VISCOSITY OF A MIXTURE OF n-BUTYL AND ISOBUTYL ALCOHOLS AT DIFFERENT TEMPERATURES AND PRESSURES

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The results of an experimental investigation of the dynamic viscosity of binary mixtures of n-butyl and isobutyl alcohols are given.

The wide use of n-butyl and isobutyl alcohols in industry has given rise to the need to determine the density [1] and viscosity of solutions of alcohols in different proportions. In this paper we give the viscosity of a mixture composed of 88% n-butyl and 12% isobutyl alcohol.

In preparing the mixtures we paid particular attention to the purity of the components. After drying they were repeatedly distilled under vacuum. Results of chromatographic analysis showed that the purity of the individual substances was 99.9%; the concentration error in the determination of the composition of the mixture was less than 0.1%.

The viscosity was determined by the capillary technique [2] at temperatures 293.98-479.83°K and pressures 0.1-49.1 MPa. The temperature of the part of the viscometer with the mercury seal, which creates a pressure drop on the ends of the capillary, was kept constant at 24°C to within ±0.05°C, and the temperature of the capillary extending into the region of the experimental temperature was kept constant separately to the same accuracy.

To investigate the alcohol solution in the experiments we used a viscometer with dimensions $r = 1.165 \cdot 10^{-4}$ m, $l = 772.94 \cdot 10^{-4}$ m, and $\omega_0 = 206.607 \cdot 10^{-4}$ m^3. The geometric dimensions of the viscometer were determined with a MIP-12 microscope and a KM-8 cathetometer by the technique in [3]. The temperature was determined with a PTS-10 platinum resistance thermometer. The pressure was created and measured by an MP-600 dead-weight pressure gauge of accuracy class 0.05.

The viscometer temperature was kept constant at 24°C to within ±0.05°C. The time of flow of the investigated substance through the capillary was measured automatically by a P14M timer to within ±0.01 sec.

The mean error of viscosity measurement was ±1%. We obtained 100 experimental values of the dynamic viscosity. The results of the investigations of the temperature dependence of the viscosity, given in Table 1, are satisfactorily represented by an exponential curve; with increase in pressure the viscosity increases almost linearly.

TABLE 1. Coefficients of Dynamic Viscosity of 88% n-Butyl Alcohol +12% Isobutyl Alcohol, $\eta \cdot 10^6$, Pa·sec

T, K	p, MPa						
	0,1	5,0	9,9	19,7	29,5	39,3	49,1
293,98	6100	6310	6335	7090	7750	8500	9300
318,03	3430	3580	3733	4041	4360	4690	5040
340,13	2248	2350	2450	2650	2860	3065	3270
366,88	—	1505	1565	1680	1815	1953	2090
403,63	—	950	990	1070	1145	1230	1310
431,33	—	740	770	830	887	950	1003
453,53	—	630	652	700	748	797	845
479,63	—	555	575	615	657	697	740

LITERATURE CITED

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