

up to this time are listed in Table 5.2. The measurements by Stolyarov, Ipatiev, and Teodorovitch were made in a cell of the hot-wire type with a wire inside a glass tube 0.6 mm. wide. The measurements reported by these authors are given in Table 5.3. The data in this table have been interpolated to provide values at definite temperatures and pressures.

ACKNOWLEDGEMENT

The work was partially supported by a grant from the National Science Foundation and one of the authors held the Visking Corporation Fellowship in Chemical Engineering.

Table 5.2. Thermal Conductivity Measurements of Gases above 5 atm.

Gas	Pressure range, atm.	Temperature range	Reference
Air	1, 200, 400	11 to 188 deg. C.	19
Ammonia	0 to 9.0	50 to 250 deg. C.	7
Argon	1 to 100	87 to 194 deg. K.	20
	1 to 217.4	127 deg. F.	12
	1 to 194.1	106 deg. F.	11
	0 to 19.5	90 to 350 deg. C.	7
	1 to 2500	0 to 75 deg. C.	15, 16
Benzene		0 to 346 deg. C.	1
Carbon dioxide	1 to 205.3	106, 134, and 153 deg. F.	11
	1 to 300	7 to 202 deg. C.	19
	1 to 60.6	1 to 50 deg. C.	6
Ethane	1 to 261	154 deg. F.	10
	1 to 196	108, 134, and 153 deg. F.	12
	0 to 39.4	52 deg. C.	7
Ethylene	1 to 226	106 and 153 deg. F.	11
	0 to 15.5	72, 153 deg. C.	7
Ethylene and carbon dioxide (2 mixtures)	1 to 199.9	108 deg. F.	4
Ethylene and nitrogen (4 mixtures)	1 to 206.5	108 deg. F.	4
Helium	1 to 205.2	109 deg. F.	11
Hydrogen	1 to 206.7	109 deg. F.	11
	1 to 500	14 to 302 deg. C.	19
	0 to 144.8	85 to 250 deg. C.	7
m-Xylene		0 to 346 deg. C.	1
Methane	1 to 203.4	106 deg. F.	11
	1 to 500	11 to 212 deg. C.	19
	1 to 203	127 deg. F.	12
	0 to 60.5	50 to 300 deg. C.	7

Gas	Pressure range, atm.	Temperature range	Reference
Nitrogen	11.2 to 99	-183 to -103 deg. C.	2
	1 to 2500	25, 50, 75 deg. C.	13
	1 to 216.7	127 deg. F.	12
	1 to 150	to 400 deg. C.	8
	1 to 90	40 to 62 deg. C.	21
	1 to 205.7	106 deg. F.	11
	5.8 to 67	76 to 184 deg. C.	20
	1 to 143.4	0 to 50 deg. C.	6
	1 to 500	12 to 298 deg. C.	19
Nitrogen and carbon dioxide (3 mixtures)	1 to 84.3	0.6 to 50 deg. C.	6
Nitrous oxide	0 to 52.7	50 deg. C.	7
Oxygen	1 to 96.8	-117.0 deg. C.	2
Propane	1 to 282	122 to 284 deg. F.	10
Steam	5 to 28	250 to 355 deg. C.	21
	to 150	250 to 500 deg. C.	5, 8
Toluene		0 to 346 deg. C.	1

Table 5.3. Thermal Conductivity Measured by Stolyarov, Ipatiev and Teodorovitch 1950

$$k = 10^7 \times \text{cal per cm. sec. degree C.}$$

$$\text{Pressure kg per sq. cm.}$$

$$1 \text{ kg. per sq. cm.} = 14.2 \text{ lb. per sq. in.}$$

	t, deg. C.	1	100	200	300	400	500
Hydrogen	15	4190	4309	4463	4561	4591	4612
	100	5050	5110	5215	5268	5303	5326
	200	6025	6064	6142	6183	6212	6220
	300	7000	7029	7095	7134	7146	7155
Nitrogen	15	600	674	871	1038	1128	1275
	100	735	761	907	1049	1124	1263
	200	888	898	983	1088	1151	1270
	300	1030	1035	1097	1182	1233	1337
Air	20	615	665	910	1082	1207	—
	100	730	737	897	1030	1121	—
	180	865	872	975	1033	1160	—
Methane	20	800	1080	1565	1808	1956	2011
	100	1085	1173	1479	1668	1784	1828
	200	1420	1448	1675	1750	1840	1864
Carbon dioxide	53	460	1336	2006	—	—	—
	85	520	—	1548	1902	—	—
	100	560	812	1461	1836	—	—
	150	665	735	1169	1529	—	—
	200	765	790	1069	1383	—	—