§ 54.30–10 Method of performing mechanical stress relief.

(a) The mechanical stress relief shall be carried out in accordance with the following stipulations using water as the pressurizing medium:

(1) At a hydrostatic pressure (measured at the tank top) of 1 1/2 times the design pressure. (See UA–60(e) of section VIII of the ASME Boiler and Pressure Vessel Code.)

(2) At a temperature of 70 °F or the service temperature plus 50 °F, whichever is higher. Where the ambient temperature is below 70 °F, and use of water at that temperature is not practical, the minimum temperature for mechanical stress relief may be below 70 °F but shall not be less than 50 °F above service temperature.

(b) When a pressure vessel is to be mechanically stress relieved in accordance with § 54.30–10(a)(1), its maximum allowable working pressure will be 40 percent of the value which would otherwise be determined. However, an increase of this 40 percent factor may be permitted if the stress relief is carried out at a pressure higher than that required by § 54.30–10(a)(1) and an experimental strain analysis is carried out during stress relief. This evaluation should provide information as to the strains at the saddles, welded seams and nozzles as well as the body of the vessel. The hydrostatic pressure applied during stress relief should be such that, except in the case of welds, the stresses in the vessel shall closely approach but not exceed 90 percent of the yield stress of the material at the test temperature. The proposed experimental program should be submitted to the Commandant for approval prior to its use. Photo-elastic coating, strain gaging, or a brittle coating technique is suggested for the experimental analysis.