

Cryogen-free cryostat with sample changer for fast automatic data collection

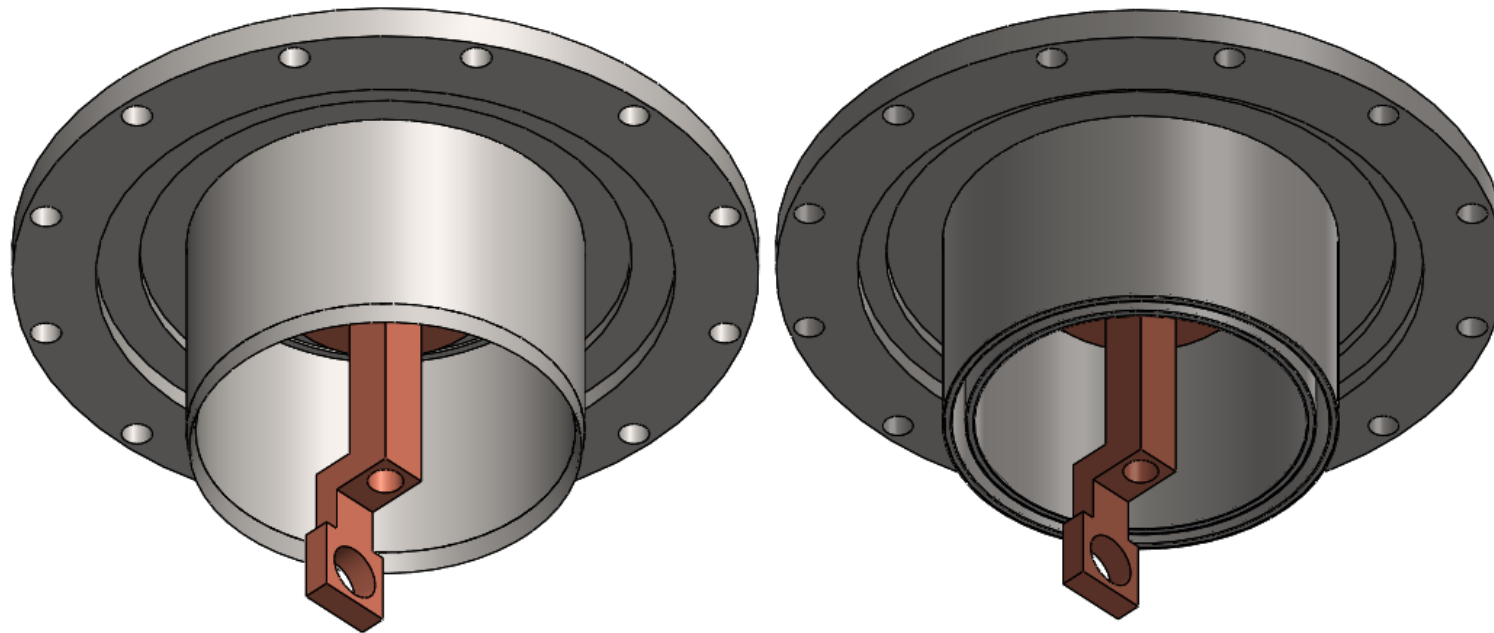
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MLZ is a cooperation between:

Thermal decoupling of the sample desk

Enhancement: Longer thermal decoupling

Problems faced: Leaks due to thermal stress and/or pressure load

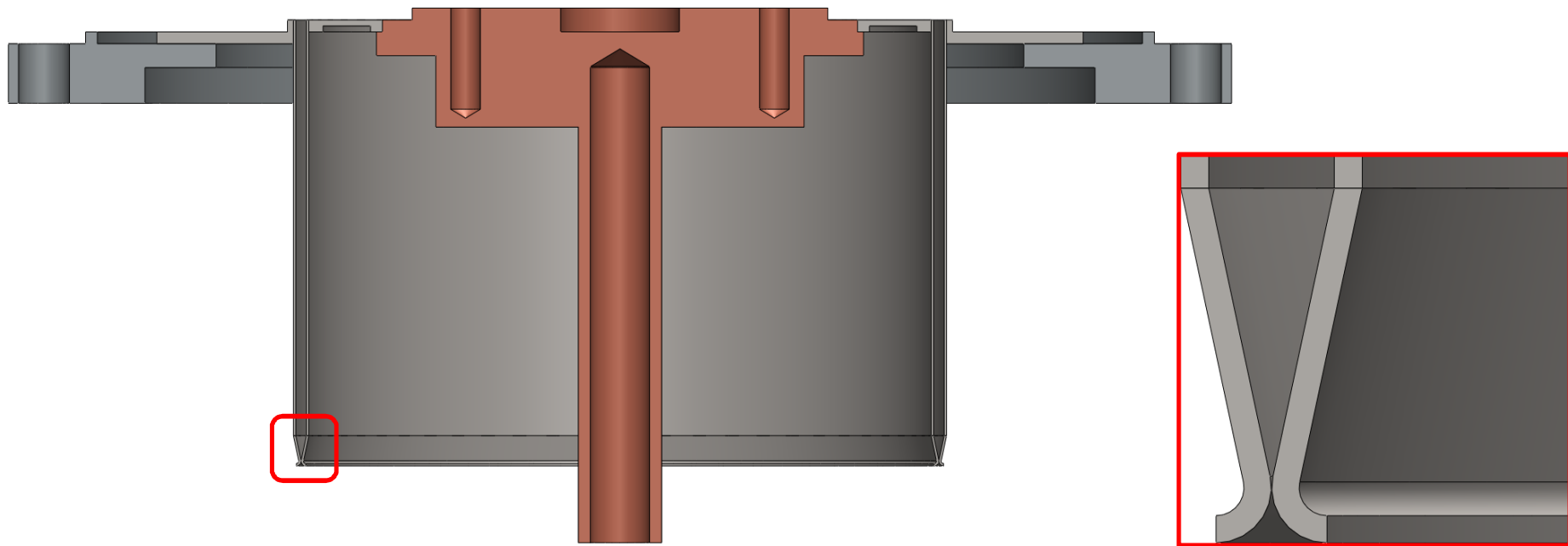


Thermal decoupling: Our design

Single pair of cylinders

Bent endings for weld connection

⇒ Rejected by manufacturing company, design too complicated

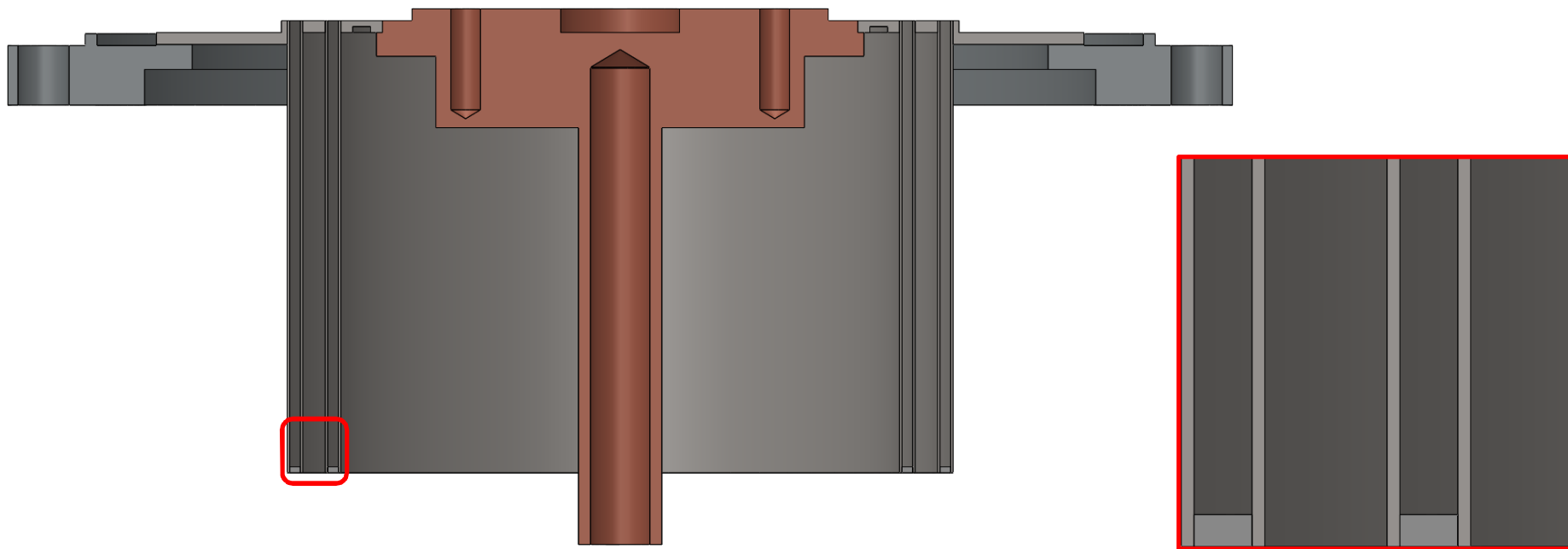


Thermal decoupling: Enhanced design 1

First single pair, later double pair of cylinders (due to thermal input)

Ring welded between cylinders

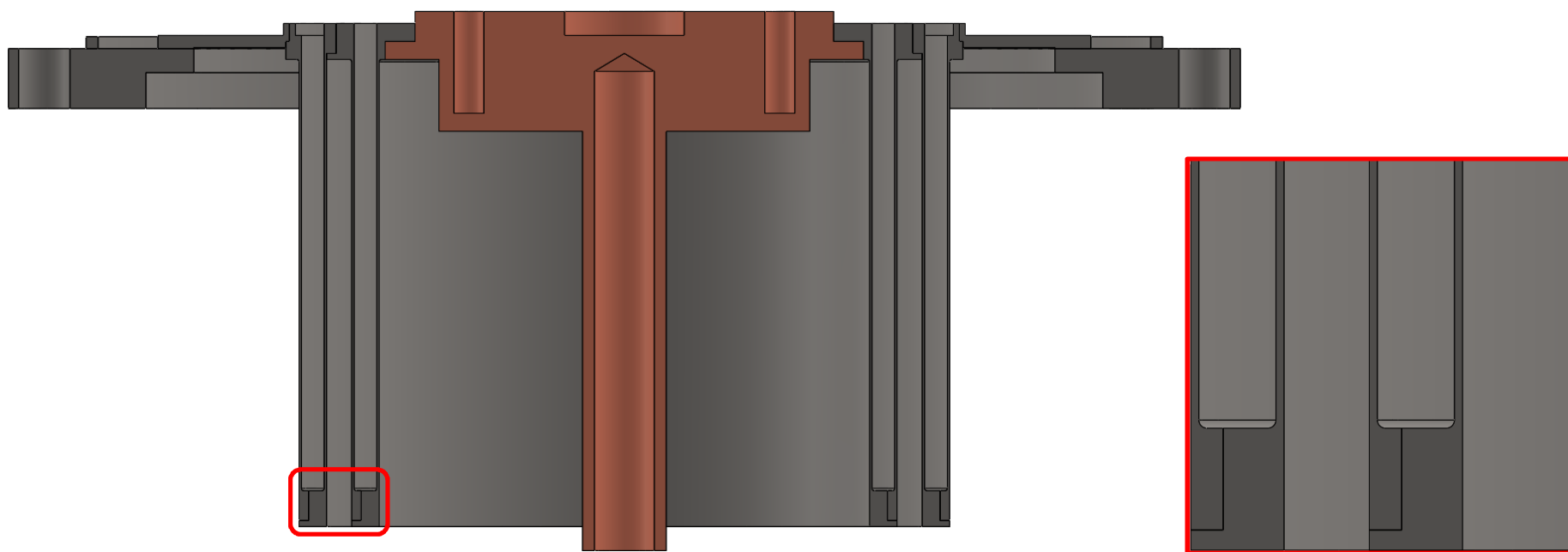
⇒ Connection does not withstand thermal stresses and/or alternating pressure loads



Thermal decoupling: Enhanced design 2

Double pair of cylinders with solder seam

Each cylinder turned separately



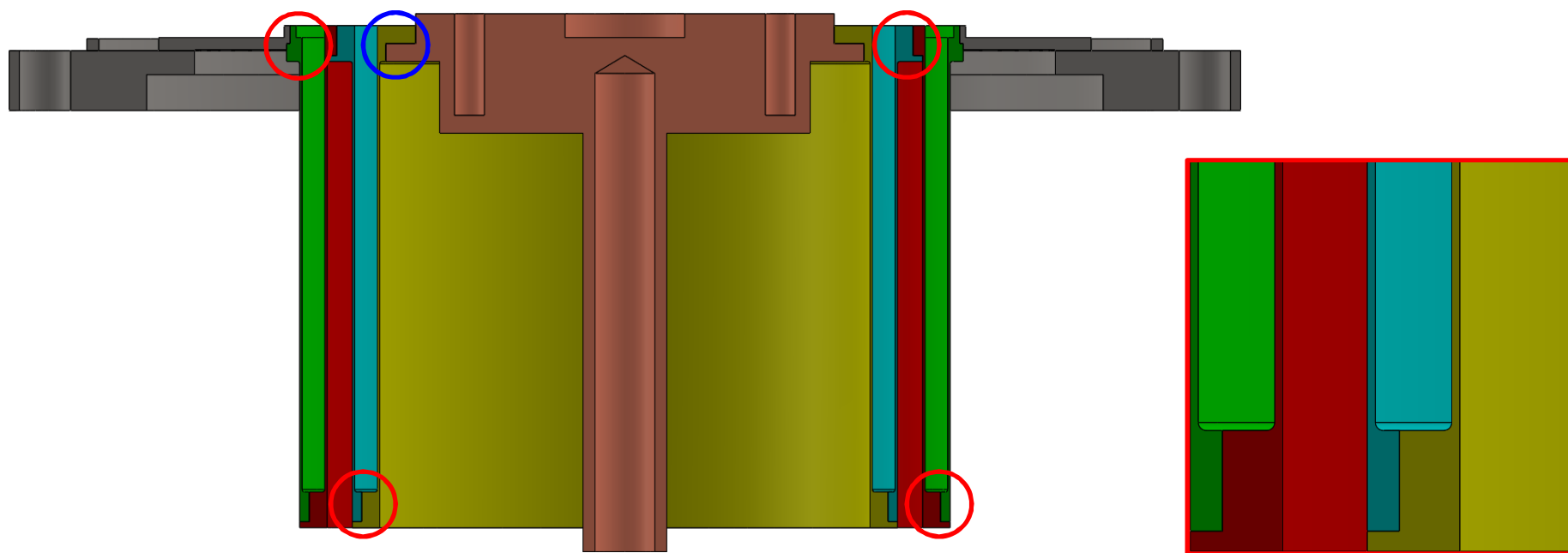
Thermal decoupling: Enhanced design 2

Double pair of cylinders with solder seam

Each cylinder turned separately

Solder connection between the cylinders for elasticity

Welding connection between sample desk and cylinders



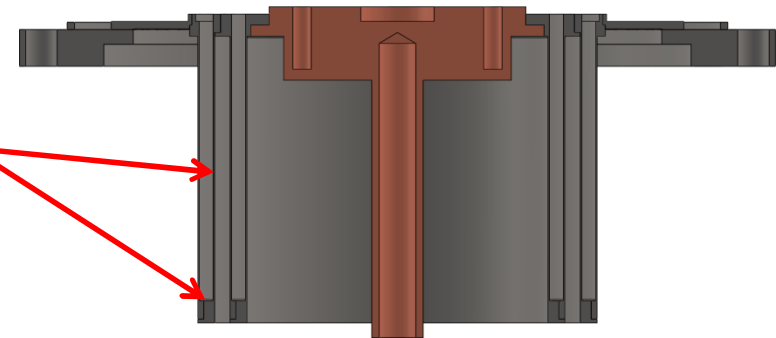
Thermal decoupling: Enhanced design 2

Huge problems to get the solder connections sealed properly

- ⇒ solder ring between cylinders
- ⇒ electron beam heating

Leakages along inner cylinder surface

- ⇒ cutting the outer surfaces
- ⇒ soldering the inner cylinder
- ⇒ welding the outer surface



- ⇒ Solder connections withstand thermal and pressure loads so far
- ⇒ Simpler design for future sample desks:
 - four standard cylinders
 - thicker rings for brazing fit

Thank you for your attention!



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