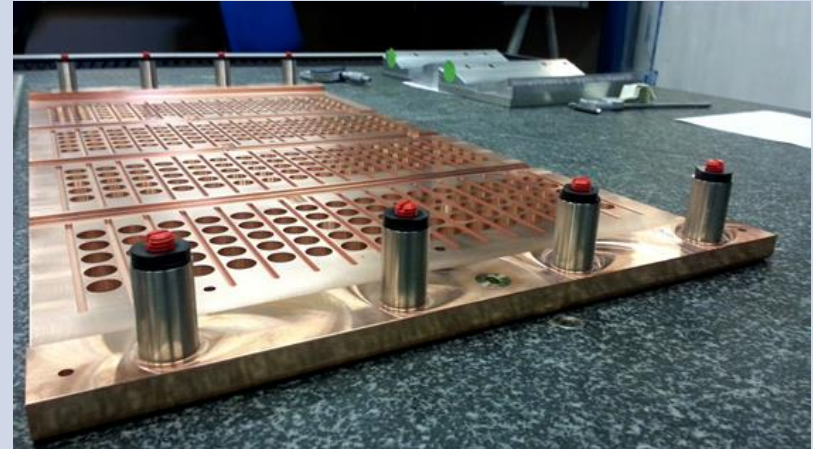


# Keep fusion cool : A process for manufacturing robust and compact components subjected to very high heat loads

A process for manufacturing robust and compact components subjected to very high heat loads

## Value proposition

- The main benefit of the process developed by CECOM is that, by combining technologies of galvanic copper and nickel deposition, any deterioration of the mechanical properties in the components is eliminated.
- Furthermore, the use of copper deposition as a cold method to cover the channels allows reducing the overall weight of the pieces significantly. Finally, the process has been optimized for having better repeatability (e.g in comparison with the the brazing) and it is ready for industrial production.



Technology Transfer proposal BSBF 2022

## Fusion heritage

CECOM worked with Fusion for Energy, the Agency in charge of providing the European contribution to the ITER project, in the development of a high precision, robust and compact water-cooled grids using the galvanic deposition of copper.

By means of this process, all the components that need to be cooled from inside can be manufactured; the grids of the Neutral Beam Injection, but eventually the backside of the elements subjected to intense heat load, since this process is applicable also to other metals as well as for joining different metals, like for instance copper and stainless steel.

The technology developed by CECOM can be used to produce brazing-free manufactured combustion chambers for liquid propelled rocket engines.

Regenerative thrust chambers are employed in rocket engines fed by liquid fuel. Part of the propellant flows inside channels to cool down the temperature of the walls of both nozzle and combustion chamber, and at the same time it is energized for expanding in a turbine and moving the turbo-pumps of combustible and oxidizer pressurization.

Furthermore, this technology allows embedding sensors on cryopump components.

CECOM offers the collaboration to develop assemblies on the basis of this “cold-welding” technique, that relies on higher mechanical strength of materials thermally unaltered.

For further information, the contact point is [Nicolas.louee@inextenso-innovation.fr](mailto:Nicolas.louee@inextenso-innovation.fr)