

27 April 1977

## STATUS OF RCBC DESIGN

The design is progressing on a broad front with certain long delivery items being given more detailed attention.

On a sectional basis points worth noting are as follows:

## 1. CHAMBER AND VACUUM ENCLOSURE

Further analysis of the beam entry and exit windows have been carried out and the latest characteristics are summarised on the attached diagram. In all cases the thicknesses are determined by the internal pressure requirements. There is likely to be little change in these figures and attention is now being directed towards the bending stresses at the peripheries of the windows.

Tests on the heavy liquid bubble chamber window have been completed and indicate that pre-stressing is acceptable for the RCBC window, though care has to be taken at the edge of the visible region. The RCBC window is now being specified on the basis that it will never be put in tension even under the chamber room temperature pressure tests (at 19.5 bars). We have also asked Colin Fisher to consider any requirements particularly with respect to reconstruction accuracy which may arise from the use of a high resolution optical system.

## 2. OPTICAL SYSTEM

Tests carried out at Imperial College have shown that a simple coating of a proprietary varnish virtually removes specular reflections and leaves the retro-directed intensity at 63% compared to the untreated Scotchlite. Some short term low temperature tests have shown that the material is mechanically satisfactory but long term tests are planned.

Revised data board proposals have been circulated to users and if accepted will simplify considerably the provision of a mechanically acceptable system.

## 3. CHAMBER TEMPERATURE CONTROL SYSTEM

The flow diagram has been drawn and discussed with CERN. In addition to the refrigeration control it shows all chamber services and pumpouts.

The external valve vessel is being designed in detail and we will shortly purchase a sample control valve actuator for test purposes.

#### 4. EXPANSION SYSTEM

The bellows design has been completed and the moulds are fully detailed ready for tender action, the material for the moulds has already been purchased.

A detailed flow diagram for the actuating system has been produced.

An analysis of the frequency spectrum generated by the actuating system has been carried out by Alain Hervé, principally to allow the magnet supports to be designed.

#### 5. VACUUM SYSTEMS

Flow diagrams have been prepared and the pumpout system is being studied in detail.

#### 6. ACCESSORIES FOR CONTROL AND MONITORING SYSTEM

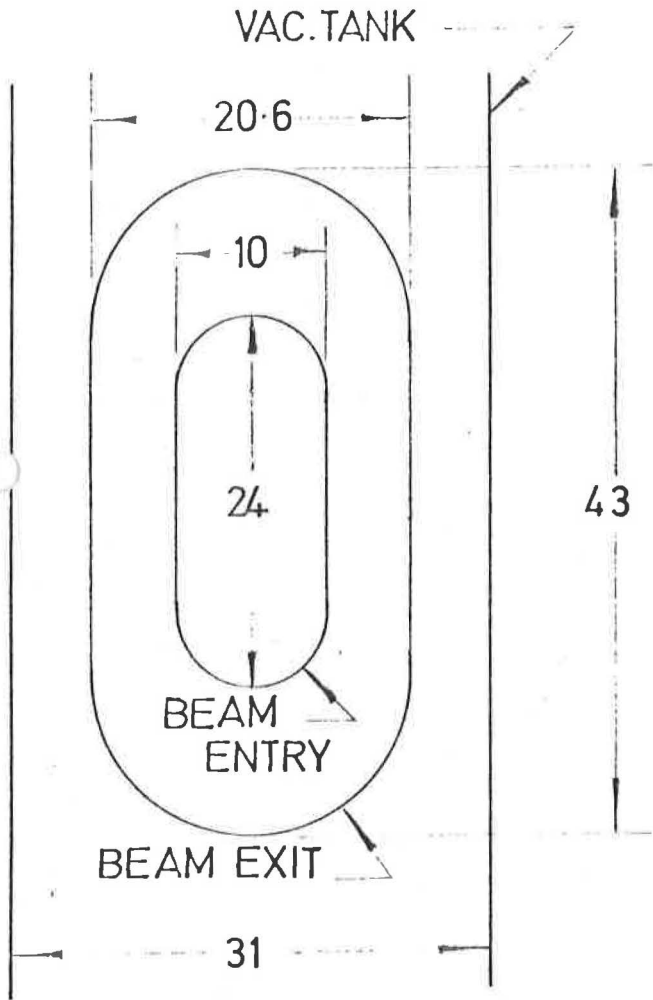
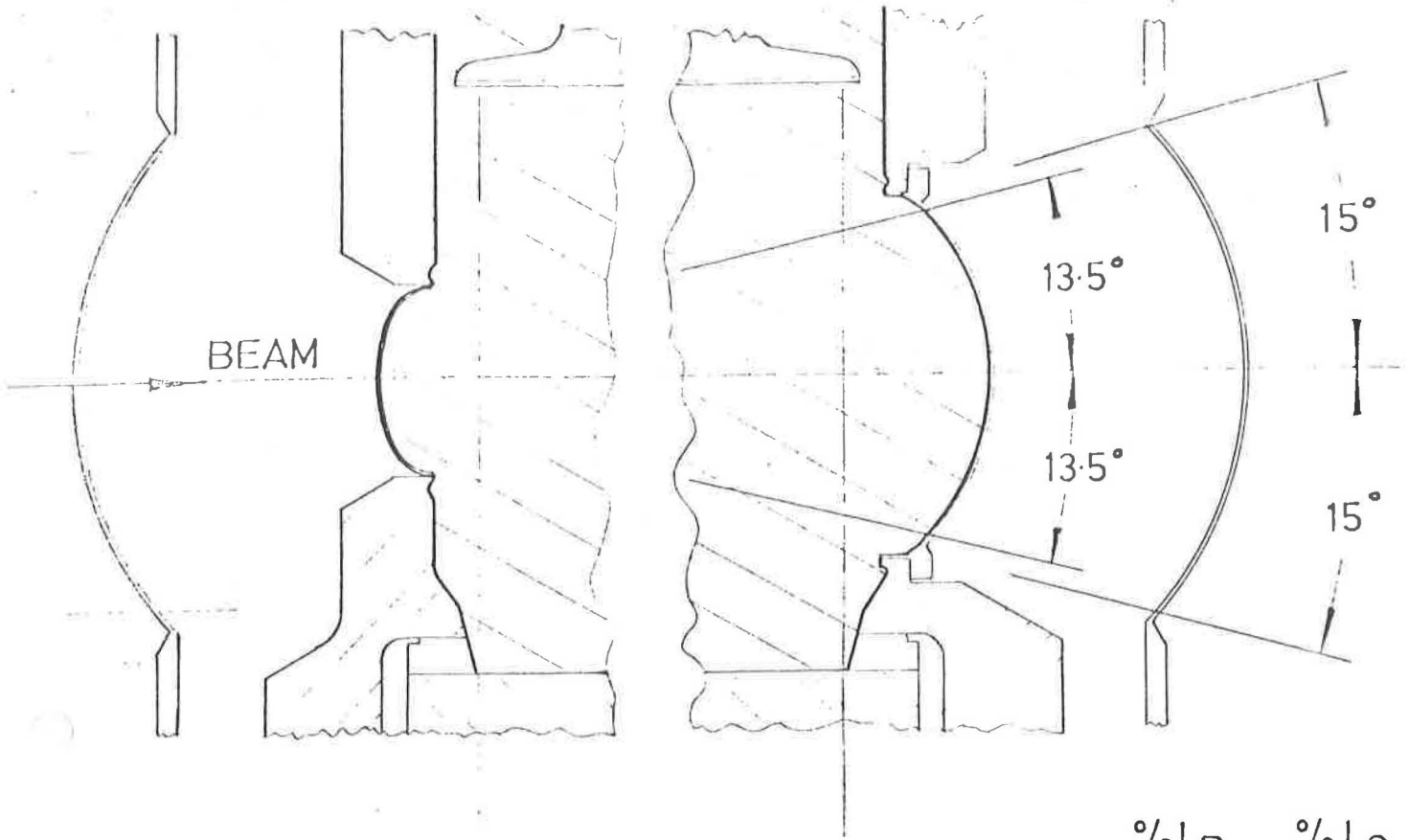
The use of a data logger incorporating a DVM is being discussed by CERN and RL.

#### 7. IRON SUPPORT STRUCTURE

At a meeting held recently at Saclay the specifications were agreed and detailed drawings have now been prepared. The structure will have cast iron end pieces and forged steel cross pieces, now increased in cross-section, to take account of the recent analysis of the frequency spectrum generated by the expansion system. B-H curves have been provided by potential manufacturers for the 0.2% carbon steel preferred for the end pieces and magnetic field plots are hardly affected by this choice.

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	%LR	%LC
<u>ENTRY SIDE</u>		
VAC. TANK 2mm Al.	2.25	0.78
CHAMBER 1.5 mm S.STL.	8.52	1.47
LIQ. HYD. 3.5 cm	0.35	0.51
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	11.12	2.76
<u>EXIT SIDE</u>		
VAC. TANK 2mm Al.	2.25	0.78
CHAMBER 1.5 mm S.STL.	8.52	1.47
LIQ. HYD. 8.0 cm	0.80	1.17
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	11.57	3.42