

## PXIE MEBT quadrupoles specifications

Transverse focusing in the PXIE MEBT is provided by 2 quadrupole doublets and 7 quadrupole triplets. The total of 25 quadrupoles are of two types, 11 quadrupoles of Type F and 14 of Type D (spares are not included). The quadrupoles should be removable without breaking vacuum for a possible bakeout, leak checks, and connecting BPM cables.

A dipole corrector assembly is mounted downstream of each triplet or doublet (total of 9). The design should take into account effects resulting from the proximity of the quadrupole and corrector yokes.

### *Beam parameters*

In the present optics configuration, PXIE MEBT requires 2 quadrupole doublets and 7 triplets to focus 5mA, 2.1 MeV CW H- beam.

Typical 3 sigma beam half-size  
in quadrupoles (X/Y)- 10/5 mm  
Shift of the un-chopped beam centroid - 4 mm

### *Main quadrupole parameters*

Minimum tip separation (diameter) - 34 mm

Integrated gradient homogeneity  
in the good field region 1%  
Region of the good field (diameter)- 23 mm

Maximum integrated gradient- 1.5 T for Type F  
0.85 T for Type D  
Suggested magnetic length- 10 cm for Type F  
5 cm for Type D

Separation between centers of quadrupoles  
in triplets (D+F+D)- 14.5 cm  
in doublets (F+F)- 17 cm  
(corresponds to the distance between iron of 7 cm in both cases)

### *Dipole correctors*

Each assembly includes two (H and V) dipole correctors. The assembly should be removable without breaking vacuum for the initial assembly, leak checks, and a possible bakeout.

Integral of the dipole field- 2.1 mT\*m  
Region of the good field (diameter)- 23 mm  
Integrated field homogeneity in the good field region 5%  
Minimum clear aperture (diameter) 75 mm  
Available space between the yoke of the nearest quadrupole  
and a wall of a vacuum box downstream 75 mm

Space between quadrupoles is used for BPMs. The BPMs are connected to cables before installation of quadrupoles. The space that should be left free of winding and other quadrupole elements is shown on the following figure by brown dashed lines.

All dimensions are in mm.

