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Gas Load (Q) Measurements of the AGS Ring Vacuum Sectors

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* AGS Accelerator Division *
* Technical Note # 225 *
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Abstract

During the 1985 summer shutdown, the rate of pressure rise of each ring vacuum sector was measured several times by turning off H.V. of the ion pumps. The resulted gas load per sector,Q, varies from 1.0*10**-7 to 1.0*10**-4 torr-lit/sec.

Measurement

The gas load of each vacuum sector Q can be estimated by the sector volume V and the rate of pressure rise dP/dt such that

$$Q = dP/dt * V \quad \text{(torr-lit/sec)}$$

The gas load Q represents the sum of the total outgassing and leak rate of the sector.

For sectors which have no special instruments of high outgassing rate, the measured Q value is very useful in deciding the potential leaks. A change in gas load Q will also give an advanced warning of developing problem for the sector.

The rate of pressure rise was derived from cold cathode gauge reading at each vacuum sector by turning off the ion pump power supply for 10 to 20 minutes. The volume V of the standard vacuum sector is approximately 500 l while sectors A,E and G have a volume of approximately 1000 l due to special devices at their straight section and sectors AB,F,H,and HI have a volume of 2000 l due to the large boxes for beam injection and extraction.

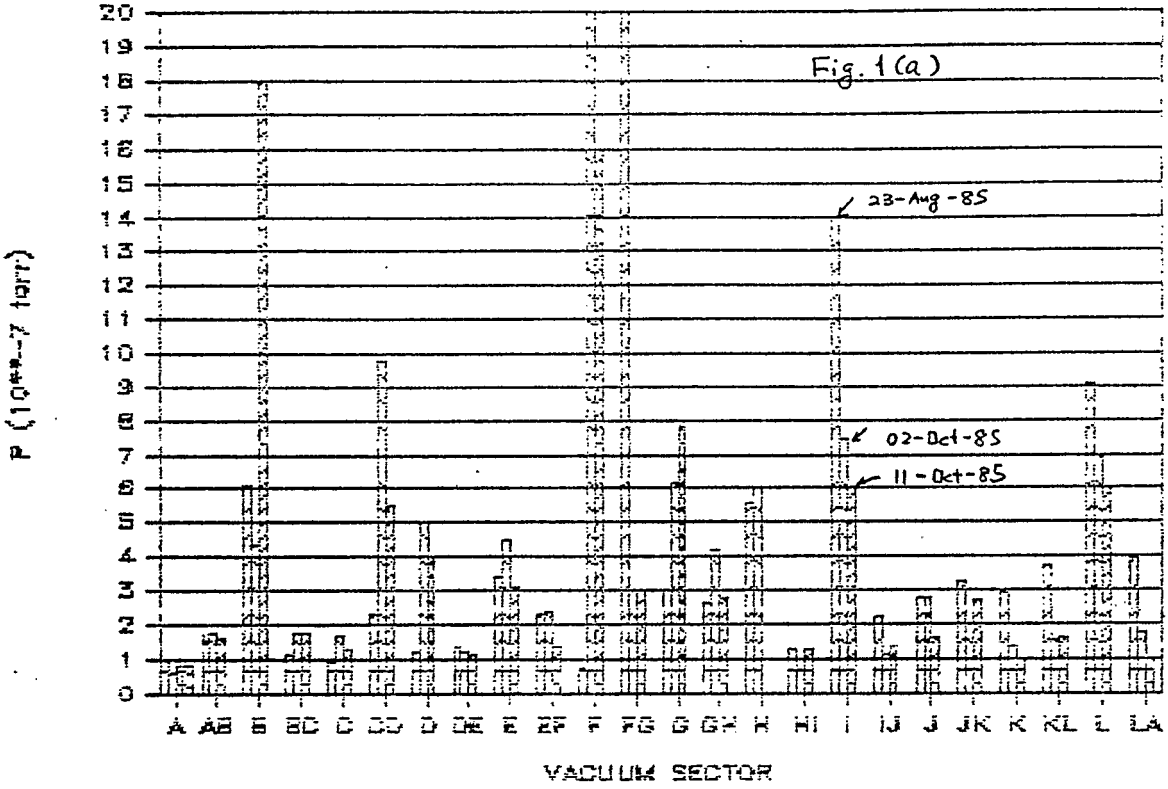
The pressure P before turning off the ion pump H.V.. and the gas load Q have been measured several times for each vacuum sector. The results are listed in Table 1. and plotted in Fig.1. Based on a single chamber measurement at the vacuum lab. the outgassing of 10 standard ring vacuum chambers (i.e. 1 sector) after one week of pumping is estimated to be approxiamately 2*10**-6 torr-l/s which is in reasonable agreement with the results for more than half of the sectors. However there are

Appendix.

INTERPRETATION

A:
AB: Leak near B3 by VSCAN; found small leaks(10*-8 range) at A-20 box on Oct. 14
B: Still in the process of pumping down from the B-10 cavity repair; the high outgassing of 1x10*-4 Torr.l/s is due to the current transformer at B-5(this is consistent with the measured outgassing in lab. by V. Castillo)
BC:
C: May be due to the outgassing of the bump coil installed at C-13 in September
CD: May have leaks around C-20 pipe
D: May be due to the outgassing of the bump coil installed at D-7 in September
DE: May have small leak around D-19 by VSCAN
E: Small leak around E-9 by VSCAN
EF: Area worked on in September; more ion pumps are on line
F: No measurement due to local controlled turbo at F-10 box
FG: Leak at G-3 bellow; found leak at F-14 bellow on Oct. 15
G:
GH: Small leak near G-19 by VSCAN
H: Leaks at H-12 and H-13 bellows were repaired
HI: Leaks at H-16, H-17, H-19 and I-3 were found
I: Small leaks were found at I-4, I-8 and I-11
IJ: May have leaks near I-17 and I-20 by VSCAN
J:
JK: May have leaks near K-2 by VSCAN
K: May have leaks near K-9 by VSCAN
KL:
L: Have leaks near L-6 by VSCAN
LA: May have leaks near L-17 and L-19 by VSCAN

P Measurement



Q Measurement