

APPENDIX C

DETAILS OF VARIATIONS IN EXPERIMENTAL PROCEDURE

Variations in target preparation are not believed to have affected the experimental results in any significant way, but for completeness some of the variations which occurred will be recorded.

A number of air bubbles in the epoxy near the active foil edges were observed in target 73-011. There were 10 bubbles with diameters from 0.01 to 0.02 cm; some bubbles were as close as 0.03 cm from the foil, and a couple were touching the foil. For a short time during the impact experiment these bubbles would be a source of rarefaction waves, disturbing the state of uniaxial compression. After shock arrival the pressure in bubble volumes would remain near one atmosphere until the bubbles collapse as the free surface at the sapphire accelerates, collapsing in about 60 nanoseconds. In 60 nanoseconds the waves would travel 0.03 cm, so a small but not serious effect on the foil response might be expected. The voltage-time profile on that shot was noisier than other shots but otherwise normal.

There were some variations in the procedure for making electrical connections to the specimen. In shots 73-027 and 73-028 mercury amalgam was put in the electrical-lead holes in

the sapphire backing piece while the epoxy was still soft. This resulted in mercury stain on the foil (mercury embrittles silver), but the voltage-time profiles showed nothing unusual. Beginning with shot 73-013 silver wire was spot-welded to the foil leads; previously copper wire had been used. Electrical signals have been observed from shocked metallic junctions (Crosnier, Jacquesson, and Migault, 1965). Even if present, the symmetry of the two potential leads implies that no net signal would be observed. No change in response was noted in changing from copper to silver.

Beginning with shot 73-029 the screw clamping the sandwich together was tightened just once instead of twice. Previous to that shot the screw was tightened a second time after the excess epoxy had a chance to flow out of the sandwich. No noticeable change in the thickness of the epoxy layer resulted from this change of procedure. If the clamping were deforming the foil, the change of procedure might have affected shot results; no effect was noted.

In impact experiments up to 73-010 there were some problems with erratic shifts in the reference voltage level during preshot pulsing. The problem was eliminated by removing all intermediate ground connections to points on cable outer conductors from the target assembly to the power supply and oscilloscopes. Apparently the problem was caused by ground loops.