

Viscosity Measurements on Gaseous Ethane: Re-evaluation
[*Journal of Chemical & Engineering Data* 2006, 51, 136–144. DOI: 10.1021/jc0502871]. Jörg Wilhelm, Daniel Seibt, Eckhard Vogel,* Daniel Buttig, and Egon Hassel

Measurements of the viscosity (η) of ethane by Wilhelm et al., performed by means of a vibrating-wire viscometer with a freely suspended weight using measurements of temperature (T) and pressure (p) for the determination of the required density (ρ) with the equation of state by Bücker and Wagner,¹ have been re-evaluated. The re-evaluation concerns the determination of the wire radius using an improved calibration. The re-evaluated data are to be used together with new accurate $\eta\rho pT$ data² to test, particularly in the vicinity of the critical point, their performance in comparison with the viscosity surface correlation by Hendl et al.³

The recalibration of the old vibrating-wire viscometer was performed using a value for the radius of the wire that was newly determined using old measurements on argon⁴ and the currently accepted value for the zero-density viscosity coefficient of argon derived by Vogel et al.⁵ from an ab initio potential for argon on the basis of the kinetic theory of dilute gases ($\eta_{0,Ar,298.15K} = 22.552 \mu\text{Pa}\cdot\text{s}$ with an uncertainty of $\pm 0.1\%$).

The results reported in Table 1 of the previous paper of Wilhelm et al. were restricted to $\eta\rho p$ triples along the measured isotherms. In this correction, we include more details about the re-evaluated measurements in order to make the information comparable to that given for the new $\eta\rho pT$ measurements by Seibt et al.² The individual points were not exactly measured at the nominal temperature of an isotherm (T_{nom}) but could be kept within small deviations. The experimental viscosity data were adjusted to $\eta_{T_{\text{nom}}}$ values at the nominal temperature using a Taylor series expansion restricted to the first power in temperature. For that purpose, the value of the temperature dependence for the low-density region, $(\partial\eta/\partial T)_{\rho} = (0.027 \text{ to } 0.030) \mu\text{Pa}\cdot\text{s}\cdot\text{K}^{-1}$, determined experimentally by Hendl and Vogel⁶ for ethane was used. Furthermore, it was assumed that the density values $\rho_{\text{eos}}(T,p)$ calculated from the measured values for T and p using the equation of state by Bücker and Wagner¹ and those for the isotherms are the same. As a consequence, the pressures $p_{T_{\text{nom}},\rho_{\text{eos}}}$ at the nominal temperature changed and were recalculated from the densities. The corrected and improved experimental $\eta\rho pT$ data from the earlier measurements of Wilhelm et al. on ethane (eight isotherms at 290 K, 300 K, 310 K, 320 K, 340 K, 370 K, 400 K, and 430 K) are summarized in Tables 1 to 8.

The experimental results for each nominal isotherm for ethane were correlated as a function of the reduced density ($\delta = \rho/\rho_{c,C_2H_6}$) by means of a power-series representation in which the highest power (n) was restricted to 6 or lower depending on the density range and the reduced temperature ($\tau = T/T_{c,C_2H_6}$):

$$\eta(\tau, \delta) = \sum_{i=0}^n \eta_i(\tau) \delta^i \quad (1)$$

The values of the critical density and temperature, $\rho_{c,C_2H_6} = 206.18 \text{ kg}\cdot\text{m}^{-3}$ and $T_{c,C_2H_6} = 305.322 \text{ K}$, are those given by

Table 1. Corrected Experimental $\eta\rho pT$ Data for Ethane at 290 K

T	p	$p_{290K,\rho_{\text{eos}}}$	$\rho_{\text{eos}}(T,p)$	η	η_{290K}
K	MPa	MPa	$\text{kg}\cdot\text{m}^{-3}$	$\mu\text{Pa}\cdot\text{s}$	$\mu\text{Pa}\cdot\text{s}$
289.97	0.079588	0.079597	0.99911	8.971	8.972
289.97	0.10307	0.10308	1.2964	8.976	8.977
289.97	0.12423	0.12425	1.5653	8.979	8.980
289.98	0.14826	0.14827	1.8717	8.984	8.985
289.98	0.17697	0.17698	2.2396	8.987	8.987
289.98	0.20260	0.20262	2.5696	8.991	8.992
289.98	0.22556	0.22558	2.8663	8.991	8.992
289.98	0.24644	0.24646	3.1373	8.993	8.994
289.98	0.27099	0.27101	3.4570	8.996	8.997
289.98	0.30057	0.30059	3.8441	8.997	8.998
289.97	0.32734	0.32738	4.1964	9.001	9.002
289.97	0.35383	0.35387	4.5466	9.004	9.005
289.97	0.37869	0.37873	4.8766	9.007	9.008
289.97	0.41279	0.41283	5.3317	9.010	9.011
289.98	0.43791	0.43794	5.6686	9.015	9.016
289.98	0.47692	0.47696	6.1952	9.020	9.021
289.99	0.50885	0.50887	6.6288	9.026	9.026
289.99	0.55618	0.55620	7.2766	9.031	9.032
289.99	0.59517	0.59519	7.8147	9.037	9.037
290.00	0.63689	0.63689	8.3947	9.042	9.042
290.00	0.67153	0.67153	8.8800	9.046	9.046
290.00	0.71098	0.71098	9.4367	9.053	9.053
290.00	0.77525	0.77525	10.353	9.063	9.063
289.99	0.82526	0.82530	11.075	9.073	9.073
289.99	0.88200	0.88204	11.903	9.082	9.082
289.99	0.91327	0.91331	12.363	9.087	9.088
289.98	0.95833	0.95841	13.033	9.098	9.099
289.98	1.0094	1.0095	13.799	9.108	9.109
289.98	1.0644	1.0645	14.633	9.120	9.121
289.98	1.1232	1.1233	15.537	9.132	9.133
289.97	1.1815	1.1817	16.447	9.146	9.147
289.97	1.2165	1.2166	16.997	9.154	9.155
289.97	1.2592	1.2593	17.676	9.165	9.166
289.96	1.3499	1.3501	19.143	9.190	9.191
289.96	1.4378	1.4381	20.596	9.215	9.217
289.96	1.4846	1.4848	21.382	9.227	9.228
289.95	1.5591	1.5595	22.657	9.251	9.253
289.95	1.6149	1.6153	23.627	9.270	9.271
289.95	1.6669	1.6673	24.546	9.284	9.286
289.95	1.7164	1.7168	25.432	9.302	9.304
289.96	1.8156	1.8160	27.248	9.341	9.342
289.97	1.8843	1.8845	28.536	9.368	9.368
289.98	1.9466	1.9468	29.730	9.393	9.393
289.99	2.0266	2.0267	31.299	9.428	9.428

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Table 1. Continued

T	p	$p_{290K, \rho_{eos}}$	$\rho_{eos}(T,p)$	η	η_{290K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
289.99	2.0804	2.0806	32.381	9.453	9.453
289.99	2.1393	2.1394	33.586	9.480	9.480
289.99	2.2274	2.2275	35.442	9.524	9.524
289.99	2.2797	2.2799	36.574	9.551	9.552
289.98	2.3470	2.3473	38.067	9.588	9.589
289.97	2.4383	2.4387	40.162	9.640	9.641
289.96	2.4748	2.4754	41.026	9.666	9.667
289.95	2.5320	2.5327	42.406	9.701	9.702
289.95	2.6018	2.6026	44.139	9.748	9.749
289.95	2.6742	2.6750	46.003	9.797	9.798
289.96	2.7471	2.7478	47.949	9.854	9.855
289.96	2.7947	2.7954	49.265	9.893	9.894
289.96	2.8528	2.8536	50.928	9.943	9.944
289.96	2.8893	2.8901	52.002	9.975	9.976
289.95	2.9150	2.9160	52.780	9.995	9.997

Table 2. Corrected Experimental $\eta p p T$ Data for Ethane at 300 K

T	p	$p_{300K, \rho_{eos}}$	$\rho_{eos}(T,p)$	η	η_{300K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
300.00	0.071393	0.071393	0.86518	9.279	9.279
300.00	0.10259	0.10259	1.2462	9.282	9.282
300.00	0.12556	0.12556	1.5278	9.288	9.288
300.00	0.15172	0.15172	1.8497	9.290	9.290
300.00	0.17840	0.17840	2.1793	9.290	9.290
300.00	0.20362	0.20362	2.4922	9.293	9.293
300.00	0.22421	0.22421	2.7484	9.301	9.301
300.00	0.25424	0.25424	3.1237	9.301	9.301
300.01	0.27547	0.27546	3.3900	9.302	9.302
300.01	0.30564	0.30563	3.7701	9.307	9.306
300.01	0.33454	0.33453	4.1358	9.311	9.311
300.01	0.35807	0.35806	4.4348	9.315	9.314
300.02	0.38850	0.38848	4.8231	9.318	9.318
300.02	0.41995	0.41992	5.2264	9.322	9.322
300.02	0.44726	0.44723	5.5784	9.326	9.325
300.02	0.48198	0.48195	6.0281	9.331	9.330
300.02	0.50733	0.50729	6.3579	9.334	9.333
300.02	0.54582	0.54578	6.8616	9.340	9.339
300.02	0.57996	0.57991	7.3110	9.343	9.342
300.00	0.61884	0.61884	7.8267	9.350	9.350
299.97	0.64987	0.64995	8.2412	9.354	9.355
299.97	0.68370	0.68378	8.6946	9.358	9.359
299.97	0.72824	0.72832	9.2955	9.364	9.365
299.97	0.77863	0.77872	9.9812	9.373	9.374
299.97	0.81301	0.81311	10.453	9.381	9.382
299.97	0.86895	0.86905	11.226	9.390	9.391
299.97	0.91114	0.91125	11.814	9.397	9.397
299.98	0.97423	0.97430	12.702	9.411	9.412
299.98	1.0135	1.0135	13.259	9.421	9.421
299.98	1.0645	1.0646	13.992	9.431	9.432
299.98	1.1163	1.1164	14.742	9.441	9.442

Table 2. Continued

T	p	$p_{300K, \rho_{eos}}$	$\rho_{eos}(T,p)$	η	η_{300K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
299.98	1.1599	1.1600	15.379	9.451	9.451
299.98	1.2513	1.2514	16.734	9.472	9.473
299.98	1.3212	1.3213	17.785	9.492	9.493
299.99	1.3645	1.3646	18.445	9.502	9.502
299.99	1.4463	1.4464	19.708	9.525	9.526
299.99	1.5148	1.5149	20.783	9.545	9.545
299.99	1.5509	1.5510	21.356	9.557	9.557
299.99	1.6107	1.6107	22.315	9.576	9.577
299.99	1.6535	1.6536	23.012	9.588	9.588
299.99	1.7609	1.7609	24.786	9.623	9.623
300.00	1.8292	1.8292	25.938	9.649	9.649
300.01	1.8714	1.8713	26.660	9.665	9.665
300.01	1.9103	1.9102	27.333	9.677	9.676
300.01	2.0057	2.0056	29.011	9.715	9.715
299.97	2.0824	2.0827	30.400	9.746	9.747
299.98	2.1302	2.1304	31.273	9.767	9.767
299.98	2.2438	2.2440	33.402	9.819	9.819
299.98	2.3336	2.3338	35.137	9.860	9.860
299.99	2.3916	2.3918	36.282	9.890	9.890
300.00	2.4554	2.4554	37.564	9.924	9.924
300.00	2.5584	2.5584	39.698	9.980	9.980
300.00	2.6063	2.6063	40.714	10.008	10.008
300.00	2.6881	2.6881	42.495	10.056	10.056
299.97	2.7453	2.7457	43.780	10.094	10.095
299.97	2.8532	2.8537	46.267	10.166	10.167
299.96	2.9042	2.9049	47.486	10.202	10.203
299.97	2.9861	2.9867	49.487	10.263	10.264
299.97	3.0539	3.0545	51.204	10.318	10.319
299.97	3.1312	3.1317	53.227	10.382	10.383
299.98	3.2134	3.2138	55.463	10.459	10.460
299.98	3.2670	3.2674	56.975	10.507	10.507
299.99	3.3489	3.3491	59.369	10.591	10.591
300.00	3.4042	3.4042	61.050	10.655	10.655
300.00	3.4836	3.4836	63.579	10.747	10.747
300.01	3.5355	3.5352	65.295	10.807	10.806
300.00	3.6199	3.6199	68.256	10.924	10.924
300.01	3.6930	3.6927	70.959	11.033	11.032
300.02	3.7606	3.7600	73.617	11.140	11.139
300.02	3.8013	3.8007	75.307	11.206	11.206
300.03	3.8390	3.8381	76.919	11.274	11.273

Table 3. Corrected Experimental $\eta p p T$ Data for Ethane at 310 K

T	p	$p_{310K, \rho_{eos}}$	$\rho_{eos}(T,p)$	η	η_{310K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
309.98	0.10000	0.10000	1.1744	9.577	9.577
309.98	0.12314	0.12315	1.4485	9.581	9.582
309.98	0.14847	0.14848	1.7495	9.584	9.585
309.98	0.17540	0.17541	2.0705	9.586	9.587
309.98	0.20043	0.20045	2.3701	9.593	9.594
309.97	0.22628	0.22630	2.6806	9.596	9.597

Table 3. Continued

T	p	$P_{310K, \rho_{\text{cos}}}$	$\rho_{\text{eos}}(T, p)$	η	η_{310K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
309.97	0.24874	0.24876	2.9512	9.598	9.599
309.97	0.27428	0.27431	3.2600	9.600	9.601
309.97	0.27427	0.27429	3.2598	9.600	9.601
309.97	0.29967	0.29970	3.5680	9.605	9.606
309.97	0.32843	0.32846	3.9183	9.608	9.609
309.98	0.35486	0.35488	4.2413	9.611	9.612
309.98	0.38284	0.38287	4.5847	9.611	9.612
309.98	0.43991	0.43994	5.2893	9.621	9.622
309.98	0.46854	0.46857	5.6451	9.624	9.625
309.98	0.49820	0.49824	6.0153	9.630	9.631
309.98	0.53395	0.53399	6.4635	9.636	9.636
309.98	0.58182	0.58186	7.0674	9.642	9.643
309.98	0.62334	0.62339	7.5947	9.651	9.652
309.98	0.67025	0.67029	8.1944	9.655	9.655
309.99	0.71397	0.71400	8.7570	9.663	9.663
309.99	0.75620	0.75623	9.3042	9.671	9.671
309.99	0.81581	0.81584	10.083	9.682	9.683
310.00	0.85950	0.85950	10.658	9.688	9.688
310.00	0.92413	0.92413	11.516	9.702	9.702
310.00	0.92412	0.92412	11.516	9.700	9.700
310.00	0.92409	0.92409	11.516	9.703	9.703
310.00	0.98307	0.98307	12.307	9.715	9.715
310.00	1.0528	1.0528	13.252	9.729	9.729
310.01	1.1337	1.1336	14.362	9.747	9.747
309.98	1.1913	1.1914	15.165	9.761	9.762
309.98	1.2513	1.2514	16.006	9.774	9.774
309.98	1.3575	1.3576	17.519	9.800	9.800
309.98	1.4287	1.4288	18.550	9.819	9.820
309.99	1.4972	1.4972	19.552	9.839	9.839
309.99	1.5688	1.5689	20.616	9.860	9.861
309.99	1.6074	1.6075	21.196	9.871	9.871
309.99	1.7141	1.7141	22.819	9.904	9.904
310.00	1.7908	1.7908	24.007	9.929	9.929
310.00	1.8337	1.8337	24.680	9.944	9.944
310.01	1.9175	1.9174	26.011	9.973	9.973
310.01	1.9983	1.9982	27.319	10.003	10.003
310.02	2.0784	2.0783	28.636	10.032	10.031
310.02	2.1582	2.1580	29.972	10.064	10.063
310.01	2.2364	2.2363	31.308	10.096	10.096
310.01	2.3484	2.3483	33.264	10.144	10.144
310.00	2.4493	2.4493	35.073	10.193	10.193
310.00	2.5294	2.5294	36.541	10.231	10.231
309.99	2.6332	2.6334	38.493	10.281	10.281
309.99	2.7413	2.7415	40.582	10.341	10.341
309.99	2.8468	2.8469	42.683	10.406	10.407
309.98	2.9264	2.9267	44.318	10.455	10.456
309.99	3.0154	3.0155	46.184	10.507	10.507
310.00	3.1610	3.1610	49.360	10.608	10.608
310.01	3.2301	3.2299	50.919	10.660	10.659
310.01	3.3464	3.3462	53.641	10.751	10.750
310.00	3.4455	3.4455	56.062	10.833	10.833
310.01	3.5734	3.5732	59.317	10.943	10.943

Table 3. Continued

T	p	$P_{310K, \rho_{\text{cos}}}$	$\rho_{\text{eos}}(T, p)$	η	η_{310K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
309.93	3.6647	3.6663	61.808	11.034	11.036
309.93	3.7973	3.7991	65.548	11.183	11.185
309.93	3.9060	3.9079	68.804	11.307	11.310
309.92	4.0946	4.0970	74.945	11.559	11.561
309.93	4.2211	4.2234	79.469	11.756	11.759
309.93	4.3680	4.3705	85.274	12.022	12.024
309.93	4.4922	4.4949	90.757	12.284	12.286
309.93	4.5934	4.5963	95.734	12.524	12.527
309.94	4.7000	4.7027	101.58	12.846	12.848
309.94	4.8063	4.8092	108.31	13.212	13.213
309.94	4.8890	4.8921	114.38	13.559	13.561
309.95	4.9384	4.9412	118.43	13.809	13.810
309.95	5.0065	5.0094	124.83	14.206	14.208
309.95	5.0528	5.0559	129.87	14.532	14.534
309.95	5.1055	5.1087	136.53	14.993	14.995
309.96	5.1611	5.1640	145.03	15.602	15.603
309.97	5.1932	5.1955	150.90	16.068	16.069
309.98	5.2209	5.2224	156.75	16.554	16.554
310.00	5.2555	5.2555	165.37	17.186	17.186
309.98	5.2705	5.2722	170.49	17.750	17.751
310.00	5.2969	5.2969	179.18	18.455	18.455
310.02	5.3193	5.3174	187.55	19.171	19.170
309.95	5.3308	5.3357	195.72	19.972	19.974
309.96	5.3501	5.3542	204.28	20.874	20.875
309.96	5.3705	5.3748	213.48	21.774	21.775
309.97	5.3914	5.3948	221.51	22.723	22.724
309.97	5.4104	5.4140	228.23	23.468	23.469
309.95	5.4290	5.4351	234.57	24.223	24.225
309.95	5.4538	5.4602	240.91	25.085	25.087
309.95	5.4865	5.4932	247.76	25.946	25.948
309.96	5.5250	5.5306	254.09	26.826	26.827
309.97	5.5768	5.5812	260.98	27.795	27.796
309.98	5.6424	5.6454	267.94	28.828	28.829
309.99	5.7346	5.7363	275.64	29.907	29.907
309.95	5.8401	5.8488	283.10	31.058	31.060
309.94	5.9810	5.9920	290.57	32.279	32.281
309.93	6.1530	6.1666	297.84	33.511	33.513
309.93	6.3711	6.3855	305.17	34.832	34.834
309.95	6.8328	6.8441	316.87	37.042	37.044
309.93	7.3661	7.3833	327.13	39.124	39.127
309.97	8.2000	8.2081	339.01	41.693	41.694
309.98	8.8751	8.8809	346.71	43.457	43.457
309.97	9.6968	9.7060	354.62	45.338	45.339
309.93	10.595	10.618	362.03	47.242	47.244
309.94	11.677	11.698	369.54	49.276	49.277
309.96	12.742	12.757	375.95	51.091	51.093
309.99	14.800	14.804	386.48	54.236	54.236
310.02	16.321	16.313	393.10	56.331	56.330
309.95	18.226	18.247	400.59	58.829	58.831
309.97	19.596	19.609	405.33	60.514	60.515
310.01	22.395	22.390	413.98	63.691	63.691
310.02	24.944	24.934	420.95	66.455	66.455

Table 4. Corrected Experimental $\eta\rho pT$ Data for Ethane at 320 K

T	p	$p_{320K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{320K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
320.06	0.11959	0.11957	1.3611	9.877	9.876
320.06	0.15295	0.15292	1.7443	9.882	9.881
320.06	0.18153	0.18149	2.0739	9.888	9.887
320.06	0.21534	0.21530	2.4653	9.892	9.890
320.06	0.24398	0.24393	2.7980	9.897	9.895
320.06	0.27875	0.27870	3.2038	9.901	9.899
320.06	0.31309	0.31303	3.6061	9.905	9.904
320.06	0.34564	0.34558	3.9892	9.911	9.909
320.06	0.37803	0.37795	4.3719	9.911	9.910
320.06	0.41219	0.41210	4.7772	9.918	9.916
320.06	0.44891	0.44882	5.2151	9.921	9.919
320.06	0.47790	0.47780	5.5621	9.929	9.927
320.04	0.50925	0.50918	5.9393	9.933	9.932
320.04	0.54419	0.54411	6.3611	9.939	9.938
320.06	0.58507	0.58495	6.8567	9.941	9.939
320.07	0.62035	0.62020	7.2866	9.952	9.950
320.05	0.67040	0.67029	7.9010	9.957	9.956
320.05	0.71918	0.71906	8.5033	9.962	9.960
320.05	0.78201	0.78187	9.2849	9.973	9.972
320.05	0.85413	0.85398	10.191	9.991	9.990
320.05	0.89983	0.89968	10.769	10.002	10.000
320.06	0.95244	0.95223	11.440	10.008	10.006
320.06	1.0500	1.0498	12.698	10.027	10.025
320.02	1.1260	1.1259	13.691	10.044	10.043
320.03	1.2227	1.2226	14.969	10.065	10.064
320.03	1.3458	1.3456	16.624	10.096	10.095
320.03	1.4498	1.4496	18.047	10.125	10.124
320.03	1.5258	1.5256	19.102	10.141	10.140
320.03	1.6392	1.6390	20.701	10.176	10.175
320.03	1.7572	1.7570	22.397	10.212	10.211
320.03	1.8540	1.8537	23.813	10.242	10.241
320.04	1.9624	1.9621	25.428	10.278	10.277
320.04	2.0685	2.0682	27.040	10.311	10.310
320.05	2.2125	2.2120	29.277	10.368	10.366
320.05	2.3280	2.3275	31.117	10.416	10.414
320.03	2.4671	2.4667	33.394	10.470	10.469
320.03	2.5945	2.5941	35.536	10.529	10.528
320.03	2.7110	2.7106	37.545	10.588	10.587
320.03	2.8505	2.8501	40.020	10.655	10.654
320.04	2.9660	2.9654	42.128	10.722	10.721
320.04	3.0838	3.0831	44.339	10.789	10.788
320.05	3.2276	3.2268	47.128	10.873	10.872
320.05	3.3730	3.3721	50.059	10.975	10.974
320.06	3.4962	3.4951	52.633	11.056	11.055
320.01	3.6281	3.6279	55.518	11.155	11.154
320.00	3.7112	3.7112	57.387	11.225	11.225
319.99	3.9952	3.9955	64.159	11.475	11.476
319.95	4.1729	4.1742	68.776	11.655	11.657
319.96	4.3253	4.3264	72.969	11.831	11.832
319.96	4.5052	4.5065	78.289	12.061	12.062
319.97	4.6788	4.6798	83.846	12.316	12.317

Table 4. Continued

T	p	$p_{320K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{320K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
319.98	4.8019	4.8026	88.088	12.521	12.522
319.99	4.9711	4.9715	94.421	12.833	12.833
320.00	5.1502	5.1502	101.88	13.232	13.232
320.01	5.2764	5.2760	107.72	13.546	13.545
320.04	5.4032	5.4012	114.12	13.916	13.915
319.97	5.5148	5.5164	120.65	14.315	14.316
319.99	5.6553	5.6558	129.57	14.897	14.897
320.01	5.7392	5.7386	135.49	15.299	15.299
320.02	5.8492	5.8479	144.19	15.889	15.888
320.00	5.9347	5.9347	151.91	16.478	16.478
320.02	6.0190	6.0174	160.02	17.114	17.113
320.00	6.0834	6.0834	167.01	17.659	17.659
319.99	6.1309	6.1318	172.42	18.128	18.128
319.99	6.2004	6.2012	180.54	18.854	18.855
320.00	6.2701	6.2701	188.85	19.607	19.607
320.01	6.3457	6.3447	197.92	20.513	20.513
320.02	6.4236	6.4215	207.06	21.433	21.432
320.00	6.4843	6.4843	214.18	22.167	22.167
320.01	6.5435	6.5424	220.40	22.892	22.892
320.03	6.6068	6.6032	226.49	23.575	23.574
320.00	6.6999	6.6999	235.28	24.646	24.646
320.04	6.8260	6.8206	244.79	25.840	25.839
319.96	6.9642	6.9700	254.70	27.118	27.119
319.98	7.0815	7.0846	261.18	28.075	28.075
320.01	7.2801	7.2784	270.48	29.428	29.428
320.04	7.5676	7.5605	281.35	31.064	31.062
320.00	7.9215	7.9215	292.28	32.872	32.872
320.02	8.2303	8.2262	299.81	34.183	34.182
320.05	8.6176	8.6068	307.73	35.599	35.598
320.00	9.0573	9.0573	315.62	37.081	37.081
320.00	9.5507	9.5507	322.96	38.537	38.537
320.01	10.194	10.191	331.05	40.232	40.232
320.02	10.930	10.925	338.92	41.947	41.947
320.05	12.261	12.246	350.55	44.662	44.660
320.02	13.367	13.360	358.67	46.689	46.688
320.05	15.715	15.697	372.51	50.386	50.384
319.99	17.373	17.377	380.69	52.773	52.773
320.02	19.360	19.352	389.04	55.303	55.303
319.99	21.680	21.684	397.59	58.120	58.120
320.03	24.211	24.198	405.64	60.900	60.899
320.04	25.365	25.347	409.01	62.133	62.132

Table 5. Corrected Experimental $\eta\rho pT$ Data for Ethane at 340 K

T	p	$p_{340K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{340K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
339.97	0.10560	0.10561	1.1293	10.452	10.453
339.97	0.13552	0.13553	1.4514	10.460	10.461
339.98	0.17299	0.17300	1.8561	10.467	10.468
339.98	0.20373	0.20374	2.1894	10.473	10.473
339.97	0.24668	0.24671	2.6568	10.480	10.481

Table 5. Continued

<i>T</i>	<i>p</i>	$P_{340K, \rho_{\text{eos}}}$	$\rho_{\text{eos}}(T, p)$	η	η_{340K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
339.97	0.28104	0.28106	3.0321	10.488	10.488
339.99	0.31772	0.31773	3.4341	10.489	10.489
339.99	0.34052	0.34053	3.6848	10.493	10.494
339.99	0.36543	0.36544	3.9594	10.498	10.499
339.99	0.40615	0.40617	4.4099	10.506	10.506
339.98	0.43080	0.43082	4.6836	10.508	10.509
339.98	0.47100	0.47103	5.1313	10.508	10.509
339.97	0.52395	0.52400	5.7242	10.522	10.523
339.96	0.56302	0.56309	6.1639	10.526	10.527
339.98	0.63208	0.63212	6.9447	10.541	10.541
339.98	0.66839	0.66843	7.3579	10.546	10.546
339.97	0.74594	0.74601	8.2459	10.557	10.558
339.96	0.82673	0.82684	9.1792	10.569	10.570
339.98	0.86566	0.86571	9.6311	10.578	10.579
340.02	0.92427	0.92421	10.315	10.594	10.593
340.03	0.97816	0.97806	10.948	10.604	10.603
339.99	1.0471	1.0471	11.766	10.614	10.614
339.97	1.1333	1.1335	12.798	10.632	10.633
339.96	1.2064	1.2066	13.680	10.649	10.651
339.95	1.3335	1.3337	15.231	10.681	10.682
339.96	1.4527	1.4529	16.707	10.712	10.713
339.96	1.5498	1.5500	17.925	10.729	10.730
339.96	1.6158	1.6161	18.762	10.750	10.751
339.96	1.7293	1.7296	20.217	10.783	10.784
339.96	1.8415	1.8418	21.677	10.815	10.816
339.96	1.9560	1.9563	23.187	10.851	10.852
339.96	2.0757	2.0760	24.791	10.892	10.893
339.96	2.2085	2.2089	26.603	10.935	10.936
339.96	2.3484	2.3488	28.546	10.982	10.983
339.97	2.4987	2.4990	30.675	11.041	11.042
339.97	2.6024	2.6027	32.173	11.079	11.080
339.97	2.7115	2.7119	33.774	11.124	11.124
340.06	2.8935	2.8928	36.487	11.205	11.203
340.05	3.0097	3.0091	38.271	11.256	11.254
340.05	3.1320	3.1313	40.182	11.315	11.314
340.05	3.2578	3.2571	42.189	11.376	11.375
340.03	3.4525	3.4520	45.385	11.477	11.477
340.03	3.5649	3.5645	47.276	11.541	11.540
340.02	3.6746	3.6742	49.160	11.604	11.603
340.03	3.7789	3.7783	50.983	11.666	11.665
340.03	3.8766	3.8760	52.725	11.726	11.725
340.03	3.9535	3.9529	54.118	11.772	11.772
340.03	4.0800	4.0794	56.457	11.865	11.864
340.04	4.2375	4.2366	59.447	11.973	11.972
340.01	4.3992	4.3990	62.636	12.101	12.101
340.01	4.4874	4.4872	64.415	12.172	12.172
340.01	4.5778	4.5775	66.272	12.247	12.246
340.01	4.6698	4.6695	68.202	12.329	12.329
340.02	4.9655	4.9650	74.680	12.606	12.606
340.01	5.0807	5.0804	77.338	12.727	12.727
340.01	5.1887	5.1884	79.893	12.845	12.845
340.01	5.3126	5.3123	82.909	12.989	12.988

Table 5. Continued

<i>T</i>	<i>p</i>	$P_{340K, \rho_{\text{eos}}}$	$\rho_{\text{eos}}(T, p)$	η	η_{340K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
340.01	5.4301	5.4298	85.862	13.125	13.125
340.02	5.5575	5.5568	89.158	13.282	13.281
339.96	6.2304	6.2322	108.80	14.342	14.343
339.97	6.4470	6.4485	115.97	14.776	14.777
339.96	6.6613	6.6635	123.57	15.246	15.247
339.96	6.8460	6.8483	130.51	15.698	15.699
339.98	7.0397	7.0410	138.14	16.225	16.226
339.99	7.2211	7.2218	145.67	16.764	16.764
340.01	7.4045	7.4037	153.58	17.356	17.355
340.03	7.5856	7.5833	161.66	17.978	17.977
339.96	8.0780	8.0817	184.80	19.982	19.983
339.97	8.2599	8.2628	193.16	20.759	20.760
339.99	8.4475	8.4485	201.51	21.594	21.594
340.00	8.6445	8.6445	209.98	22.489	22.489
340.02	8.8642	8.8618	218.86	23.446	23.445
340.04	9.0819	9.0769	227.07	24.370	24.369
339.94	9.3147	9.3227	235.72	25.396	25.398
339.95	9.5674	9.5744	243.81	26.407	26.408
339.95	9.8474	9.8548	251.97	27.470	27.471
339.95	10.688	10.697	272.14	30.327	30.328
339.96	11.133	11.140	280.74	31.624	31.625
339.99	11.649	11.651	289.42	33.044	33.044
340.02	12.247	12.243	298.15	34.534	34.534
339.97	12.867	12.873	306.27	35.968	35.969
339.96	13.576	13.585	314.29	37.460	37.461
339.98	14.507	14.512	323.36	39.236	39.237
339.95	15.595	15.608	332.58	41.167	41.169
339.92	16.865	16.887	341.82	43.224	43.227
339.94	18.715	18.733	353.11	45.884	45.885
339.94	20.525	20.545	362.50	48.268	48.270
339.96	22.678	22.692	372.10	50.882	50.884
339.94	24.717	24.739	380.09	53.166	53.168

Table 6. Corrected Experimental $\eta\rho pT$ Data for Ethane at 370 K

<i>T</i>	<i>p</i>	$P_{370K, \rho_{\text{eos}}}$	$\rho_{\text{eos}}(T, p)$	η	η_{370K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
370.03	0.11333	0.11332	1.1124	11.322	11.321
370.02	0.14747	0.14746	1.4494	11.330	11.329
370.02	0.18033	0.18032	1.7746	11.336	11.336
370.03	0.21980	0.21978	2.1661	11.342	11.341
370.03	0.25055	0.25053	2.4721	11.348	11.347
370.03	0.27779	0.27777	2.7438	11.352	11.351
370.03	0.32054	0.32051	3.1712	11.359	11.358
370.03	0.34672	0.34669	3.4336	11.362	11.361
370.02	0.37339	0.37336	3.7016	11.368	11.368
370.02	0.40074	0.40072	3.9770	11.374	11.374
370.02	0.43976	0.43973	4.3708	11.377	11.376
370.02	0.48562	0.48559	4.8353	11.392	11.391
370.02	0.51950	0.51947	5.1794	11.391	11.391
370.02	0.56228	0.56225	5.6153	11.403	11.403

Table 6. Continued

T	p	$p_{370K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{370K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
370.02	0.59886	0.59882	5.9892	11.403	11.403
370.02	0.63954	0.63951	6.4063	11.410	11.409
370.03	0.74269	0.74262	7.4696	11.424	11.423
370.03	0.79059	0.79052	7.9666	11.431	11.430
370.03	0.85121	0.85113	8.5981	11.444	11.443
370.03	0.89729	0.89721	9.0803	11.457	11.456
370.03	0.95730	0.95722	9.7110	11.465	11.464
370.01	1.0613	1.0613	10.812	11.482	11.482
370.01	1.1451	1.1451	11.706	11.501	11.500
370.01	1.2450	1.2450	12.779	11.525	11.525
370.01	1.3568	1.3568	13.991	11.550	11.550
370.01	1.4443	1.4442	14.947	11.571	11.571
370.01	1.5440	1.5440	16.046	11.590	11.590
370.01	1.6916	1.6916	17.690	11.630	11.630
370.01	1.7922	1.7921	18.822	11.653	11.652
370.01	1.8905	1.8904	19.939	11.684	11.683
370.01	2.0398	2.0398	21.654	11.725	11.724
370.01	2.2039	2.2038	23.565	11.769	11.769
370.01	2.3488	2.3487	25.276	11.812	11.812
370.01	2.4746	2.4745	26.781	11.851	11.851
370.01	2.6603	2.6602	29.034	11.914	11.914
370.01	2.7355	2.7354	29.959	11.940	11.940
370.01	2.9502	2.9501	32.633	12.016	12.016
370.02	3.0978	3.0976	34.504	12.074	12.073
370.02	3.2540	3.2538	36.515	12.132	12.131
370.03	3.4135	3.4131	38.599	12.199	12.199
370.03	3.5722	3.5718	40.708	12.264	12.263
370.04	3.7503	3.7497	43.114	12.349	12.348
370.05	4.0114	4.0106	46.724	12.469	12.468
370.05	4.2576	4.2568	50.225	12.595	12.593
370.06	4.4092	4.4081	52.424	12.670	12.668
370.03	4.6435	4.6429	55.907	12.806	12.805
370.03	4.8297	4.8291	58.737	12.916	12.915
370.03	5.0325	5.0318	61.886	13.042	13.041
370.02	5.3042	5.3037	66.225	13.224	13.224
370.02	5.5677	5.5672	70.564	13.411	13.411
369.99	5.7901	5.7904	74.345	13.582	13.582
369.99	5.9618	5.9621	77.324	13.713	13.713
369.99	6.2278	6.2281	82.060	13.944	13.945
369.99	6.5025	6.5029	87.110	14.187	14.187
370.00	6.8002	6.8002	92.765	14.482	14.482
370.01	7.0654	7.0650	97.969	14.767	14.767
370.03	7.3613	7.3601	103.96	15.094	15.093
370.04	7.6746	7.6727	110.52	15.473	15.472
370.06	8.0232	8.0202	118.06	15.934	15.932
370.07	8.2540	8.2504	123.20	16.259	16.257
370.04	8.5915	8.5893	130.95	16.767	16.766
370.05	8.8517	8.8487	137.01	17.180	17.178
370.07	9.1109	9.1064	143.13	17.606	17.604
370.00	9.4635	9.4635	151.72	18.254	18.254
370.01	9.7650	9.7643	159.01	18.818	18.818
370.01	10.126	10.125	167.76	19.524	19.524
370.01	10.525	10.524	177.32	20.357	20.357

Table 6. Continued

T	p	$p_{370K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{370K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
370.00	10.820	10.820	184.33	20.986	20.986
370.01	11.122	11.121	191.27	21.631	21.631
370.02	11.586	11.584	201.59	22.643	22.642
370.00	11.948	11.948	209.35	23.439	23.439
369.98	12.309	12.311	216.75	24.217	24.218
369.97	12.692	12.695	224.18	25.056	25.057
369.95	13.105	13.112	231.78	25.944	25.946
370.01	14.180	14.179	249.20	28.103	28.103
370.03	14.738	14.733	257.20	29.167	29.166
370.01	15.326	15.325	265.04	30.258	30.257
370.00	15.970	15.970	272.87	31.415	31.415
370.05	17.173	17.163	285.69	33.402	33.401
370.00	18.821	18.821	300.66	35.910	35.910
370.06	20.707	20.693	314.68	38.493	38.491
370.01	23.712	23.709	332.90	42.185	42.185
370.00	25.448	25.448	341.68	44.136	44.136
370.00	27.479	27.479	350.77	46.269	46.269
370.05	29.977	29.960	360.56	48.700	48.698

Table 7. Corrected Experimental $\eta p p T$ Data for Ethane at 400 K

T	p	$p_{400K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{400K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
400.01	0.11397	0.11397	1.0338	12.157	12.157
400.01	0.14304	0.14303	1.2986	12.167	12.167
400.01	0.17207	0.17206	1.5634	12.168	12.168
400.01	0.22011	0.22010	2.0027	12.177	12.176
400.01	0.25628	0.25628	2.3344	12.188	12.188
400.01	0.29092	0.29091	2.6525	12.191	12.190
400.01	0.31323	0.31322	2.8578	12.201	12.200
400.01	0.34031	0.34031	3.1074	12.202	12.201
400.01	0.37906	0.37905	3.4651	12.205	12.205
400.01	0.41296	0.41295	3.7788	12.212	12.212
400.00	0.45221	0.45221	4.1429	12.220	12.220
400.00	0.49306	0.49306	4.5225	12.226	12.226
400.00	0.53915	0.53915	4.9520	12.233	12.233
400.00	0.58320	0.58320	5.3636	12.239	12.239
400.00	0.61260	0.61260	5.6389	12.245	12.245
400.00	0.65092	0.65092	5.9984	12.252	12.252
400.00	0.69699	0.69699	6.4319	12.256	12.256
400.00	0.76943	0.76943	7.1156	12.272	12.272
400.00	0.82812	0.82812	7.6719	12.278	12.278
400.00	0.88281	0.88281	8.1920	12.290	12.290
400.00	0.93577	0.93577	8.6973	12.299	12.299
399.99	1.0482	1.0482	9.7754	12.324	12.324
399.99	1.1746	1.1746	10.996	12.344	12.344
399.99	1.2793	1.2793	12.015	12.364	12.364
399.99	1.3859	1.3859	13.059	12.390	12.390
399.99	1.4912	1.4913	14.097	12.408	12.409
399.99	1.5728	1.5729	14.906	12.430	12.431

Table 7. Continued

T	p	$p_{400K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{400K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
399.99	1.6735	1.6735	15.909	12.455	12.455
399.99	1.7972	1.7972	17.151	12.484	12.484
399.99	1.8964	1.8965	18.155	12.507	12.507
399.99	2.0546	2.0547	19.768	12.546	12.546
399.99	2.2399	2.2400	21.677	12.596	12.596
399.99	2.3920	2.3921	23.262	12.638	12.638
400.02	2.5331	2.5330	24.744	12.679	12.678
400.03	2.6748	2.6745	26.246	12.722	12.721
400.00	2.8418	2.8418	28.040	12.770	12.770
400.00	3.0035	3.0035	29.793	12.819	12.819
400.01	3.1946	3.1945	31.887	12.884	12.883
400.01	3.3410	3.3409	33.511	12.933	12.932
400.01	3.5169	3.5168	35.483	12.999	12.999
400.00	3.6698	3.6698	37.218	13.049	13.049
400.00	3.7784	3.7784	38.459	13.087	13.087
399.99	3.9878	3.9880	40.882	13.168	13.168
399.99	4.1683	4.1684	42.996	13.239	13.239
399.99	4.3525	4.3527	45.181	13.318	13.318
399.99	4.5822	4.5824	47.945	13.416	13.416
399.99	4.7833	4.7834	50.399	13.509	13.509
399.99	4.9729	4.9731	52.746	13.593	13.593
399.99	5.1782	5.1784	55.322	13.693	13.694
399.99	5.4039	5.4041	58.195	13.812	13.812
399.98	5.6463	5.6467	61.332	13.939	13.939
399.98	5.9018	5.9023	64.694	14.079	14.079
399.98	6.1664	6.1669	68.238	14.235	14.235
399.98	6.4648	6.4653	72.308	14.417	14.417
399.97	6.8691	6.8700	77.958	14.683	14.684
399.98	7.3321	7.3327	84.599	15.005	15.005
399.99	7.7673	7.7676	91.014	15.338	15.338
399.99	8.2158	8.2162	97.800	15.701	15.701
400.01	8.6835	8.6831	105.03	16.107	16.107
400.01	9.0604	9.0599	110.99	16.459	16.459
399.97	9.4342	9.4357	117.02	16.822	16.823
399.97	9.8352	9.8368	123.55	17.239	17.240
399.98	10.231	10.232	130.04	17.666	17.666
400.00	10.615	10.615	136.39	18.097	18.097
400.02	11.010	11.009	142.93	18.563	18.563
400.04	11.428	11.425	149.86	19.081	19.080
400.05	11.867	11.864	157.13	19.640	19.639
399.95	12.268	12.272	163.82	20.161	20.162
399.96	12.722	12.725	171.17	20.778	20.779
399.96	13.186	13.189	178.55	21.417	21.418
399.99	14.033	14.034	191.54	22.603	22.603
400.02	14.542	14.540	198.98	23.322	23.321
400.03	15.075	15.072	206.52	24.074	24.073
400.05	15.656	15.650	214.35	24.919	24.917
400.07	16.451	16.442	224.48	26.022	26.020
399.97	17.254	17.258	234.19	27.152	27.153
399.99	18.094	18.095	243.45	28.291	28.291
400.00	18.892	18.892	251.63	29.353	29.353
400.00	19.766	19.766	259.94	30.465	30.465

Table 7. Continued

T	p	$p_{400K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{400K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
400.00	20.713	20.713	268.28	31.635	31.635
400.03	21.770	21.765	276.78	32.910	32.909
400.06	22.943	22.931	285.40	34.271	34.269
400.01	24.249	24.246	294.26	35.709	35.708
400.04	25.698	25.689	303.07	37.262	37.261
400.01	27.361	27.359	312.28	38.919	38.919
400.05	29.239	29.227	321.55	40.763	40.762

Table 8. Corrected Experimental η vs p vs T Data for Ethane at 430 K

T	p	$p_{430K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{430K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
429.96	0.13852	0.13854	1.1688	12.972	12.973
429.97	0.18678	0.18680	1.5776	12.985	12.986
429.97	0.22092	0.22093	1.8674	12.993	12.994
429.97	0.24819	0.24821	2.0992	12.997	12.998
429.97	0.28468	0.28470	2.4098	13.005	13.006
429.97	0.31443	0.31446	2.6634	13.007	13.008
429.99	0.33819	0.33820	2.8661	13.013	13.013
429.99	0.36035	0.36035	3.0554	13.015	13.016
429.99	0.40009	0.40010	3.3954	13.024	13.024
429.99	0.42921	0.42922	3.6449	13.029	13.030
429.99	0.46048	0.46049	3.9133	13.038	13.039
429.99	0.52173	0.52175	4.4400	13.047	13.047
429.99	0.57246	0.57247	4.8772	13.053	13.053
429.99	0.60743	0.60745	5.1793	13.057	13.057
429.99	0.67004	0.67006	5.7213	13.068	13.069
429.97	0.73768	0.73774	6.3089	13.077	13.078
429.98	0.78388	0.78391	6.7109	13.085	13.085
429.99	0.86262	0.86264	7.3981	13.101	13.101
429.99	0.90567	0.90569	7.7750	13.106	13.106
429.99	0.97653	0.97656	8.3969	13.119	13.119
430.00	1.0874	1.0874	9.3740	13.139	13.139
430.00	1.1810	1.1810	10.202	13.155	13.155
430.01	1.3484	1.3484	11.694	13.191	13.191
430.01	1.4464	1.4464	12.572	13.212	13.212
430.02	1.5309	1.5308	13.332	13.230	13.230
430.02	1.6209	1.6208	14.145	13.248	13.247
430.03	1.7172	1.7171	15.019	13.267	13.266
430.04	1.8182	1.8180	15.939	13.291	13.290
430.05	1.9250	1.9248	16.917	13.320	13.318
430.06	2.0971	2.0968	18.504	13.353	13.352
430.07	2.2919	2.2915	20.314	13.401	13.400
430.02	2.4283	2.4282	21.595	13.434	13.434
430.01	2.5736	2.5735	22.967	13.471	13.470
430.01	2.7242	2.7241	24.398	13.511	13.510
430.00	2.8986	2.8986	26.068	13.552	13.552
430.00	3.0531	3.0531	27.559	13.598	13.598
430.00	3.1946	3.1946	28.933	13.642	13.642
430.00	3.3566	3.3566	30.518	13.688	13.688
430.00	3.5079	3.5079	32.009	13.729	13.729

Table 8. Continued

T	p	$p_{430K, \rho_{\text{eos}}}$	$\rho_{\text{eos}(T,p)}$	η	η_{430K}
K	MPa	MPa	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$
430.00	3.6569	3.6569	33.488	13.783	13.783
430.00	3.8313	3.8313	35.232	13.834	13.834
430.00	3.9544	3.9544	36.472	13.876	13.876
430.00	4.1106	4.1106	38.054	13.925	13.925
430.00	4.3438	4.3438	40.439	14.008	14.008
430.00	4.4920	4.4920	41.969	14.060	14.060
430.01	4.7861	4.7860	45.032	14.171	14.171
430.01	5.1055	5.1054	48.408	14.287	14.287
430.00	5.4778	5.4778	52.405	14.441	14.441
430.01	5.7395	5.7393	55.253	14.560	14.560
430.02	6.0147	6.0143	58.282	14.679	14.678
430.02	6.3105	6.3101	61.580	14.812	14.812
430.03	6.6139	6.6132	65.003	14.967	14.966
430.03	6.9328	6.9321	68.649	15.130	15.130
430.04	7.3237	7.3226	73.177	15.333	15.332
429.96	7.7861	7.7872	78.652	15.591	15.593
429.97	8.2915	8.2924	84.708	15.894	15.895
429.98	8.6704	8.6710	89.312	16.129	16.129
429.99	9.0564	9.0568	94.056	16.383	16.383
429.96	9.5966	9.5982	100.80	16.749	16.750
429.96	10.161	10.163	107.91	17.167	17.168
429.98	10.893	10.894	117.23	17.729	17.729
430.00	11.360	11.360	123.20	18.112	18.112
430.02	11.840	11.839	129.35	18.509	18.508
429.99	12.361	12.362	136.07	18.972	18.972
429.99	12.882	12.883	142.73	19.452	19.452
429.96	13.391	13.394	149.23	19.921	19.923
429.96	14.174	14.177	159.05	20.676	20.677
429.97	14.769	14.772	166.38	21.256	21.256
429.95	15.396	15.400	173.96	21.903	21.905
429.92	16.017	16.025	181.30	22.545	22.547
429.94	16.737	16.743	189.49	23.302	23.303
429.96	17.522	17.526	198.10	24.127	24.128
429.99	18.351	18.352	206.76	24.992	24.992
430.03	19.235	19.231	215.55	25.923	25.922
430.07	20.089	20.081	223.60	26.807	26.805
430.14	21.190	21.171	233.32	27.931	27.927
430.02	22.416	22.413	243.60	29.193	29.193
430.04	23.642	23.636	252.96	30.407	30.406
430.06	24.941	24.931	262.13	31.660	31.659
430.02	26.294	26.290	271.02	32.917	32.917
430.05	27.721	27.712	279.59	34.237	34.235
429.98	29.309	29.313	288.47	35.642	35.643
430.04	30.915	30.907	296.60	37.011	37.010

Bücker and Wagner.¹ Weighting factors of η_{exp}^{-2} were used in the multiple linear-least-squares regression to minimize the relative deviations for the different isotherms. The weighted standard deviation was employed as the criterion for the quality of the representation of the considered isotherm. The coefficients $\eta_i(\tau)$ in eq 1 and their standard deviations σ_{η_i} [expressed as $\eta_i(\tau) \pm \sigma_{\eta_i}$] along with the weighted standard deviations σ are given in Table 9.

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Table 9. Coefficients of Equation 1 for the Re-evaluated Viscosity Measurements on Ethane

T	ρ_{max}	η_0	η_1	η_2	η_3	η_4	η_5	η_6	σ	
K	n	$\text{kg} \cdot \text{m}^{-3}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	$\mu\text{Pa} \cdot \text{s}$	
290	3	52.78	8.971 ± 0.001	1.222 ± 0.023	13.031 ± 0.221	-8.297 ± 0.588			0.015	
300	3	76.92	9.273 ± 0.001	1.578 ± 0.018	11.567 ± 0.124	-3.846 ± 0.235			0.019	
310	6	420.95	9.567 ± 0.001	1.823 ± 0.024	11.786 ± 0.162	-7.031 ± 0.402	7.773 ± 0.433	-3.798 ± 0.211	0.877 ± 0.038	0.031
320	6	409.01	9.863 ± 0.001	1.980 ± 0.033	11.972 ± 0.204	-7.564 ± 0.495	7.978 ± 0.547	-3.737 ± 0.276	0.846 ± 0.052	0.040
340	6	380.09	10.445 ± 0.001	2.386 ± 0.026	11.650 ± 0.175	-7.077 ± 0.451	7.177 ± 0.531	-3.263 ± 0.287	0.755 ± 0.058	0.029
370	5	360.56	11.307 ± 0.001	2.954 ± 0.028	10.080 ± 0.140	-2.792 ± 0.258	1.291 ± 0.194	0.258 ± 0.050		0.040
400	4	321.55	12.146 ± 0.001	3.252 ± 0.014	10.260 ± 0.050	-3.822 ± 0.060	2.206 ± 0.022			0.027
430	4	296.60	12.962 ± 0.001	3.488 ± 0.013	10.047 ± 0.050	-3.785 ± 0.065	2.219 ± 0.026			0.022