

II. EXPERIMENTAL FACILITIES AND PROCEDURES

The compressive loads applied to the wafer assembly are supplied by a 2500-ton hydraulic ram press. A view of this press, and the associated controls, is presented in Figure 2. This press constitutes a part of the general research facilities employed at Pressure Science, Inc., 11642 Old Baltimore Pike, Beltsville, Maryland, for the long range study of high-pressure phenomenon, and the design of ultra-high pressure test equipment. The purpose of having such a massive press is twofold. First, the increased tonnage provides an access to ultra-high pressures (providing the anvil design is adequate), and secondly, the wafer size can be scaled-up to sizes that are easily manufactured and handled.

The top of the press is maintained in a permanent position by four 10-inch diameter steel posters. The bottom section of the press (ram) is raised through the action of fluid pressure generated by hydraulic pumps. A high- and a low-volume pump is connected to the ram in order to obtain a more deliberate control of the applied force. The approximate magnitude of the applied force can be found by recording the ram gage pressure, and multiplying by the projected ram area. This method does not account for the friction created by the sliding seals, and other effects; thus, a standard load-cell was acquired from the National Bureau of Standards, and used to calibrate the ram pressure gage directly in terms