

# INFLUENCE OF QUENCHING ON ULTRASOUND SPEED IN STEELS

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The results of an experimental study of the ultrasound speed and the relative temperature expansion of 09G2S, 30HGSA, U8 and 45 steel in quenched and annealed states over a wide temperature range are presented. The chemical composition, application and conditions for heat treatment of steels are given in the database of steels. A characteristic feature of these steels is the presence of alpha-gamma transformation at high temperatures. An experimental study of the ultrasonic velocity was carried out according to the method developed by the GSSSD ME 216-2014. The obtained experimental data on the relative temperature expansion made it possible not only to increase the accuracy of the experimental data on the ultrasound velocity, the calculation formulas of which include the length of the sample, but also to calculate the temperature dependence of the density of steels. Wherein, the density at room temperature was determined with high accuracy by the hydrostatic weighing method. In addition, data on the ultrasound velocity and density make it possible to calculate the values of Young's modulus. Experimental data showed that the ultrasonic velocity in the quenched sample is much less than in the annealed sample. However, in the region of the phase transition, their values practically coincide, which indicates the annealing of the sample. Experimental and calculated values of the properties of steels in the temperature range from room temperature to the start of the phase transformation were processed by the least squares method, which allowed obtaining approximating equations in the indicated temperature range.