Supporting information

Thermophysical properties of glycols and glymes

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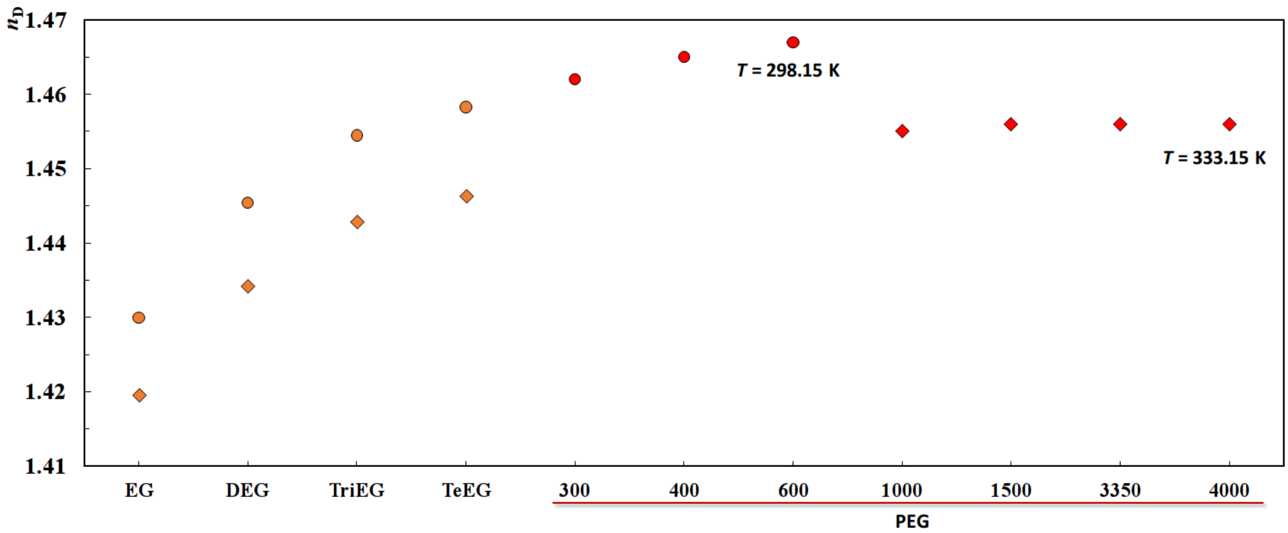

Figure S1. Refractive index as function of the mono, di, tri and tetra ethylene glycol and different molecular weight PEGs. Filled circles and diamond symbols represent the refractive indices at 298.15 K and 333.15 K, respectively.

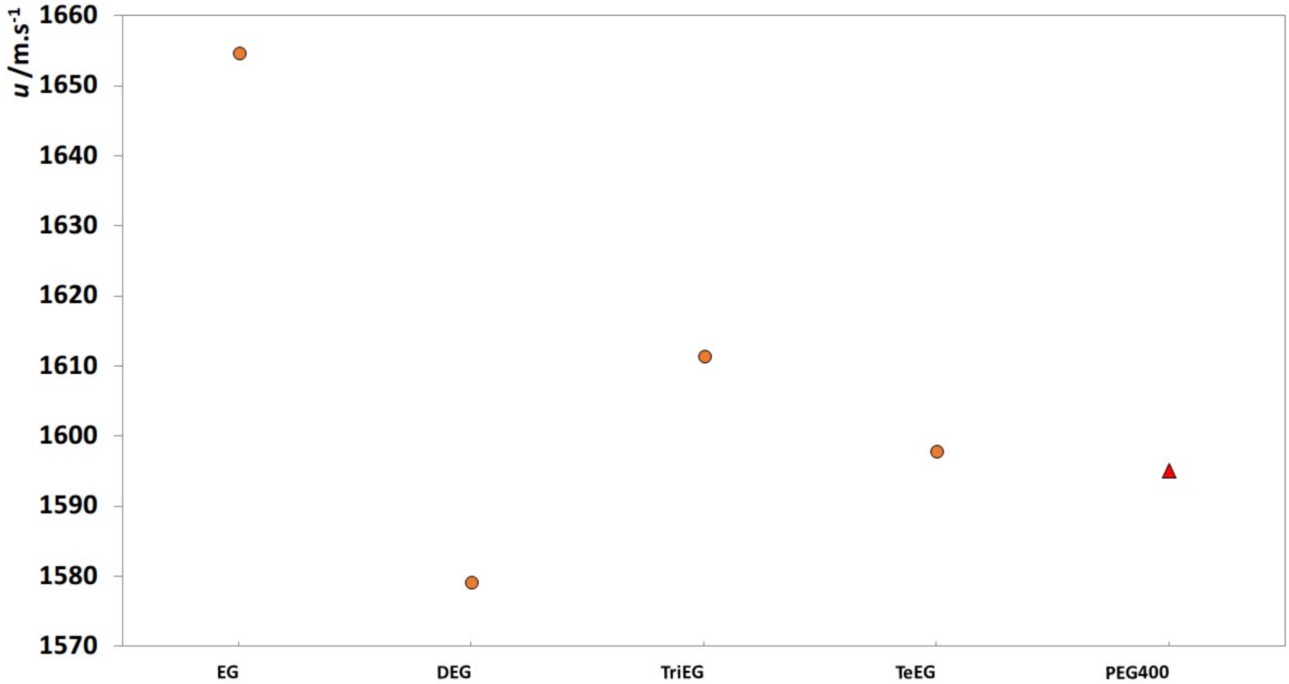

Figure S2. Sound speed for the mono, di, tri and tetra ethylene glycol (orange circles) and PEG400 (red triangle), at 298.15 K.

Table S1. Experimental density data for the glycols and glymes aqueous solutions as function of the temperature and compound's mole fraction.

	ρ /kg.m^{-3}									
	DEG					**DEGEE**				
***T* /K** x_{glycol}	**0.9070**	**0.9589**	**0.9698**	**0.9900**	**0.9901**	**0.9674**	**0.9740**	**0.9826**	**0.9887**	**0.9899**
283.15	1123.135	1123.266	1123.273	1123.325	1123.327	997.734	997.587	997.387	997.339	997.227
288.15	1119.575	1119.710	1119.716	1119.767	1119.771	993.310	993.160	992.963	992.908	992.793
293.15	1116.018	1116.151	1116.159	1116.211	1116.213	988.877	988.725	988.528	988.475	988.357
298.15	1112.454	1112.585	1112.594	1112.649	1112.651	984.434	984.285	984.088	984.028	983.913
303.15	1108.881	1109.016	1109.025	1109.077	1109.081	979.981	979.829	979.636	979.572	979.459
308.15	1105.295	1105.431	1105.442	1105.496	1105.498	975.514	975.363	975.164	975.102	974.991
313.15	1101.695	1101.834	1101.843	1101.900	1101.903	971.029	970.880	970.684	970.620	970.511
323.15	1094.447	1094.595	1094.603	1094.667	1094.668	962.022	961.873	961.673	961.608	961.499
333.15	1087.119	1087.278	1087.288	1087.359	1087.356	952.945	952.794	952.591	952.534	952.422
343.15	1079.710	1079.883	1079.897	1079.973	1079.969	943.775	943.629	943.425	943.381	943.264
	EGEE					**DEGME**				
	0.9426	**0.9490**	**0.9549**	**0.9567**	**0.9670**	**0.9483**	**0.9601**	**0.9674**	**0.9893**	**0.9932**
283.15	943.675	943.444	943.150	943.112	942.599	1029.621	1029.502	1029.287	1028.835	1028.734
288.15	939.208	938.975	938.680	938.638	938.120	1025.244	1025.129	1024.903	1024.451	1024.350
293.15	934.713	934.479	934.183	934.140	933.622	1020.866	1020.744	1020.520	1020.059	1019.951
298.15	930.190	929.953	929.657	929.614	929.099	1016.470	1016.344	1016.121	1015.651	1015.546
303.15	925.638	925.399	925.102	925.055	924.540	1012.059	1011.934	1011.709	1011.235	1011.124
308.15	921.054	920.815	920.517	920.467	919.951	1007.635	1007.505	1007.280	1006.801	1006.688
313.15	916.435	916.194	915.892	915.843	915.328	1003.193	1003.063	1002.834	1002.352	1002.240
323.15	907.087	906.839	906.540	906.493	905.969	994.251	994.119	993.893	993.397	993.288
333.15	897.580	897.329	897.036	896.985	896.461	985.224	985.089	984.870	984.365	984.259
343.15	887.911	887.628	887.337	887.297	886.774	976.029	975.972	975.754	975.241	975.146
	DEGDEE							**EG**		
	0.9700	**0.9742**	**0.9778**	**0.9836**	**0.9875**	**0.9911**		**0.9886**	**0.9943**	**0.9959**
283.15	918.572	918.371	918.271	917.783	917.643	917.567		1119.903	1120.066	1120.113
288.15	913.742	913.543	913.443	912.955	912.820	912.740		1116.426	1116.590	1116.638
293.15	908.910	908.705	908.610	908.126	907.993	907.914		1112.944	1113.108	1113.155
298.15	904.074	903.873	903.775	903.300	903.166	903.090		1109.463	1109.613	1109.661
303.15	899.235	899.035	898.937	898.467	898.334	898.256		1105.950	1106.110	1106.155
308.15	894.389	894.189	894.092	893.628	893.496	893.419		1102.430	1102.586	1102.634
313.15	889.537	889.339	889.241	888.783	888.652	888.577		1098.889	1099.049	1099.095
323.15	879.812	879.619	879.518	879.074	878.945	878.873		1091.746	1091.903	1091.952
333.15	870.056	869.867	869.760	869.332	869.203	869.134		1084.507	1084.669	1084.718
343.15	860.264	860.076	859.966	859.550	859.411	859.346		1077.163	1077.326	1077.370

standard uncertainty $u(T)$ = 0.01 K; $u(\rho)$ = 0.005 kg.m^{-3} and combined expanded uncertainty $U_c(x_{glycol})$ = 0.001, with an approximately 95% level of confidence.

Table S2. Experimental sound speed data for the glycos and glymes aqueous solutions as function of the temperature and compound's mole fraction.

	u /m.s^{-1}										
	DEG					**DEGEE**					
***T* /K** x_{glycol}	**0.9070**	**0.9589**	**0.9698**	**0.9900**	**0.9901**	**0.9674**	**0.9740**	**0.9826**	**0.9887**	**0.9899**	
283.15	1620.3	1617.8	1617.4	1616.4	1616.5	1430.8	1430.3	1429.4	1429.6	1429.6	
288.15	1608.0	1605.5	1605.2	1604.1	1604.2	1412.8	1412.2	1411.4	1411.4	1411.2	
293.15	1595.9	1593.3	1593.0	1591.9	1592.0	1394.9	1394.3	1393.5	1393.6	1393.3	
298.15	1583.8	1581.0	1580.8	1579.6	1579.8	1377.3	1376.5	1375.7	1375.7	1375.4	
303.15	1571.7	1569.0	1568.6	1567.5	1567.4	1359.6	1358.8	1358.0	1357.9	1357.5	
308.15	1559.6	1557.0	1556.6	1555.4	1555.4	1342.0	1341.3	1340.5	1340.1	1340.0	
313.15	1547.5	1545.0	1544.6	1543.4	1543.3	1324.4	1323.9	1323.1	1322.7	1322.5	
323.15	1523.4	1520.9	1520.5	1519.3	1519.2	1289.8	1289.3	1288.5	1287.9	1287.8	
333.15	1499.0	1496.6	1496.2	1495.1	1494.9	1255.6	1255.0	1254.2	1253.7	1253.5	
343.15	1474.6	1472.2	1471.8	1470.8	1470.5	1221.7	1221.1	1220.3	1220.0	1219.7	
	EGEE					**DEGME**					
	0.9426	**0.9490**	**0.9549**	**0.9567**	**0.9670**	**0.9373**	**0.9483**	**0.9601**	**0.9674**	**0.9893**	**0.9932**
283.15	1364.0	1365.8	1366.2	1366.8	1361.6	1473.4	1472.6	1471.2	1470.8	1468.4	1468.6
288.15	1346.2	1347.5	1347.9	1348.4	1343.5	1455.8	1455.1	1453.9	1453.3	1451.0	1451.0
293.15	1328.3	1329.2	1329.6	1330.2	1325.6	1438.7	1438.0	1436.7	1436.1	1433.7	1433.4
298.15	1310.5	1311.1	1311.3	1311.8	1307.8	1421.6	1420.8	1419.5	1418.9	1416.4	1416.1
303.15	1292.8	1293.0	1293.2	1292.6	1289.8	1404.5	1403.6	1402.3	1401.7	1399.1	1398.9
308.15	1275.0	1275.3	1275.2	1274.3	1272.0	1387.3	1386.5	1385.1	1384.5	1381.9	1381.6
313.15	1257.4	1257.6	1256.6	1256.1	1254.3	1370.3	1369.4	1368.1	1367.5	1364.9	1364.6
323.15	1222.2	1222.2	1220.3	1220.2	1218.9	1336.5	1335.6	1334.3	1333.7	1330.9	1330.3
333.15	1187.1	1186.9	1185.1	1184.9	1183.7	1302.9	1302.1	1300.7	1300.2	1297.3	1296.7
343.15	1152.0	1151.1	1150.1	1149.8	1148.6	1269.6	1268.8	1267.4	1266.9	1263.9	1263.3
	DEGDEE						**EG**				
	0.9700	**0.9742**	**0.9778**	**0.9836**	**0.9875**	**0.9911**		**0.9886**	**0.9943**	**0.9959**	
283.15	1305.3	1304.9	1303.9	1303.6	1304.4	1304.1		1690.2	1689.0	1690.6	
288.15	1284.9	1284.6	1283.6	1283.3	1284.0	1284.0		1678.4	1678.1	1678.6	
293.15	1264.8	1264.4	1263.6	1263.2	1263.9	1263.8		1666.6	1666.3	1666.6	
298.15	1244.9	1244.6	1243.7	1243.4	1244.1	1244.0		1654.7	1654.8	1654.6	
303.15	1225.2	1224.9	1224.0	1223.6	1224.4	1224.2		1643.0	1643.0	1642.7	
308.15	1205.6	1205.3	1204.6	1204.1	1204.7	1204.6		1631.2	1631.3	1630.9	
313.15	1186.4	1186.0	1185.3	1184.7	1184.7	1185.3		1619.5	1619.4	1619.1	
323.15	1148.2	1147.7	1147.3	1146.7	1146.3	1146.2		1595.7	1595.5	1595.2	
333.15	1111.0	1110.4	1110.0	1109.5	1109.1	1108.9		1571.7	1571.5	1571.2	
343.15	1074.5	1074.0	1073.7	1073.1	1072.6	1072.7		1547.6	1547.4	1547.1	

standard uncertainty, $u(T)$, *is* 0.01 K; $u(u)$ = 0.5 m.s^{-1} and combined expanded uncertainty $U_c(x_{glycol})$ = 0.001, with an approximately 95% level of confidence.

Table S3. Least squares fitting coefficients of the compound's aqueous solutions densities, the corresponding uncertainties of the extrapolated densities of the pure glycols and glymes (calculated by error propagation), $u(\rho)$, the number of points used for each fit and the respective composition range.

		T / K									
	$kg{\times}m^{-3}$	283.15	288.15	293.15	298.15	303.15	308.15	313.15	323.15	333.15	343.15
EG	*a*	1091.39	1087.66	1084.28	1081.28	1078.07	1074.84	1070.91	1063.91	1055.94	1048.95
	b	28.84	29.09	28.99	28.50	28.20	27.91	28.30	28.16	28.90	28.54
	$u(\rho)_t$	0.5	0.6	0.4	0.9	0.2	1.1	0.4	1.1	1.0	0.2
		3 points; 0 .987 < x_{EG} < 0.996									
DEG	a	1121.07	1117.48	1113.92	1110.33	1106.74	1103.11	1099.46	1092.06	1084.54	1076.88
	b	2.28	2.31	2.32	2.34	2.37	2.41	2.47	2.63	2.85	3.12
	$u(\rho)$	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		5 points; 0 .907 < x_{DEG} < 0.990									
DEGME	a	1049.11	1044.92	1040.93	1036.75	1032.56	1028.36	1024.07	1015.41	1006.46	996.15
	b	-20.50	-20.69	-21.10	-21.33	-21.56	-21.80	-21.96	-22.25	-22.33	-21.12
	$u(\rho)$	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
		5 points; 0 .948 < x_{DEGME} < 0.993									
EGEE	a	985.62	981.63	977.26	972.72	968.46	964.09	959.64	950.62	941.11	931.85
	b	-44.47	-44.97	-45.10	-45.09	-45.40	-45.63	-45.81	-46.16	-46.15	-46.60
	$u(\rho)$	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.05
		5 points; 0 .943 < x_{EGEE} < 0.967									
DEGEE	a	1017.79	1013.71	1009.33	1005.03	1000.61	996.27	991.61	982.85	973.70	963.94
	b	-20.74	-21.09	-21.15	-21.29	-21.33	-21.46	-21.28	-21.54	-21.46	-20.86
	$u(\rho)$	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
		5 points; 0 .967 < x_{DEGEE} < 0.990									
DEGDEE	*a*	968.50	963.47	958.20	952.82	947.66	942.32	936.99	926.23	915.61	905.61
	b	-51.46	-51.26	-50.81	-50.24	-49.91	-49.41	-48.91	-47.85	-46.95	-46.74
	$u(\rho)$	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07
		6 points; 0 .970 < x_{DEGDEE} < 0.991									

Table S4. Least squares fitting coefficients of the compound's aqueous solutions sound speed, uncertainties of the extrapolated sound speed of the pure glycols and glymes (calculated by error propagation), *u*(*u*), the number of points used for each fit and the respective composition range.

		T / K									
	m×s^{-1}	283.15	288.15	293.15	298.15	303.15	308.15	313.15	323.15	333.15	343.15
EG	Average	1689.91	1678.34	1666.51	1654.72	1642.91	1631.12	1619.32	1595.47	1571.47	1547.35
	u(*u*)	0.7	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
		3 points; 0 .987 < x_{EG} < 0.996									
DEG	*a'*	1662.36	1650.86	1640.00	1628.45	1618.50	1605.88	1593.97	1569.09	1543.74	1518.13
	b'	-46.43	-47.24	-48.63	-49.27	-51.58	-50.99	-51.11	-50.33	-49.24	-47.98
	u(*u*)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		5 points; 0 .907 < x_{DEG} < 0.990									
DEGME	*a'*	1559.63	1541.45	1530.84	1516.27	1502.07	1485.73	1468.87	1441.89	1409.44	1378.30
	b'	-91.93	-91.21	-98.09	-100.84	-103.94	-104.84	-105.00	-112.15	-113.33	-115.58
	u(*u*)	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
		6 points; 0 .937 < x_{DEGME} < 0.993									
EGEE	*a'*	1454.18	1443.74	1426.34	1409.20	1407.55	1393.40	1385.84	1364.93	1331.51	1286.89
	b'	-93.61	-101.71	-102.47	-103.46	-120.82	-124.78	-135.67	-151.11	-153.02	-143.15
	u(*u*)	5.0	5.0	5.0	4.0	2.0	2.0	1.0	1.0	1.0	0.3
		5 points; 0 .943 < x_{EGEE} < 0.967									
DEGEE	*a'*	1484.48	1479.34	1460.70	1451.10	1440.25	1426.82	1403.63	1375.64	1343.49	1304.25
	b'	-55.63	-68.88	-68.10	-76.45	-83.49	-87.77	-81.91	-88.71	-90.89	-85.35
	u(*u*)	0.3	0.2	0.2	0.2	0.2	0.1	0.03	0.04	0.04	0.1
		5 points; 0 .967 < x_{DEGEE} < 0.990									
DEGDEE	*a'*	1353.25	1327.76	1309.63	1287.64	1271.84	1253.13	1251.05	1245.33	1206.06	1164.89
	b'	-49.84	-44.56	-46.57	-44.37	-48.39	-49.26	-66.95	-100.20	-98.12	-93.24
	u(*u*)	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.2
		6 points; 0 .970 < x_{DEGDEE} < 0.991									

Table S5. Summary of experimental density, viscosity and sound speed data for the studied compounds, at atmospheric pressure.

Reference	**Compounds**	**Property**	**Method**	T_{range} **/K**	***U( )***
Albuquerque et al.[11]	EG	ρ; n_D	VTD; RF	298.15	0.00002; 0.00002
Aminabhavi et al.[25]	EG; DEG	ρ; η; u; n_D	PY; CV; I; RF	298.15	0.0002; 0.001; 2; 0.0001
Aminabhavi et al.[36]	DEGDME	ρ; η; u; n_D	PY; CV; I; RF	298 to 318	0.0002; 0.001; 2; 0.0001
Aralaguppi et al.[47]	EGEE	ρ; η; u; n_D	PY; CV; I; RF	298 to 308	0.0002; 0.001; 2; 0.0002
Awasthi et al.[59]	EGEE	ρ; η	PY; CV	303 to 323	0.00001; 0.0001
Awwad et al.[70]	EG	ρ; n_D	VTD; RF	303.15	0.00003; 0.0002
Begum et al.[81]	TriEG; TeEG; TeEGDME	ρ; η; γ	PY; CV; WP	293 to 323	0.00015; 0.04; 0.51
Bernal-Garcia et al.[85]	DEG	ρ; η	VTD; CV	283 to 343	0.00003; 0.004
Chandrasekhar et al.[1]	EGEE	ρ; u	PY; I	298.15; 308.15	0.00002; 0.2%
Chiao and Thompson[2]	DEGME; DEGEE	ρ; n_D	PY; RF		0.0001; 0.14%
Chu and Thompson[3]	EGEE	ρ; n_D	PY; RF	293.15; 298.15	0.0001; 0.0001
Cocchi et al.[4]	EG	ρ	VTD	273 to 313	0.00001
Comunas et al.[5]	EGEE	ρ	VTD	293 to 353	0.0001
Conesa et al.[6]	EGDME; DEGDME; TriEGDME; TeEGDME	ρ; η	VTD; CV	283 to 423	0.00002; 0.0005
Corradini et al.[7]	EG	η	CV	283 to 353	0.004
Ćwiklińska et al.[8]	EGEE; DEGEE	η	CV	293 to 303	0.001
Das et al.[9]	EGEE	ρ; η; u	PY; CV; I	298.15	0.00003; 0.0002; 0.2

de Ruiz Holgado et al.[10]	DEGDME	ρ; η	VTD; CV	298.15	0.0003; 0.005
de Ruiz Holgado et al.[12]	TeEGDME	ρ; η	VTD; CV	278 to 318	0.0002; 0.0003
Dhondge et al.[13]	EGEE; DEGME; DEGEE	ρ; η	PY; RB	275.15; 283.15	0.00005; 1%
Dhondge et al.[14]	DEGDME	ρ; u; n_D	PY; I; RF	298.15	0.00005; 0.5; 0.0001
Douhéret et al.[15,16]	EGEE; DEGEE	u	I	298.15	0.1
Douhéret et al.[17–19]	EG; DEG; TriEG; DEGME	ρ; u	VTD; I	288 to 308	0.0005; 0.1
Ge et al.[20]	EG	ρ; η	PY; RB	298 to 338	1%; 1%
George et al.[21]	EG; DEG; TriEG; TeEG	ρ; u; n_D	VTD; I; NA	298 to 348	0.00001; 1.3; NA
Hartel et al.[22]	TriEG; TriEGDME	ρ; η	NA; NA	283; 313 to 353	NA; NA
Henni et al.[23]	TriEGDME	ρ; η	VTD; CV	298 to 343	0.00005; 1%
Henni et al.[24]	TeEGDME	ρ; η	VTD; CV	298 to 343	0.00005; 1%
Iglesias-Otero et al.[26]	EG	ρ; n_D	VTD; RF	298.15	0.0001; 0.0002
Islam et al.[27]	EGEE	ρ; η	PY; CV	303 to 323	0.00003; 0.5%
Jerome et al.[28]	EG; TriEG	η	CV	298.15	0.3%
Jiménez et al.[29]	EG	ρ; n_D; γ	VTD; RF; PD	293 to 308	0.002; 0.0001; 0.01
Johnson et al.[30]	EGEE	ρ; η; u	PY; CV; I	308.15	0.0001; 0.001; 1
Kinart et al.[31]	DEG; TriEG; TeEG	η; u	CV; I	293 to 303	0.002; 0.01
Kinart et al.[32]	DEGME	η	CV	293 to 303	0.001
Klimaszewski et al.[33]	TeEG	ρ; u	VTD; I	288 to 328	0.00001; 0.1

Kodama et al.[34]	DEGDME; TriEGDME; TeEGDME	ρ; η	VTD; RB	313.15	0.00005; 3%
Ku et al.[35]	EGDME; DEGDME; DEGDEE	ρ; η; n_D	VTD; CV; RF	288 to 343	0.1%; 0.9%; 0.00001
Ku et al.[37]	EGDME: DEGDME; TriEGDME; TeEGDME	ρ; n_D	VTD; RF	288 to 318	0.00002; 0.00002
Kumagai et al.[38]	EG; DEG; TriEG; TeEG	ρ; η	PY; FB;	273 to 333	0.04%; 0.7%
Lee et al.[39]	EG; DEG; TriEG; TeEG	η	CV	294 to 427	1.5%
Li et al.[40]	EG	ρ	PY	293 to 328	0.00003
Li et al.[41]	DEGME	ρ; η	PY; CV	293 to 333	0.1%; 0.15%
Lopez et al.[42]	DEGME	u	I	293 to 353	0.2%
Marchetti et al.[43]	EG	ρ; η	VTD; CV	293 to 353	0.000001; 0.004
Marchetti et al.[44]	EG	n_D	RF	263 to 353	0.0001
McGee[45]	TeEGDME	ρ; η; n_D	PY; CV; RF	298.15	0.0009; NA; 0.0002
Mesquita et al.[46]	DEG: TriEG	ρ; η	VTD; RB	298.15	0.0005; 0.35%
Miller, K.J.[48]	EGEE	ρ; η; n_D	PY; CV; RF	298.15	NA; NA; 0.0001
Mozo et al.[49,50]	EGEE; DEGME	ρ; u	VTD; I	293 to 303	0.000002; 0.3
Nayak et al.[51]	EG	ρ; η; u; n_D	PY; CV; I; RF	298 to 308	0.0001; 0.001; 2; 0.001
Pal et al.[52]	EG; DEG; TriEG; TeEG	ρ; η; u	PY; CV; I	303.15; 308.15	0.0001; 0.003; 0.2
Pal et al.[53]	EG; DEG	ρ; η	PY; CV	298.15	0.00005; 0.003
Pal et al.[54]	TriEGDME	ρ; η; n_D	PY; CV; RF	298.15	0.00005; 0.003; 0.0001

Pal et al.[55]	EGDME; DEGDME; TriEGDME; TeEGDME	ρ; η	PY; CV	298.15	0.0003; 0.003
Pal et al.[56]	DEGDEE	ρ; η	PY; CV	298 to 318	0.0001; 0.003
Pal et al.[57]	DEGME; DEGEE	η	CV	298.15	0.003
Pal et al.[58]	DEGME; DEGEE	ρ; u	PY; CV	298.15	0.00003; 0.2
Pandhurnekar et al.[60]	EGEE; DEGME; DEGEE	ρ; u; n_D	PY; I; RF	278.15; 288.15	0.00005; 0.5; 0.0001
Pereira et al.[61]	TriEGDME	ρ; u; n_D	VTD; I; RF	288 to 308	0.0001; 0.1; 0.00001
Quijada et al.[62]	EG	ρ; η	VTD; CV	298 to 328	0.000005; 0.65%
Real et al.[63]	TeEGDME	ρ; u; n_D	VTD; I; RF	288 to 308	0.0001; 0.00005; 1
Ren et al.[64]	EG; DEG	ρ; η	PY; CV	303 to 323	0.0002; 0.1%
Rinkenbach et al.[65]	DEG	ρ; η; n_D	PY; CV; RF	174 to 306	NA; NA; NA
Roy et al.[66]	EGEE	ρ; η; u; n_D	PY; CV; I; RF	303 to 323	0.0002; 0.0002; 0.8; 0.0002
Sagdeev et al.[67]	EG	ρ; η	HW; FB	293 to 464	(0.15 to 0.30)%; (1.5 to 2.0)%
Sastry et al.[68]	EG; DEG; TriEG	ρ; η; u	VTD; CV; I	298 to 313	0.00003; 0.003; 1.3
Seikel et al.[69]	DEGEE; DEGME	ρ; n_D	NA; NA	293.15; 298.15	NA; NA
Sun et al.[71]	EG	ρ; η	PY; CV	290 to 450	0.2%; 2%
Tamura et al.[72]	EGEE	ρ; u	VTD; I	298.15; 303.15	0.00002; 0.1
Tawfik et al.[73]	EG	ρ	VTD	303 to 422	0.0002
Tsai et al.[74]	TriEG	ρ; η	PY; CV	303 to 343	0.05%; 1%

Tseng and Thompson[75]	DEGME; DEGEE	ρ; n_D	NA; NA	283 to 313	NA; NA
Tsierkezos et al.[76]	EG	ρ; η; n_D; γ	VTD; CV; RF; DNR	283 to 313	0.00001; 0.001; 0.0001; 0.1
Tsierkezos et al.[77]	EG; DEG; TriEG; TeEG	ρ; u	VTD; I	298.15	0.00005; 1
Wallace et al.[78]	TriEGDME	ρ; η; n_D	PY; CV; RF	298.15	0.0005; NA; 0.0001
Wallace et al.[79]	DEGDME	ρ; η; n_D	PY; CV; RF	298.15	NA ; NA; NA
Yu et al.[80]	TeEG	n_D	RF	298.15	NA
Zivkovic et al.[82]	TeEGDME	ρ; η; n_D	VTD; RB; RF	288 to 323	0.002; 0.8%;0.00006
Zorębski and Lubowiecka-Kostka[83]	EG	ρ; η; u	VTD; CV; PEO	298 to 313	0.00005; 0.2 %; 0.1
Zorębski and Waligóra[84]	EG	ρ; n_D	VTD; RF	293 to 313	0.00005; NA

ρ – density; η – viscosity; u – sound speed; n_D – Refractive index; γ – surface tension; VTD – vibrating tube densimeter; CV – Capillary viscometer; PYC – pycnometer; HW – hydrostatic weighing; FB – falling-body method; RB – rotational viscometer; RF – refactrometer; I – ultrasonic interferometer; PEO – pulse-echo-overlap method; DNR – Du Nouy ring; PD – pendant drop method; WP - Wilhelmy plate; NA – information not available.
combined expanded uncertainties units are; $U(\rho)$ in $g.cm^{-3}$, $U(\eta)$ in mPa.s, $U(u)$ in $m.s^{-1}$, $U(n_D)$ in n_D and $U(\sigma)$ in $mN.m^{-1}$, except if other units are mentioned

Table S6. Empirical correlations of the viscosity, sound speed and refractive index experimental data.

EG	**DEG**
η = exp [-2.3568 + 617.200/(T – 179.414)]	η = exp [-2.5622 + 723.618/(T – 175.571)]
n_D = (-3.0121 · 10^{-4} ± 6.5 · 10^{-7})·T + (1.51990 ± 2.0 · 10^{-4})	n_D = (-3.1893 · 10^{-4} ± 3.7 · 10^{-7})·T + (1.54050 ± 1.2 · 10^{-4})
u = (-2.3745 ± 4.1 · 10^{-3})·T + (2362.6 ± 1.3)	u = (-2.4259 ± 2.7 · 10^{-3})·T + (2302.6 ± 0.8)
TriEG	**TeEG**
η = exp [-2.6357 + 787.734/(T – 172.191)]	η = exp [-2.6238 + 818.977/(T – 171.168)]
n_D = (-3.3091 · 10^{-4} ± 5.4 · 10^{-7})·T + (1.55313 ± 1.7 · 10^{-4})	n_D = (-3.4147 · 10^{-4} ± 5.0 · 10^{-7})·T + (1.56008 ± 1.6 · 10^{-4})
u = (-3.015 ± 1.5 · 10^{-2})·T + (2510.9 ± 4.5)	u = (-3.130 ± 2.0 · 10^{-2})·T + (2531.7 ± 6.2)
DEGDME	**TriEGDME**
η = exp [-2.328 + 335.020/(T – 154.903)]	η = exp [-2.266 + 409.375/(T – 159.307)]
n_D = (-4.3731 · 10^{-4} ± 7.8 · 10^{-7})·T + (1.53621 ± 2.4 · 10^{-4})	n_D = (-4.2669 · 10^{-4} ± 2.5 · 10^{-7})·T + (1.547940 ± 7.9 · 10^{-5})
u =(-3.915 ± 1.7 · 10^{-2})·T + (2447.6 ± 5.3)	u = (-3.794 ± 2.2 · 10^{-2})·T + (2473.7 ± 6.8)
TeEGDME	**DEGDEE**
η = exp [-2.310 + 484.727/(T – 161.306)]	η = exp [-2.590 + 421.682/(T – 149.566)]
n_D = (-4.047 · 10^{-4} ± 1.3 · 10^{-6})·T + (1.55059 ± 4.1 · 10^{-4})	n_D = (-4.5488 · 10^{-4} ± 2.4 · 10^{-7})·T + (1.545378 ± 7.5 · 10^{-5})
u = (-3.692 ± 2.3 · 10^{-2})·T + (2483.3 ± 7.1)	u = (-3.875 ± 2.4 · 10^{-2})·T + (2398.9 ± 7.3)
DEGME	**DEGEE**
η = exp [-2.752 + 604.927/(T – 146.089)]	η = exp [-2.113 + 370.955/(T – 192.340)]
n_D = (-3.819 · 10^{-4} ± 3.7 · 10^{-6})·T + (1.5373 ± 1.2 · 10^{-3})	n_D = (-4.0538 · 10^{-4} ± 9.0 · 10^{-7})·T + (1.54588 ± 2.8 · 10^{-4})
u = (-3.4181 ± 9.7 · 10^{-3})·T + (2434.7 ± 3.0)	u = (-3.500 ± 1.5 · 10^{-2})·T + (2418.4 ± 4.7)
EGEE	
η = exp [-4.254 + 1108.435/(T – 70.499)]	
n_D = (-4.412 · 10^{-4} ± 2.4 · 10^{-6})·T + (1.53970 ± 7.5 · 10^{-4})	
u = (-3.626 ± 1.4 · 10^{-2})·T + (2386.4 ± 4.3)	

Table S7. Parameters of the least squares fitting equation of density as a function of temperature, for the 11 glycols studied, and the corresponding standard deviations of the fits. In parenthesis are the standard uncertainties affecting each parameter.

	A	*B*	*C*	*D*	*E*	σ_{fit}
	(kg×m^{-3})					
EG	1370.7	-1.3024	2.2794×10^{-3}	-2.8382×10^{-6}	—	0.0019
	(3.5)	(0.034)	(1.1×10^{-4})	(1.2×10^{-7})		
DEG	1376.9	-1.2813	2.0720×10^{-3}	-2.5040×10^{-6}	—	0.0032
	(6.0)	(0.058)	(1.8×10^{-4})	(2.0×10^{-7})		
TrEG	1629	-4.1528	1.5243×10^{-2}	-3.0263×10^{-5}	2.2227×10^{-8}	0.0010
	(40)	(0.52)	(2.5×10^{-3})	(5.3×10^{-6})	(4.2×10^{-9})	
TeEG	1409	-1.2802	1.5143×10^{-3}	-1.5795×10^{-6}	—	0.0059
	(11)	(0.11)	(3.4×10^{-4})	(3.6×10^{-7})		
DEGME	1554	-4.4764	1.7307×10^{-2}	-3.6394×10^{-5}	2.8101×10^{-8}	0.0011
	(41)	(0.52)	(2.5×10^{-3})	(5.3×10^{-6})	(4.3×10^{-9})	
DEGDME	1236.0	-1.0851	5.8328×10^{-4}	-9.6528×10^{-7}	—	0.0023
	(4.4)	(0.042)	(1.4×10^{-4})	(1.4×10^{-7})		
TrEGDME	1280.0	-1.1323	6.5458×10^{-4}	-7.8131×10^{-7}	—	0.0018
	(3.3)	(0.032)	(1.0×10^{-4})	(1.1×10^{-7})		
TeEGDME	1305.9	-1.1323	6.0857×10^{-4}	-5.8733×10^{-7}	—	0.0011
	(2.1)	(0.020)	(6.5×10^{-5})	(6.9×10^{-8})		
EGEE	1224	-1.3305	1.9889×10^{-3}	-2.8695×10^{-6}	—	0.0068
	(13)	(0.12)	(4.0×10^{-4})	(4.2×10^{-7})		
DEGEE	1272.7	-1.1914	1.2262×10^{-3}	-1.6127×10^{-6}	—	0.0037
	(6.9)	(0.066)	($2.1x10^{-4}$)	($2.3x10^{-7}$)		
DEGDEE	1232.3	-1.4049	1.5343×10^{-3}	-1.7813×10^{-6}	—	0.0020
	(3.8)	(0.036)	(1.2×10^{-4})	(1.2×10^{-7})		

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