

PROGRESS REPORT ON RCBC

R W Newport

1. CHAMBER AND VACUUM ASSEMBLY

1.1 Chamber Assembly

The machining of the chamber at MORFAX is well advanced and up to schedule.

An order has also been placed with MORFAX for the manufacture of small items which are an integral part of the chamber eg. the cold valves

Machining of all items is 95% complete.

1.2 Main Window

The main window was offered slightly outside specification early in January. We did not accept the offer and requested regrinding and polishing. It is now within specification and will be inspected at the end of March.

1.3 Window Gasket

There has been some delay in the spinnings due to the lorry drivers strike but this should not affect the final delivery of the complete gasket which is strongly conditioned by the timescale of 8 months offered by MORFAX. We have no alternative but to accept this offer and may have to revise our schedule for testing the chamber to accommodate this delivery time.

1.4 Vacuum Tank

Apart from two or three weeks delay caused by non-delivery of forged rings there are no problems. A new date of the end of June has been given for delivery.

Test pieces for beam window development have been made by IMI.

1.5 Beam Entry and Exit Windows

These are still critical items. Technically progress is satisfactory but again some delays have occurred because of strikes. The entry window has been delayed, the exit window is on schedule.

The specification of the exit window has been revised as a result of discussions with the manufacturers. The net effect is to reduce the horizontal acceptance from $\pm 12^\circ$ to $\pm 11.5^\circ$ (see attached Figure 1.)

2. OPTICAL SYSTEM

2.1 Telecentric Lenses

All elements, ground and polished have been received, accepted and sent for coating, All elements have been coated. Two doublets and all triplets have been mounted.

About six to eight weeks has been lost mainly due to industrial action at Imperial College.

Material for the filter substrates has been obtained and polished. The spectral characteristics of the material have been measured and sent to OCLI. An order was placed with OCLI for coatings.

2.2 Lens Mounting Plate

The sub-mounts have been machined and delivered but need small additional machining.

The lens plate casting has been made and accepted subject to small modifications being completed.

2.3 Illumination System

The non-imaging concentrators have been made and tests with one of these for uniformity of illumination have been carried out. The results are encouraging but further tests are to be carried out on a more representative model of the chamber which has been constructed.

We have received a sample of beam splitting pellicles for test purposes, this has been examined and is to specification.

2.4 Small Window

All small windows have been ordered from Grubb-Parsons, delivery for fused silica and the BK-7 windows is better than expected and should be complete by June.

2.5 Data Board

An illumination system has been developed to test the 39 channel fibre optics sample and tests have started.

2.6 Cameras

The design of the optics trolley is now being detailed.

Camera casting patterns have been made and have been inspected.

3. CHAMBER TEMPERATURE CONTROL SYSTEM

3.1 Valve Vessel

The valve vessel has been delivered, all valves have been trial fitted and formers for superinsulation have been made.

An order has been placed with Vickers Limited of South Marston for the heat exchanger, O-P converter and liquid hydrogen collecting pot, and for the internal pipework. The valve vessel has been delivered to Vickers.

3.2 Control System

All elements have now been delivered. Location of the various sub-systems has been agreed with CERN and panel design has started.

4. EXPANSION SYSTEM

4.1 Bellows

The third and fifth bellows have been machined and a sixth bellows is being prepared.

4.2 Bellows Test Rig

All components for modifying the maquette have been delivered to CERN and welding to the existing parts has been completed.

4.3 Piston

The first piston has been fabricated and machined but with a modification to the material specification for an internal clamping nut.

Build-up of the first piston-bellows assembly has started and is expected to be completed before the end of March.

4.4 Stainless Steel Bellows

A satisfactory design has been obtained and order for manufacture placed with the CERN workshops.

The design of a suitable piston will now be pursued.

5. VACUUM SYSTEM

We have taken delivery of almost all components, except the E0-6 diffusion pumps and their valves, including all five Roots/rotary pump combinations. The first Roots/rotary pump system has been prepared and operated and the remaining four are being worked on.

Both the warm and cold pump outs will have manual valves. The design of these systems is well advanced.

6. MECHANICAL HANDLING

The chamber trolley has been tested at CERN including movement on the rails. After the addition of some small items it will be shipped to RL.

7. ACCESSORIES FOR CONTROL AND MONITORING

Although the data logger has been delivered by Credshire there were some problems and a modified version has been ordered.

The detailed design of panels and cable requirements are well advanced.

8. IRON STRUCTURE

The iron structure was erected and aligned satisfactorily in CERN before the end of January, including painting.

The dynamic response of the mounts has been measured and is satisfactory with frequency cut-offs at 3Hz and 6Hz in the two horizontal directions.

9. TRANSPORT TO CERN

Nothing to report.

10. PROGRAMME

The latest programme valid at 1.3.79 is attached. Points to note are as follows:-

- 10.1 The revision of the assembly programme for the chamber which envisages certain activities taking place in parallel.
- 10.2 The maintenance of delivery of the chamber to CERN at end of February 1980.
- 10.3 Some delays in the gasket making it unlikely to be ready for complete assembly tests at RL.
- 10.4 The maintenance of useful slack in the programme for the valve vessel, piston-bellows assembly, vacuum tank and optics systems.

11. FINANCIAL

11.1 A financial statement valid at 28.2.79 is attached. Points to note are as follows:-

11.1.1 The commitment has reached £ 666,015

11.1.2 The latest official revised estimate is still 11% higher than the initial estimate after correction for inflation. We have, however, been informed informally by the CERN members of the project team that they anticipate committing 10% more than the estimate made for the camera and expansion system components. If this is correct then we anticipate committing 12.8% more than the initial estimate.

11.1.3 The commitment is now 81.5% of the revised estimated cost, after correction for inflation.

15 March 1979

FINANCIAL STATEMENT
 RAPID CYCLING BUBBLE CHAMBER FOR EHS CERN
 PROJECT NOs NA71500 - NA71799 INCLUSIVE
 PROGRESS STATEMENT AS AT 1.3.79

| ITEM | INITIAL COST ESTIMATE | LATEST COST ESTIMATE * | COMMITTED TO | FORECAST DELIVERY DATE | TOTAL SPEND IN PRIOR YEARS | ACTUAL SPEND IN CURRENT YEAR TO 1.3.79 | SPEND FORECAST 1978/79 |
|----------------------------|-----------------------------|------------------------------|-----------------|------------------------------|-------------------------------------|---|------------------------------|
| | 15.2.77 | 31.10.78 | 1.3.79 | | | | |
| | £ | £ | £ | | £ | £ | £ |
| 1. Chamber & Vac Enclosure | 297,235 | 313,096 | 312,818 | 28.2.80 | 178 | 127,424 | — |
| 2. Optical System | 86,925 | 87,925 | 58,499 | 15.11.79 | — | 7,719 ^c | — |
| 3. Chamber Temp Control | 46,640 | 46,640 | 35,053 | 28.2.80 | 4 | 29,845 | — |
| 4. Expansion System | 58,488 | 58,488 | 41,452 | 31.10.79 | — | 49 ^c | — |
| 5. Vacuum Systems | 36,559 | 51,394 | 53,048 | 30.9.79 | — | 45,485 | — |
| 6. Acc for Control etc | 17,798 | 17,798 | 6,147 | 31.12.79 | — | 3,717 | — |
| 7. Mech Handling Equipt | 29,120 | 29,120 | 14,625 | 28.2.80 | — | 6,022 ^c | — |
| 8. Iron Support Structure | 78,000 | 118,956 | 136,742+ | DELIVERED | — | 137,094 | — |
| 9. Transport to CERN | 18,200 | 18,200 | 7,631 | — | 102 | 7,631 | — |
| 10. Miscellaneous | 1,040 | 1,040 | — | 31.12.79 | — | 157 | — |
| | 670,000 | 742,657 | 666,015 | — | 284 | 365,143 ^c | 375,000 ^c |

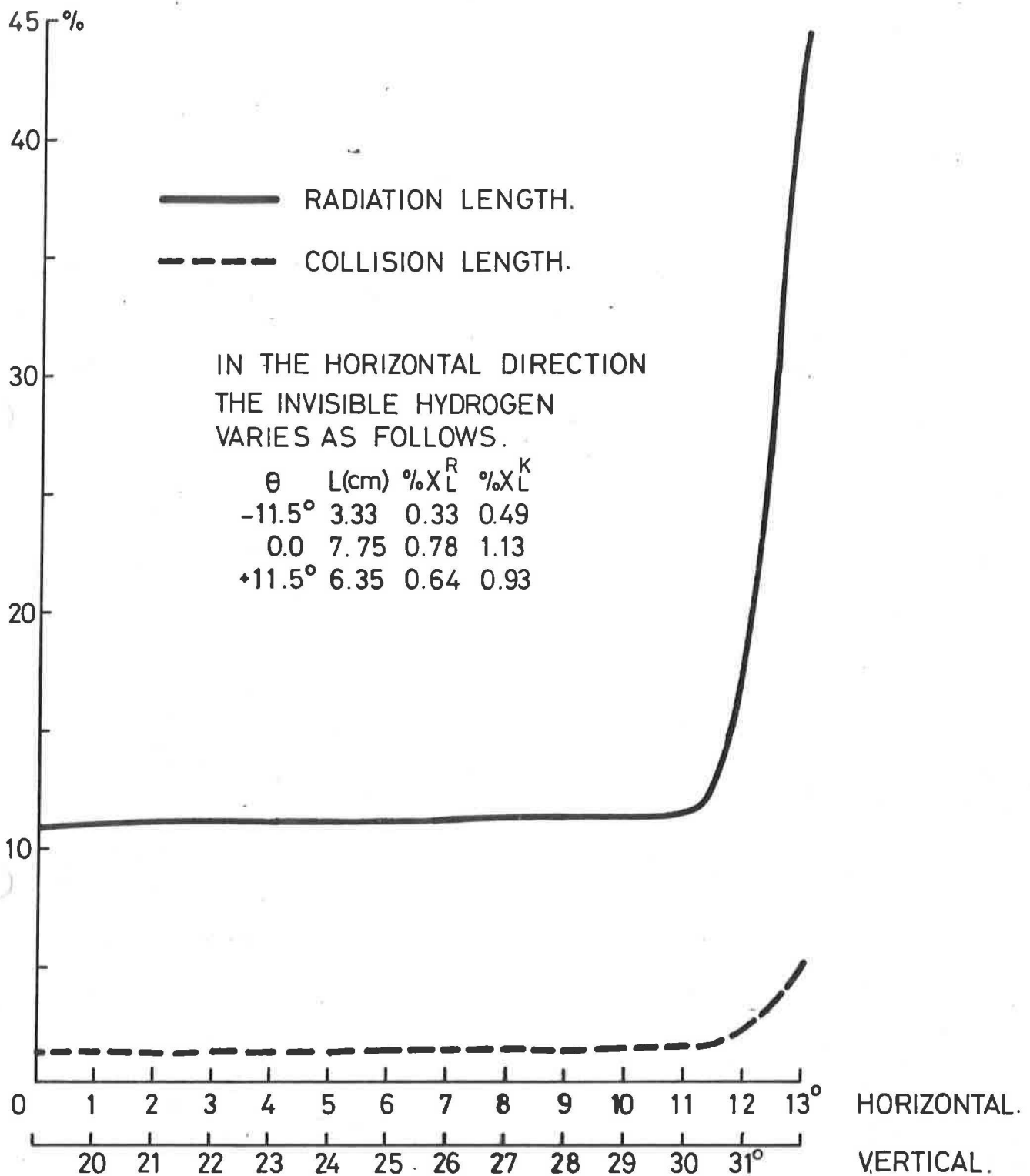
Contract Price £670,000 (+ 15% Contingency)
 at 15.2.77 prices.

* at 15.2.77 prices.

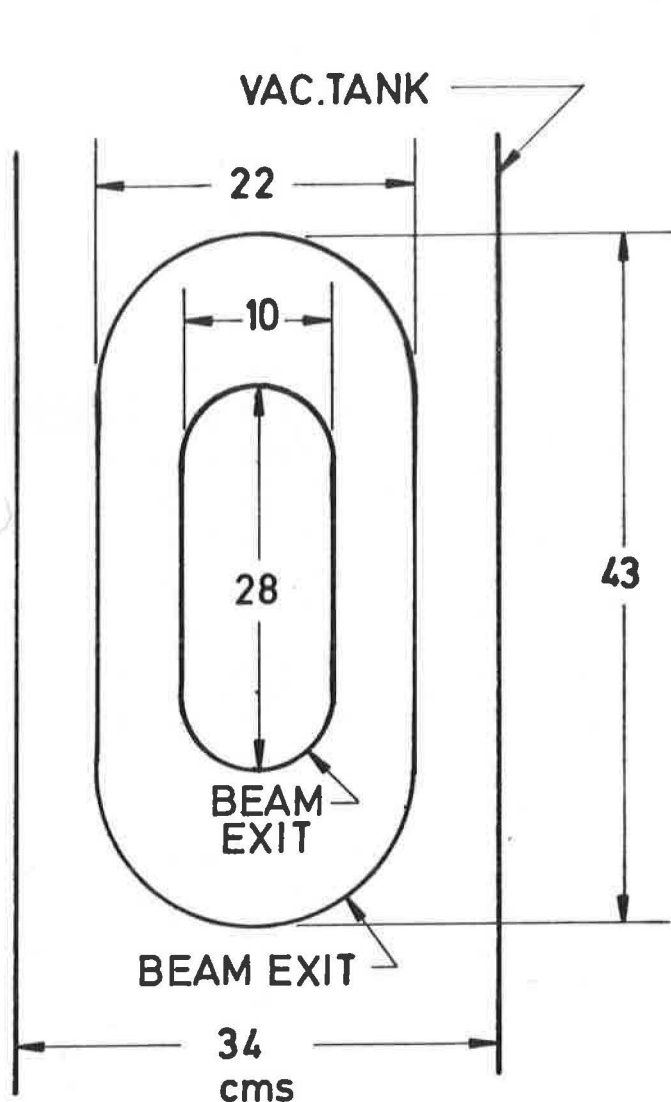
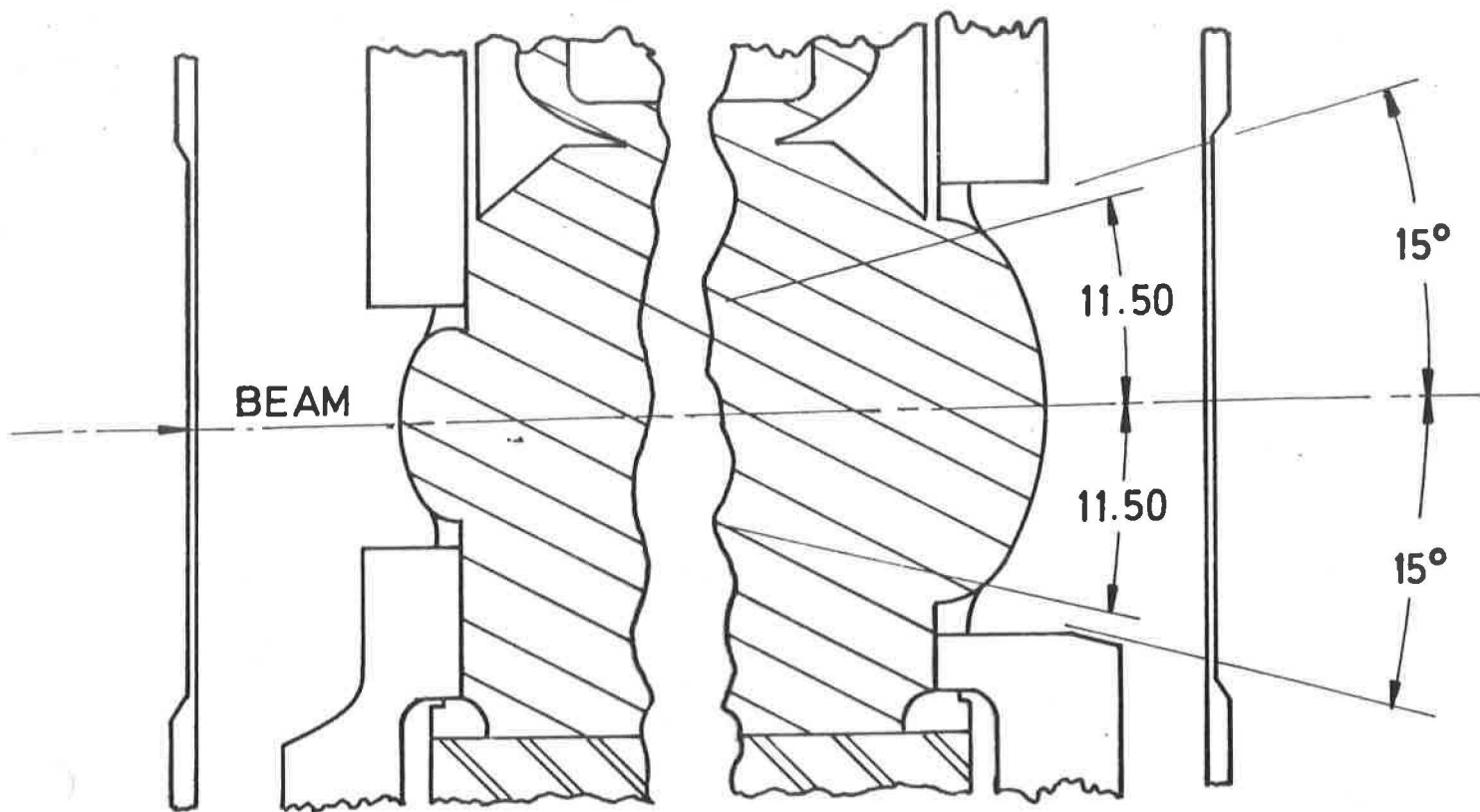
All prices exclude VAT.

+ £ 9,500 will be paid from another
 CERN budget.

^cExcluding CERN spend

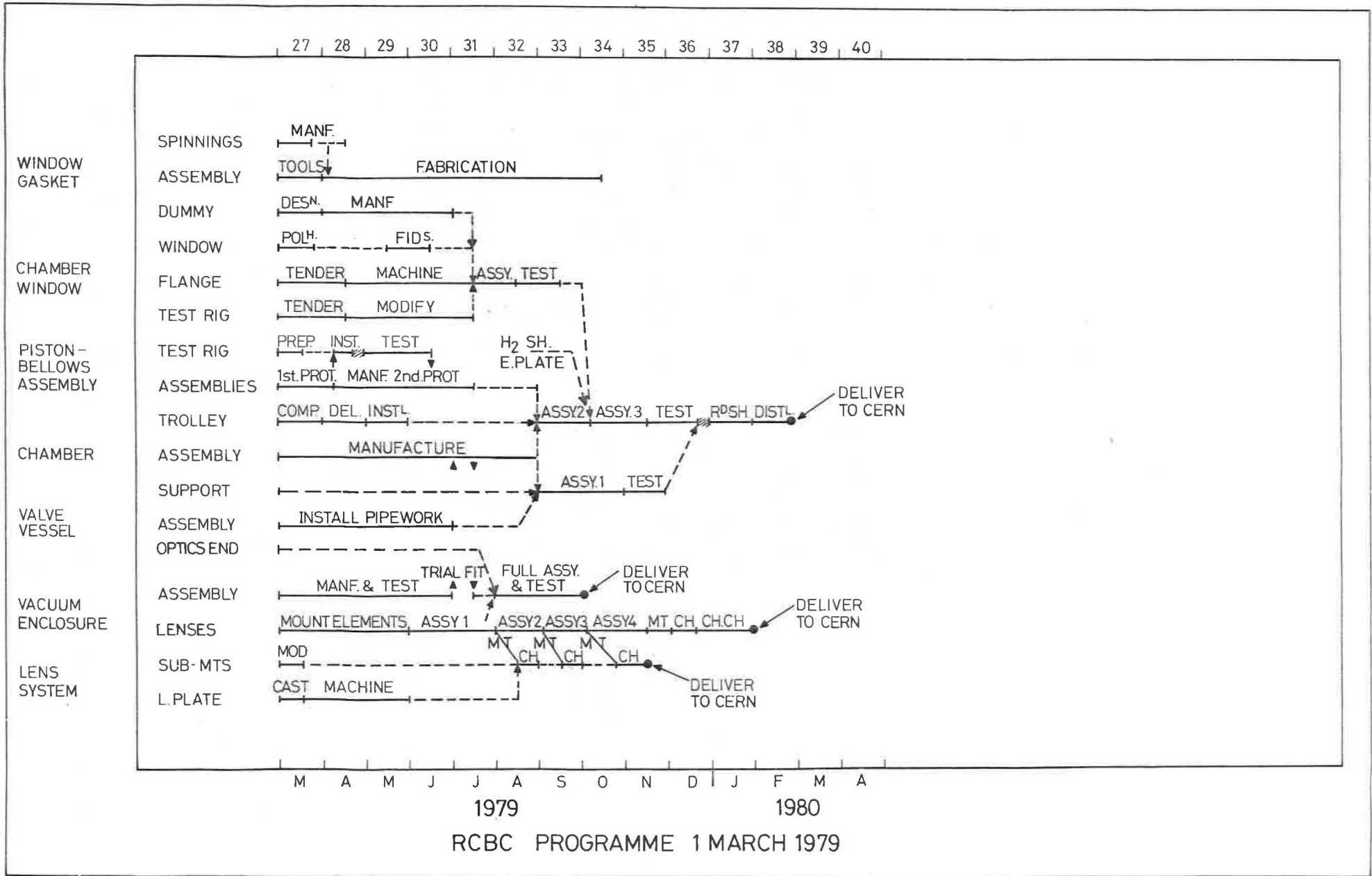


EXIT WINDOW CHARACTERISTICS, INCLUDING
 THE CHAMBER AND VACUUM TANK BUT
 EXCLUDING THE INVISIBLE LIQUID HYDROGEN.



| | %LR | %LC |
|-------------------------|-------------|-------------|
| <u>ENTRY SIDE</u> | | |
| VAC. TANK | 2.68 | 0.85 |
| CHAMBER 1.5mm S.STL. | 8.52 | 1.47 |
| LIQ. HYD. (7.0 cm) | <u>0.70</u> | <u>1.02</u> |
| | 11.98 | 3.34 |
| <u>EXIT SIDE</u> | | |
| VAC. TANK | 2.68 | 0.85 |
| CHAMBER 1.5mm S.STL. | 8.52 | 1.47 |
| LIQ. HYD. (7.75 cm) | <u>0.78</u> | <u>1.13</u> |
| | 11.98 | 3.45 |

BEAM ENTRY AND EXIT WINDOW CHARACTERISTICS.



RCBC PROGRAMME 1 MARCH 1979

PRICE CORRECTION FOR INFLATION

CORRECTION FACTOR C

$$P = C P_0$$

$$C = 0.15 + 0.35 M/M_0 + 0.50 L/L_0$$

$P_0 =$ PRICE AT 15.2.77

$M_0 =$ MTL'S INDEX AT 15.2.77

$L_0 =$ WAGES INDEX AT 15.2.77

1.15

1.10

1.05

1.00

1977

1978

J F M A M J J A S O N D J F M A M J J A S O N D

