



INTERNAL NOTE EMA 87/3

VACUUM PUMP GROUP ALCATEL RVR 1300  
A BRIEF SUMMARY OF PRELIMINARY TEST RESULTS

F. Haug

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The vacuum pump group ALCATEL RVR 1300 delivered by VACOTEC S.A., Suisse, in 1986, will be the main component in the helium-II pumping system of the vertical cryostat test station.

Prior to installation preliminary tests were conducted to demonstrate that the performance of the pump group meets the requirements for its application. Results are briefly summarized in the following.

a) Operating temperatures

A high performance of both roots and primary pump is required at the initial stage during the cool-down of the cryostat from 4.2 K to 1.8 K, where the inlet pressure at the roots pump can achieve 1000 mbar. To simulate cool-down conditions, the pumps were operated in a closed cycle mode with helium gas at ambient temperature. The inlet pressure at the roots pump was varied from approximately 1 atmosphere to 13 mbar in several stages. During operation of 1 hour, the temperature variations at the pumps were recorded. The values listed in the following had not been exceeded.

1. Roots pump ..... T < 40°C  
Electric motor ..... T < 60°C
2. Primary pump ..... T < 70°C  
Electric motor ..... T < 50°C

These data are below 90°C, a value stated by the supplier that especially should not be exceeded in the primary pump.

b) Oil losses

To detect oil losses at the exhaust pipe of the primary pump, a suitable filter was mounted. The pump group was operated in a closed cycle mode with helium gas at ambient temperature and at 13 mbar inlet pressure for a total of 11 hours, which simulates continuous operation of the test station. After the test, no additional oil deposit in the filter could be detected. This result seems to confirm information of the supplier, i.e. oil losses are expected to be smaller than 10 mg/h at 10 mbar inlet pressure.

c) Leak detection

Using a helium leak detector, leak detection was carried out for both at rest and at operational condition of the pump group. However, no leaks at the shafts or at any other part could be detected.

Conclusion

The results of this study indicate that the performance of the vacuum pump group RVR 1300 is satisfactory for the intended application at the vertical cryostat test station.

F. Haug

Distribution :    EMA Scientific Personnel  
                  A. Fluhmann  
                  M. Paroz, VACOTEC S.A.