

III. EXPERIMENTAL TECHNIQUES

A. Explosives

The plane shock waves discussed in Chapter II are generated by detonating chemical explosives. By varying the type of explosive and the experimental arrangement, dynamic pressures of 20-600 kbar in the liquids are achieved. The success of this dynamic technique for producing high pressures is due largely to methods in casting and pressing large homogeneous blocks of explosives and to the development of accurate machining processes.

The solid explosives basic for most experimental uses are TNT (trinitrotoluene), RDX (cyclotrimethylenetrinitramine), and HMX (cyclotetramethylenetetranitramine). In practice, these explosives are mixed with each other in various proportions or mixed with inert binders. Four common explosives, each having a different pressure associated with the detonation front, were used in this program. Baratol, which is a mixture of 76% by weight of barium nitrate a non-reactive material and 24% TNT, has the lowest detonation pressure of the four explosives. The pressure is about 140 kbar and a detonation velocity of 4.9 km/sec. Intermediate pressures are achieved when TNT is used alone. This explosive has a 180 kbar detonation pressure and a velocity of 6.9 km/sec. A mixture of 60% RDX and 40% TNT called Composition B is used for high pressures. The detonation wave in Comp B travels at 8.0 km/sec with a pressure of 290