

EXPERIMENTAL FACILITIES

To complete a thorough investigation of the use of a knock-off tube as a quick pressure-release mechanism, it was necessary to conduct experiments. There were two major considerations: (1) sufficient experimental evidence must be found to assess the validity of the time-constant equation (62) and (2) experimental data establishing the utility of a knock-off tube as a quick pressure-release mechanism must be provided to aid the designer in selecting the optimum tube for a given set of conditions. By conditions is meant those specific values prescribed for the pressure-release time, chamber pressure, available load for breaking the knock-off tube, etc.

The experimental facilities employed in obtaining these data can be divided into six major parts: (1) composite pressure system, (2) pressure pot, (3) piezoelectric gages and conjoint instrumentation, (4) knock-off tubes, (5) loading mechanism, and (6) oscilloscope triggering mechanism. The instrumentation system and oscilloscope triggering mechanism have been previously described in the section pertaining to instrumentation.

The composite pressure system shown in Figure 9 consists of a hydraulic pressure generator and a high-pressure control system. The hydraulic pressure generator used in the program is an electrically driven, dual-action, variable stroke, hydraulic pressure pump. This pump is capable of delivering 5 gallons of fluid per hour at a pressure of 60,000 psi. However, the pumping rate was reduced considerably in all calibration tests to prevent undue pressure surges on the knock-off tube and the piezoelectric gages. A view of the hydraulic pressure pump appears in Figure 10. The high-pressure control system consists of a pressure intensifier

