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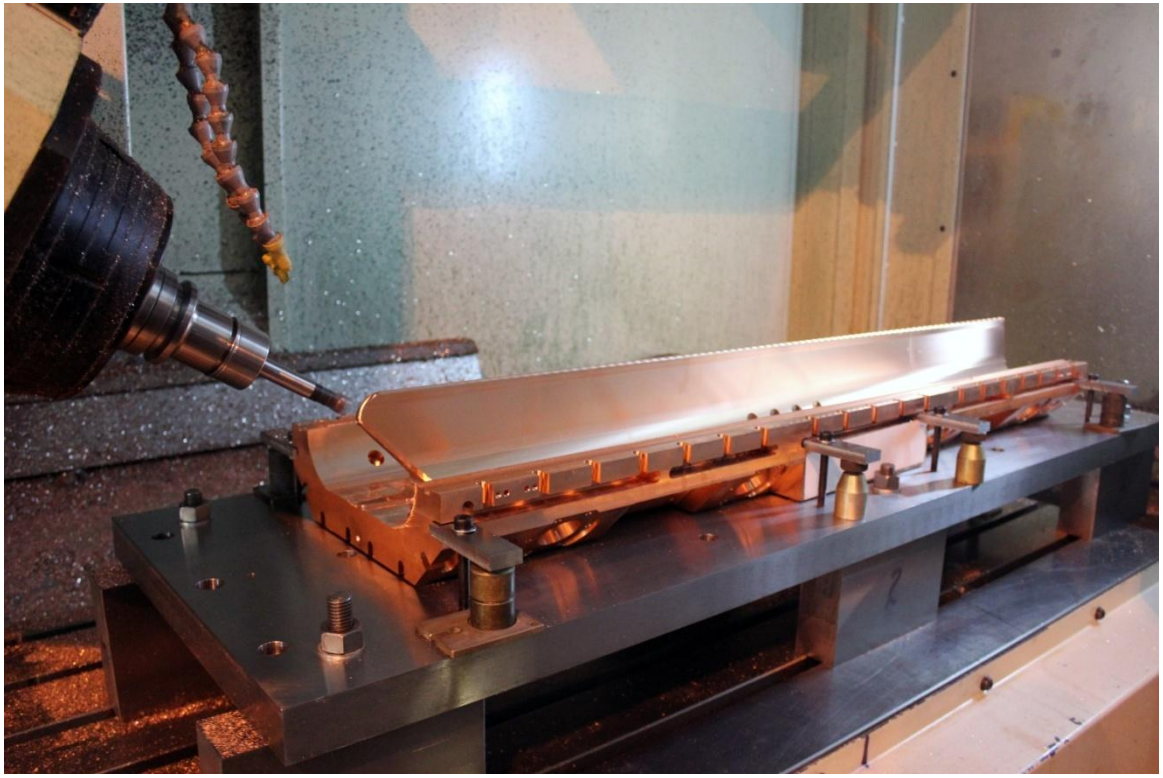
FETS Meeting @ RHUL

RFQ Update

By Peter Savage

14th November 2012

RFQ Manufacturing



One major vane has been completed and awaits inspection before proceeding to finish the remaining pieces of RFQ section 1. The CMM is now fully operational and the inspection document is complete. The document allows measurements to be cross-referenced back to the original vane modulations spreadsheet. In the meantime the machining of RFQ section 2 has progressed.

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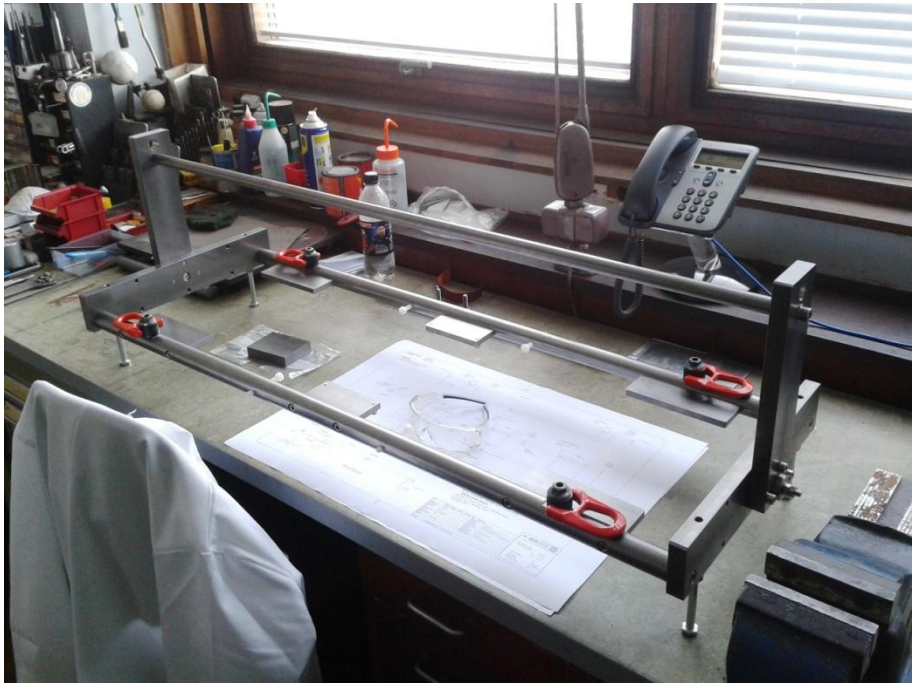
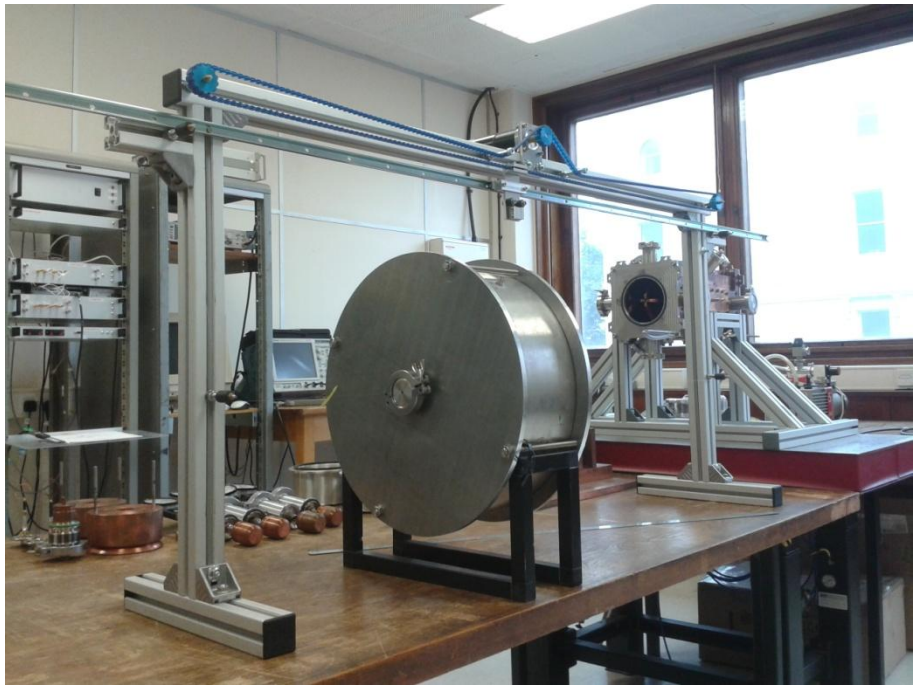
RFQ Lifting and Handling



The RFQ lifting frame has been successfully used by the manufacturers. Once tested it will be included into the RAL lifting safety system.

In addition the four RFQ cradles will need to be registered as lifting frames. This will be done when the supporting calculations have been made.

Bead-pull test

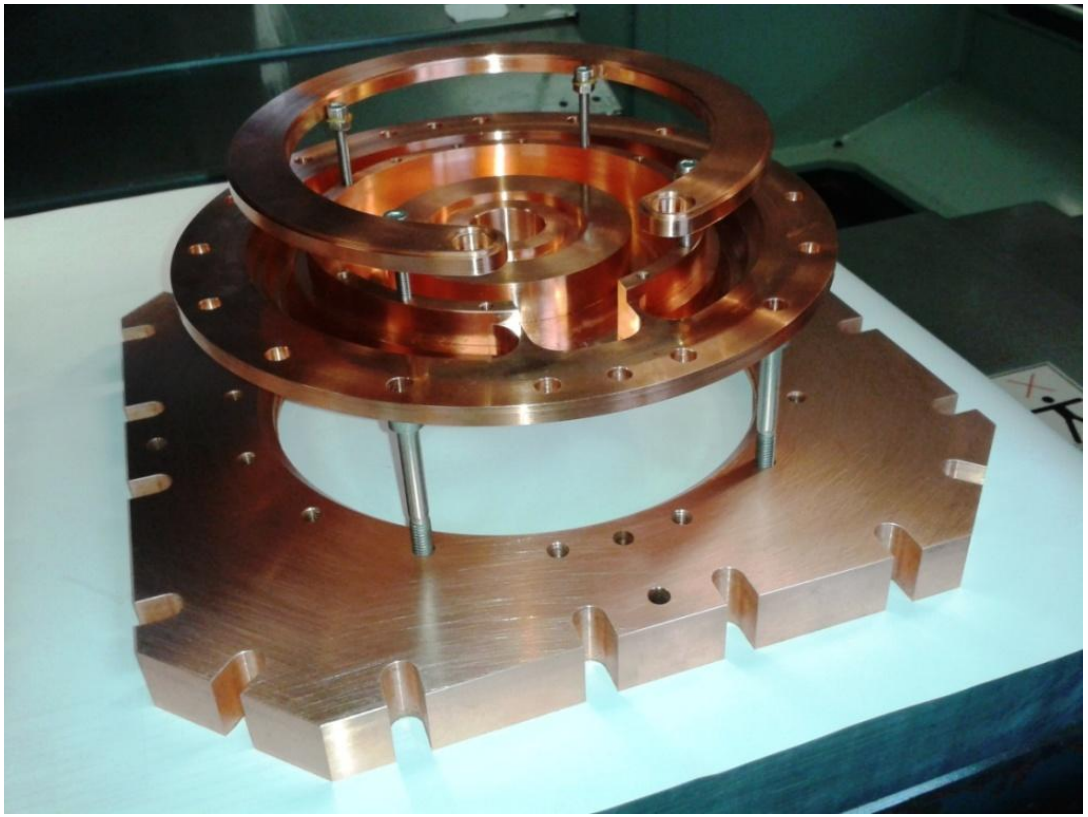


The bead-pull apparatus has been extended to cover one RFQ section and the end flange assemblies for the flat vane RFQ regions are complete. The bead-pull system will be tested inside the pill-box cavity and will then be ready for transport to RAL.

RFQ Tuners

Sixteen tuners for RFQ section 1 have returned from the vacuum brazing company and have been vacuum tested to 10^{-3} mbar. Vacuum components are on order to allow testing to 10^{-6} mbar.

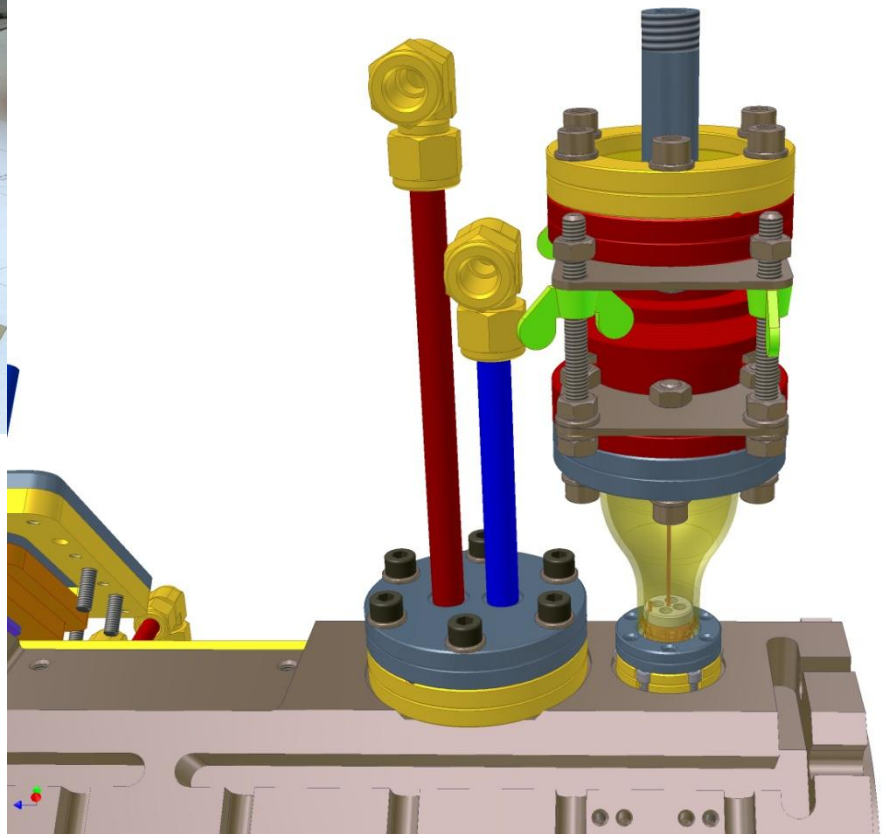
RFQ End Flanges



Both end flange assemblies have also been vacuum brazed, and have been tested for water leaks and vacuum leaks. They, along with the tuners are awaiting vacuum testing to 10^{-6} mbar.

RFQ Pick-ups

Four RFQ pick-ups have been built. Two will be used during the bead-pull tests. One pick-up per RFQ section is available for the feedback system.



The next steps are:

1. Test them in the RFQ cold model.
2. Add bellows to allow the loop length to be adjusted without breaking vacuum. The bellows are on order.

END

INSPECTION GOAL
To measure datums
To measure external features
To measure inner profile at a number of positions along the length.
To measure the vane modulation (height) at those positions.
To cross reference those measured heights with the values *a* and *ma* in the spreadsheet (RFQVaneParamsMaster_Pete.xls).

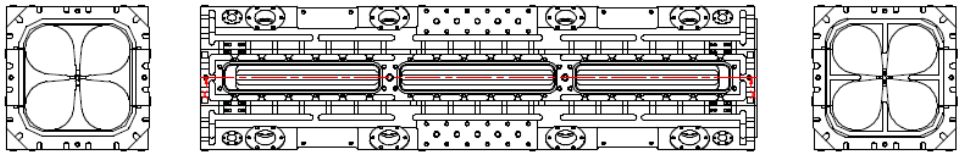
HOW TO MAKE ZERO THICKNESS SLICES
Pick a distance from the spreadsheet.
Sketch line on side view at desired distance from datum - the joint (Project Geometry) between the matching section and the vane tip.
Dimension line from datum, e.g. if value picked from spreadsheet = 549.6782, enter dimension: 549.6782 mm - 21.7698 mm
Finish sketch.
Project an end view.
Highlight newly created end view and select 'Slice'
Tick 'slice all parts' and choose the sketched line.
Right click the slice and break the alignment to move it and realign with other slices.
Label and dimension the slice.
Check beam axis to vane tip measurements against the spreadsheet values of *a* and *ma*.
Repeat for next Z distance along.

WHAT DO THE Z DISTANCES MEAN?
I chose to look at 10 positions along the RFQ length.
It's a balance between getting enough data and becoming swamped with data.
Note that the Z distance corresponds to those shown in the spreadsheet: RFQVaneParamsMaster_Pete.

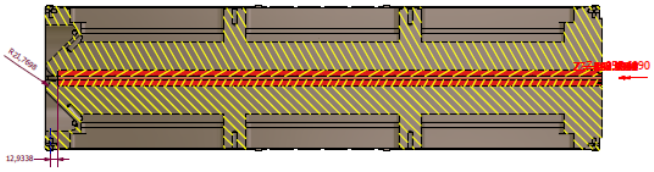
They are at nominally 50, 150, 250 etc along the RFQ BUT sometimes they are shifted a little to avoid certain features that hide the datum faces e.g. clamping slots.

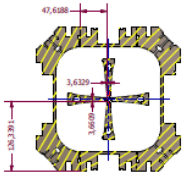
The distances are relative to the end of the matching section at 21,7698mm

For example, Z=48,9898 is 48,9898 - 21,7698 + 12,9338 = 40.01538mm from the centre of the datum dowel hole.

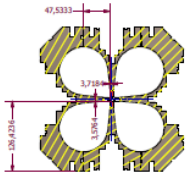


X-X (1 : 4)

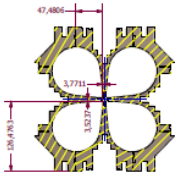




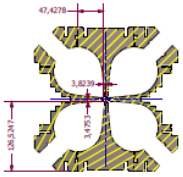
Z = 48.9898



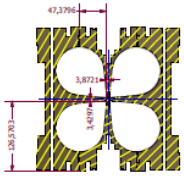
Z = 152.4331



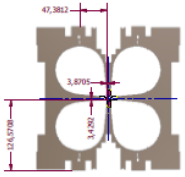
Z = 250.7109



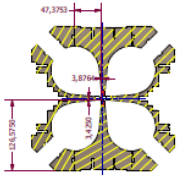
Z = 349.9342



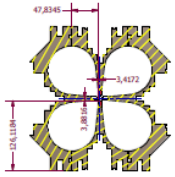
Z = 462.5522



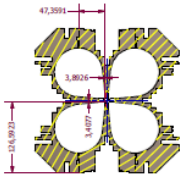
Z = 543.7824



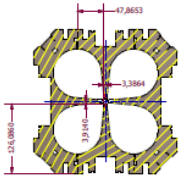
Z = 652.1960



Z = 760.0934



Z = 847.5233



Z = 955.6990

Title:		
Drawn by:	Projection:	
Designed by:	Model file:	RFQ_v13_Section1_WithModulations.iam
Checked by:	Drawing file:	PETS_RFQ_Inspection_Dimensions.idw
Date:	Version number:	
Manufactured by:	Project:	
Material:	Sheet number:	1 / 1
Remove all burrs	Number off:	
Scale:	Drawing number:	
Sheet size: A2		
Notes:		
Contact: p.savage@imperial.ac.uk (Work) 0207 594 7817 (Mobile) 07884 268058		

Unless otherwise stated:		
Dimensional tolerance:	X	± 0.5 mm
	X.X	± 0.2 mm
	X.XX	± 0.1 mm
Angular tolerance:		± 0.5°
Hole centres:		± 0.05 mm
Surface finish:		1.6 microns
Dimensions in mm		☐

RFQ **SECTION 1**
VANE MODULATION HEIGHTS AT DEFINED LONGITUDINAL POSITIONS
P. Savage
12th NOVEMBER 2012

Imperial College London

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