

## Fabrications of Drift Tube for PEFP(III)

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### 1. Introduction

As the first stage of the PEFP(Proton Engineering Frontier Project) whose final goal is to develop 1GeV, 20mA proton accelerator, beam extraction test of 3MeV 350MHz RFQ is being performed and 20MeV 350MHz DTL(Drift Tube Linac) is being constructed.

### 2. Fabrication Process of the Drift Tube

We want to summarize the fabrication process of the drift tubes which is containing electro-quadrupole magnet(EQM) inside. First, all the parts of drift tube which has same dimensions except the length L, shown in figure 1, were machined within the machining error of 10micron. And then, stem and inner tube were brazed to drift tube body and cap respectively assuring the perpendicularity as shown in figure 1. Electro-quadrupole magnet was made with the magnet core composed of commercial iron. For coil, we used the commercial transformer wire which has rectangular shape of 3mm \* 2mm. EQM has 36 turns of winding and consumes 800W at the current level of 2200 A-turns. Fabricated EQM is shown in figure 2. After assembling the DT parts and EQM as shown in figure 3, we welded every parts using E-beam welding method. Temperature increment during e-beam welding was restricted to 50 degree. As the final process, surface of the welding seam was polished mechanically.

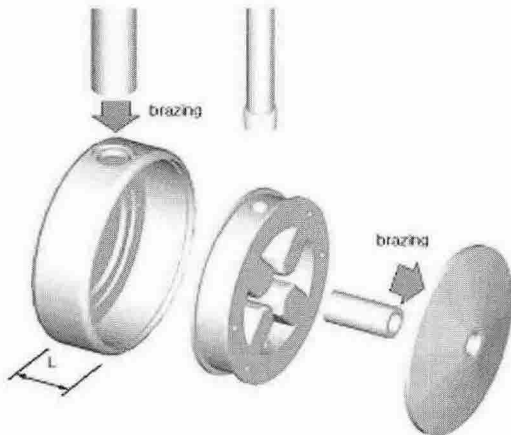


Figure 1. Parts of the Drift Tube

### 3. Test Results of the Drift Tube

We test the vacuum stability of the fabricated drift tube using He leak detector and vacuum chamber, coolant flow level under the coolant pressure of out

cooling system, and insulation level using mega-ohm tester. Fabricated drift tube didn't show any problem in vacuum stability. Coolant flow shows 30 SLM under the pressure difference of 3atm, so it is considered that it has adequate cooling capacity.



Figure 2. Fabricated EQM

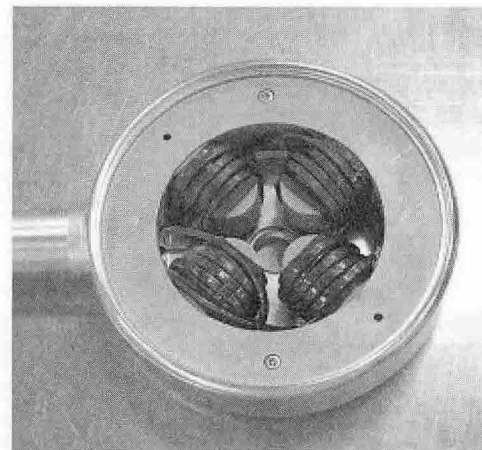


Figure 3. Assembled Drift Tube

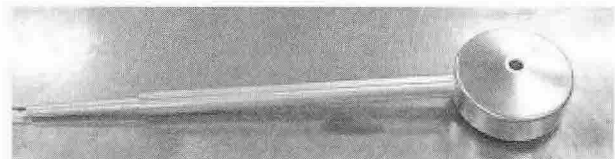


Figure 4. Fabricated Drift Tube : final feature