



Fig. 1. Specimen and container arrangement.

Pressure Seals

The seal configuration used, as shown in Fig. 2, was of the unsupported area type, consisting of an "O" ring and an annealed 1020 steel ring that is forced to an inclined plane by the internal pressure. This configuration was considered as the simplest and most trouble-free over the large range of pressure, specimen bore enlargements, and diameter ratios encountered in this investigation.

Test Apparatus

The pressure source as shown in Fig. 3 was a 200,000 psi 10 in³/min intensifier type pumping system manufactured by the Harwood Engineering Company. This system has an intensification ratio of 100:1 with a low pressure source of 2000 psi and a charging pressure of 10,000 psi.

Pressures were measured with a Manganin cell and a Wheatstone bridge. This Manganin pressure measurement system was calibrated on a controlled clearance piston gage which utilizes a known weight supported on a free piston of known area. In this device the unknown pressure, which the Manganin cell measures, is introduced into the bottom of the cylinder and

the piston floated. From the known weight supported by the piston of a specified area, the pressure can be determined to an accuracy of 0.1 percent.

The tangential strain at the outside surface during the application of pressure was measured by 2 SR-4 type strain gages attached to the outside surface of the specimen at the midlength and diametrically opposed. An SR-4 strain

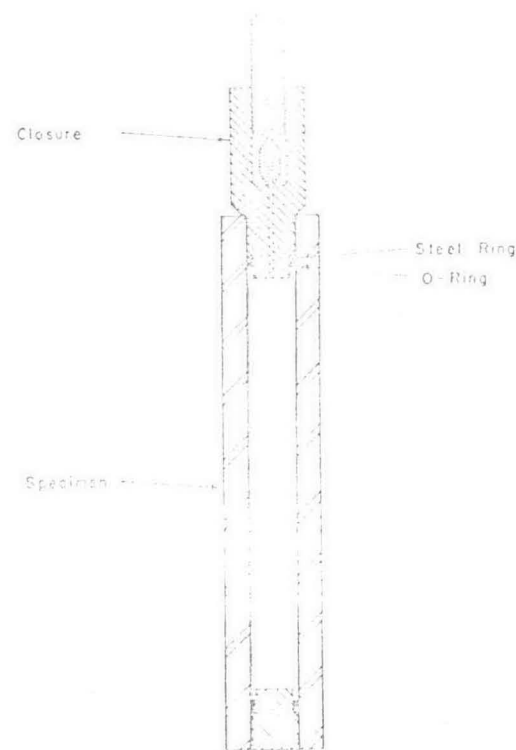


Fig. 2. Pressure seal configuration.

indicator was used on most tests for measuring the strain. A photograph of the physical strain measurement setup is shown in Fig. 4. Supplemental data was obtained using a Moseley Model 2S X-Y recorder. This recorder simultaneously measured and plotted outside surface strain and pressure. It was calibrated by the use of an accurate shunt resistance in one arm of a 4-arm bridge.

The overall experimental accuracy depended upon the Manganin cell and Wheatstone bridge in the pressure measurement system, and strain gages, SR-4 indicator, X-Y recorder and associated strain recording equipment in the strain-measurement circuit. The estimated error, including the human