For the feed-in method shown in Fig. 1c, the expression for E^{true}_{AB} takes the form

$$E^{true}_{AB}=E^{m}_{AB}+k_A(E_A-E_N)-k_B(E_B-E_N)+\eta(k_A-k_B)(E_N-E_M),$$

where

$$k_A=\frac{R_A(R_N+R_M)}{R_AR_N+R_AR_M+R_NR_M};$$

$$k_B=\frac{R_B(R_N+R_M)}{R_BR_N+R_BR_M+R_NR_M};\quad \eta=\frac{R_N}{R_N+R_M};\quad E_N=\int_{T_1}^{T}\alpha_N dT;$$

E_N and R_N are the appropriate values of the thermo-emf and total longitudinal resistance for the solder material N, sandwiched between the surface of the thermocouple branch and the surface of the longitudinal channel inside the conical fitting.

Taking account of the inequality (6), independent of the magnitude of R_N, one can assume $k_A = k_B = 1$; substituting these values in Eq. (8) leads us once again to Eq. (2) for the quantity E^{true}_{AB}.

To check the validity of using the electrical circuit presented in Fig. 2 as an equivalent circuit, it is sufficient to check the accuracy of Eq. (4).

The thermoelectric circuit which was used for the experimental check of this relation is shown in Fig. 3. Here an Alumel wire A (d = 0.07 cm) was hammered against a metal rod M (U8 steel) of circular cross section (D = 0.5 cm) and of length L = 35 cm. By means of a Dewar vessel with melting ice and a thermostat, a temperature difference in the range of 20 to 100°C could be provided between the ends of the rod. The thermo-emf at the ends of the metal rod was measured by means of a potentiometer. Using Eq. (4) to write the expression for this thermo-emf, we obtain

$$E^{ad}_{M}=-\frac{R_M}{R_M+R_A}(E_M-E_A), \tag{9}$$

where R_M and R_A are the total resistances of the section of the steel rod M and the Alumel wire A, respectively, between the points 1 and 2 (see Fig. 2); E_M-E_A) is none other that the thermo-emf of the thermocouple M-A, i.e., a thermocouple of U8 steel and Alumel. After calibrating an M-A thermocouple, E^{ad}_M was computed as a function of the ΔT across the ends of the hammered-in wire A.

The calculated and experimental results are in good agreement with one another. The deviations of the experimental points from the theoretical values are found to be within the limits of acceptable error. Thus the experiment performed confirms the validity of Eq. (4).

From all that has been said, it follows that feeding thermocouple leads into a high pressure chamber without cutting at the cones does not exclude the generation of additional thermo-emfs. Moreover, since the inequality (6) is almost always fulfilled under real conditions, feed-in of thermocouple leads without interruption at the cones is in fact not different from breaking them at the feed-in; therefore, use of more complex feed-ins with continuous leads becomes inexpedient.

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