



## A.8: Vacuum brazing of 8-cell PWT Linac assembly and collimators of front end

An 8-Cell Plain Wave Transformer (PWT) Linac assembly as shown in Fig. A.8.1 has been successfully vacuum brazed at the Vacuum Brazing Facility available at the Accelerator Component Engineering and Fabrication Division of RRCAT. The assembly consists of 8 Oxygen Free Electrolytic (OFE) copper discs, 4 copper plated stainless steel tubes, OFE copper reservoir, and a copper plated flange. There were 68 joints to braze. All the joints have been vacuum brazed in the single cycle. Brazing alloy used was Cusil eutectic (72Ag-28Cu) in the form of wire and foil. For holding the job in position and maintaining accuracy in the job, vacuum treated graphite fixture was used. Brazing was carried out at a temperature of 835° C and at a pressure of  $5 \times 10^{-5}$  mbar. The assembly has been leak tested for a leak rate better than  $1 \times 10^{-10}$  std-cc/sec (He). Earlier, a full scale prototype with 8-cell assembly was successfully vacuum brazed using ETP copper discs and reservoir.

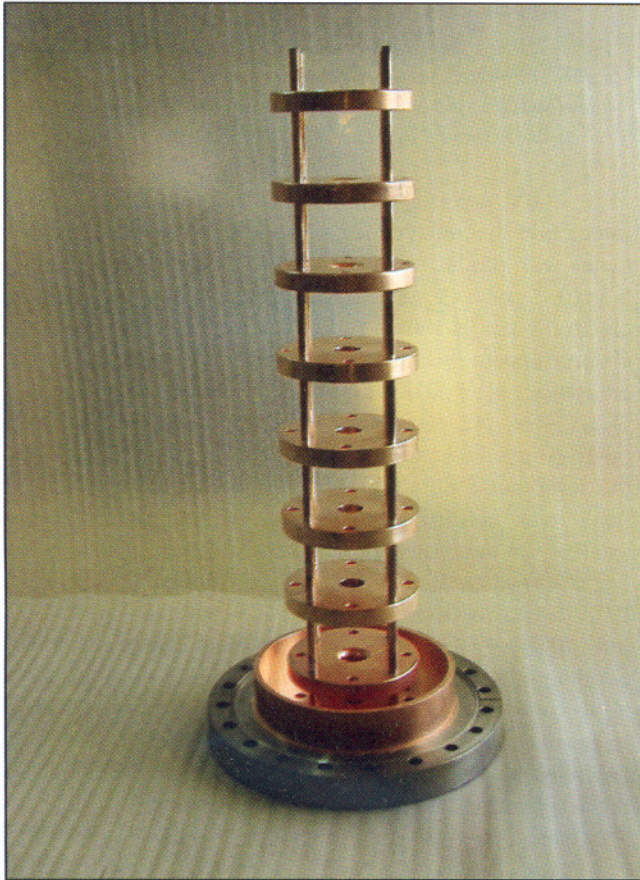


Fig. A.8.1: 8-Cell PWT Linac Assembly.

Several other components have been vacuum brazed at the above vacuum brazing facility. These include SFDTL Drift Tube assembly with very complex shape. The brazing of the above has been accomplished successfully. All of the brazed joints were leak tested and leak rates of the vacuum brazed joints were found lower than  $2 \times 10^{-10}$  std-cc/sec (He). Drift Tube capacitor plate with SS-Cu joint was also vacuum brazed.

Other components such as collimators for front end of Indus-1 beam-line (Fig. A.8.2), Fixed Position Filter, Fixed Position Slit Plate assembly, UHV assemblies of Fixed Masks, and water cooled safety shutters have also been vacuum brazed. The above assemblies were having several joints of Cu-Cu and SS-Cu. Leak tightness of all vacuum brazed joints of the assemblies and components so far was found to be better than  $2 \times 10^{-10}$  std-cc/sec (He) with

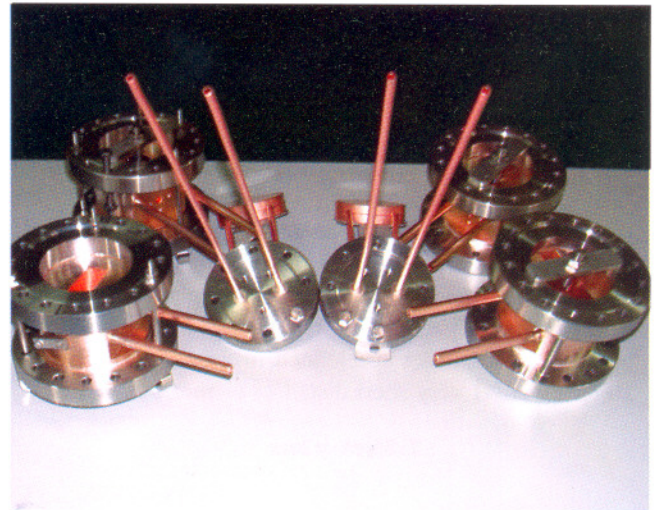


Fig. A. 8.2: Collimators of front end

zero failure in joint making. The results of the vacuum brazing are very encouraging and reliable. Other challenging jobs, which are difficult to join and fabricate can be developed as per the requirements of the users. The vacuum brazing facility available at the centre has become complimentary to the other procedures of fabrication and development at the centre. The centre is looking forward to undertake jobs of national and international importance in the near future.

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