

## **An Automated Densimetric Technique for Binary Compressed Mixtures: New Measurements for Systems Containing Carbon Dioxide**

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Recently, we have presented a computer-operated-densimetric equipment with an Anton Paar HPM vibrating tube densimeter for pure liquids together with the evaluation of the density uncertainty using the EA-4/02 Guide [1]. In this work we present a loading technique for systems containing two compounds, which are at atmospheric pressure and ambient temperature in different states (liquid and gas). For these types of systems specific procedures to manage and/or transfer the mixtures are required to perform accurate density measurements. That could be done with high pressure circulation pumps, sapphire feeding cells as Zúñiga-Moreno et al. [2], or with isobaric transfer procedures as Bessières et al. [3]. Our loading system consists in two syringe pumps ISCO Teledyne with electronic valves which deliver the gas and the liquid pure components through stainless-steel tubing at programmable constant flow rates. Temperature was measured by a Pt100 probe located inside the cellblock of the densimeter connected to an Agilent data acquisition unit. The pressure transducer and an automated piston screw pump are also connected to the data acquisition unit. To verify the accuracy of this technique four mixtures of CO<sub>2</sub> + n-decane have been measured from 283 to 398 K and up to 120 MPa. The density data are coherent with those previously reported in the literature [2-4] for other compositions of the same binary system. In addition, we have also studied the volumetric behavior of several mixtures containing CO<sub>2</sub> and an ester oil.

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