

- 2 -

methods are impractical. Alloying was accomplished in this investigation by sheath-rolling compressed compacts. (5)

The alloys were made from titanium sponge and high purity magnesium. Chemical analysis of the sponge showed 0.04% Mg, <.005% Al, <.001% Cu, .05% Fe, .022% Mn, <.0025% Ni, .007% Si, <.005% V, <.01% Zn.

All heat treating was conducted in a protective atmosphere by encapsulating the specimens in fused silica ampules under a partial pressure of helium. Equilibrium was achieved by holding the specimens at temperature for periods of 24-120 hours. The alloys were hot rolled, cold rolled and annealed prior to solution heat treatment.

Figure 1 shows the constitutional diagram obtained for the Ti-Mg system up to 1.5% titanium. Oxygen was known to be present in the alloys; therefore, it is necessary to consider the alloys as ternary rather than binary and the diagram should be viewed as a plot of a section through the titanium-magnesium oxygen system. Other investigators (6) have shown that the addition of oxygen to titanium stabilize the alpha phase. The data presented in Figure 1 indicates that the addition of magnesium to titanium tends to stabilize the beta phase. Armour Research Foundation (7) has shown that the addition of magnesium to zirconium lowers the alpha