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LOAD LOSS AS A FACTOR IMPACTING GASKET LEAKAGE

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ABSTRACT

After flange assembly and following a period of operation, some of the compressive stress on a gasket is lost due to factors such as temperature, pressure, flange movement, and material composition. Increased leakage (fugitive emissions) is often a result of gasket stress loss; however, the increased, operating leak rate is not necessarily directly proportional to the degree of gasket stress loss. A study was conducted using a previously published leak rate model based on an equation set derived from the Pressure Vessel Research Council to provide a demonstration of the impact of load loss (under operating conditions) on the predicted gasket leak rate. The model incorporates system pressure and gasket stress as input variables along with gasket specific factors determined from room temperature tightness test data. Model-derived leak rate data have been plotted as a function of gasket assembly stress for several material types including polytetrafluoroethylene, compressed fiber, and flexible graphite. Plot trends were found to vary noticeably by material type as well as by manufacturer. The derived model outputs are a confirmation that predicted leak rates are not linearly proportional to the degree of gasket stress loss. The results of this study may be instructive to the end user for comparing predicted leak rates of gasket materials over a gasket stress loss range associated with a given application.

