

## From the Bochum Equations of State for Pure Substances Up to the Complex Mixture Equation GERG-2008

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In the period from 1975 to 2006, the Chair of Thermodynamics at the Ruhr-University Bochum was working in the field of the calculation and experimental determination of thermodynamic properties of pure fluid substances and mixtures. Over these 31 years, accurate equations of state had been developed for a number of pure substances. The talk summarizes the ideas and the procedure for the development of these equations of state considered as equations in reference quality for the corresponding pure substances. The experiences and conclusions from these pieces of work were the starting point for the development of an equation of state for multi-component mixtures – the GERG-2004 equation of state for natural gases and other mixtures of an arbitrary combination of the 18 components methane, nitrogen, carbon dioxide, ethane, propane, n-butane, isobutane, n-pentane, isopentane, n-hexane, n-heptane, n-octane, hydrogen, oxygen, carbon monoxide, water, helium, and argon. Then, this equation was expanded by including the three additional components n-nonane, n-decane, and hydrogen sulfide and was called GERG-2008. The development of GERG-2008 was our longest and most difficult equation of state project. This equation and its quality are described and a number of insights are given.