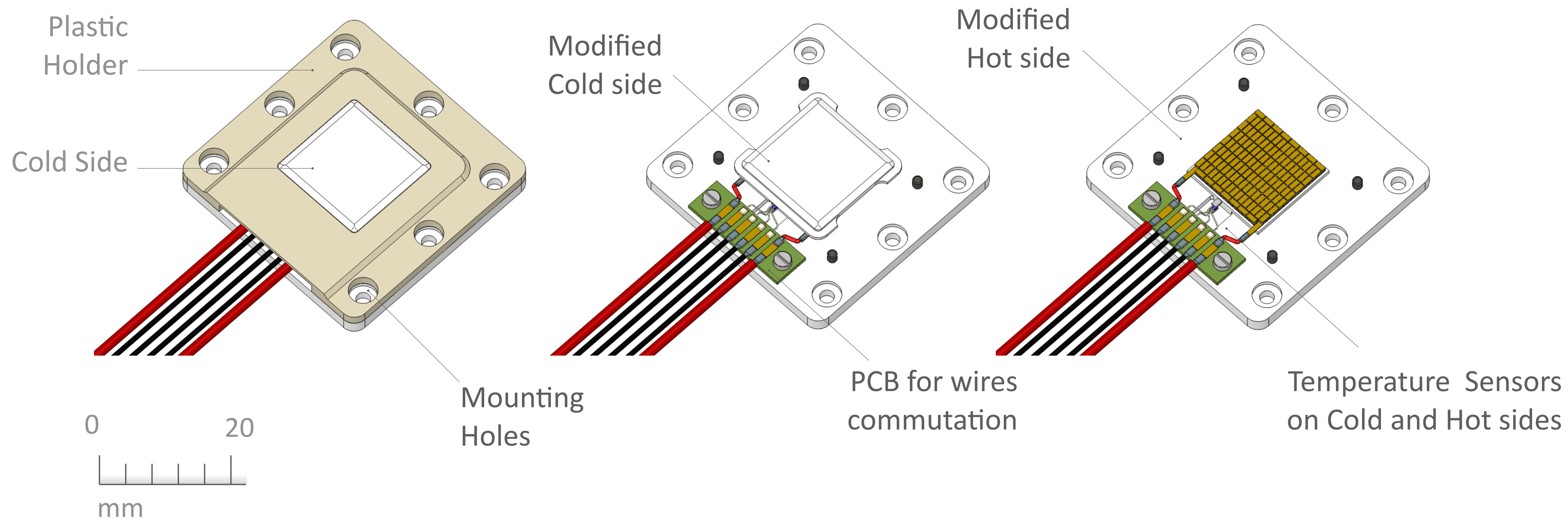
Aluminium TEC plates make it possible to create unique configurations for non-flat objects cooling





1MA10 SERIES ALUMINIUM TEC ADVANCED MANUFACTURING

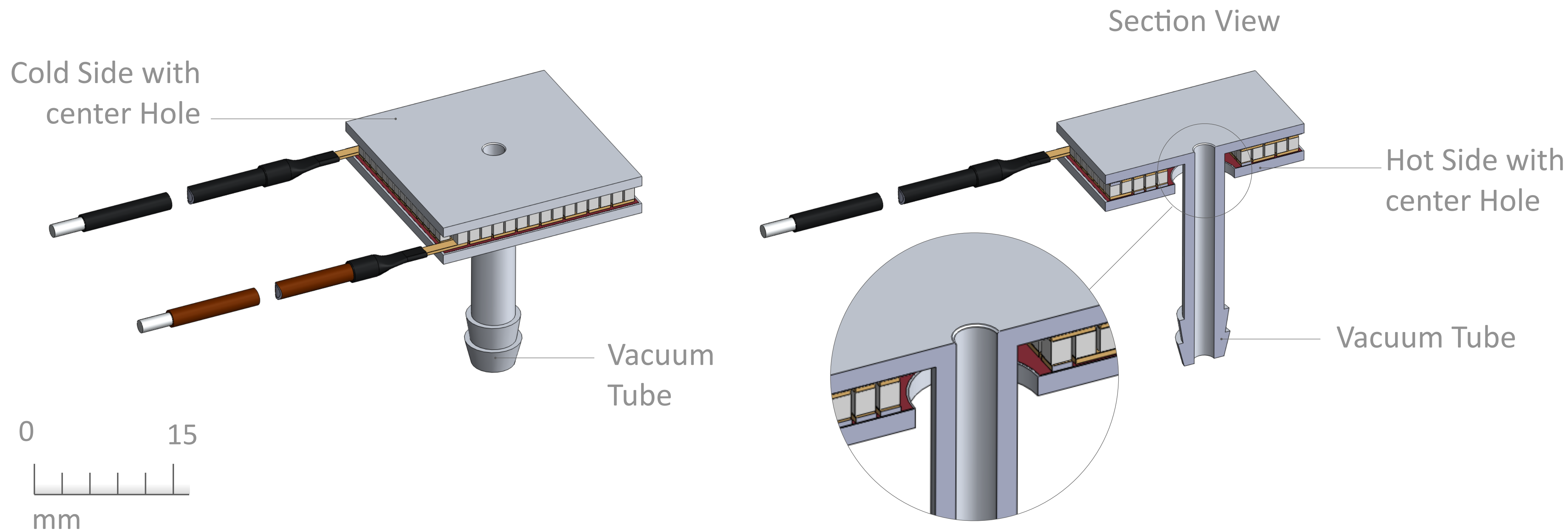
1MA10-127-XX PCR CYCLING ASSEMBLY (EXAMPLE)





1MA10 SERIES ALUMINIUM TEC ADVANCED MANUFACTURING

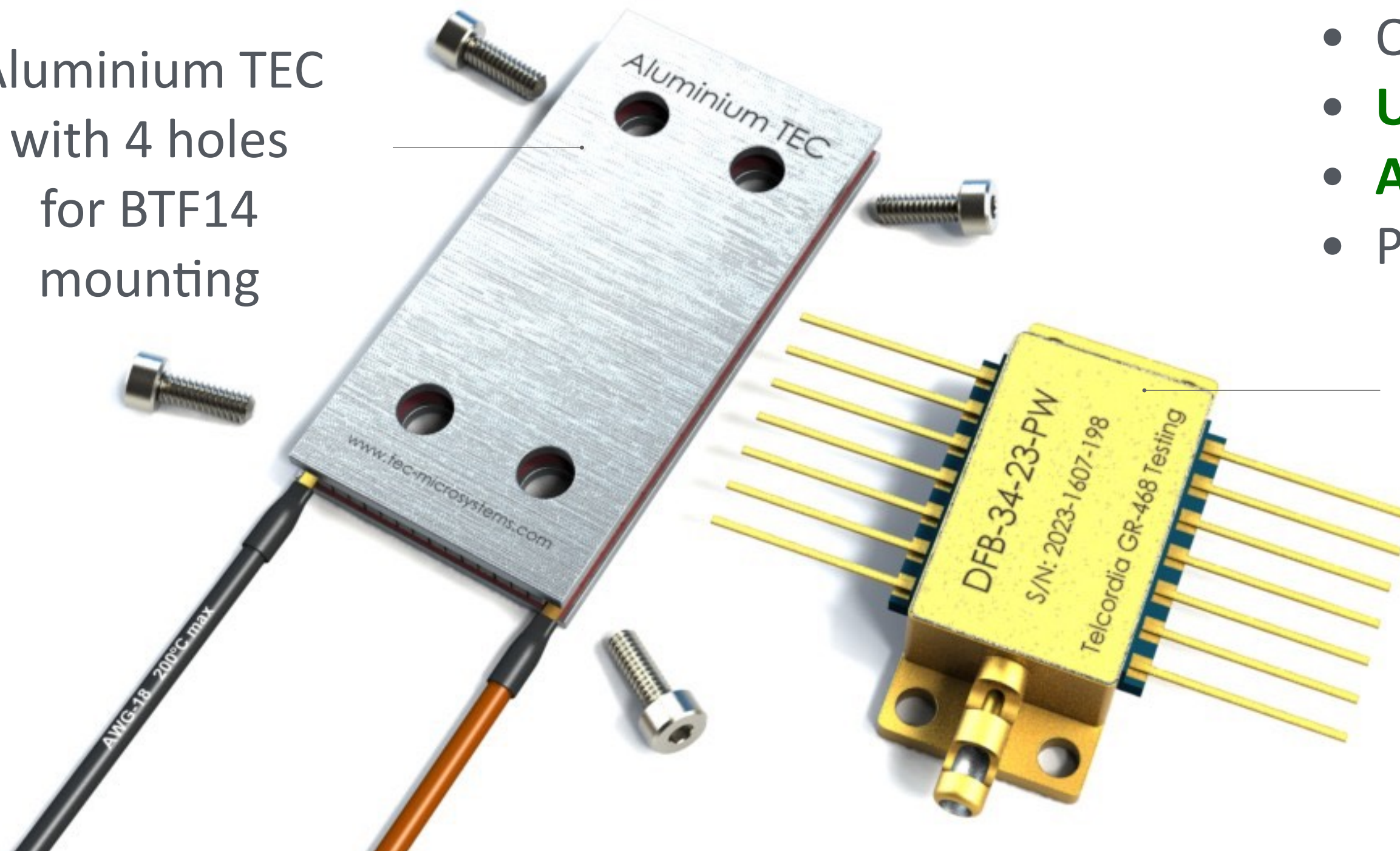
1MA10-127-XX VACUUM TUBE (CONCEPT DESCRIPTION)





“EXTERNAL COOLING” WITH ALUMINIUM THERMOELECTRIC COOLERS

Aluminium TEC
with 4 holes
for BTF14
mounting



- “External” Thermoelectric cooling for sealed components
- Optimal for external cooling and temperature cycling
- **Up to 30W/cm²** cooling power density
- **Aluminium plates** in TEC construction instead of ceramics
- Perfect temperature uniformity and CTE matching with heatsink

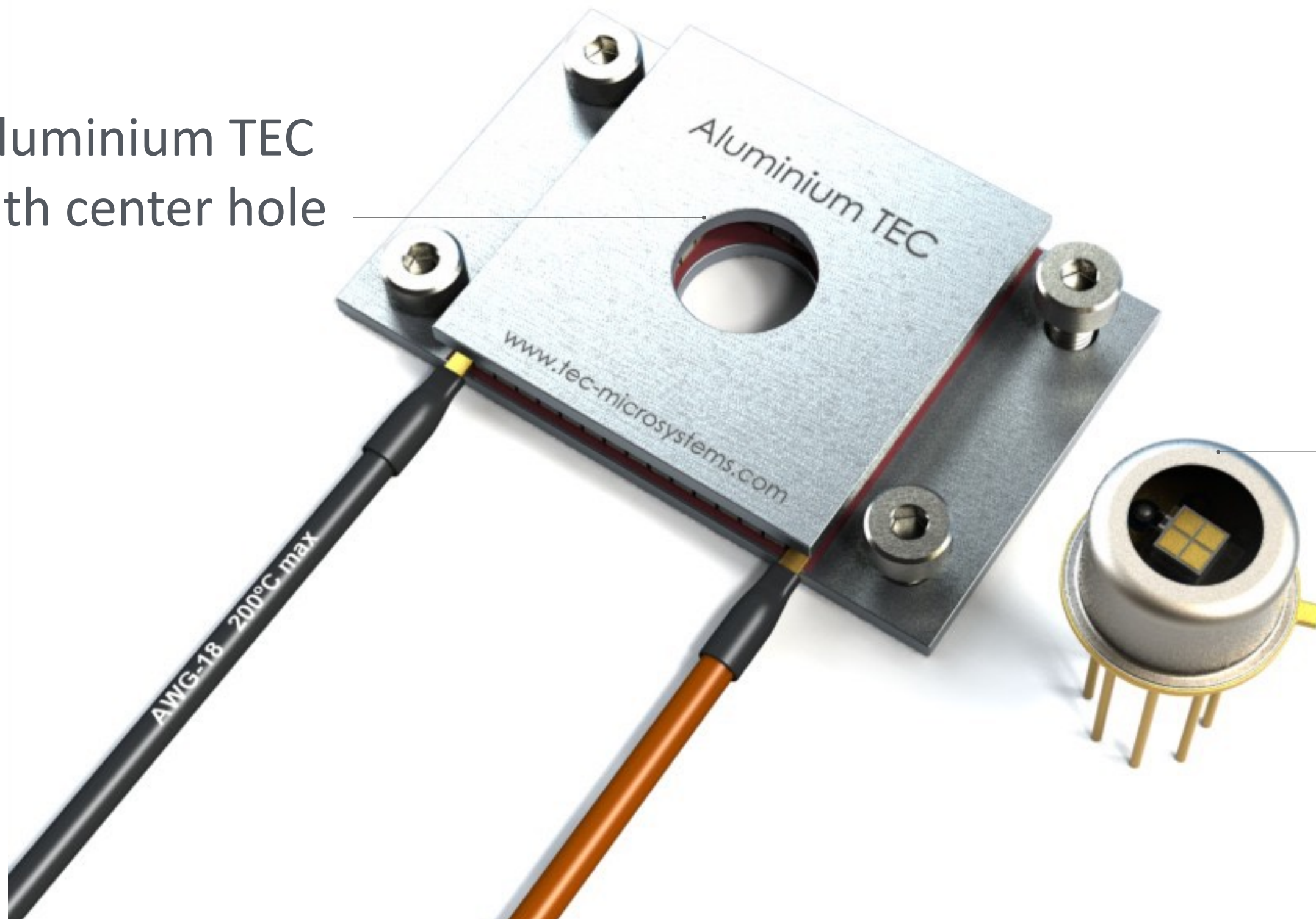
LD sealed in standard 14pin “Butterfly” package

- TECs with center-hole and multi-hole configurations
- Customization and custom TECs development
- Thermistor integrating (optional)
- Advanced Protective Coating (optional)



“EXTERNAL COOLING” WITH ALUMINIUM THERMOELECTRIC COOLERS

Aluminium TEC
with center hole



- “External” Thermoelectric cooling for sealed components
- Optimal for external cooling and temperature cycling
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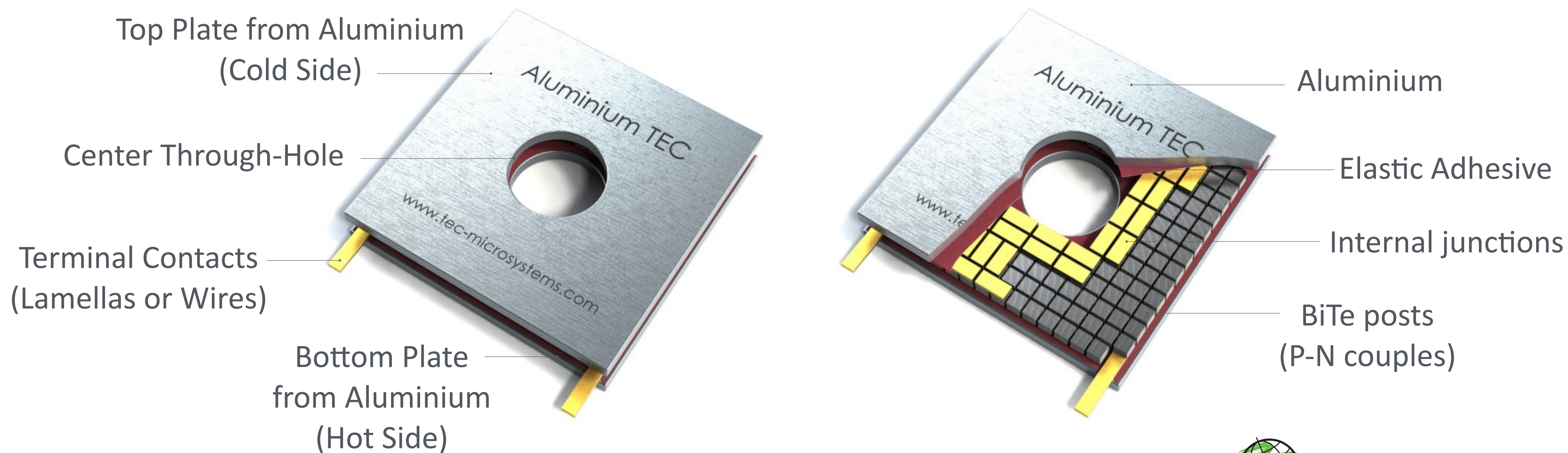
Sealed TO-style header (LD or detector applications)

- TECs with center-hole and multi-hole configurations
- Customization and custom TECs development
- Thermistor integrating (optional)
- Advanced Protective Coating (optional)



ALUMINIUM TE COOLER WITH HOLE - CONSTRUCTION

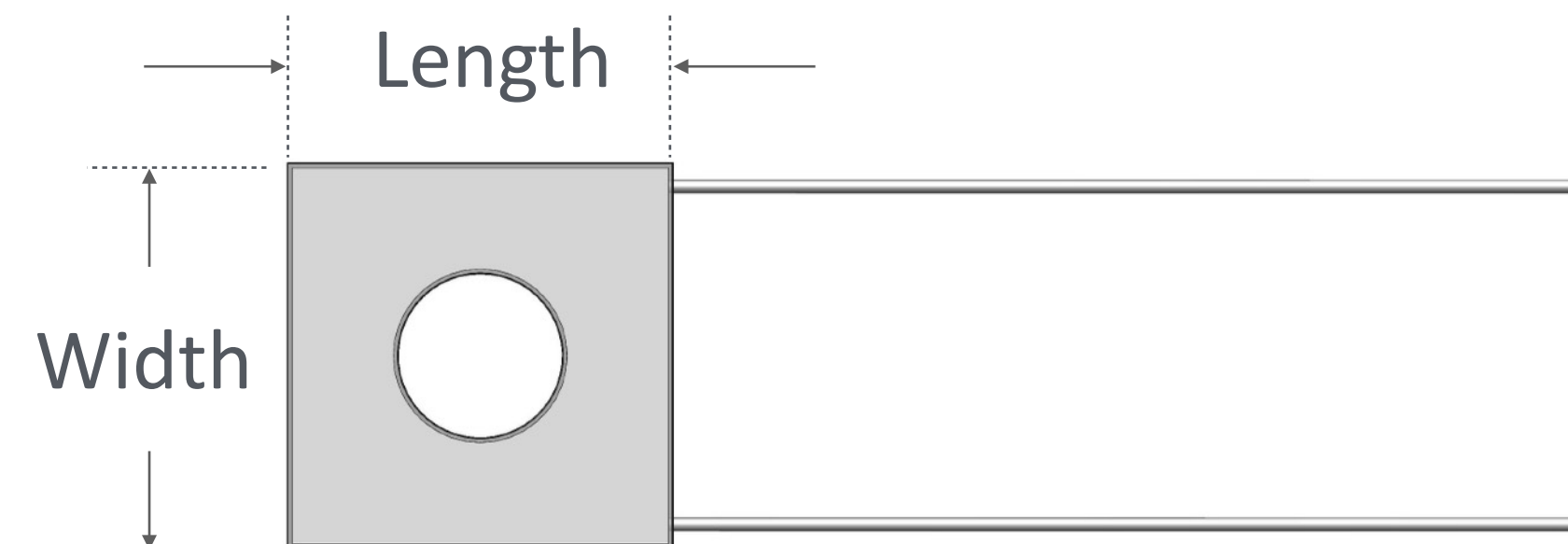
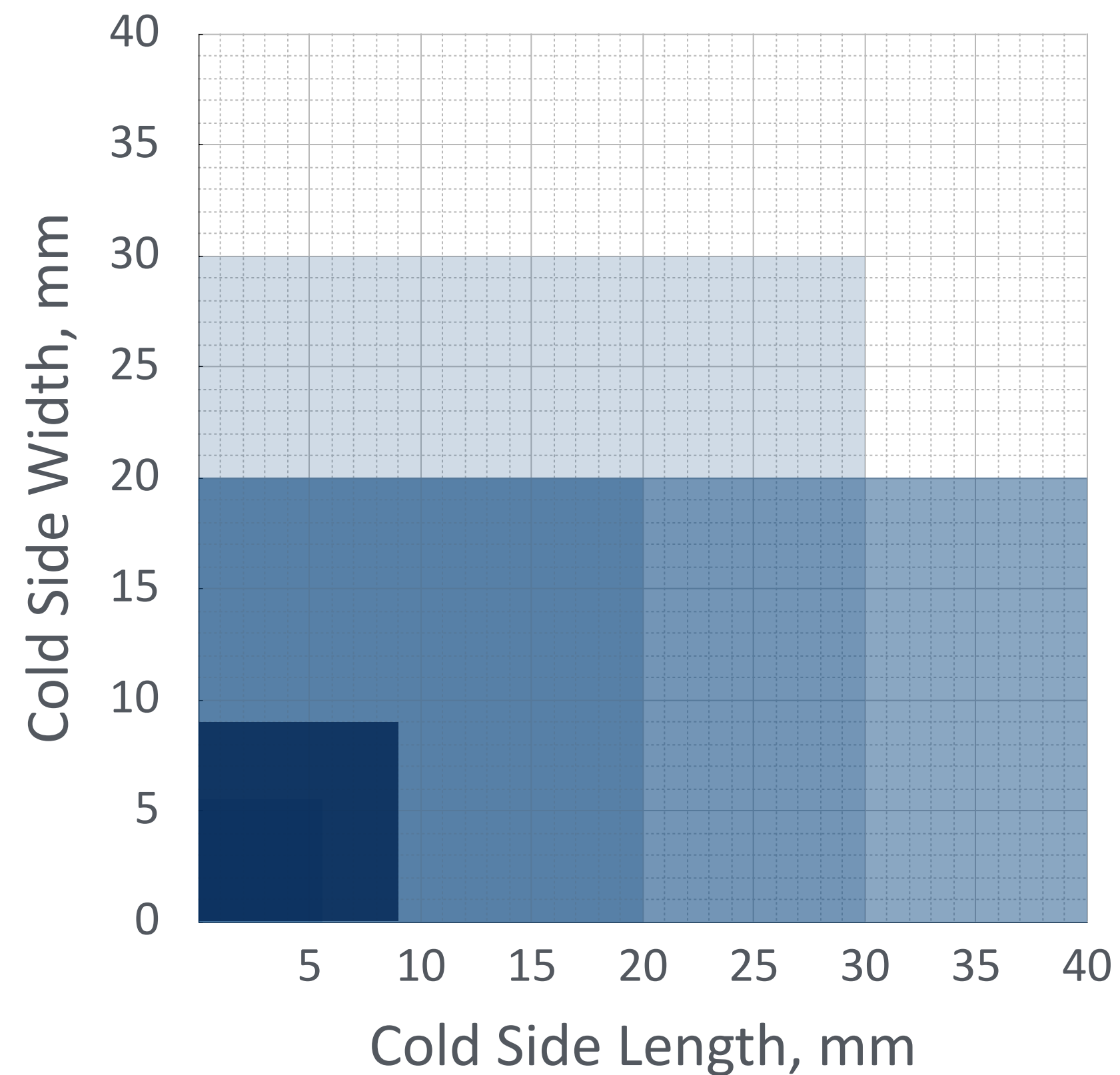
Internal Assembly Solder by default: Sn-Sb, $T_{\text{melt}}=230^{\circ}\text{C}$



RoHS Compliant



ALUMINIUM THERMOELECTRIC COOLERS WITH HOLES



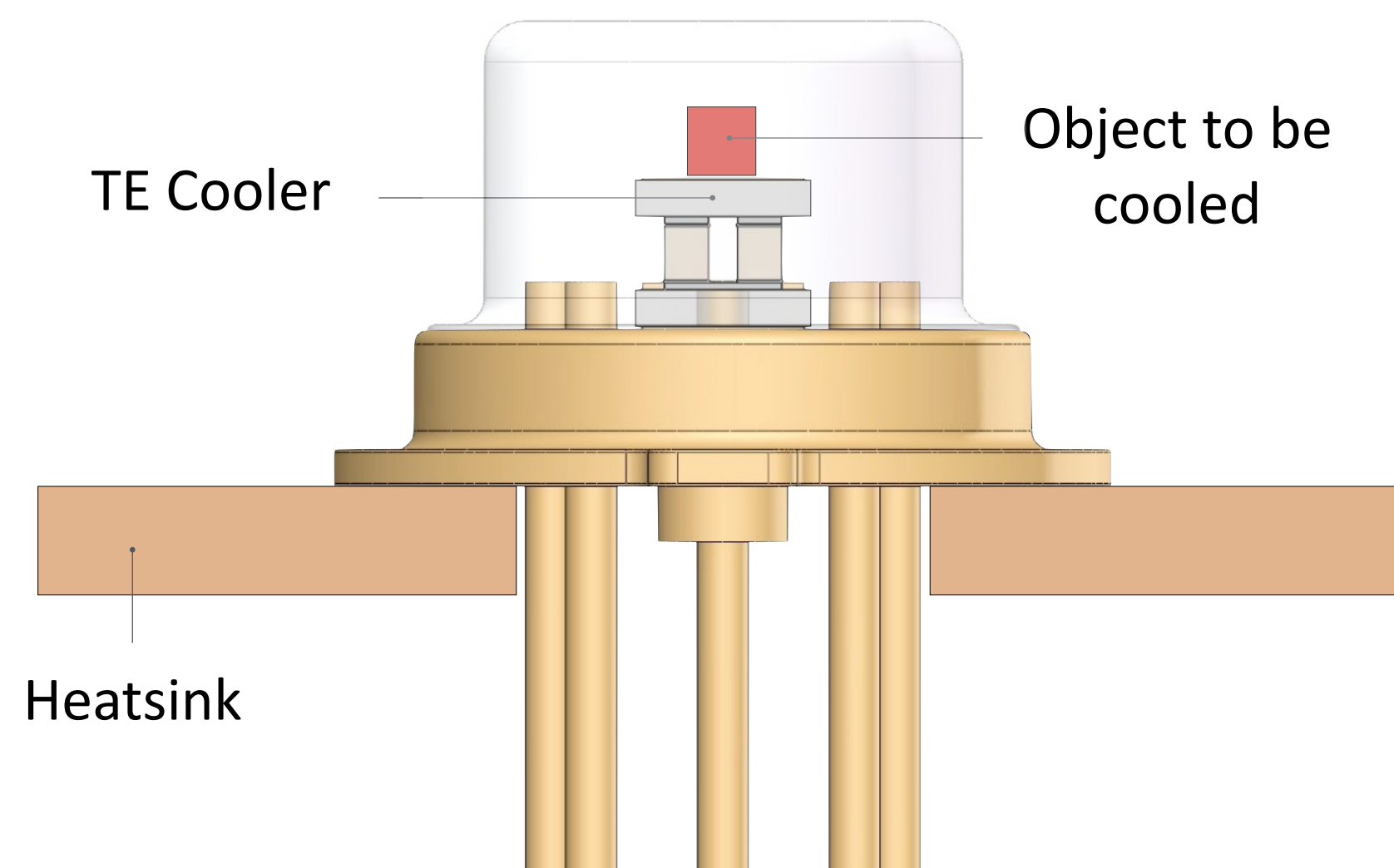
Dimensions, mm	Width	Length
Min	9.0	9.0
Most Common	<30	<30
Available	20	40
Max possible*	30	30..40

* in case of customized TEC development



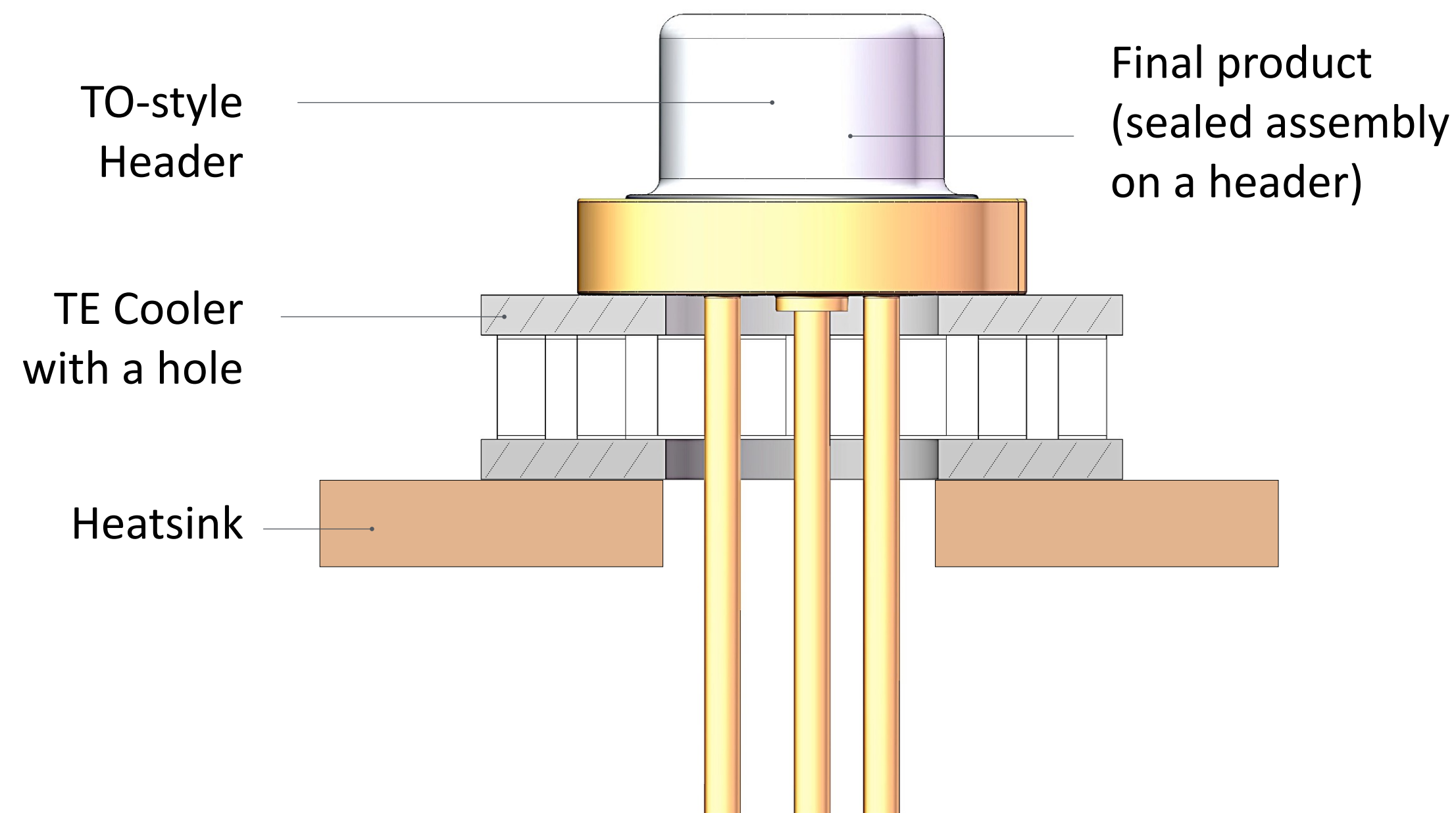
UNDERSTANDING “EXTERNAL THERMOELECTRIC COOLING” CONCEPT

“Internal” Cooling



TEC directly controls the temperature of the object to be cooled

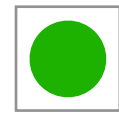
“External” Cooling



TEC controls the temperature of an assembly with the object to be cooled



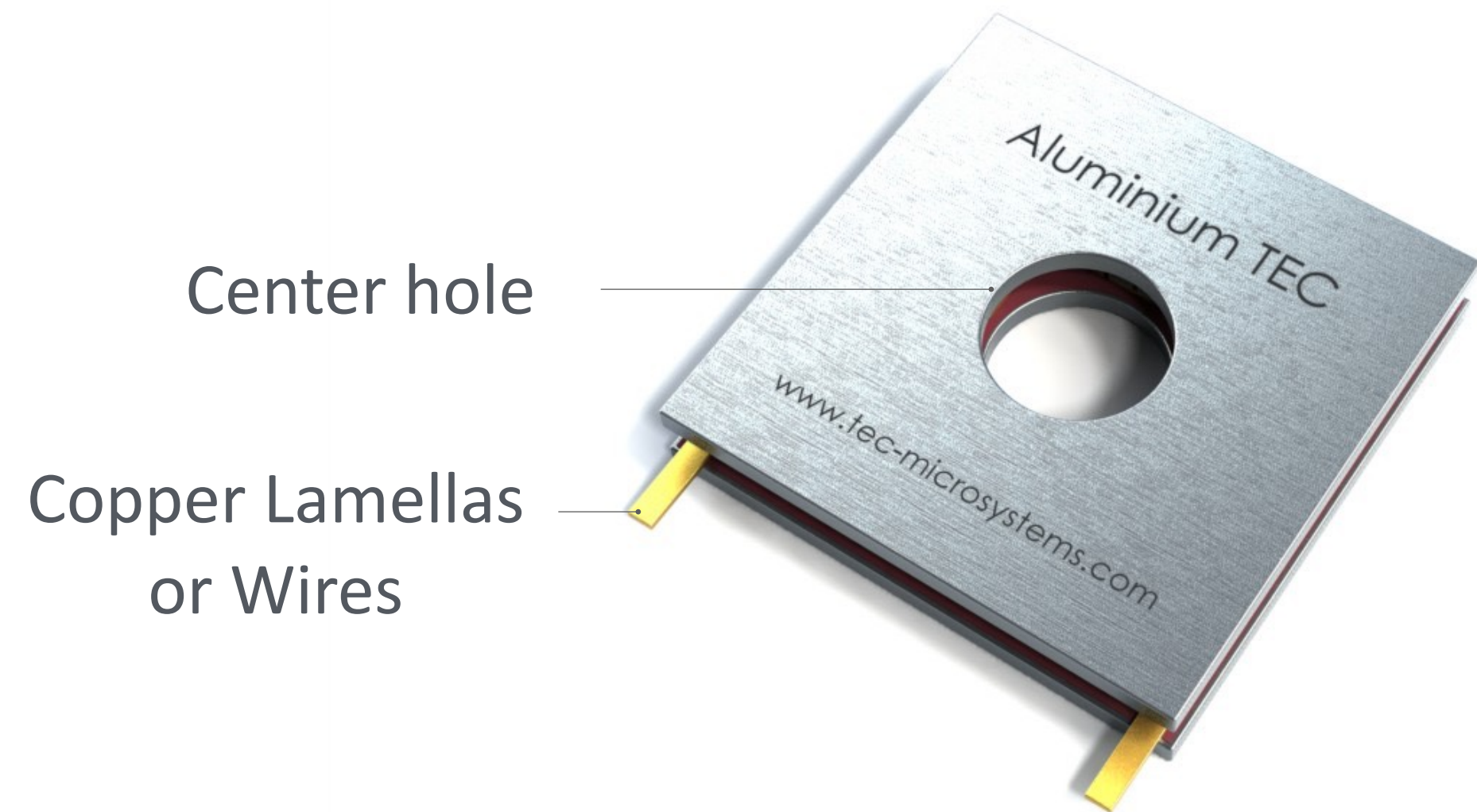
ALUMINIUM THERMOELECTRIC COOLERS WITH HOLES - MOUNTING



Standard manufacturing configuration (default)



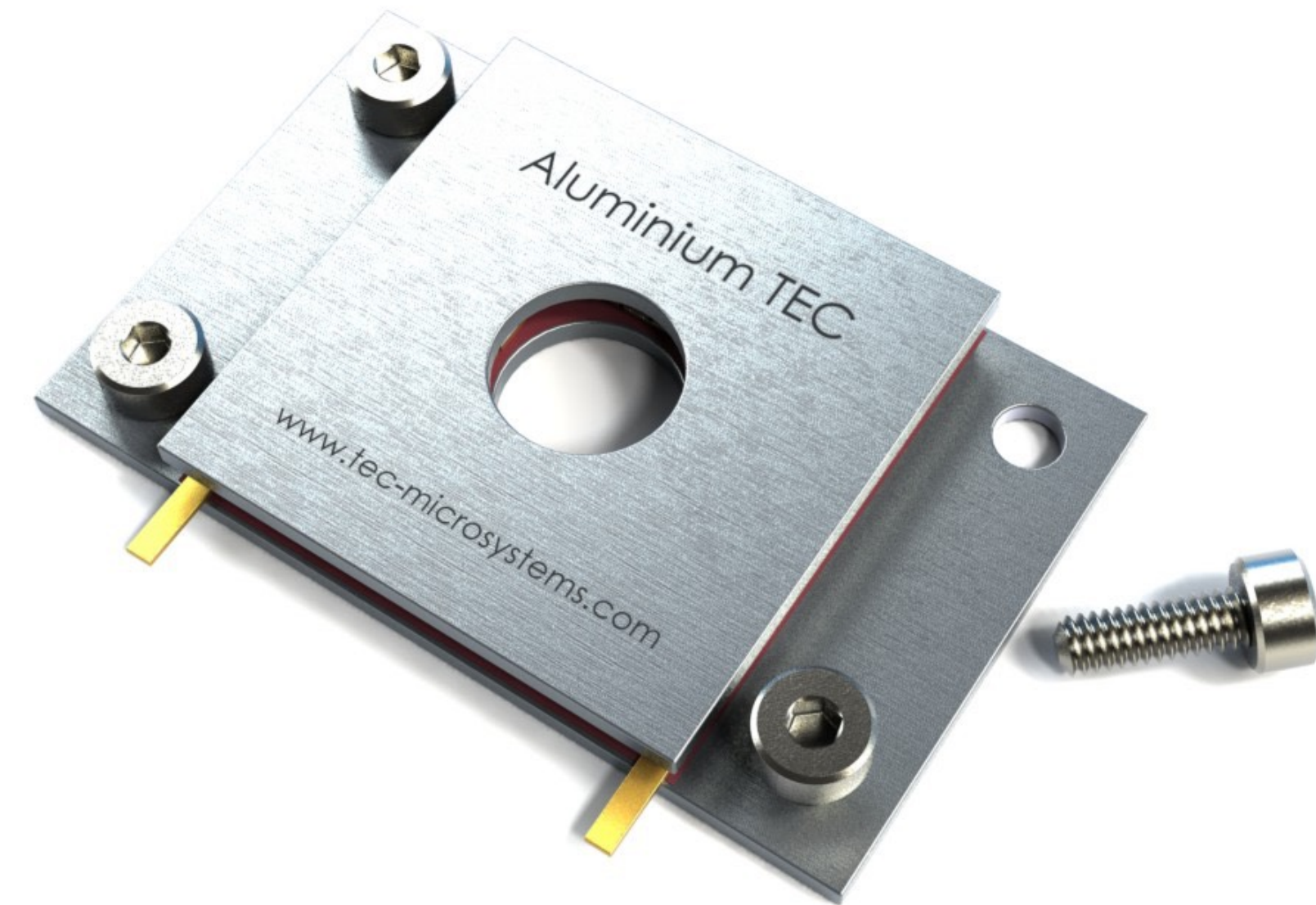
Optional solution with side porches and mounting holes



Center hole

Copper Lamellas
or Wires

TEC Top and Bottom plates have the same dimensions

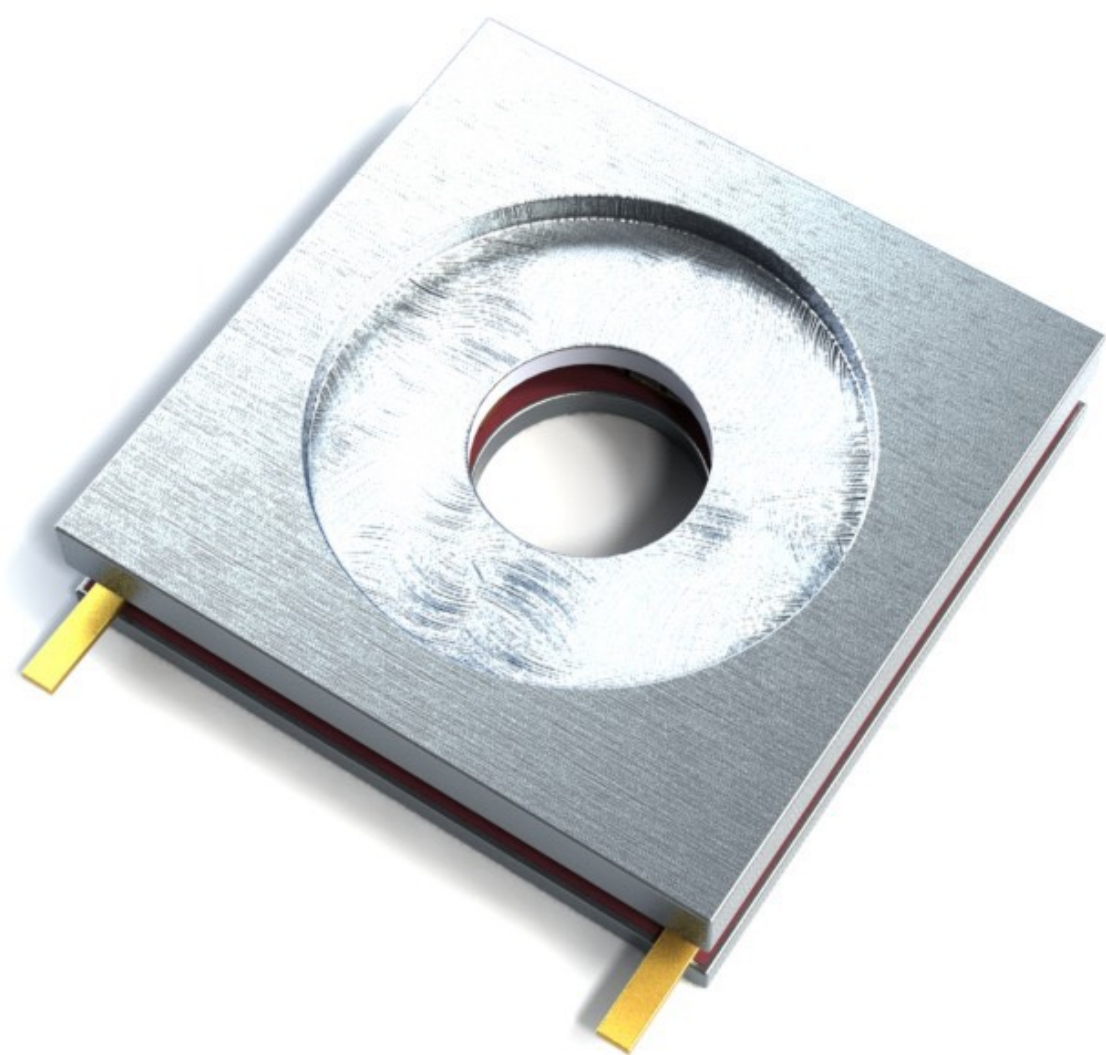


Bottom plated is extended with side porches and has mounting holes

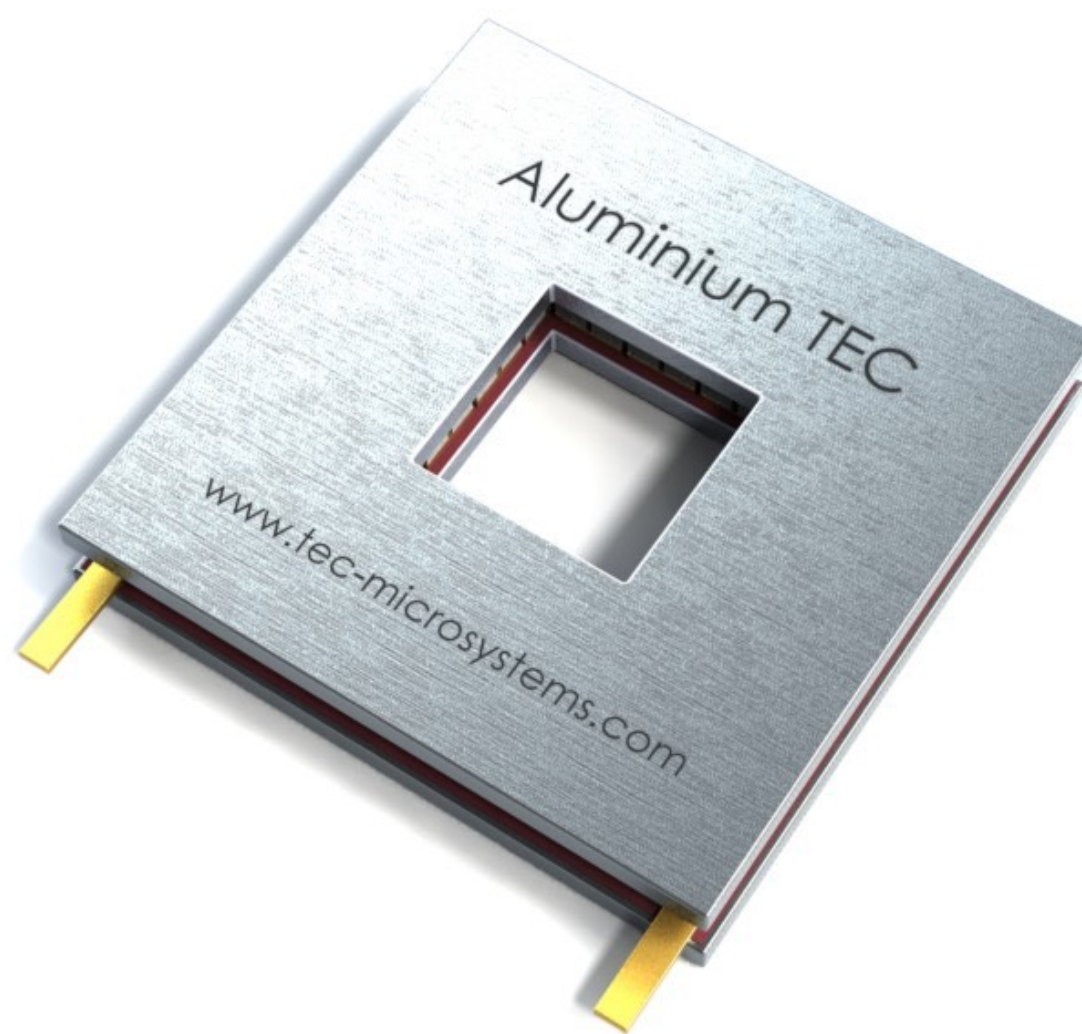


ALUMINIUM THERMOELECTRIC COOLERS WITH HOLES - CUSTOMIZATION

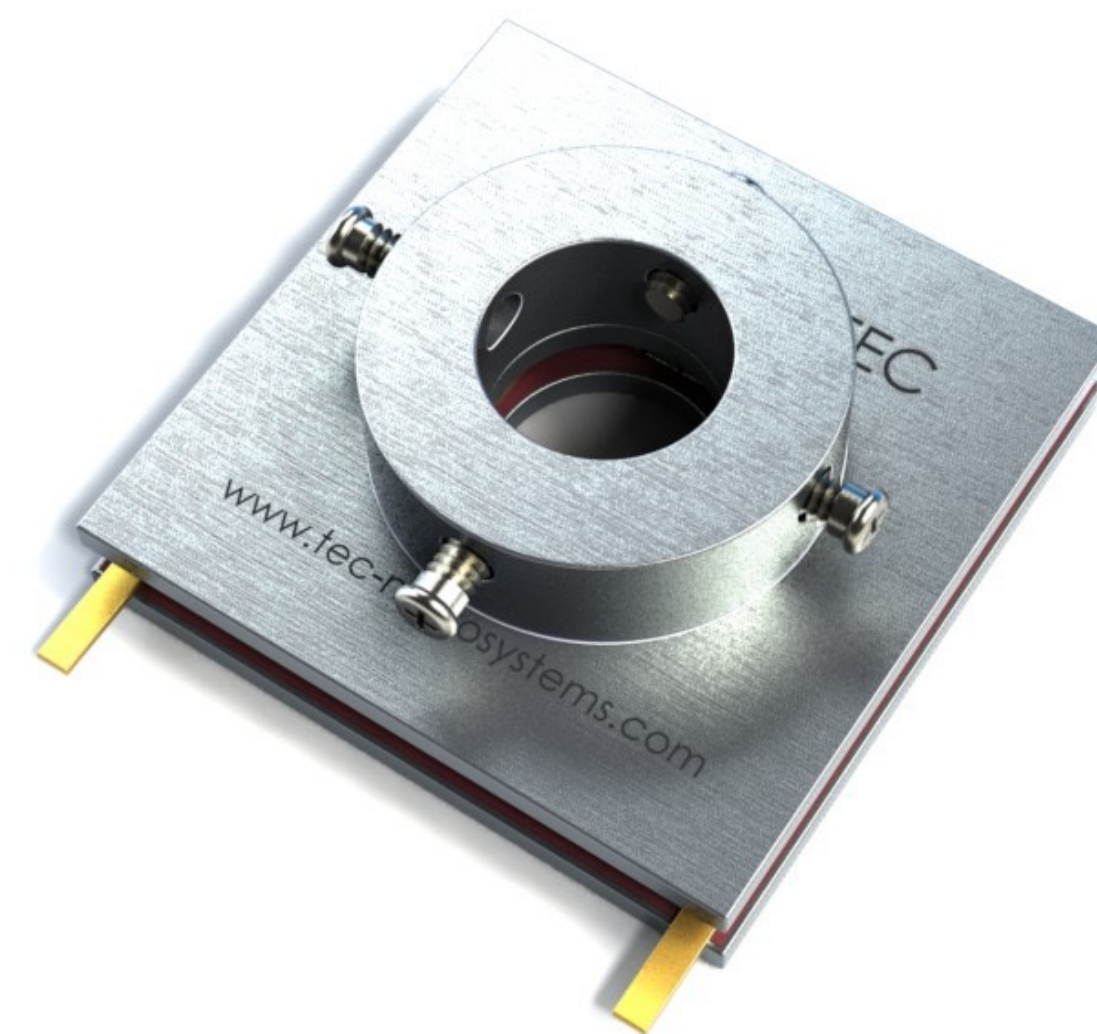
Aluminium plates machining brings new customization methods for TEC



☐ Customized TEC plates
thickness & machining



☐ Customized TEC center hole
size and shape



☐ Advanced 3D surface
machining & mounting



ALUMINIUM THERMOELECTRIC COOLERS WITH HOLES - CUSTOMIZATION

CNC machining of TEC Cold and Hot sides allows to create cooling solutions for non-flat surfaces and components

