FINAL COMPREHENSIVE TEST REPORT
GAS CERENKOV COUNTER

Alexander I. Baron
February 15, 1972

Abstract
Pressure tests have been completed on a Cerenkov Counter in accordance with NAL Standard SD-24. These tests included the vessel itself as well as quartz and aluminum windows. The test results are described herein.

Subject
Gas Cerenkov Counter
Job No. 24
Assembly drawing No. 3063.138-ME-13121
Ordered by: Dr. James Johnston

Design
The counter as a pressure vessel was designed pursuant to NAL Standard SD-24 and ASME Boiler and Pressure Vessel Code, Section VIII - 1971 respectively, by the Technical Services Department (Alexander I. Baron, Engineer).
See: Stress Calculations from 10-18-1971 3063.138-SC-27302
Fabrication

Body, drawing #3063.138-ME-13113

Window Mount,  "  MD-13115  By: Atomic Weld & Machine Co.,

Guard,  "  MD-13118  Lyons, Ill.

Al Windows,  "  MD-13119

Quartz Window,  "  MD-13116  By: G. Behm & Sons Co.

Relief Valve: M5159B-2MP(L)-315  Dayton, Ohio

Pressure Gage:  410, 4½  Chicago, Ill.

Rupture Disc Assembly:  ½-305A3000  By: Fike Metal

Inspection and tests

The vessel, having a nominal inside diameter of 6 inches, legally and strictly speaking, is not covered by the rules of the ASME-Code, since it is stated in paragraph U-1 (d) (5):

(d) "The following classifications are not considered to be within the jurisdiction of this Division of Section VIII:

(5) Vessels having an inside diameter not exceeding 6 inches with no limitation on pressure."

Still, for safety reasons, the vessel was designed, fabricated, and tested according to all relevant rules of the said Code.

1. Body


(See attached Test Report) Acceptable for use.

2. Aluminum Windows

Five windows were fabricated, for testing purposes and for selection.

2.1 Strain measurements: Performed by NAL, Technical Services Testing Station. January 18-21, 1972. Tests No. 3,4,5,6 and 7. (See Log Book). Results are shown on attached diagram. Acceptable for use: specimens No. 4 and 5.

2.2 Pressure test: Test No. 8. Specimen No. 2, the worst from stress point of view, was pressurized up to six times the operating pressure, and deflections measured at the center.

3. Quartz Window

Due to its sensitive polished surface, the Quartz window was replaced by dummy windows for strain measurements. Three DOW CORNING PYREX #7740 glass windows were subjected to strain measurements.

3.1 Tests No. 1, 2 and 9. Results are shown on attached diagram.

3.2 Pressure test on real Quartz window. Test No. 11. Acceptable for use.

4. Counter Assembly

Pressure test: One and a half times operating pressure. Test No. 10. Acceptable for use.
5. Marking

Test pressure:  450 psi
Working pressure:  300 psi
Working Temp.:  max. 200°F
Drawing No.:  3063.138-ME-13121
Date:  2-15-72

shall be permanently affixed to the vessel.
MAGNETIC INSPECTION LABORATORY
9536 W. Foster Avenue  •  Phone Area Code 312-625-0933  •  Chicago, Illinois 60656

TEST REPORT

FOR
Atomic Wald & Machine Co.
7933 W. 39th St.
Lyons, Ill. 60534

Date  Nov. 24, 1971
Order No.  C-423
Register No.  57973
Contractors P.O. No.  -

THE FOLLOWING PARTS HAVE BEEN CAREFULLY HELIUM LEAK TESTED ON A CONSOLIDATED ELECTRO DYNAMIC MASS SPECTROMETER, MODEL 24-120A. THE SENSITIVITY OF THE INSTRUMENT IS $2.8 \times 10^{-10}$ ATM CC/SEC.

<table>
<thead>
<tr>
<th>NO. PCS.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>6226</td>
<td>6&quot; pipe weldments</td>
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Serial NOS.

SPECIFICATION:

<table>
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<tr>
<th>PRESSURE OF HELIUM</th>
<th>PARAGRAPH</th>
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<tbody>
<tr>
<td>ATM PSIG. TIME UNDER PRESSURE  HRS.</td>
<td>MIN.</td>
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ADDITIONAL DATA

Allowable leakage $1 \times 10^{-9}$ cc/sec

CONCLUSION

1 PARTS ACCEPTABLE FOR USE.
0 PARTS REJECTED FOR LEAKAGE AND SO MARKED. LEAKAGE ON ACCEPTABLE PARTS, IF ANY, IS LESS THAN $1 \times 10^{-9}$ ATM/CC/SEC.

MAGNETIC INSPECTION LABORATORY

[Signature]

INSPECTOR.
GLASS WINDOWS

Dwg #: 3063.132 - MC-13116

Operating pressure:

*1, *2, *3 \{ at center

Normal working stress

Stress:

*1

*2

*3 \{ at periphery

Hydrostatic pressure

0 100 200 300 400 500 psi

1-18-72
ALUMINUM WINDOWS

Pressure vs Stress Diagram

Hydrostatic Pressure (psi) vs Stress (psi)

Operating pressure at periphery

Maximum allowable stress

Dwg. 3063.128-HD-13119

1-21-72