

CALCULATION OF THERMODYNAMIC FUNCTIONS BASED ON THE JOINT THERMAL AND ACOUSTIC MEASUREMENTS

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The use of new working fluids for steam turbine units that are able to compete with the traditional water vapor is one of the promising directions in expanding the fundamental foundations of heat power engineering [1]. Such fluorocarbons as e.g. octafluoropropane (C3F8), decafluorobutane (C4F10) and octafluorocyclobutane (c-C4F8) need to have cumulative databases on thermophysical properties in the range of parameters of the operation of power plants [2,6], since the listed substances were previously used primarily as refrigerants. A comprehensive study of thermodynamic properties, including measurements of the density of the working fluid and the sound speed as a function of pressure and temperature, as properties most accurately studied, allows to calculate other thermodynamic functions using the mathematical apparatus of thermodynamics [4,5]. The report presents the conclusions of the formulas for calculating the isobaric and isochoric heat capacities based on the mathematical apparatus of thermodynamics [3]. An example of calculation based on new experimental data on the thermal and acoustic properties of octafluorocyclobutane in the liquid phase is given. _____

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