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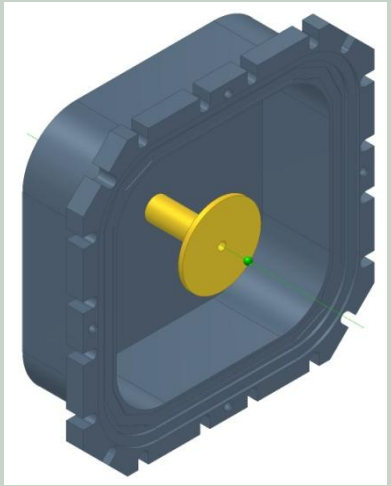
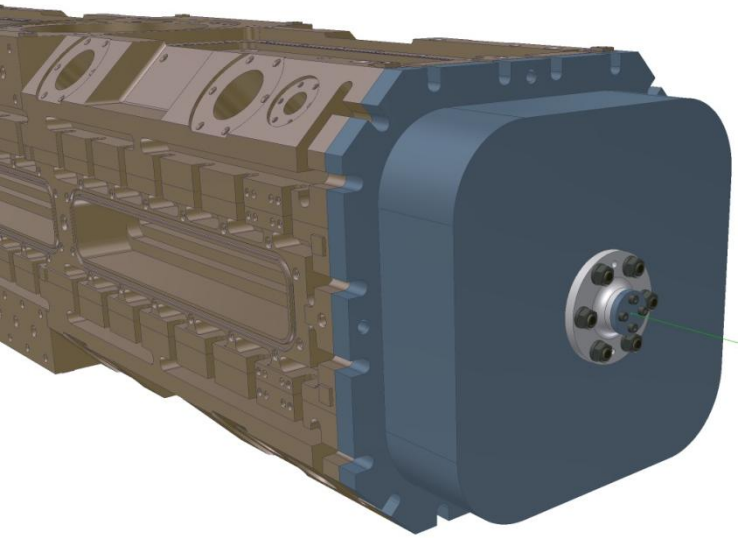
FETS RFQ RF Test / Bead Pull Test End Flange Design

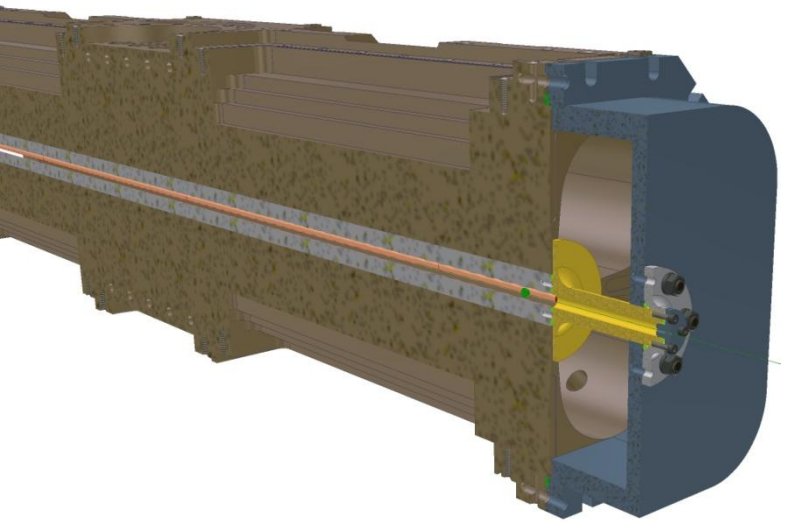
28th March 2012



by Peter Savage

RFQ RF Test / Bead Pull Test





“The RF test will give us a lot of information on the alignment and quality of the machining by observing the RF modes at low power. Not only is the RF highly sensitive to errors, but the relation of quadrupole to dipole modes in position and height will tell us something of the "direction" of misalignment. In addition if we get the RF right we should also get the best beam transmission.....”, J.P.

The RF test end flange has been designed to simulate the function of the vane cutbacks i.e. to provide a path for the longitudinal magnetic fields to loop around.

The end flange has been optimised for frequency and longitudinal electric field flatness. By modifying the protrusion size, shape and offset we could control the capacitance and by modifying the size of the end flange interior we could control the inductance. Balancing these requirements with Engineering requirements has led to this design.

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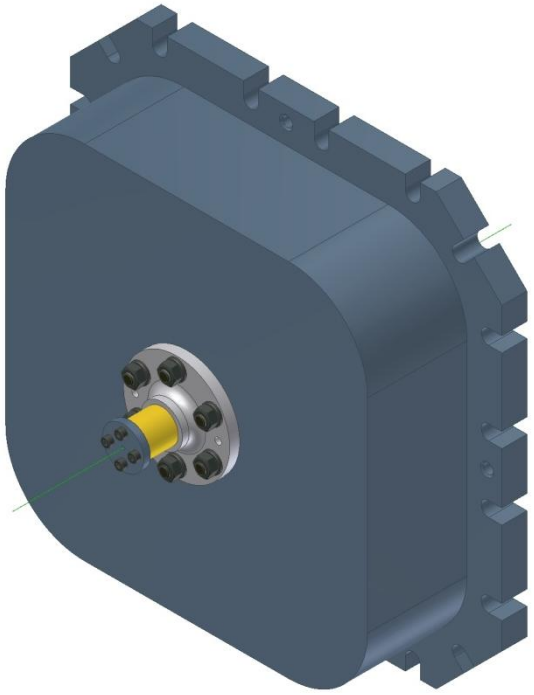

Figure 1

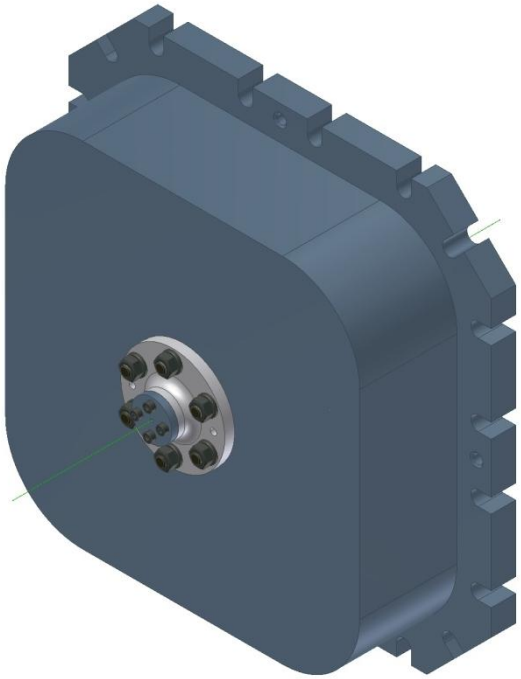

Figure 2

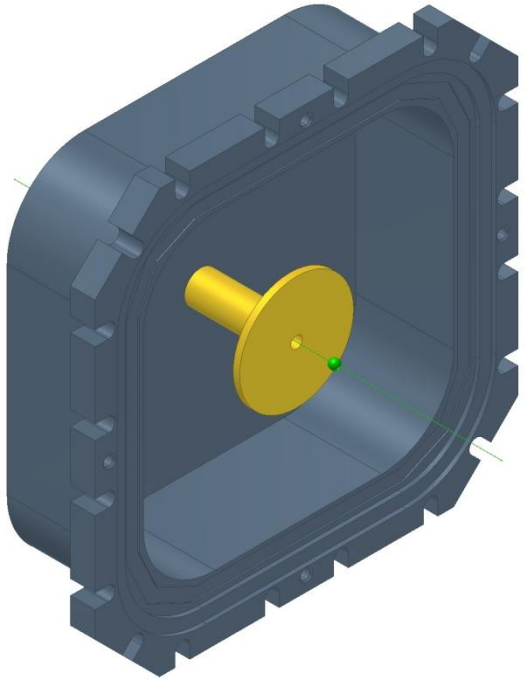

Figure 3

Figure 1 shows the end flange protrusion in a retracted position.
Figure 2 shows the protrusion in the default ‘as simulated’ position.
Figure 3 shows the interior with the protrusion and the bead

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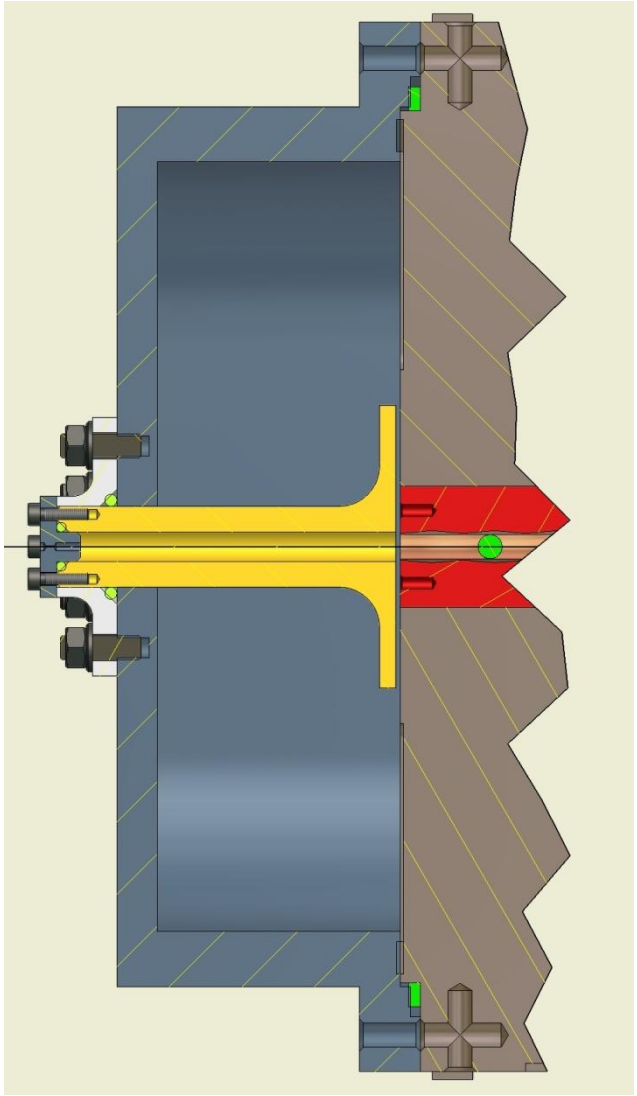
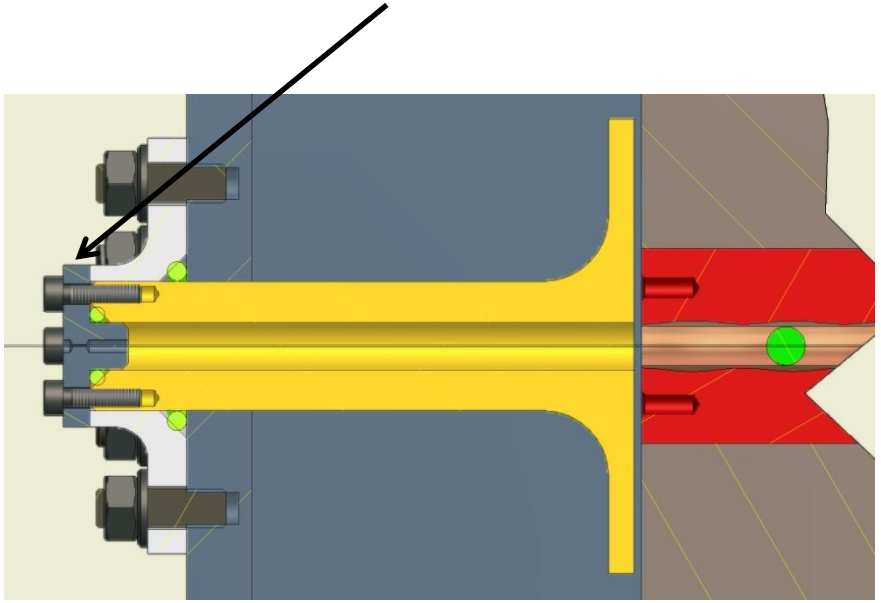


The bead pull (fishing) line guide also acts as a stop. When pushed fully in the end flange protrusion is at it's simulated ideal position from the ends of the vanes.

The line guide can be replaced with a blank undrilled version if a vacuum seal is required.



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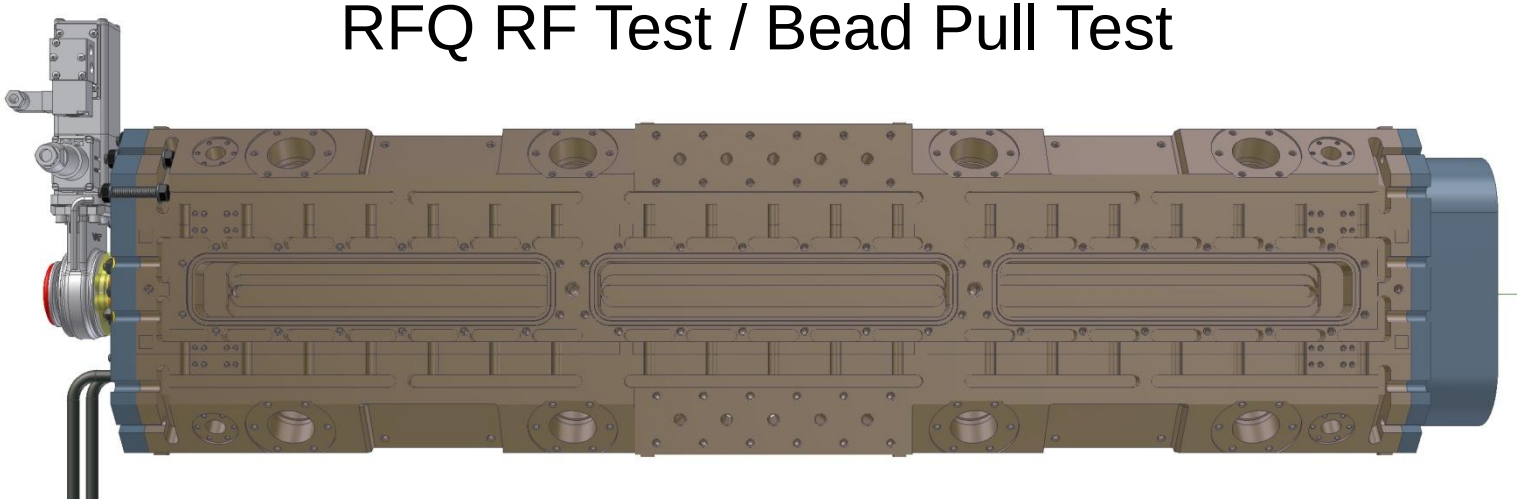
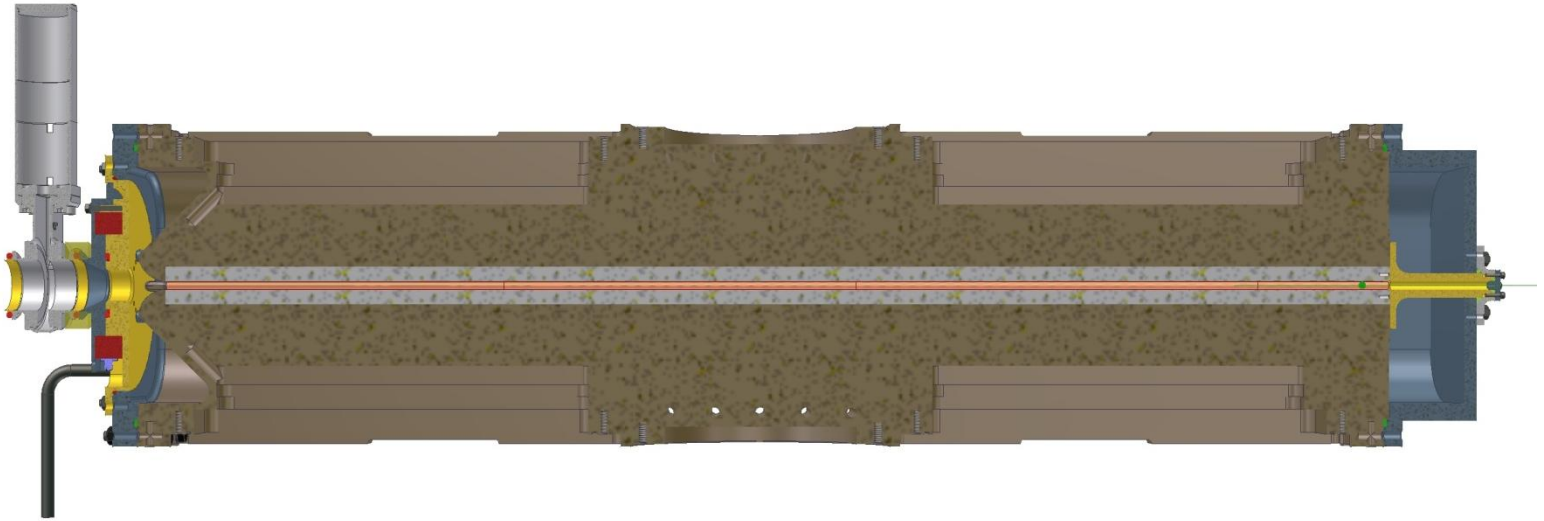


The ‘regular’ end flange can be made into a guide for the bead pull with the simple addition of a blank KF40 flange drilled to accept the fishing line.



To follow..... Coupling loop design