Experimental Fine-Advancement of Vacuum Brazing Processes for Fabrication of S-Band RF Coupling Cells

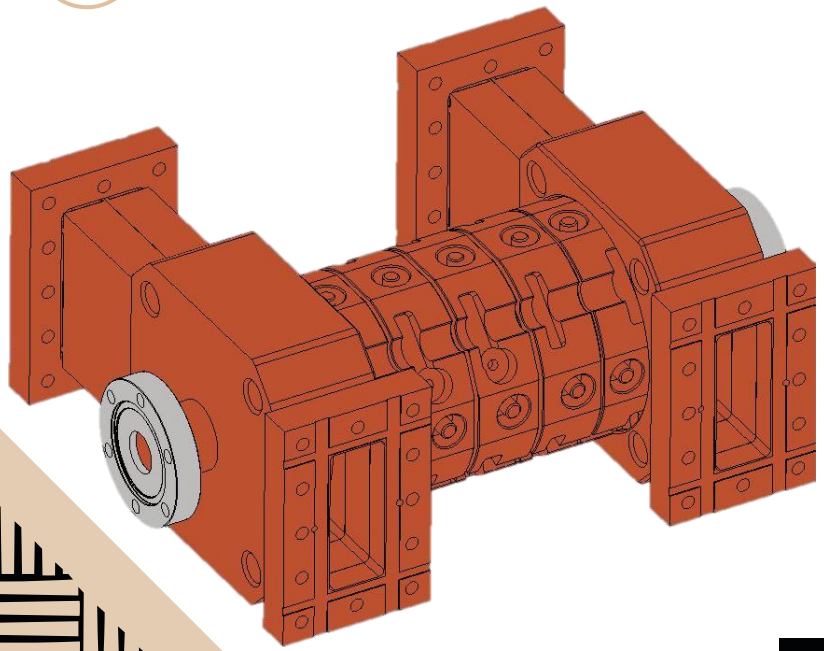
Speaker` Hamlet Isunts

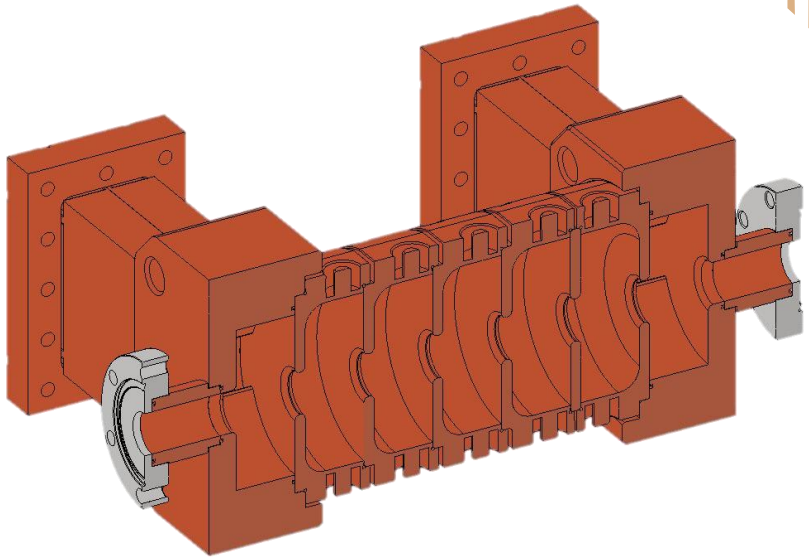
Introduction

This applies to the technology of high vacuum brazing for fabrication of S-Band RF coupling cell. The brazing in high vacuum conditions provides a vacuum-tight and more precise connection with the use of special high-purity fillers. Based on the material and design of the part, as well as the shape of the filler, it is necessary to develop filler channels and gaps that will be of the most optimal shape and size.

Introduction

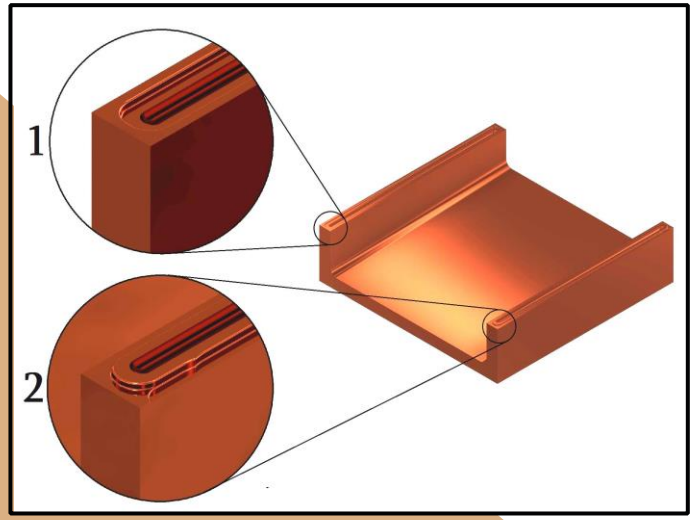
High-purity silver-copper alloys of the BV Ag-30, BV Ag-8, and BV Ag-29 brands were used as fillers. Rectangular flanges for brazing with waveguides are made of GlidCop AL-25, and the CF flange for the beamline tube is made of stainless steel.

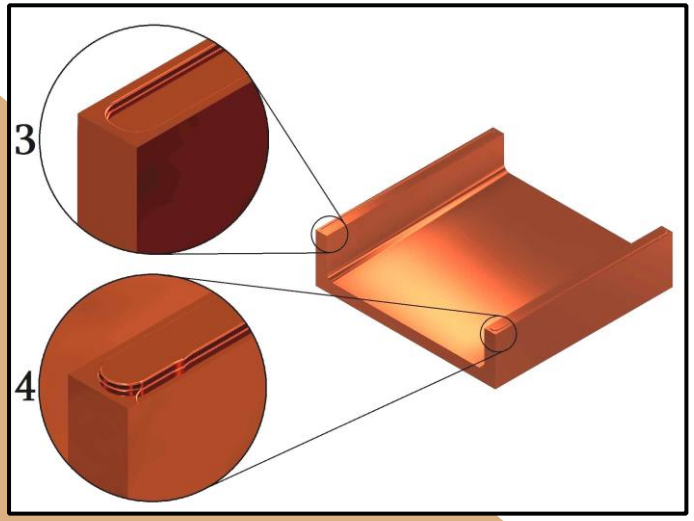


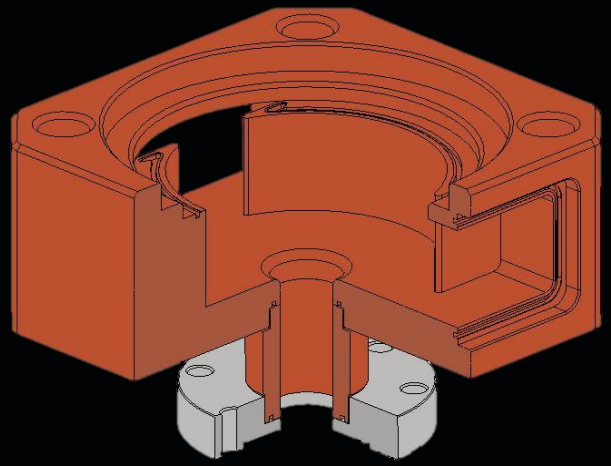


S-Band RF Coupling Cells Unit Model

Design of Long Waveguide Parts Joints





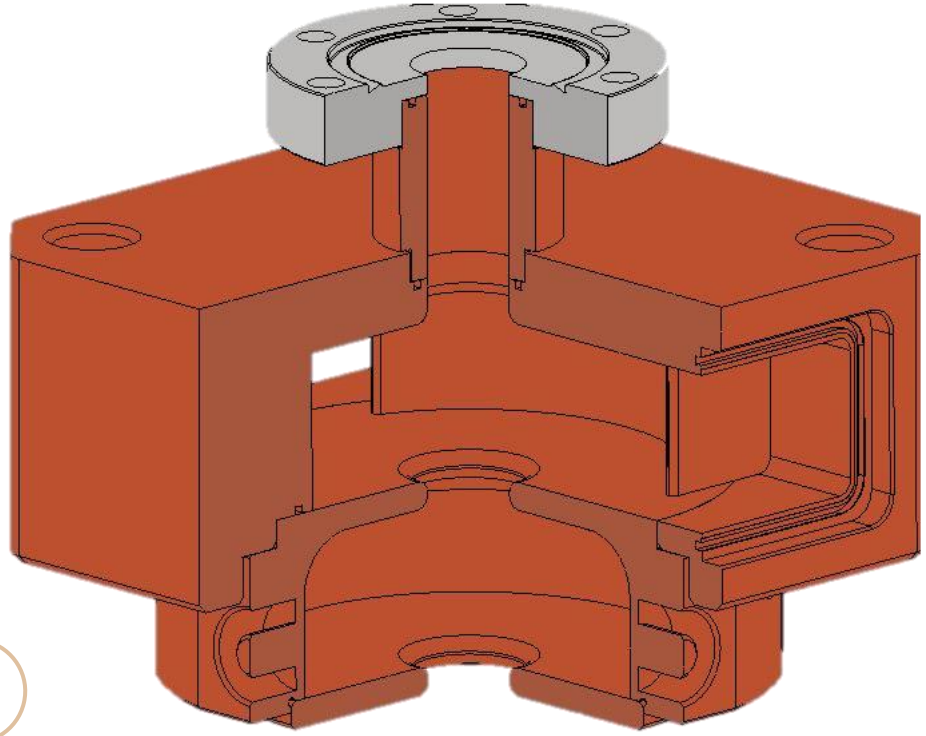


1 Part’s Position

Vacuum brazing operations: Coupler with end beamline tube and flange

Brazing filler: BV Ag-30

2 Part’s Position



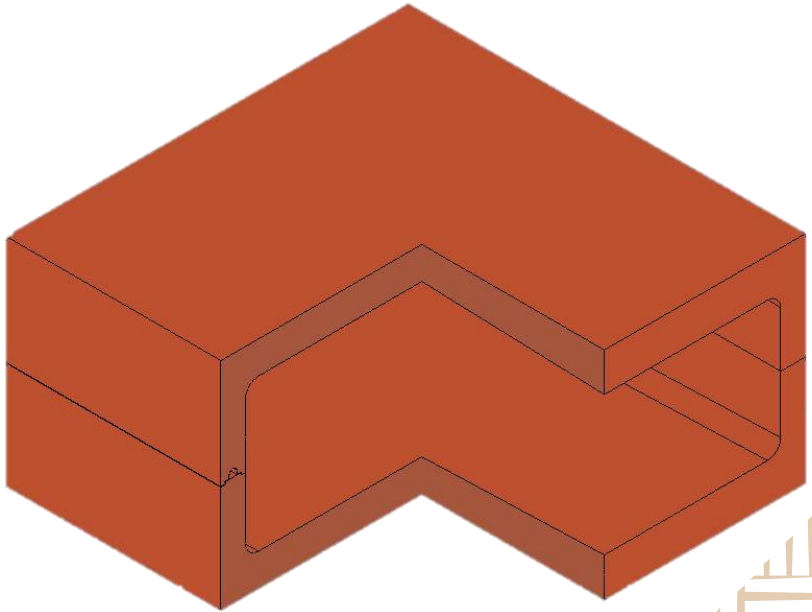
Vacuum brazing operations: Unit from operation 1 with coupler cell (and thin disk)

Brazing filler: BV Ag-8

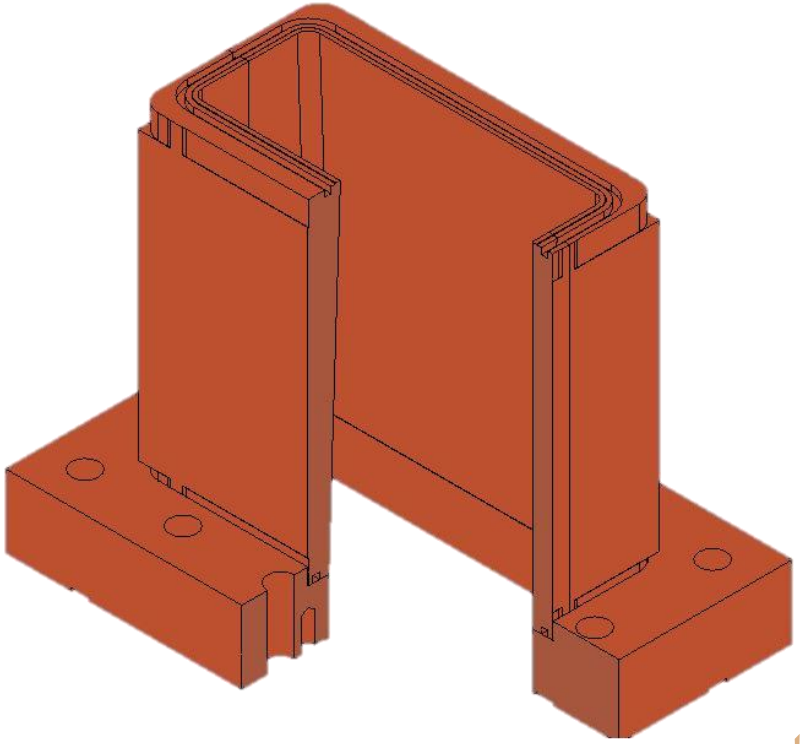
3 Part's Position

Vacuum brazing operations: Long rectangular waveguide parts

Brazing filler: BV Ag-30



4 Part’s Position



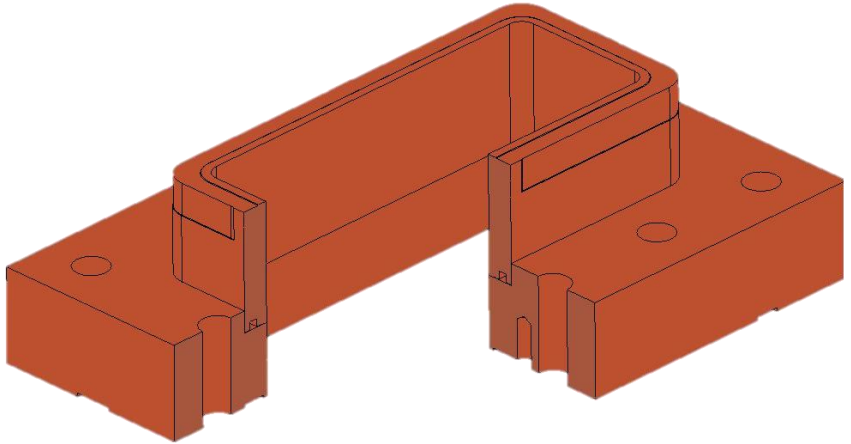
Vacuum brazing operations: Unit from operation 3 with rectangular flange

Brazing filler: BV Ag-8

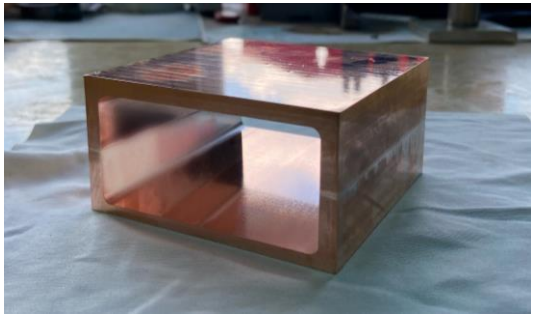
Vacuum brazing operations: Short rectangular waveguide with rectangular flange

Brazing filler: BV Ag-30

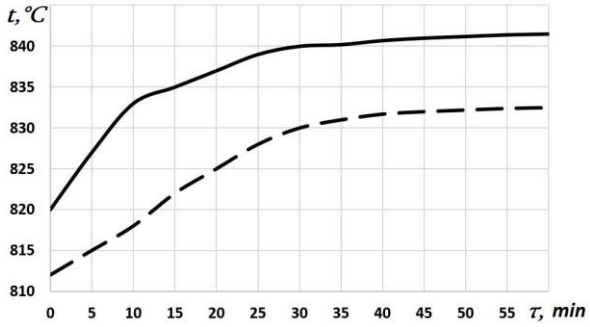
5 Part's Position

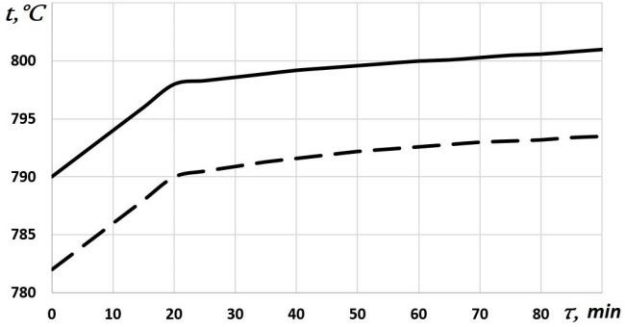


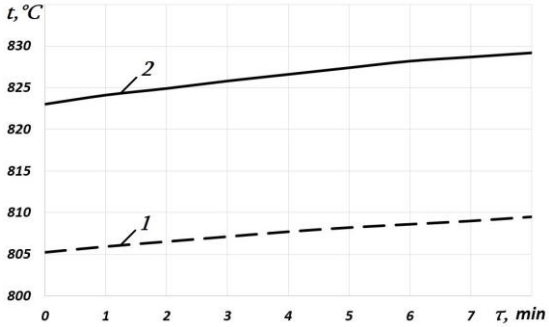
Brazed Units

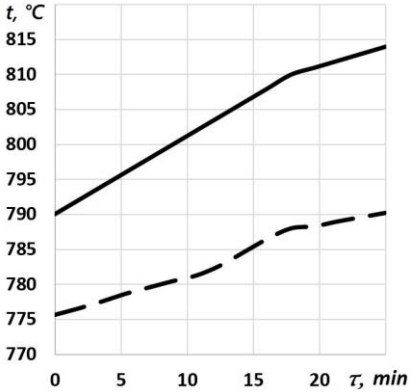


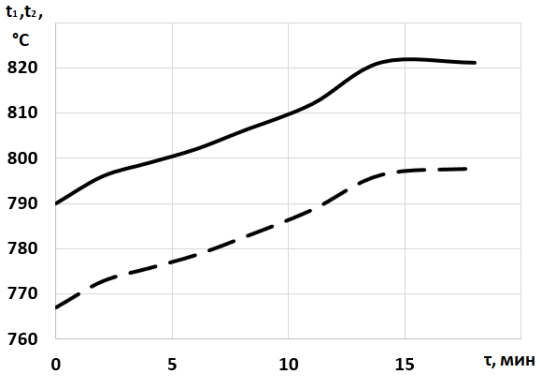
Brazing Modes

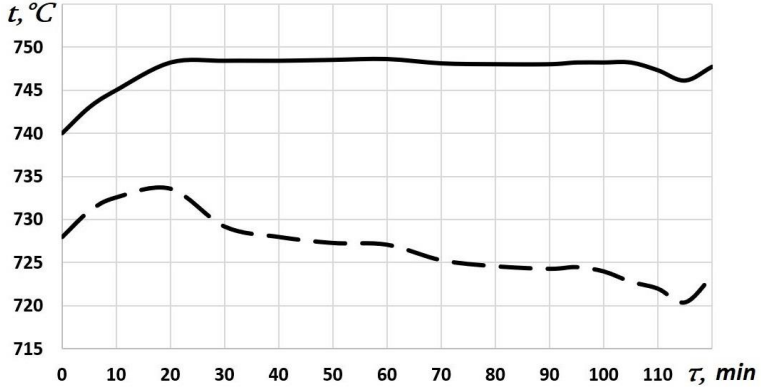








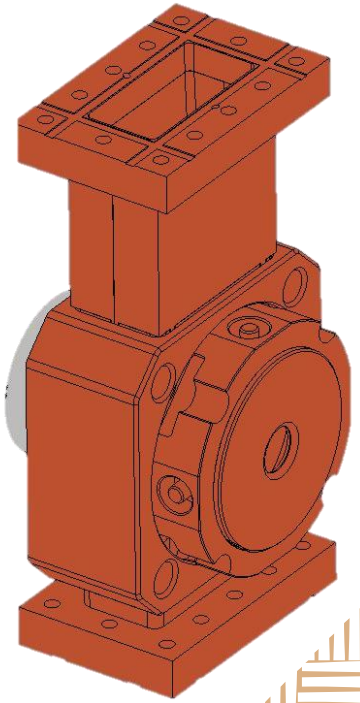


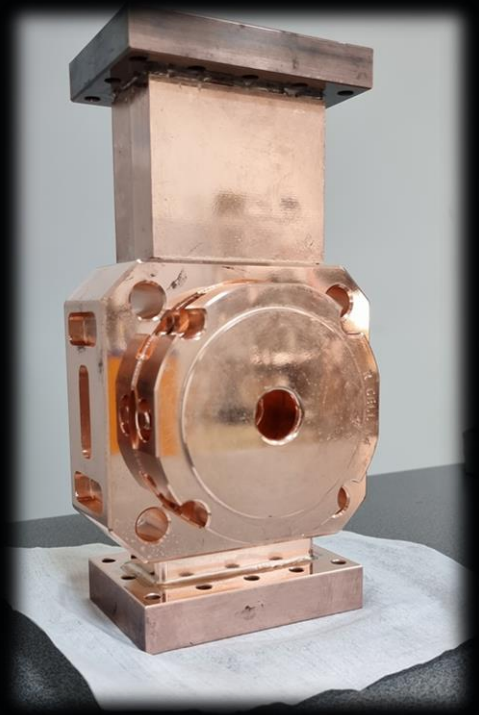


6 Part’s Position And Brazed Units

Vacuum brazing operations: Units from operation 4 and 5 with unit 2

Brazing filler: BV Ag-29





The Main Goals

- Design and processing of couplers, coupler cells, end beamline tubes, and flanges.
- Brazing processes of couplers with end beamline tubes and flanges in high vacuum conditions.
- Developing a vacuum brazing technology for coupler cells.
- A technology for the fabrication and vacuum brazing of a rectangular high-frequency waveguide with variable cross-section and minimal reflection.
- Vacuum brazing of the resulting waveguide from OFHC copper with a rectangular flange from GlidCop AL-25.
- Processing and vacuum brazing of short waveguide from OFHC copper with a rectangular flange from GlidCop AL-25.
- A technology for vacuum brazing of waveguide units with coupler unit.

Thanks!