

required interference fit between the liner and sleeve to be lost during operation at 500 F.

The second design consisted of replacing the liner component with two rings which occupy the same volume as did the liner component. This design was used because calculations indicated that the safety factor could be increased to a minimum of about 1.25 without resorting to any larger interference fits than were used in the present container assembly.

The final revised container assembly design is illustrated in Figure 73. To avoid possible confusion, the designations for the component rings have been changed as follows:

<u>Container I</u> <u>(Figure 67)</u>	<u>Container II</u> <u>(Figure 73)</u>
Liner	Liner
(None)	Sleeve 1
Sleeve	Sleeve 2
Container	Container

In other words, Sleeve 1 was a new addition to the old design, but Sleeve 2 is the same component as the "sleeve" in the old design.

### Stress Analysis

Referring to Figure 73, it can be seen that the liner was assembled with the same manufactured\* interference fit of 0.007 in./in. as that in the previous container. However, because the liner in Container II had a thinner wall such an interference would generate a higher hoop prestress on assembly than was obtained in Container I providing the "assembly" interferences were also of the same order. To achieve the same "assembly" interference between the liner and Sleeve 1 shown in Figure 73 as that obtained in Container I, it was found necessary to manufacture an interference of 0.0048 in./in. between Sleeve 1 and Sleeve 2. Measurements of the liner bore before and after assembly were used to determine the actual stress distribution achieved in the assembly. Equations 13 and 14 in Section 3 were used in these calculations.

The stress patterns calculated for both room temperature and 500 F are presented in Figures 74 and 75. Each figure shows both the hoop and radial stresses developed at the ring interfaces under internal fluid pressures of 0 and 250,000 psi.

The combined interference fits of 0.0071 and 0.0048 inch per inch on the Sleeve 1-liner and Sleeve 2-Sleeve 1 interfaces, respectively, place the liner bore in precompression with a stress of 260,650 psi at room temperature. With this amount of precompression, it can be seen in Figure 4-8 that an internal pressure of 250,000 psi at room temperature produces a tensile hoop stress on the liner bore of only 5,600 psi. At 500 F, the precompression is reduced from 260,650 to 217,250 psi (Figure 75) because of the decrease in elastic moduli of the rings at this temperature. In this case, the tensile stress on the liner bore at maximum internal pressure is increased from 5,600 to 49,000 psi.

\*The "manufactured" interference is that which is obtained before assembly and represents the difference in size between each mating diameter. The "assembled" interference is greater than the "manufactured" interference before assembly by an amount proportional to the extent that each ring changes dimensions elastically as the rings are assembled.

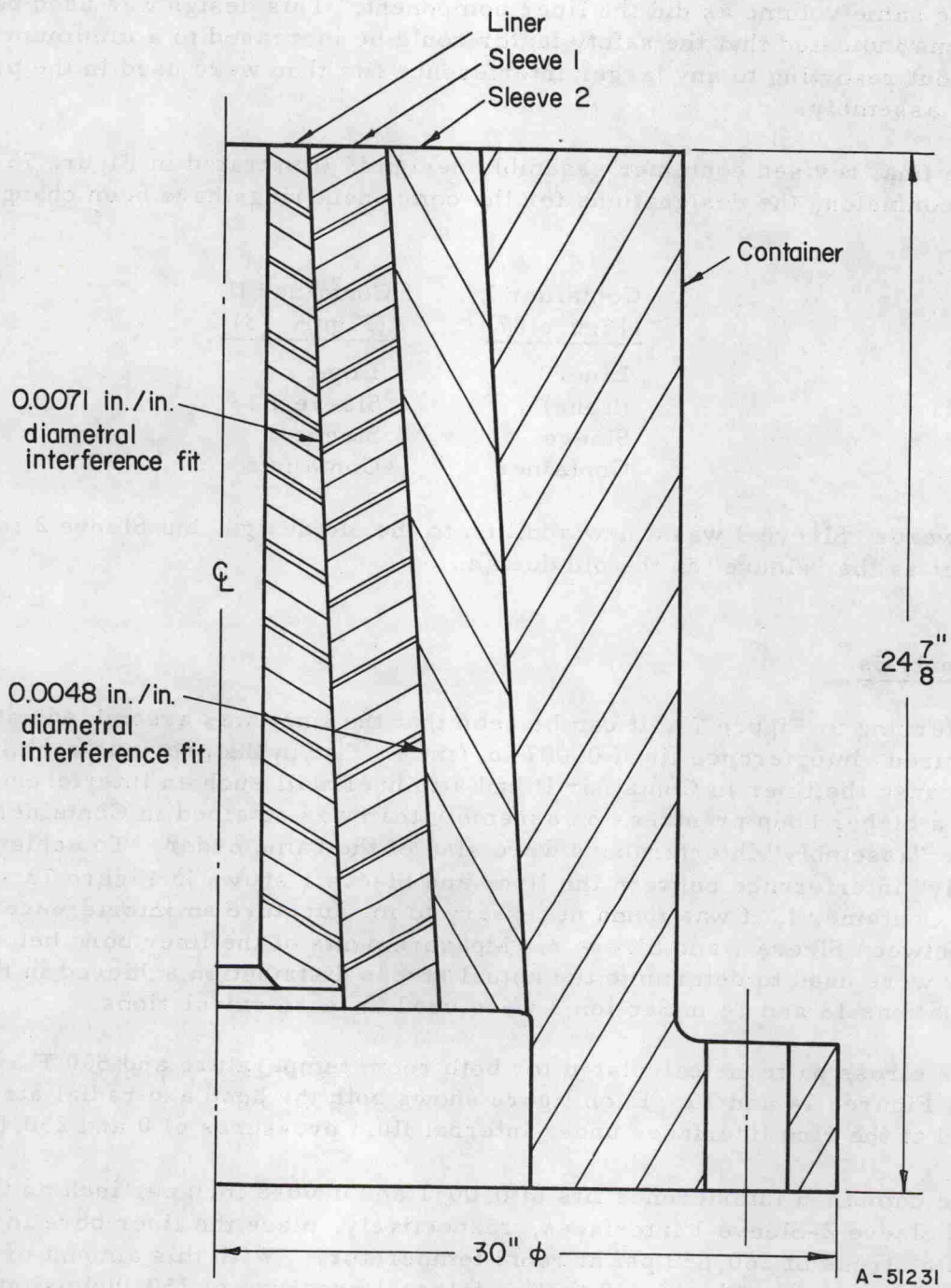


FIGURE 73. CROSS-SECTIONAL VIEW OF CONTAINER II