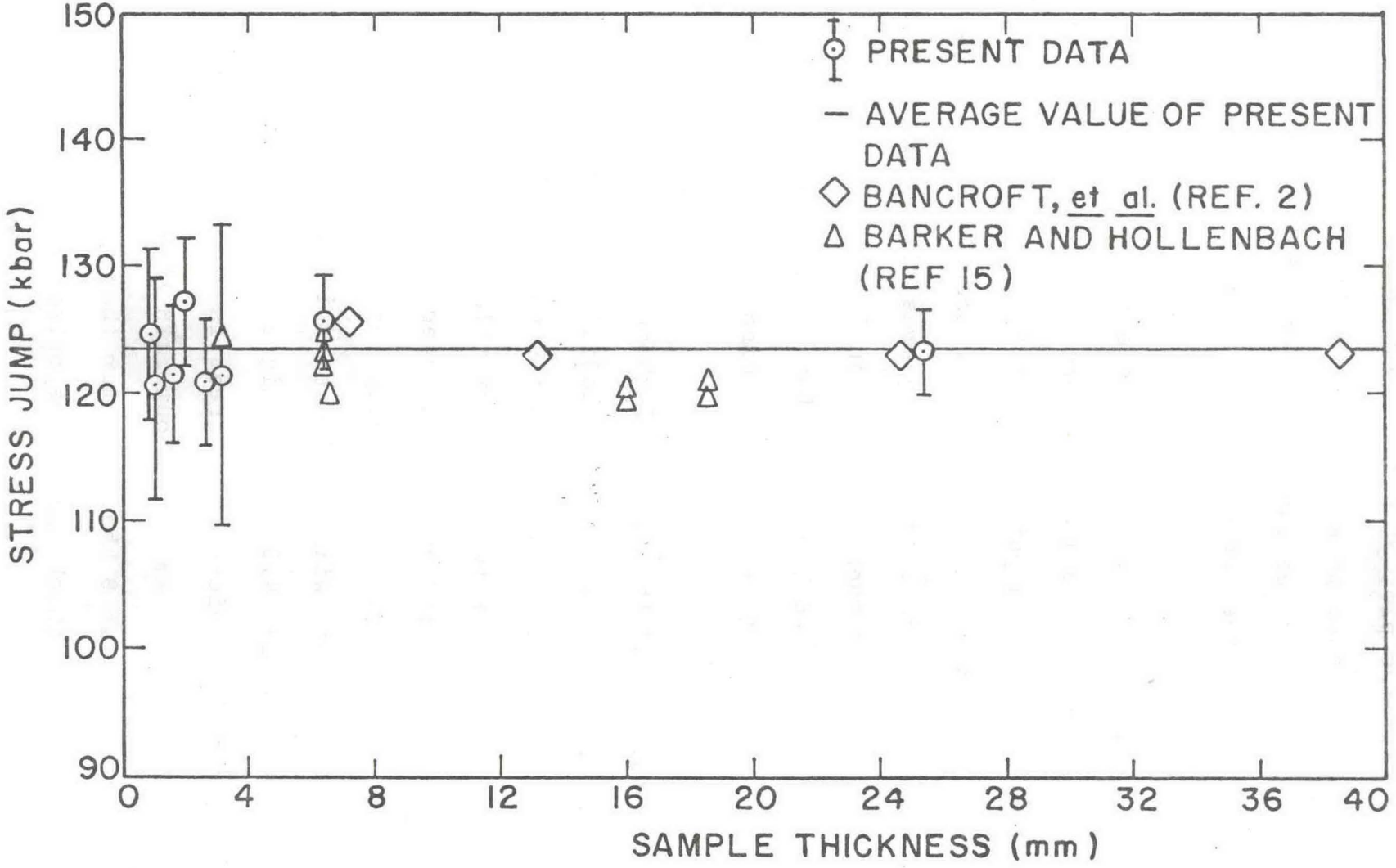

Fig. 4.4.--Stress jump across the plastic I shock as a function of sample thickness.

sample thickness. The plot of stress jump versus thickness implies that the increase in stress behind the plastic I front for small sample thicknesses may be accounted for by the known increase in stress of the precursor as sample thickness is decreased.

Figure 4.2 shows free surface velocity versus sample thickness; data from two additional sources are shown for comparison. These other data points result from experiments using different experimental techniques and different final driving stresses. The solid line is a least-squares fit of present data to a straight line. It corresponds to an increase in free surface velocity of about 0.1 percent for every 1-mm decrease in sample thickness. Its slope is not significantly different from zero.

Stresses behind the plastic I shock in iron versus sample thickness are shown in Fig. 4.3. In addition, two solid curves are present which are calculated from the phenomenological model of Duvall and Horie[20] for two different relaxation times. Comparison between calculated curves and experimental data shows that relaxation time, τ, is obviously less than 0.1 μsec. The significance of this will be discussed in Section 6.1.

The data in Fig. 4.3 show a slight increase in stress for decreasing sample thickness. Stress is about 140 kbar for a sample thickness of 1 mm and about 136 kbar at 6.35 mm. The 140-kbar value is 9 kbar greater than the stress measured for the 25.4-mm-thick sample reported in Section 4.2.