In previous experiments [1] concerning the influence of ultrasonics on the transformation of austenite the samples were exposed to ultrasonic vibrations at the austenitizing temperature and the transformation of austenite occurred without exposure to ultrasonic vibrations. In our experiments the ultrasonic vibrations were transmitted to the samples by direct contact and, in contrast to the earlier experiments, were begun at the beginning of the transformation of austenite. They were stopped at the completion of the transformation. Thus, the entire isothermal transformation occurred under the influence of ultrasonic vibrations. The ultrasonic generator had an output of 50 W, frequency of 20 kHz, amplitude of 0.025 mm.

The length of the samples exceeded one-fourth the wavelength, so that the node lay within the sample. The sample was held between the concentrator and the bottom of the bath. The chemical composition of the steels is given in Table 1.

![Isothermal transformation diagrams](image-url)

**Fig. 1.** Isothermal transformation diagrams. --- ) Without ultrasonic vibration; --- ) with ultrasonic vibration.

The kinetics of the isothermal transformation of supercooled austenite was investigated with a magnetometer. The intermediate amounts of magnetic phase were determined from the readings of a galvanometer at specified time intervals.

Samples 80 mm long and 9 mm in diameter were heated in a bath of 50% NaCl + 50% KCl. During the process the bath was deoxidized with charcoal. The samples were austenitized 10 min at 900°C. To avoid the transformation of austenite, the samples were quickly supercooled to a given subcritical temperature after soaking. Rapid cooling was carried out in salt baths of the following composition: 55% KNO₃ + 45% NaNO₂ (for isotherms of 500–150°C), 84% NaNO₃ + 16% NaCl (for isotherms of 700–500°C).

The temperature of the bath and the samples was controlled with thermocouples. To create a uniform temperature the bath was stirred with a mechanical agitator. The difference between the temperature of the bath and any given section of the sample did not exceed 5°C during the experiment.

The isothermal transformation process was studied at 200–700°C (at 25–50°C intervals). The samples were held in the bath until the transformation of austenite was almost complete.

On the basis of consistent results from repeated experiments (10–12 samples for each temperature) we constructed diagrams of the isothermal transformation of supercooled austenite with and without application of ultrasonic vibrations [2].

As can be seen in Fig. 1, the effect of ultrasonic vibrations on the transformation is not the same and depends on the temperature and the chemical composition of the steel.