INFLUENCE OF CHROMIUM CONTENT IN TEMPERING STEELS ON PHASE TRANSITION TEMPERATURE A_1 AND A_3

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The study was conducted for three species of quenched and tempered steel (C50, 50Cr3, 51Cr6). The chemical composition was analyzed using arc spark spectrometer PMI-MASTER PRO. These studies showed that the content of carbon, silicon and manganese in these steels was similar and only the chromium content varied significantly. For the determination of phase transition temperature dilatometric studies were conducted. The study was conducted using an automatic dilatometer DA-3. Edited program attempts allowed to operate from ambient temperature to a temperature of 1000°C with different rates of heating and cooling. In clinical samples were used in the shape of a cylinder with a diameter of 6 mm and a length of 40 mm. Each test material was 5-fold sample heating and cooling. The resulting graphs allow the determination of temperature changes Ac_1, Ac_3, Ar_3 and Ar_1. Method of determining the phase transition temperatures shown figure 1.

The variable component of the test materials were chrome and therefore this factor should be assigned to different temperatures of phase transitions. With the increase in the chromium content, the A_1 transformation temperature during heating and cooling were increased, while the A_3 transformation temperature during heating and cooling decreased. It was also observed that increased the chromium content in steels cause narrowing of the temperature range between the beginning and end of the transformation of A_1 and A_3. This was due to the fact that chromium moves eutectoid point to lower carbon content in the steel and thus the steel containing 0.5% carbon and increased chromium content has a structure similar to the eutectoid.

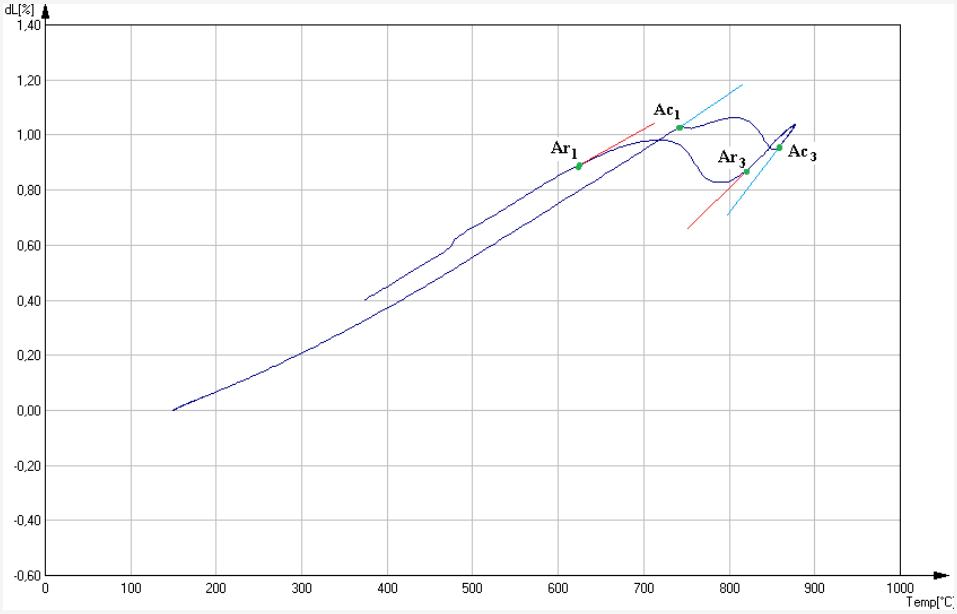

Figure 1. Method of determining the phase transition temperature.

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