# A New Apparatus for Measuring VLE and Phase Density of Aqueous-Organic-Salt Solutions

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An apparatus has been developed to measure the vapor-liquid equilibria (VLE) and densities of aqueous-organic-salt solutions. This apparatus is similar to other systems in use, but the wetted metal parts are constructed of Hastelloy C, a more corrosion resistant material. The system consists of a pressure vessel for phase contacting, two vibrating tube densimeters, and vapor and liquid recirculation pumps. The equilibrium pressure vessel is equipped with a sapphire window for observation of the phases. This window may be removed and replaced with a Hastelloy C blank for more corrosion resistance. The composition of the vapor phase is measured with a GC that has been calibrated with a standard mixture. The temperature range of operation is 300-400 K with the densimeters installed and 300-500 K without the densimeters, with a pressure maximum of 35 MPa. The volume of the apparatus has been calibrated over the working range of temperature and pressure to enable PρT measurements to also be made in the same apparatus. The pressure transducers, platinum resistance thermometers, and pressure gauges were calibrated using standard methods. Performance tests for the system water-ethanol-NaCl and its constituents are presented.