

On the relation between the isentropic index and the Grüneisen parameter for saturated liquids

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Supporting Information. Table listing data used in the Figures, obtained from the fluids available in the NIST program RefProp 9.1. See main text.

Fluid	T_{kgmin}	T^*	T_{hgmax}	k_{gmin}	k_{gT^*}	$k_{gThgmax}$	γ_{fTkmin}	γ_{fT^*}	$\gamma_{fThgmax}$
Water	607.4	526	508.5	1.233	1.262	1.270	0.396	0.528	0.539
Heavy water	606.8	523	508.5	1.201	1.252	1.261	0.360	0.490	0.498
Fluorine	118.5	118	117.0	1.372	1.372	1.372	1.366	1.378	1.402
Oxygen	126.7	127	124.0	1.377	1.377	1.378	1.365	1.358	1.426
Ammonia	375.7	325	322.0	1.208	1.252	1.255	0.512	0.819	0.836
Nitrogen	99.0	103	102.0	1.379	1.380	1.380	1.491	1.383	1.411
Carbon monoxide	108.6	108	107.5	1.364	1.364	1.365	1.361	1.377	1.389
Carbon dioxide	273.7	246	249.0	1.260	1.283	1.280	0.828	1.177	1.144
Nitrous oxide	281.1	251	257.5	1.212	1.243	1.234	0.783	1.088	1.023
Hydrogen sulphide	321.6	301	306.5	1.274	1.281	1.279	0.899	1.043	1.006
Methane	162.8	156	158.0	1.276	1.279	1.278	1.042	1.153	1.121
R41	293.0	255	253.0	1.208	1.249	1.252	0.604	0.924	0.940
Sulphur dioxide	396.4	347	362.5	1.149	1.193	1.175	0.601	0.905	0.812
R32	331.7	282	290.0	1.119	1.190	1.177	0.452	0.866	0.802
Nitrogen trifluoride	220.3	191	201.0	1.116	1.182	1.155	0.562	1.046	0.886
Ethylene	261.7	230	237.5	1.185	1.230	1.216	0.672	1.077	0.984
R23	282.7	242	254.5	1.073	1.155	1.126	0.464	0.886	0.758
Carbonyl sulphide	351.9	308	327.0	1.110	1.169	1.137	0.590	0.941	0.793
R40	396.5	337	357.0	1.066	1.160	1.124	0.429	0.789	0.674
R14	211.6	186	198.0	1.096	1.153	1.119	0.582	0.979	0.790
Ethane	291.2	253	268.5	1.029	1.115	1.074	0.451	0.858	0.695
R161	363.9	305	338.0	0.888	1.065	0.967	0.235	0.572	0.375
Cyclopropane	391.3	323	368.0	0.792	1.048	0.882	0.235	0.686	0.387

Propyne	396.1	323	364.0	0.851	1.053	0.948	0.241	1.006	0.495
R22	355.2	300	329.2	0.959	1.086	1.014	0.368	0.785	0.564
Dimethylether	388.4	326	368.0	0.822	1.015	0.879	0.257	0.616	0.381
R13	290.7	246	275.5	0.904	1.053	0.945	0.347	0.720	0.471
R152a	376.7	312	353.5	0.848	1.036	0.913	0.242	0.592	0.367
Propylene	355.0	297	335.0	0.845	1.028	0.900	0.269	0.682	0.415
R143a	338.3	281	319.5	0.804	1.011	0.868	0.217	0.578	0.342
R21	436.7	368	414.5	0.869	1.032	0.916	0.298	0.599	0.400
Sulphurhexafluoride	313.5	261	301.0	0.727	0.971	0.779	0.187	0.591	0.289
R134a	367.0	304	349.0	0.772	0.997	0.834	0.197	0.548	0.305
Propane	363.5	302	345.5	0.765	0.995	0.827	0.209	0.608	0.332
R125	333.1	276	319.0	0.749	0.984	0.807	0.197	0.563	0.292
Acetone	502.5	410	476.0	0.704	0.971	0.776	0.138	0.427	0.225
R12	374.6	313	357.5	0.813	0.971	0.858	0.252	0.653	0.371
RE143a	372.0	305	357.0	0.706	0.978	0.770	0.163	0.499	0.240
R116	287.1	239	277.0	0.732	0.971	0.774	0.217	0.558	0.297
R142b	403.0	335	387.5	0.716	0.968	0.770	0.198	0.519	0.275
Trifluoroiodomethane	382.4	322	363.5	0.873	1.022	0.909	0.297	0.684	0.421
R1234ze	377.1	312	362.5	0.698	0.961	0.760	0.161	0.520	0.251
cis-butene	429.5	355	414.5	0.674	0.956	0.724	0.174	0.505	0.245
Butene	413.0	342	399.5	0.661	0.950	0.711	0.174	0.488	0.239
trans-butene	422.2	349	409.0	0.659	0.949	0.706	0.171	0.475	0.230
iso-butene	412.5	341	399.0	0.650	0.943	0.700	0.163	0.470	0.226
R1234yf	363.1	298	349.5	0.683	0.960	0.760	0.157	0.509	0.243
R124	389.9	322	376.0	0.680	0.956	0.735	0.163	0.498	0.236

R11	462.2	382	443.0	0.736	0.972	0.790	0.215	0.569	0.308
R115	347.6	289	338.0	0.648	0.942	0.692	0.177	0.499	0.234
Dimethylcarbonate	554.1	455	539.0	0.583	0.929	0.611	0.086	0.378	0.182
Butane	420.9	347	409.0	0.599	0.928	0.650	0.138	0.440	0.189
R141b	471.2	389	457.0	0.645	0.948	0.697	0.181	0.487	0.243
R245ca	441.0	364	430.0	0.582	0.929	0.648	0.113	0.405	0.171
Benzene	556.2	458	544.0	0.548	0.909	0.585	0.117	0.374	0.154
R1216	354.0	292	348.0	0.659	0.949	0.678	0.157	0.495	0.197
iso-butane	404.1	333	392.5	0.607	0.931	0.657	0.134	0.454	0.192
R245fa	423.1	348	411.0	0.614	0.943	0.669	0.135	0.444	0.192
Cyclopentane	510.0	415	492.0	0.511	0.910	0.592	0.089	0.398	0.148
R236ea	409.0	335	398.0	0.596	0.933	0.648	0.152	0.435	0.165
R1233zd	433.0	357	419.0	0.659	0.945	0.707	0.150	0.465	0.215
R236fa	390.3	323	382.0	0.637	0.940	0.675	0.130	0.443	0.179
R123	451.3	371	438.0	0.640	0.942	0.690	0.152	0.462	0.205
Diethylether	464.0	379	453.0	0.547	0.913	0.587	0.104	0.356	0.139
R227ea	371.9	307	363.0	0.582	0.924	0.632	0.115	0.415	0.163
RE245fa2	440.0	361	430.0	0.564	0.923	0.602	0.119	0.385	0.163
R114	415.6	343	404.0	0.599	0.917	0.645	0.135	0.430	0.183
R218	341.1	281	334.0	0.563	0.920	0.600	0.127	0.425	0.164
RE245cb2	404.0	331	393.5	0.560	0.920	0.611	0.104	0.368	0.150
iso-pentane	457.4	376	449.0	0.506	0.896	0.546	0.101	0.350	0.131
Neopentane	431.0	354	423.0	0.497	0.895	0.538	0.104	0.359	0.135
Cyclohexane	550.8	451	545.0	0.387	0.878	0.440	0.079	0.296	0.093
pentane	466.5	383	457.5	0.510	0.900	0.550	0.101	0.354	0.133

R365mfc	456.1	373	448.0	0.554	0.914	0.581	0.100	0.349	0.127
Toluene	588.6	482	578.0	0.479	0.885	0.514	0.083	0.310	0.108
RC318	385.0	316	378.0	0.527	0.917	0.567	0.110	0.385	0.141
R113	482.8	397	472.5	0.561	0.912	0.603	0.120	0.381	0.150
Ethylbenzene	614.0	503	606.0	0.411	0.876	0.443	0.072	0.246	0.089
Methylcyclohexane	568.7	467	564.0	0.362	0.860	0.380	0.073	0.243	0.082
iso-hexane	495.1	407	488.0	0.435	0.877	0.468	0.079	0.294	0.100
Hexane	505.2	415	497.0	0.442	0.882	0.481	0.077	0.286	0.102
p-xylene	616.2	501	604.0	0.394	0.878	0.463	0.052	0.253	0.086
o-xylene	630.3	512	619.0	0.369	0.871	0.440	0.051	0.240	0.076
m-xylene	615.0	501	606.0	0.420	0.885	0.457	0.066	0.272	0.090
RE347mcc	436.0	353	429.0	0.462	0.908	0.504	0.077	0.307	0.100
Perfluorobutane	383.9	319	379.0	0.460	0.882	0.494	0.082	0.251	0.096
Heptane	539.3	440	532.0	0.392	0.875	0.423	0.062	0.252	0.076
iso-octane	543.0	445	539.0	0.330	0.857	0.355	0.056	0.210	0.064
Perfluoropentane	419.6	343	415.5	0.398	0.894	0.430	0.067	0.253	0.077
Propylcyclohexane	629.1	511	625.0	0.301	0.856	0.316	0.048	0.191	0.052
Octane	567.5	463	562.0	0.359	0.876	0.382	0.055	0.216	0.063
Nonane	592.9	485	588.0	0.333	0.873	0.357	0.048	0.204	0.058
Decane	616.6	501	611.0	0.317	0.877	0.343	0.040	0.184	0.047
Hexamethyldisiloxane	516.9	427	512.0	0.363	0.865	0.394	0.050	0.155	0.056
Undecane	637.3	517	633.0	0.304	0.879	0.326	0.041	0.171	0.047
Dodecane	657.4	526	654.0	0.267	0.892	0.296	0.036	0.168	0.041
D4	586.1	478	583.0	0.256	0.881	0.285	0.034	0.172	0.040
Methylpalmitate	752.0	607	750.0	0.315	0.917	0.317	0.032	0.119	0.033

Methyllenolate	768.8	624	766.0	0.356	0.934	0.362	0.039	0.136	0.042
D5	618.7	492	617.0	0.242	0.910	0.260	0.031	0.141	0.035
Methylolate	779.1	624	777.0	0.290	0.926	0.293	0.030	0.105	0.032
Methyllenoleate	798.1	643	796.0	0.207	0.908	0.221	0.028	0.125	0.032
Methylstearate	771.4	621	770.0	0.324	0.933	0.325	0.033	0.112	0.034
D6	645.2	508	643.9	0.213	0.928	0.228	0.027	0.111	0.029
Argon	86.0	124	113.0	1.664	1.714	1.681	2.820	1.901	2.211
Krypton	149.5	171	156.5	1.644	1.661	1.645	2.323	1.899	2.193
Xenon	209.6	237	217.0	1.642	1.657	1.643	2.245	1.863	2.148
Ethanol	510.2	425	472.0	0.869	1.034	0.958	0.156	0.300	0.236
Methanol	486.4	424	412.5	0.940	1.096	1.110	0.198	0.302	0.319
