Table 11. Rate constant for hydrogen molecule in v=1 and J=28-30 states and v=2 and J=0-2 state

T(K)	v=1, J=28	v=1, J=29	v=1, J=30	v=2, J=0	v=2, J=1	v=2, J=2
100	1.2848 -09	4.3533 -09	7.1478 -09	---	---	---
200	3.9586 -09	1.0433 -08	1.4969 -08	---	---	---
300	7.7653 -09	1.6719 -08	2.1481 -08	---	---	---
400	1.2229 -08	2.2535 -08	2.6675 -08	---	---	---
500	1.6837 -08	2.7595 -08	3.0732 -08	---	---	---
600	2.1242 -08	3.1852 -08	3.3867 -08	---	---	---
700	2.5267 -08	3.5363 -08	3.6271 -08	1.5013 -29	1.9675 -29	3.2707 -29
800	2.8839 -08	3.8222 -08	3.8102 -08	3.8941 -27	4.9570 -27	7.8073 -27
900	3.1950 -08	4.0527 -08	3.9484 -08	2.9070 -25	3.6178 -25	5.4636 -25
1000	3.4623 -08	4.2368 -08	4.0513 -08	9.0823 -24	1.1100 -23	1.6209 -23
1100	3.6896 -08	4.3823 -08	4.1263 -08	1.5069 -22	1.8146 -22	2.5779 -22
1200	3.8813 -08	4.4956 -08	4.1793 -08	1.5559 -21	1.8507 -21	2.5695 -21
1300	4.0414 -08	4.5823 -08	4.2145 -08	1.1158 -20	1.3134 -20	1.7886 -20
1400	4.1741 -08	4.6469 -08	4.2355 -08	6.0113 -20	7.0127 -20	9.3919 -20
1500	4.2828 -08	4.6930 -08	4.2451 -08	2.5765 -19	2.9824 -19	3.9371 -19
1600	4.3707 -08	4.7237 -08	4.2454 -08	9.1723 -19	1.0546 -18	1.3747 -18
1700	4.4406 -08	4.7415 -08	4.2381 -08	2.8030 -18	3.2034 -18	4.1294 -18
1800	4.4949 -08	4.7486 -08	4.2245 -08	7.5431 -18	8.5748 -18	1.0945 -17
1900	4.5357 -08	4.7466 -08	4.2059 -08	1.8241 -17	2.0637 -17	2.6107 -17
2000	4.5649 -08	4.7370 -08	4.1830 -08	4.0281 -17	4.5377 -17	5.6949 -17
2100	4.5839 -08	4.7210 -08	4.1567 -08	8.2298 -17	9.2350 -17	1.1507 -16
2200	4.5941 -08	4.6996 -08	4.1275 -08	1.5724 -16	1.7582 -16	2.1763 -16
2300	4.5967 -08	4.6737 -08	4.0960 -08	2.8342 -16	3.1589 -16	3.8867 -16
2400	4.5928 -08	4.6440 -08	4.0625 -08	4.8549 -16	5.3952 -16	6.6018 -16
2500	4.5832 -08	4.6112 -08	4.0275 -08	7.9525 -16	8.8134 -16	1.0730 -15
2600	4.5687 -08	4.5757 -08	3.9911 -08	1.2521 -15	1.3842 -15	1.6774 -15
2700	4.5499 -08	4.5380 -08	3.9538 -08	1.9035 -15	2.0994 -15	2.5330 -15
2800	4.5274 -08	4.4985 -08	3.9156 -08	2.8046 -15	3.0864 -15	3.7089 -15
2900	4.5018 -08	4.4575 -08	3.8768 -08	4.0179 -15	4.4127 -15	5.2829 -15
3000	4.4735 -08	4.4153 -08	3.8376 -08	5.6129 -15	6.1529 -15	7.3404 -15
3100	4.4429 -08	4.3722 -08	3.7980 -08	7.6648 -15	8.3874 -15	9.9735 -15
3200	4.4103 -08	4.3283 -08	3.7582 -08	1.0254 -14	1.1202 -14	1.3279 -14
3300	4.3761 -08	4.2839 -08	3.7182 -08	1.3463 -14	1.4685 -14	1.7359 -14
3400	4.3404 -08	4.2391 -08	3.6783 -08	1.7379 -14	1.8929 -14	2.2314 -14
3500	4.3035 -08	4.1940 -08	3.6384 -08	2.2089 -14	2.4026 -14	2.8250 -14
3600	4.2657 -08	4.1488 -08	3.5985 -08	2.7679 -14	3.0066 -14	3.5266 -14
3700	4.2271 -08	4.1035 -08	3.5589 -08	3.4233 -14	3.7140 -14	4.3464 -14
3800	4.1878 -08	4.0583 -08	3.5195 -08	4.1835 -14	4.5334 -14	5.2938 -14
3900	4.1480 -08	4.0132 -08	3.4803 -08	5.0562 -14	5.4731 -14	6.3779 -14
4000	4.1079 -08	3.9684 -08	3.4414 -08	6.0489 -14	6.5407 -14	7.6071 -14

Table 11. (continued)

T(K)	v=1, J=28	v=1, J=29	v=1, J=30	v=2, J=0	v=2, J=1	v=2, J=2
4100	4.0675 -08	3.9237 -08	3.4029 -08	7.1684 -14	7.7435 -14	8.9891 -14
4200	4.0270 -08	3.8794 -08	3.3647 -08	8.4210 -14	9.0878 -14	1.0531 -13
4300	3.9863 -08	3.8354 -08	3.3268 -08	9.8122 -14	1.0580 -13	1.2239 -13
4400	3.9457 -08	3.7918 -08	3.2894 -08	1.1347 -13	1.2224 -13	1.4118 -13
4500	3.9051 -08	3.7487 -08	3.2523 -08	1.3029 -13	1.4024 -13	1.6173 -13
4600	3.8646 -08	3.7059 -08	3.2157 -08	1.4863 -13	1.5986 -13	1.8407 -13
4700	3.8243 -08	3.6636 -08	3.1795 -08	1.6851 -13	1.8110 -13	2.0823 -13
4800	3.7842 -08	3.6218 -08	3.1438 -08	1.8995 -13	2.0398 -13	2.3423 -13
4900	3.7444 -08	3.5805 -08	3.1085 -08	2.1296 -13	2.2853 -13	2.6208 -13
5000	3.7048 -08	3.5397 -08	3.0737 -08	2.3755 -13	2.5475 -13	2.9178 -13
5500	3.5120 -08	3.3436 -08	2.9063 -08	3.8399 -13	4.1056 -13	4.6761 -13
6000	3.3293 -08	3.1608 -08	2.7505 -08	5.6756 -13	6.0532 -13	6.8622 -13
6500	3.1575 -08	2.9911 -08	2.6057 -08	7.8356 -13	8.3390 -13	9.4161 -13
7000	2.9969 -08	2.8340 -08	2.4714 -08	1.0258 -12	1.0897 -12	1.2262 -12
7500	2.8473 -08	2.6885 -08	2.3470 -08	1.2874 -12	1.3655 -12	1.5321 -12
8000	2.7079 -08	2.5538 -08	2.2316 -08	1.5620 -12	1.6544 -12	1.8515 -12
8500	2.5783 -08	2.4291 -08	2.1246 -08	1.8435 -12	1.9502 -12	2.1775 -12
9000	2.4577 -08	2.3135 -08	2.0252 -08	2.1267 -12	2.2472 -12	2.5041 -12
9500	2.3454 -08	2.2062 -08	1.9328 -08	2.4072 -12	2.5411 -12	2.8264 -12
10000	2.2408 -08	2.1065 -08	1.8469 -08	2.6815 -12	2.8282 -12	3.1406 -12
11000	2.0523 -08	1.9272 -08	1.6920 -08	3.2013 -12	3.3713 -12	3.7330 -12
12000	1.8875 -08	1.7711 -08	1.5568 -08	3.6718 -12	3.8620 -12	4.2661 -12
13000	1.7429 -08	1.6344 -08	1.4381 -08	4.0868 -12	4.2938 -12	4.7336 -12
14000	1.6152 -08	1.5139 -08	1.3333 -08	4.4452 -12	4.6659 -12	5.1349 -12
15000	1.5021 -08	1.4073 -08	1.2404 -08	4.7488 -12	4.9806 -12	5.4731 -12
16000	1.4012 -08	1.3123 -08	1.1576 -08	5.0017 -12	5.2422 -12	5.7529 -12
17000	1.3109 -08	1.2274 -08	1.0834 -08	5.2085 -12	5.4555 -12	5.9800 -12
18000	1.2298 -08	1.1512 -08	1.0167 -08	5.3742 -12	5.6259 -12	6.1604 -12
19000	1.1566 -08	1.0824 -08	9.5646 -09	5.5036 -12	5.7585 -12	6.2998 -12
20000	1.0903 -08	1.0201 -08	9.0188 -09	5.6014 -12	5.8582 -12	6.4035 -12
21000	1.0300 -08	9.6357 -09	8.5224 -09	5.6718 -12	5.9294 -12	6.4763 -12
22000	9.7496 -09	9.1199 -09	8.0695 -09	5.7185 -12	5.9760 -12	6.5227 -12
23000	9.2464 -09	8.6481 -09	7.6549 -09	5.7449 -12	6.0015 -12	6.5465 -12
24000	8.7847 -09	8.2153 -09	7.2744 -09	5.7539 -12	6.0091 -12	6.5510 -12
25000	8.3599 -09	7.8172 -09	6.9241 -09	5.7482 -12	6.0015 -12	6.5391 -12
26000	7.9679 -09	7.4501 -09	6.6009 -09	5.7301 -12	5.9809 -12	6.5135 -12
27000	7.6055 -09	7.1106 -09	6.3018 -09	5.7013 -12	5.9495 -12	6.4763 -12
28000	7.2695 -09	6.7960 -09	6.0246 -09	5.6638 -12	5.9090 -12	6.4295 -12
29000	6.9575 -09	6.5039 -09	5.7670 -09	5.6189 -12	5.8609 -12	6.3746 -12
30000	6.6670 -09	6.2319 -09	5.5271 -09	5.5679 -12	5.8065 -12	6.3131 -12

Table 12. Rate constant for hydrogen molecule in v=2 and J=3-8 states.

T(K)	v=2, J=3	v=2, J=4	v=2, J=5	v=2, J=6	v=2, J=7	v=2, J=8
100	---	---	---	---	---	---
200	---	---	---	---	---	---
300	---	---	---	---	---	---
400	---	---	---	---	---	---
500	---	---	---	---	---	---
600	---	---	---	---	2.4468 -29	2.0688 -28
700	7.0041 -29	1.9313 -28	6.7234 -28	2.8928 -27	1.5390 -26	9.9777 -26
800	1.5418 -26	3.8163 -26	1.1634 -25	4.2861 -25	1.9083 -24	1.0137 -23
900	1.0131 -24	2.3055 -24	6.3390 -24	2.0697 -23	8.0227 -23	3.6501 -22
1000	2.8579 -23	6.0809 -23	1.5393 -22	4.5631 -22	1.5832 -21	6.3633 -21
1100	4.3614 -22	8.7831 -22	2.0779 -21	5.6915 -21	1.8036 -20	6.5497 -20
1200	4.2003 -21	8.0793 -21	1.8066 -20	4.6329 -20	1.3612 -19	4.5427 -19
1300	2.8398 -20	5.2543 -20	1.1202 -19	2.7167 -19	7.4878 -19	2.3263 -18
1400	1.4544 -19	2.6029 -19	5.3266 -19	1.2316 -18	3.2134 -18	9.3896 -18
1500	5.9665 -19	1.0374 -18	2.0490 -18	4.5450 -18	1.1308 -17	3.1333 -17
1600	2.0441 -18	3.4655 -18	6.6353 -18	1.4194 -17	3.3878 -17	8.9603 -17
1700	6.0387 -18	1.0012 -17	1.8651 -17	3.8641 -17	8.8903 -17	2.2568 -16
1800	1.5769 -17	2.5630 -17	4.6597 -17	9.3829 -17	2.0895 -16	5.1141 -16
1900	3.7118 -17	5.9269 -17	1.0543 -16	2.0695 -16	4.4761 -16	1.0603 -15
2000	8.0003 -17	1.2572 -16	2.1929 -16	4.2069 -16	8.8628 -16	2.0387 -15
2100	1.5990 -16	2.4768 -16	4.2439 -16	7.9744 -16	1.6405 -15	3.6746 -15
2200	2.9947 -16	4.5779 -16	7.7183 -16	1.4232 -15	2.8652 -15	6.2644 -15
2300	5.3003 -16	8.0056 -16	1.3300 -15	2.4104 -15	4.7577 -15	1.0175 -14
2400	8.9288 -16	1.3338 -15	2.1861 -15	3.8998 -15	7.5595 -15	1.5843 -14
2500	1.4402 -15	2.1298 -15	3.4473 -15	6.0610 -15	1.1555 -14	2.3769 -14
2600	2.2356 -15	3.2752 -15	5.2407 -15	9.0911 -15	1.7067 -14	3.4509 -14
2700	3.3542 -15	4.8714 -15	7.7122 -15	1.3213 -14	2.4454 -14	4.8663 -14
2800	4.8818 -15	7.0331 -15	1.1025 -14	1.8671 -14	3.4101 -14	6.6865 -14
2900	6.9145 -15	9.8872 -15	1.5356 -14	2.5729 -14	4.6415 -14	8.9764 -14
3000	9.5572 -15	1.3571 -14	2.0897 -14	3.4661 -14	6.1813 -14	1.1802 -13
3100	1.2922 -14	1.8228 -14	2.7843 -14	4.5750 -14	8.0717 -14	1.5226 -13
3200	1.7126 -14	2.4010 -14	3.6399 -14	5.9284 -14	1.0354 -13	1.9313 -13
3300	2.2290 -14	3.1070 -14	4.6769 -14	7.5544 -14	1.3070 -13	2.4121 -13
3400	2.8537 -14	3.9562 -14	5.9154 -14	9.4807 -14	1.6256 -13	2.9704 -13
3500	3.5988 -14	4.9637 -14	7.3752 -14	1.1734 -13	1.9951 -13	3.6112 -13
3600	4.4764 -14	6.1442 -14	9.0750 -14	1.4338 -13	2.4185 -13	4.3390 -13
3700	5.4979 -14	7.5119 -14	1.1033 -13	1.7317 -13	2.8991 -13	5.1575 -13
3800	6.6746 -14	9.0799 -14	1.3265 -13	2.0690 -13	3.4393 -13	6.0699 -13
3900	8.0166 -14	1.0861 -13	1.5786 -13	2.4477 -13	4.0413 -13	7.0787 -13
4000	9.5335 -14	1.2865 -13	1.8609 -13	2.8694 -13	4.7071 -13	8.1858 -13

Table 12. (continued)

T(K)	v=2, J=3	v=2, J=4	v=2, J=5	v=2, J=6	v=2, J=7	v=2, J=8
4100	1.1234 -13	1.5104 -13	2.1747 -13	3.3353 -13	5.4380 -13	9.3924 -13
4200	1.3126 -13	1.7584 -13	2.5209 -13	3.8466 -13	6.2351 -13	1.0699 -12
4300	1.5216 -13	2.0315 -13	2.9003 -13	4.4040 -13	7.0990 -13	1.2106 -12
4400	1.7509 -13	2.3302 -13	3.3134 -13	5.0080 -13	8.0300 -13	1.3613 -12
4500	2.0011 -13	2.6549 -13	3.7608 -13	5.6591 -13	9.0280 -13	1.5218 -12
4600	2.2725 -13	3.0060 -13	4.2428 -13	6.3572 -13	1.0093 -12	1.6920 -12
4700	2.5653 -13	3.3838 -13	4.7593 -13	7.1022 -13	1.1223 -12	1.8718 -12
4800	2.8798 -13	3.7882 -13	5.3103 -13	7.8937 -13	1.2418 -12	2.0608 -12
4900	3.2159 -13	4.2192 -13	5.8956 -13	8.7310 -13	1.3677 -12	2.2589 -12
5000	3.5736 -13	4.6768 -13	6.5149 -13	9.6135 -13	1.4997 -12	2.4657 -12
5500	5.6792 -13	7.3499 -13	1.0099 -12	1.4665 -12	2.2463 -12	3.6183 -12
6000	8.2761 -13	1.0611 -12	1.4414 -12	2.0654 -12	3.1156 -12	4.9335 -12
6500	1.1289 -12	1.4360 -12	1.9318 -12	2.7369 -12	4.0754 -12	6.3608 -12
7000	1.4627 -12	1.8480 -12	2.4654 -12	3.4590 -12	5.0938 -12	7.8523 -12
7500	1.8195 -12	2.2853 -12	3.0267 -12	4.2109 -12	6.1415 -12	9.3660 -12
8000	2.1902 -12	2.7368 -12	3.6018 -12	4.9741 -12	7.1937 -12	1.0868 -11
8500	2.5670 -12	3.1930 -12	4.1788 -12	5.7333 -12	8.2300 -12	1.2330 -11
9000	2.9431 -12	3.6459 -12	4.7478 -12	6.4762 -12	9.2349 -12	1.3733 -11
9500	3.3129 -12	4.0891 -12	5.3011 -12	7.1935 -12	1.0197 -11	1.5064 -11
10000	3.6720 -12	4.5176 -12	5.8331 -12	7.8782 -12	1.1108 -11	1.6312 -11
11000	4.3462 -12	5.3167 -12	6.8172 -12	9.1330 -12	1.2758 -11	1.8543 -11
12000	4.9492 -12	6.0257 -12	7.6816 -12	1.0221 -11	1.4169 -11	2.0416 -11
13000	5.4750 -12	6.6391 -12	8.4219 -12	1.1142 -11	1.5344 -11	2.1949 -11
14000	5.9238 -12	7.1586 -12	9.0425 -12	1.1905 -11	1.6302 -11	2.3173 -11
15000	6.2997 -12	7.5901 -12	9.5523 -12	1.2522 -11	1.7064 -11	2.4124 -11
16000	6.6087 -12	7.9415 -12	9.9624 -12	1.3011 -11	1.7654 -11	2.4840 -11
17000	6.8577 -12	8.2215 -12	1.0284 -11	1.3387 -11	1.8096 -11	2.5354 -11
18000	7.0536 -12	8.4389 -12	1.0530 -11	1.3666 -11	1.8411 -11	2.5699 -11
19000	7.2031 -12	8.6019 -12	1.0709 -11	1.3861 -11	1.8618 -11	2.5901 -11
20000	7.3125 -12	8.7180 -12	1.0831 -11	1.3986 -11	1.8735 -11	2.5985 -11
21000	7.3873 -12	8.7939 -12	1.0905 -11	1.4051 -11	1.8776 -11	2.5971 -11
22000	7.4325 -12	8.8355 -12	1.0938 -11	1.4067 -11	1.8754 -11	2.5876 -11
23000	7.4525 -12	8.8482 -12	1.0937 -11	1.4040 -11	1.8680 -11	2.5716 -11
24000	7.4512 -12	8.8364 -12	1.0907 -11	1.3978 -11	1.8564 -11	2.5502 -11
25000	7.4318 -12	8.8040 -12	1.0853 -11	1.3888 -11	1.8412 -11	2.5244 -11
26000	7.3972 -12	8.7544 -12	1.0779 -11	1.3774 -11	1.8231 -11	2.4953 -11
27000	7.3500 -12	8.6906 -12	1.0688 -11	1.3640 -11	1.8028 -11	2.4634 -11
28000	7.2922 -12	8.6149 -12	1.0584 -11	1.3491 -11	1.7807 -11	2.4294 -11
29000	7.2256 -12	8.5296 -12	1.0469 -11	1.3330 -11	1.7571 -11	2.3938 -11
30000	7.1520 -12	8.4365 -12	1.0346 -11	1.3158 -11	1.7324 -11	2.3571 -11

Table 13. Rate constant for hydrogen molecule in v=2 and J=9-14 states.

T(K)	v=2, J=9	v=2, J=10	v=2, J=11	v=2, J=12	v=2, J=13	v=2, J=14
100	---	---	---	---	---	---
200	---	---	---	---	---	---
300	---	---	---	---	---	---
400	---	---	---	---	1.9584 -29	1.7059 -27
500	---	1.1012 -29	2.6900 -28	7.7643 -27	2.6584 -25	1.0220 -23
600	2.1868 -27	2.7479 -26	4.1720 -25	7.3061 -24	1.4790 -22	3.2967 -21
700	7.8655 -25	7.2157 -24	7.8002 -23	9.5590 -22	1.3294 -20	2.0079 -19
800	6.4125 -23	4.6460 -22	3.8931 -21	3.6501 -20	3.8306 -19	4.3216 -18
900	1.9456 -21	1.1732 -20	8.0647 -20	6.1395 -19	5.1756 -18	4.6540 -17
1000	2.9577 -20	1.5398 -19	9.0338 -19	5.8215 -18	4.1186 -17	3.0891 -16
1100	2.7214 -19	1.2563 -18	6.4747 -18	3.6405 -17	2.2315 -16	1.4429 -15
1200	1.7191 -18	7.1793 -18	3.3213 -17	1.6669 -16	9.0661 -16	5.1805 -15
1300	8.1340 -18	3.1208 -17	1.3177 -16	6.0066 -16	2.9527 -15	1.5197 -14
1400	3.0678 -17	1.0945 -16	4.2730 -16	1.7937 -15	8.0852 -15	3.8046 -14
1500	9.6530 -17	3.2334 -16	1.1795 -15	4.6101 -15	1.9275 -14	8.3925 -14
1600	2.6220 -16	8.3116 -16	2.8572 -15	1.0490 -14	4.1069 -14	1.6707 -13
1700	6.3109 -16	1.9055 -15	6.2157 -15	2.1597 -14	7.9781 -14	3.0567 -13
1800	1.3735 -15	3.9714 -15	1.2365 -14	4.0908 -14	1.4352 -13	5.2135 -13
1900	2.7468 -15	7.6403 -15	2.2818 -14	7.2245 -14	2.4203 -13	8.3827 -13
2000	5.1122 -15	1.3733 -14	3.9502 -14	1.2023 -13	3.8637 -13	1.2820 -12
2100	8.9473 -15	2.3288 -14	6.4751 -14	1.9016 -13	5.8855 -13	1.8786 -12
2200	1.4850 -14	3.7559 -14	1.0126 -13	2.8786 -13	8.6100 -13	2.6530 -12
2300	2.3539 -14	5.7993 -14	1.5200 -13	4.1949 -13	1.2161 -12	3.6285 -12
2400	3.5839 -14	8.6202 -14	2.2017 -13	5.9133 -13	1.6659 -12	4.8259 -12
2500	5.2671 -14	1.2392 -13	3.0907 -13	8.0956 -13	2.2215 -12	6.2629 -12
2600	7.5028 -14	1.7295 -13	4.2200 -13	1.0801 -12	2.8927 -12	7.9534 -12
2700	1.0395 -13	2.3514 -13	5.6220 -13	1.4085 -12	3.6883 -12	9.9081 -12
2800	1.4052 -13	3.1231 -13	7.3276 -13	1.7997 -12	4.6151 -12	1.2134 -11
2900	1.8579 -13	4.0623 -13	9.3650 -13	2.2580 -12	5.6786 -12	1.4633 -11
3000	2.4081 -13	5.1856 -13	1.1760 -12	2.7869 -12	6.8826 -12	1.7407 -11
3100	3.0658 -13	6.5083 -13	1.4535 -12	3.3893 -12	8.2291 -12	2.0451 -11
3200	3.8404 -13	8.0443 -13	1.7708 -12	4.0672 -12	9.7189 -12	2.3760 -11
3300	4.7404 -13	9.8054 -13	2.1295 -12	4.8220 -12	1.1351 -11	2.7325 -11
3400	5.7735 -13	1.1802 -12	2.5307 -12	5.6541 -12	1.3124 -11	3.1137 -11
3500	6.9464 -13	1.4041 -12	2.9750 -12	6.5634 -12	1.5033 -11	3.5182 -11
3600	8.2646 -13	1.6531 -12	3.4629 -12	7.5492 -12	1.7075 -11	3.9448 -11
3700	9.7326 -13	1.9274 -12	3.9944 -12	8.6102 -12	1.9245 -11	4.3921 -11
3800	1.1354 -12	2.2272 -12	4.5692 -12	9.7444 -12	2.1536 -11	4.8584 -11
3900	1.3130 -12	2.5527 -12	5.1867 -12	1.0950 -11	2.3943 -11	5.3422 -11
4000	1.5064 -12	2.9037 -12	5.8460 -12	1.2223 -11	2.6458 -11	5.8420 -11

Table 13. (continued)

T(K)	v=2, J=9	v=2, J=10	v=2, J=11	v=2, J=12	v=2, J=13	v=2, J=14
4100	1.7154 -12	3.2798 -12	6.5460 -12	1.3562 -11	2.9073 -11	6.3561 -11
4200	1.9400 -12	3.6808 -12	7.2854 -12	1.4962 -11	3.1783 -11	6.8829 -11
4300	2.1801 -12	4.1059 -12	8.0627 -12	1.6421 -11	3.4577 -11	7.4209 -11
4400	2.4353 -12	4.5545 -12	8.8763 -12	1.7935 -11	3.7450 -11	7.9685 -11
4500	2.7055 -12	5.0258 -12	9.7243 -12	1.9500 -11	4.0393 -11	8.5242 -11
4600	2.9901 -12	5.5189 -12	1.0605 -11	2.1112 -11	4.3398 -11	9.0866 -11
4700	3.2888 -12	6.0329 -12	1.1516 -11	2.2767 -11	4.6458 -11	9.6544 -11
4800	3.6011 -12	6.5668 -12	1.2456 -11	2.4461 -11	4.9567 -11	1.0226 -10
4900	3.9264 -12	7.1195 -12	1.3422 -11	2.6191 -11	5.2715 -11	1.0801 -10
5000	4.2641 -12	7.6899 -12	1.4413 -11	2.7952 -11	5.5897 -11	1.1377 -10
5500	6.1175 -12	1.0768 -11	1.9664 -11	3.7104 -11	7.2091 -11	1.4244 -10
6000	8.1851 -12	1.4119 -11	2.5229 -11	4.6530 -11	8.8260 -11	1.7013 -10
6500	1.0386 -11	1.7610 -11	3.0895 -11	5.5888 -11	1.0388 -10	1.9609 -10
7000	1.2646 -11	2.1130 -11	3.6490 -11	6.4925 -11	1.1858 -10	2.1988 -10
7500	1.4906 -11	2.4590 -11	4.1887 -11	7.3464 -11	1.3217 -10	2.4128 -10
8000	1.7116 -11	2.7923 -11	4.6998 -11	8.1397 -11	1.4451 -10	2.6026 -10
8500	1.9242 -11	3.1083 -11	5.1766 -11	8.8663 -11	1.5558 -10	2.7685 -10
9000	2.1257 -11	3.4038 -11	5.6158 -11	9.5239 -11	1.6539 -10	2.9118 -10
9500	2.3146 -11	3.6773 -11	6.0160 -11	1.0113 -10	1.7400 -10	3.0341 -10
10000	2.4899 -11	3.9279 -11	6.3774 -11	1.0635 -10	1.8146 -10	3.1371 -10
11000	2.7983 -11	4.3607 -11	6.9880 -11	1.1494 -10	1.9329 -10	3.2924 -10
12000	3.0518 -11	4.7075 -11	7.4616 -11	1.2133 -10	2.0158 -10	3.3914 -10
13000	3.2546 -11	4.9770 -11	7.8161 -11	1.2586 -10	2.0699 -10	3.4460 -10
14000	3.4123 -11	5.1797 -11	8.0701 -11	1.2887 -10	2.1009 -10	3.4663 -10
15000	3.5311 -11	5.3257 -11	8.2405 -11	1.3065 -10	2.1137 -10	3.4602 -10
16000	3.6168 -11	5.4242 -11	8.3424 -11	1.3143 -10	2.1122 -10	3.4343 -10
17000	3.6746 -11	5.4835 -11	8.3888 -11	1.3142 -10	2.0997 -10	3.3935 -10
18000	3.7092 -11	5.5107 -11	8.3905 -11	1.3079 -10	2.0788 -10	3.3417 -10
19000	3.7246 -11	5.5116 -11	8.3564 -11	1.2968 -10	2.0515 -10	3.2821 -10
20000	3.7242 -11	5.4914 -11	8.2940 -11	1.2820 -10	2.0195 -10	3.2170 -10
21000	3.7109 -11	5.4542 -11	8.2093 -11	1.2643 -10	1.9841 -10	3.1482 -10
22000	3.6872 -11	5.4035 -11	8.1074 -11	1.2445 -10	1.9463 -10	3.0772 -10
23000	3.6552 -11	5.3421 -11	7.9923 -11	1.2231 -10	1.9068 -10	3.0051 -10
24000	3.6164 -11	5.2724 -11	7.8673 -11	1.2007 -10	1.8663 -10	2.9326 -10
25000	3.5723 -11	5.1964 -11	7.7350 -11	1.1775 -10	1.8254 -10	2.8604 -10
26000	3.5241 -11	5.1155 -11	7.5976 -11	1.1539 -10	1.7844 -10	2.7890 -10
27000	3.4728 -11	5.0313 -11	7.4570 -11	1.1300 -10	1.7435 -10	2.7188 -10
28000	3.4191 -11	4.9446 -11	7.3144 -11	1.1062 -10	1.7031 -10	2.6501 -10
29000	3.3638 -11	4.8564 -11	7.1711 -11	1.0825 -10	1.6633 -10	2.5829 -10
30000	3.3073 -11	4.7674 -11	7.0279 -11	1.0590 -10	1.6242 -10	2.5174 -10

Table 14. Rate constant for hydrogen molecule in v=2 and J=15-20 states.

T(K)	v=2, J=15	v=2, J=16	v=2, J=17	v=2, J=18	v=2, J=19	v=2, J=20
100	---	---	---	---	---	---
200	---	---	---	---	1.6761 -26	1.4770 -22
300	---	1.6454 -28	9.1821 -26	5.3405 -23	3.1270 -20	1.4506 -17
400	1.7497 -25	1.9636 -23	2.4694 -21	3.1890 -19	4.0694 -17	4.3332 -15
500	4.4903 -22	2.1149 -20	1.0878 -18	5.6978 -17	2.9182 -15	1.2853 -13
600	8.2297 -20	2.1736 -18	6.1610 -17	1.7687 -15	4.9332 -14	1.2064 -12
700	3.3470 -18	5.8493 -17	1.0834 -15	2.0247 -14	3.6607 -13	5.8815 -12
800	5.3210 -17	6.8231 -16	9.1864 -15	1.2444 -13	1.6262 -12	1.9069 -11
900	4.5273 -16	4.5635 -15	4.7949 -14	5.0574 -13	5.1365 -12	4.7156 -11
1000	2.4888 -15	2.0694 -14	1.7833 -13	1.5399 -12	1.2787 -11	9.6536 -11
1100	9.9634 -15	7.0778 -14	5.1866 -13	3.8027 -12	2.6787 -11	1.7234 -10
1200	3.1458 -14	1.9600 -13	1.2549 -12	8.0288 -12	4.9320 -11	2.7777 -10
1300	8.2775 -14	4.6158 -13	2.6365 -12	1.5032 -11	8.2251 -11	4.1395 -10
1400	1.8879 -13	9.5729 -13	4.9585 -12	2.5613 -11	1.2694 -10	5.8020 -10
1500	3.8415 -13	1.7939 -12	8.5370 -12	4.0483 -11	1.8416 -10	7.7444 -10
1600	7.1256 -13	3.0961 -12	1.3683 -11	6.0209 -11	2.5414 -10	9.9362 -10
1700	1.2249 -12	4.9946 -12	2.0677 -11	8.5181 -11	3.3658 -10	1.2342 -09
1800	1.9767 -12	7.6170 -12	2.9756 -11	1.1561 -10	4.3082 -10	1.4922 -09
1900	3.0246 -12	1.1081 -11	4.1098 -11	1.5153 -10	5.3588 -10	1.7640 -09
2000	4.4240 -12	1.5487 -11	5.4822 -11	1.9283 -10	6.5060 -10	2.0458 -09
2100	6.2262 -12	2.0918 -11	7.0986 -11	2.3926 -10	7.7367 -10	2.3343 -09
2200	8.4761 -12	2.7433 -11	8.9590 -11	2.9050 -10	9.0379 -10	2.6265 -09
2300	1.1211 -11	3.5067 -11	1.1058 -10	3.4614 -10	1.0396 -09	2.9196 -09
2400	1.4460 -11	4.3838 -11	1.3388 -10	4.0571 -10	1.1799 -09	3.2114 -09
2500	1.8244 -11	5.3739 -11	1.5935 -10	4.6874 -10	1.3234 -09	3.4998 -09
2600	2.2572 -11	6.4748 -11	1.8684 -10	5.3472 -10	1.4690 -09	3.7832 -09
2700	2.7450 -11	7.6826 -11	2.1618 -10	6.0318 -10	1.6157 -09	4.0602 -09
2800	3.2871 -11	8.9924 -11	2.4719 -10	6.7363 -10	1.7626 -09	4.3297 -09
2900	3.8824 -11	1.0398 -10	2.7967 -10	7.4562 -10	1.9089 -09	4.5909 -09
3000	4.5293 -11	1.1892 -10	3.1344 -10	8.1871 -10	2.0539 -09	4.8432 -09
3100	5.2254 -11	1.3468 -10	3.4830 -10	8.9253 -10	2.1969 -09	5.0859 -09
3200	5.9682 -11	1.5117 -10	3.8406 -10	9.6668 -10	2.3375 -09	5.3188 -09
3300	6.7546 -11	1.6832 -10	4.2055 -10	1.0409 -09	2.4751 -09	5.5416 -09
3400	7.5815 -11	1.8605 -10	4.5760 -10	1.1147 -09	2.6095 -09	5.7543 -09
3500	8.4456 -11	2.0428 -10	4.9504 -10	1.1881 -09	2.7404 -09	5.9569 -09
3600	9.3433 -11	2.2292 -10	5.3272 -10	1.2606 -09	2.8674 -09	6.1494 -09
3700	1.0271 -10	2.4191 -10	5.7051 -10	1.3322 -09	2.9904 -09	6.3319 -09
3800	1.1226 -10	2.6117 -10	6.0827 -10	1.4026 -09	3.1093 -09	6.5045 -09
3900	1.2204 -10	2.8064 -10	6.4590 -10	1.4716 -09	3.2240 -09	6.6676 -09
4000	1.3201 -10	3.0025 -10	6.8328 -10	1.5392 -09	3.3344 -09	6.8214 -09

Table 14. (continued)

T(K)	v=2, J=15	v=2, J=16	v=2, J=17	v=2, J=18	v=2, J=19	v=2, J=20
4100	1.4216 -10	3.1995 -10	7.2033 -10	1.6052 -09	3.4404 -09	6.9660 -09
4200	1.5243 -10	3.3966 -10	7.5695 -10	1.6696 -09	3.5422 -09	7.1019 -09
4300	1.6282 -10	3.5936 -10	7.9307 -10	1.7322 -09	3.6396 -09	7.2292 -09
4400	1.7327 -10	3.7897 -10	8.2864 -10	1.7931 -09	3.7327 -09	7.3484 -09
4500	1.8378 -10	3.9847 -10	8.6358 -10	1.8521 -09	3.8217 -09	7.4596 -09
4600	1.9431 -10	4.1782 -10	8.9785 -10	1.9092 -09	3.9064 -09	7.5633 -09
4700	2.0484 -10	4.3697 -10	9.3141 -10	1.9644 -09	3.9872 -09	7.6597 -09
4800	2.1535 -10	4.5590 -10	9.6422 -10	2.0178 -09	4.0639 -09	7.7491 -09
4900	2.2582 -10	4.7458 -10	9.9626 -10	2.0692 -09	4.1367 -09	7.8318 -09
5000	2.3623 -10	4.9297 -10	1.0275 -09	2.1187 -09	4.2058 -09	7.9081 -09
5500	2.8681 -10	5.8010 -10	1.1711 -09	2.3387 -09	4.4979 -09	8.2037 -09
6000	3.3390 -10	6.5797 -10	1.2935 -09	2.5151 -09	4.7117 -09	8.3791 -09
6500	3.7659 -10	7.2591 -10	1.3954 -09	2.6527 -09	4.8605 -09	8.4613 -09
7000	4.1449 -10	7.8403 -10	1.4784 -09	2.7568 -09	4.9562 -09	8.4722 -09
7500	4.4757 -10	8.3286 -10	1.5446 -09	2.8324 -09	5.0092 -09	8.4291 -09
8000	4.7601 -10	8.7317 -10	1.5959 -09	2.8841 -09	5.0280 -09	8.3454 -09
8500	5.0009 -10	9.0584 -10	1.6345 -09	2.9160 -09	5.0199 -09	8.2317 -09
9000	5.2020 -10	9.3173 -10	1.6621 -09	2.9316 -09	4.9904 -09	8.0962 -09
9500	5.3671 -10	9.5169 -10	1.6805 -09	2.9338 -09	4.9445 -09	7.9451 -09
10000	5.5001 -10	9.6649 -10	1.6910 -09	2.9252 -09	4.8857 -09	7.7835 -09
11000	5.6842 -10	9.8336 -10	1.6935 -09	2.8833 -09	4.7415 -09	7.4427 -09
12000	5.7804 -10	9.8707 -10	1.6775 -09	2.8187 -09	4.5758 -09	7.0948 -09
13000	5.8100 -10	9.8127 -10	1.6492 -09	2.7402 -09	4.4002 -09	6.7519 -09
14000	5.7900 -10	9.6870 -10	1.6125 -09	2.6538 -09	4.2219 -09	6.4210 -09
15000	5.7334 -10	9.5142 -10	1.5707 -09	2.5636 -09	4.0455 -09	6.1058 -09
16000	5.6504 -10	9.3095 -10	1.5258 -09	2.4724 -09	3.8741 -09	5.8078 -09
17000	5.5485 -10	9.0841 -10	1.4793 -09	2.3818 -09	3.7091 -09	5.5277 -09
18000	5.4337 -10	8.8463 -10	1.4324 -09	2.2933 -09	3.5515 -09	5.2652 -09
19000	5.3104 -10	8.6021 -10	1.3858 -09	2.2074 -09	3.4017 -09	5.0195 -09
20000	5.1818 -10	8.3560 -10	1.3400 -09	2.1247 -09	3.2597 -09	4.7898 -09
21000	5.0506 -10	8.1111 -10	1.2954 -09	2.0455 -09	3.1255 -09	4.5752 -09
22000	4.9186 -10	7.8697 -10	1.2521 -09	1.9697 -09	2.9988 -09	4.3746 -09
23000	4.7871 -10	7.6334 -10	1.2104 -09	1.8975 -09	2.8793 -09	4.1870 -09
24000	4.6573 -10	7.4033 -10	1.1702 -09	1.8288 -09	2.7665 -09	4.0114 -09
25000	4.5299 -10	7.1801 -10	1.1316 -09	1.7634 -09	2.6602 -09	3.8469 -09
26000	4.4053 -10	6.9643 -10	1.0947 -09	1.7013 -09	2.5598 -09	3.6927 -09
27000	4.2840 -10	6.7560 -10	1.0593 -09	1.6423 -09	2.4651 -09	3.5481 -09
28000	4.1663 -10	6.5554 -10	1.0255 -09	1.5862 -09	2.3756 -09	3.4121 -09
29000	4.0522 -10	6.3623 -10	9.9314 -10	1.5329 -09	2.2911 -09	3.2843 -09
30000	3.9418 -10	6.1767 -10	9.6225 -10	1.4823 -09	2.2111 -09	3.1639 -09

Table 15. Rate constant for hydrogen molecule in v=2 and J=21-26 states.

T(K)	v=2, J=21	v=2, J=22	v=2, J=23	v=2, J=24	v=2, J=25	v=2, J=26
100	1.3446 -29	1.3715 -21	2.4429 -14	6.3420 -10	4.4562 -09	6.5102 -09
200	1.7055 -18	1.6313 -14	3.3922 -11	2.6472 -09	1.0319 -08	1.2250 -08
300	7.7732 -15	3.4605 -12	4.1478 -10	5.9816 -09	1.5717 -08	1.6440 -08
400	5.0071 -13	4.8562 -11	1.5053 -09	9.9582 -09	2.0226 -08	1.9566 -08
500	5.9242 -12	2.3137 -10	3.3004 -09	1.3978 -08	2.3869 -08	2.1960 -08
600	3.0170 -11	6.4428 -10	5.5800 -09	1.7723 -08	2.6784 -08	2.3837 -08
700	9.5134 -11	1.3223 -09	8.1039 -09	2.1064 -08	2.9116 -08	2.5338 -08
800	2.2265 -10	2.2453 -09	1.0686 -08	2.3976 -08	3.0985 -08	2.6555 -08
900	4.2755 -10	3.3626 -09	1.3202 -08	2.6479 -08	3.2486 -08	2.7553 -08
1000	7.1532 -10	4.6148 -09	1.5579 -08	2.8611 -08	3.3692 -08	2.8376 -08
1100	1.0832 -09	5.9458 -09	1.7777 -08	3.0417 -08	3.4659 -08	2.9056 -08
1200	1.5225 -09	7.3089 -09	1.9780 -08	3.1937 -08	3.5430 -08	2.9619 -08
1300	2.0214 -09	8.6673 -09	2.1586 -08	3.3212 -08	3.6040 -08	3.0082 -08
1400	2.5668 -09	9.9938 -09	2.3200 -08	3.4274 -08	3.6515 -08	3.0460 -08
1500	3.1458 -09	1.1269 -08	2.4634 -08	3.5153 -08	3.6877 -08	3.0765 -08
1600	3.7464 -09	1.2481 -08	2.5901 -08	3.5873 -08	3.7144 -08	3.1006 -08
1700	4.3581 -09	1.3622 -08	2.7013 -08	3.6457 -08	3.7330 -08	3.1190 -08
1800	4.9718 -09	1.4687 -08	2.7985 -08	3.6923 -08	3.7445 -08	3.1325 -08
1900	5.5802 -09	1.5674 -08	2.8830 -08	3.7285 -08	3.7501 -08	3.1416 -08
2000	6.1772 -09	1.6586 -08	2.9560 -08	3.7559 -08	3.7506 -08	3.1467 -08
2100	6.7582 -09	1.7422 -08	3.0187 -08	3.7755 -08	3.7465 -08	3.1485 -08
2200	7.3196 -09	1.8187 -08	3.0721 -08	3.7883 -08	3.7386 -08	3.1471 -08
2300	7.8588 -09	1.8883 -08	3.1171 -08	3.7952 -08	3.7274 -08	3.1430 -08
2400	8.3739 -09	1.9514 -08	3.1546 -08	3.7970 -08	3.7132 -08	3.1364 -08
2500	8.8637 -09	2.0084 -08	3.1854 -08	3.7942 -08	3.6965 -08	3.1276 -08
2600	9.3277 -09	2.0596 -08	3.2101 -08	3.7876 -08	3.6776 -08	3.1169 -08
2700	9.7655 -09	2.1055 -08	3.2294 -08	3.7775 -08	3.6567 -08	3.1044 -08
2800	1.0177 -08	2.1465 -08	3.2439 -08	3.7643 -08	3.6342 -08	3.0903 -08
2900	1.0563 -08	2.1828 -08	3.2540 -08	3.7486 -08	3.6103 -08	3.0749 -08
3000	1.0924 -08	2.2148 -08	3.2602 -08	3.7305 -08	3.5852 -08	3.0582 -08
3100	1.1261 -08	2.2429 -08	3.2629 -08	3.7105 -08	3.5589 -08	3.0405 -08
3200	1.1574 -08	2.2673 -08	3.2625 -08	3.6887 -08	3.5318 -08	3.0218 -08
3300	1.1864 -08	2.2884 -08	3.2592 -08	3.6654 -08	3.5039 -08	3.0022 -08
3400	1.2132 -08	2.3063 -08	3.2535 -08	3.6409 -08	3.4754 -08	2.9819 -08
3500	1.2380 -08	2.3214 -08	3.2455 -08	3.6152 -08	3.4463 -08	2.9610 -08
3600	1.2607 -08	2.3338 -08	3.2356 -08	3.5885 -08	3.4168 -08	2.9395 -08
3700	1.2816 -08	2.3437 -08	3.2238 -08	3.5610 -08	3.3870 -08	2.9175 -08
3800	1.3007 -08	2.3515 -08	3.2105 -08	3.5329 -08	3.3569 -08	2.8951 -08
3900	1.3181 -08	2.3572 -08	3.1957 -08	3.5041 -08	3.3265 -08	2.8724 -08
4000	1.3339 -08	2.3610 -08	3.1797 -08	3.4749 -08	3.2961 -08	2.8493 -08

Table 15. (continued)

T(K)	v=2, J=21	v=2, J=22	v=2, J=23	v=2, J=24	v=2, J=25	v=2, J=26
4100	1.3482 -08	2.3631 -08	3.1626 -08	3.4454 -08	3.2655 -08	2.8261 -08
4200	1.3611 -08	2.3636 -08	3.1445 -08	3.4155 -08	3.2349 -08	2.8026 -08
4300	1.3726 -08	2.3626 -08	3.1255 -08	3.3854 -08	3.2044 -08	2.7791 -08
4400	1.3828 -08	2.3603 -08	3.1058 -08	3.3551 -08	3.1738 -08	2.7554 -08
4500	1.3918 -08	2.3568 -08	3.0854 -08	3.3247 -08	3.1434 -08	2.7316 -08
4600	1.3998 -08	2.3522 -08	3.0644 -08	3.2943 -08	3.1130 -08	2.7078 -08
4700	1.4066 -08	2.3465 -08	3.0430 -08	3.2638 -08	3.0829 -08	2.6841 -08
4800	1.4125 -08	2.3399 -08	3.0211 -08	3.2334 -08	3.0528 -08	2.6603 -08
4900	1.4175 -08	2.3325 -08	2.9988 -08	3.2030 -08	3.0230 -08	2.6366 -08
5000	1.4215 -08	2.3243 -08	2.9763 -08	3.1728 -08	2.9934 -08	2.6129 -08
5500	1.4307 -08	2.2739 -08	2.8607 -08	3.0239 -08	2.8488 -08	2.4963 -08
6000	1.4251 -08	2.2127 -08	2.7437 -08	2.8806 -08	2.7111 -08	2.3836 -08
6500	1.4090 -08	2.1453 -08	2.6283 -08	2.7442 -08	2.5810 -08	2.2758 -08
7000	1.3857 -08	2.0749 -08	2.5163 -08	2.6153 -08	2.4587 -08	2.1734 -08
7500	1.3574 -08	2.0036 -08	2.4089 -08	2.4940 -08	2.3439 -08	2.0766 -08
8000	1.3259 -08	1.9329 -08	2.3065 -08	2.3801 -08	2.2364 -08	1.9853 -08
8500	1.2923 -08	1.8635 -08	2.2093 -08	2.2733 -08	2.1358 -08	1.8994 -08
9000	1.2578 -08	1.7963 -08	2.1173 -08	2.1733 -08	2.0417 -08	1.8186 -08
9500	1.2228 -08	1.7313 -08	2.0305 -08	2.0796 -08	1.9537 -08	1.7427 -08
10000	1.1878 -08	1.6690 -08	1.9485 -08	1.9919 -08	1.8712 -08	1.6714 -08
11000	1.1195 -08	1.5524 -08	1.7984 -08	1.8325 -08	1.7216 -08	1.5412 -08
12000	1.0544 -08	1.4463 -08	1.6649 -08	1.6920 -08	1.5898 -08	1.4260 -08
13000	9.9336 -09	1.3501 -08	1.5459 -08	1.5678 -08	1.4733 -08	1.3236 -08
14000	9.3655 -09	1.2630 -08	1.4397 -08	1.4575 -08	1.3698 -08	1.2324 -08
15000	8.8395 -09	1.1841 -08	1.3446 -08	1.3591 -08	1.2775 -08	1.1507 -08
16000	8.3536 -09	1.1125 -08	1.2590 -08	1.2710 -08	1.1949 -08	1.0774 -08
17000	7.9053 -09	1.0474 -08	1.1819 -08	1.1917 -08	1.1205 -08	1.0114 -08
18000	7.4917 -09	9.8805 -09	1.1121 -08	1.1202 -08	1.0535 -08	9.5164 -09
19000	7.1098 -09	9.3389 -09	1.0487 -08	1.0555 -08	9.9268 -09	8.9742 -09
20000	6.7569 -09	8.8431 -09	9.9102 -09	9.9664 -09	9.3745 -09	8.4807 -09
21000	6.4305 -09	8.3883 -09	9.3832 -09	9.4298 -09	8.8707 -09	8.0299 -09
22000	6.1280 -09	7.9700 -09	8.9004 -09	8.9390 -09	8.4100 -09	7.6171 -09
23000	5.8474 -09	7.5844 -09	8.4570 -09	8.4889 -09	7.9873 -09	7.2379 -09
24000	5.5866 -09	7.2282 -09	8.0486 -09	8.0749 -09	7.5985 -09	6.8888 -09
25000	5.3439 -09	6.8984 -09	7.6717 -09	7.6931 -09	7.2399 -09	6.5666 -09
26000	5.1176 -09	6.5925 -09	7.3230 -09	7.3402 -09	6.9084 -09	6.2684 -09
27000	4.9064 -09	6.3082 -09	6.9996 -09	7.0133 -09	6.6012 -09	5.9919 -09
28000	4.7089 -09	6.0434 -09	6.6991 -09	6.7098 -09	6.3160 -09	5.7350 -09
29000	4.5239 -09	5.7963 -09	6.4192 -09	6.4274 -09	6.0506 -09	5.4957 -09
30000	4.3504 -09	5.5654 -09	6.1582 -09	6.1641 -09	5.8031 -09	5.2725 -09

Table 16. Rate constant for hydrogen molecule in v=2 and J=27-28 states and v=3 and J=0-3 states

T(K)	v=2, J=27	v=2, J=28	v=3, J=0	v=3, J=1	v=3, J=2	v=3, J=3
100	5.0688 -09	2.3575 -09	---	---	---	---
200	8.9038 -09	4.9037 -09	---	---	---	---
300	1.1650 -08	6.8528 -09	---	---	---	---
400	1.3764 -08	8.4752 -09	---	---	---	---
500	1.5471 -08	9.8969 -09	---	---	---	---
600	1.6895 -08	1.1176 -08	3.5897 -28	4.6868 -28	8.1392 -28	1.8436 -27
700	1.8112 -08	1.2340 -08	1.6985 -25	2.1451 -25	3.4764 -25	7.1081 -25
800	1.9168 -08	1.3404 -08	1.7010 -23	2.0955 -23	3.2243 -23	6.1054 -23
900	2.0092 -08	1.4378 -08	6.0571 -22	7.3188 -22	1.0816 -21	1.9293 -21
1000	2.0904 -08	1.5267 -08	1.0466 -20	1.2452 -20	1.7817 -20	3.0298 -20
1100	2.1620 -08	1.6076 -08	1.0695 -19	1.2564 -19	1.7508 -19	2.8631 -19
1200	2.2251 -08	1.6811 -08	7.3732 -19	8.5706 -19	1.1684 -18	1.8493 -18
1300	2.2806 -08	1.7476 -08	3.7567 -18	4.3279 -18	5.7910 -18	8.9169 -18
1400	2.3293 -08	1.8075 -08	1.5097 -17	1.7260 -17	2.2729 -17	3.4180 -17
1500	2.3717 -08	1.8612 -08	5.0191 -17	5.7001 -17	7.4031 -17	1.0907 -16
1600	2.4085 -08	1.9093 -08	1.4306 -16	1.6153 -16	2.0726 -16	2.9994 -16
1700	2.4401 -08	1.9520 -08	3.5929 -16	4.0360 -16	5.1237 -16	7.2982 -16
1800	2.4670 -08	1.9897 -08	8.1210 -16	9.0811 -16	1.1419 -15	1.6039 -15
1900	2.4896 -08	2.0229 -08	1.6800 -15	1.8709 -15	2.3328 -15	3.2354 -15
2000	2.5083 -08	2.0519 -08	3.2235 -15	3.5767 -15	4.4257 -15	6.0691 -15
2100	2.5234 -08	2.0769 -08	5.7995 -15	6.4137 -15	7.8812 -15	1.0697 -14
2200	2.5352 -08	2.0984 -08	9.8703 -15	1.0883 -14	1.3289 -14	1.7870 -14
2300	2.5440 -08	2.1166 -08	1.6008 -14	1.7601 -14	2.1370 -14	2.8494 -14
2400	2.5501 -08	2.1317 -08	2.4891 -14	2.7299 -14	3.2970 -14	4.3619 -14
2500	2.5537 -08	2.1440 -08	3.7296 -14	4.0810 -14	4.9049 -14	6.4427 -14
2600	2.5550 -08	2.1538 -08	5.4086 -14	5.9054 -14	7.0660 -14	9.2201 -14
2700	2.5543 -08	2.1613 -08	7.6189 -14	8.3023 -14	9.8929 -14	1.2830 -13
2800	2.5517 -08	2.1665 -08	1.0458 -13	1.1375 -13	1.3503 -13	1.7412 -13
2900	2.5474 -08	2.1699 -08	1.4027 -13	1.5231 -13	1.8015 -13	2.3107 -13
3000	2.5415 -08	2.1714 -08	1.8427 -13	1.9976 -13	2.3548 -13	3.0055 -13
3100	2.5342 -08	2.1713 -08	2.3755 -13	2.5714 -13	3.0217 -13	3.8389 -13
3200	2.5257 -08	2.1696 -08	3.0109 -13	3.2546 -13	3.8133 -13	4.8235 -13
3300	2.5160 -08	2.1667 -08	3.7578 -13	4.0566 -13	4.7399 -13	5.9712 -13
3400	2.5053 -08	2.1624 -08	4.6247 -13	4.9861 -13	5.8110 -13	7.2924 -13
3500	2.4936 -08	2.1571 -08	5.6191 -13	6.0511 -13	7.0349 -13	8.7965 -13
3600	2.4812 -08	2.1507 -08	6.7477 -13	7.2585 -13	8.4191 -13	1.0491 -12
3700	2.4679 -08	2.1433 -08	8.0164 -13	8.6141 -13	9.9696 -13	1.2383 -12
3800	2.4540 -08	2.1352 -08	9.4298 -13	1.0123 -12	1.1692 -12	1.4478 -12
3900	2.4395 -08	2.1262 -08	1.0992 -12	1.1789 -12	1.3589 -12	1.6778 -12
4000	2.4245 -08	2.1166 -08	1.2705 -12	1.3614 -12	1.5664 -12	1.9286 -12

Table 16. (continued)

T(K)	v=2, J=27	v=2, J=28	v=3, J=0	v=3, J=1	v=3, J=2	v=3, J=3
4100	2.4090 -08	2.1063 -08	1.4572 -12	1.5601 -12	1.7918 -12	2.2004 -12
4200	2.3931 -08	2.0955 -08	1.6593 -12	1.7750 -12	2.0352 -12	2.4930 -12
4300	2.3769 -08	2.0842 -08	1.8768 -12	2.0061 -12	2.2964 -12	2.8063 -12
4400	2.3603 -08	2.0724 -08	2.1096 -12	2.2533 -12	2.5754 -12	3.1401 -12
4500	2.3435 -08	2.0602 -08	2.3576 -12	2.5164 -12	2.8719 -12	3.4940 -12
4600	2.3264 -08	2.0477 -08	2.6205 -12	2.7951 -12	3.1855 -12	3.8674 -12
4700	2.3091 -08	2.0349 -08	2.8980 -12	3.0891 -12	3.5158 -12	4.2599 -12
4800	2.2917 -08	2.0217 -08	3.1898 -12	3.3980 -12	3.8624 -12	4.6709 -12
4900	2.2742 -08	2.0084 -08	3.4954 -12	3.7213 -12	4.2246 -12	5.0996 -12
5000	2.2565 -08	1.9948 -08	3.8143 -12	4.0586 -12	4.6020 -12	5.5454 -12
5500	2.1676 -08	1.9248 -08	5.5911 -12	5.9340 -12	6.6929 -12	8.0017 -12
6000	2.0792 -08	1.8530 -08	7.6164 -12	8.0664 -12	9.0578 -12	1.0758 -11
6500	1.9929 -08	1.7815 -08	9.8127 -12	1.0374 -11	1.1605 -11	1.3707 -11
7000	1.9095 -08	1.7114 -08	1.2106 -11	1.2779 -11	1.4249 -11	1.6751 -11
7500	1.8297 -08	1.6435 -08	1.4433 -11	1.5214 -11	1.6918 -11	1.9805 -11
8000	1.7537 -08	1.5782 -08	1.6739 -11	1.7625 -11	1.9551 -11	2.2805 -11
8500	1.6815 -08	1.5157 -08	1.8986 -11	1.9969 -11	2.2103 -11	2.5700 -11
9000	1.6131 -08	1.4562 -08	2.1140 -11	2.2215 -11	2.4542 -11	2.8455 -11
9500	1.5484 -08	1.3996 -08	2.3182 -11	2.4340 -11	2.6844 -11	3.1045 -11
10000	1.4874 -08	1.3460 -08	2.5097 -11	2.6332 -11	2.8995 -11	3.3456 -11
11000	1.3752 -08	1.2470 -08	2.8520 -11	2.9884 -11	3.2819 -11	3.7719 -11
12000	1.2752 -08	1.1581 -08	3.1394 -11	3.2860 -11	3.6006 -11	4.1245 -11
13000	1.1859 -08	1.0784 -08	3.3745 -11	3.5288 -11	3.8594 -11	4.4085 -11
14000	1.1059 -08	1.0068 -08	3.5622 -11	3.7222 -11	4.0643 -11	4.6314 -11
15000	1.0341 -08	9.4233 -09	3.7080 -11	3.8720 -11	4.2219 -11	4.8009 -11
16000	9.6936 -09	8.8410 -09	3.8178 -11	3.9842 -11	4.3389 -11	4.9249 -11
17000	9.1087 -09	8.3136 -09	3.8967 -11	4.0644 -11	4.4214 -11	5.0105 -11
18000	8.5786 -09	7.8347 -09	3.9495 -11	4.1176 -11	4.4749 -11	5.0638 -11
19000	8.0965 -09	7.3986 -09	3.9805 -11	4.1482 -11	4.5042 -11	5.0904 -11
20000	7.6568 -09	7.0004 -09	3.9934 -11	4.1600 -11	4.5135 -11	5.0950 -11
21000	7.2547 -09	6.6357 -09	3.9912 -11	4.1563 -11	4.5063 -11	5.0815 -11
22000	6.8858 -09	6.3009 -09	3.9767 -11	4.1399 -11	4.4856 -11	5.0533 -11
23000	6.5467 -09	5.9928 -09	3.9520 -11	4.1131 -11	4.4539 -11	5.0132 -11
24000	6.2340 -09	5.7085 -09	3.9192 -11	4.0778 -11	4.4133 -11	4.9636 -11
25000	5.9451 -09	5.4456 -09	3.8797 -11	4.0358 -11	4.3656 -11	4.9063 -11
26000	5.6776 -09	5.2020 -09	3.8350 -11	3.9883 -11	4.3123 -11	4.8431 -11
27000	5.4292 -09	4.9758 -09	3.7861 -11	3.9367 -11	4.2546 -11	4.7753 -11
28000	5.1983 -09	4.7653 -09	3.7339 -11	3.8817 -11	4.1936 -11	4.7040 -11
29000	4.9831 -09	4.5691 -09	3.6794 -11	3.8243 -11	4.1300 -11	4.6302 -11
30000	4.7822 -09	4.3858 -09	3.6230 -11	3.7651 -11	4.0647 -11	4.5546 -11

Table 17. Rate constant for hydrogen molecule in v=3 and J=4-9 states.

T(K)	v=3, J=4	v=3, J=5	v=3, J=6	v=3, J=7	v=3, J=8	v=3, J=9
100	---	---	---	---	---	---
200	---	---	---	---	---	---
300	---	---	---	---	---	---
400	---	---	---	---	---	---
500	---	---	4.6760 -29	3.7860 -28	3.9712 -27	5.2579 -26
600	5.4394 -27	2.0839 -26	9.9219 -26	5.8736 -25	4.3315 -24	3.8938 -23
700	1.8313 -24	5.9277 -24	2.3205 -23	1.0985 -22	6.2984 -22	4.2937 -21
800	1.4209 -22	4.0529 -22	1.3699 -21	5.4840 -21	2.6036 -20	1.4423 -19
900	4.1485 -21	1.0724 -20	3.2338 -20	1.1363 -19	4.6583 -19	2.1959 -18
1000	6.1155 -20	1.4613 -19	4.0215 -19	1.2732 -18	4.6412 -18	1.9227 -17
1100	5.4874 -19	1.2294 -18	3.1397 -18	9.1272 -18	3.0226 -17	1.1266 -16
1200	3.3946 -18	7.2078 -18	1.7296 -17	4.6830 -17	1.4315 -16	4.8859 -16
1300	1.5781 -17	3.2019 -17	7.2887 -17	1.8583 -16	5.3088 -16	1.6818 -15
1400	5.8624 -17	1.1440 -16	2.4892 -16	6.0278 -16	1.6249 -15	4.8290 -15
1500	1.8206 -16	3.4350 -16	7.1869 -16	1.6643 -15	4.2664 -15	1.1996 -14
1600	4.8892 -16	8.9559 -16	1.8106 -15	4.0324 -15	9.8918 -15	2.6499 -14
1700	1.1650 -15	2.0791 -15	4.0781 -15	8.7742 -15	2.0704 -14	5.3144 -14
1800	2.5129 -15	4.3819 -15	8.3672 -15	1.7459 -14	3.9801 -14	9.8351 -14
1900	4.9854 -15	8.5149 -15	1.5872 -14	3.2224 -14	7.1226 -14	1.7012 -13
2000	9.2123 -15	1.5443 -14	2.8171 -14	5.5798 -14	1.1995 -13	2.7787 -13
2100	1.6019 -14	2.6404 -14	4.7230 -14	9.1482 -14	1.9178 -13	4.3214 -13
2200	2.6431 -14	4.2903 -14	7.5388 -14	1.4309 -13	2.9319 -13	6.4423 -13
2300	4.1671 -14	6.6698 -14	1.1531 -13	2.1484 -13	4.3113 -13	9.2579 -13
2400	6.3136 -14	9.9763 -14	1.6992 -13	3.1126 -13	6.1278 -13	1.2884 -12
2500	9.2372 -14	1.4424 -13	2.4233 -13	4.3701 -13	8.4535 -13	1.7433 -12
2600	1.3104 -13	2.0240 -13	3.3575 -13	5.9681 -13	1.1359 -12	2.3009 -12
2700	1.8086 -13	2.7654 -13	4.5340 -13	7.9524 -13	1.4909 -12	2.9706 -12
2800	2.4361 -13	3.6900 -13	5.9843 -13	1.0367 -12	1.9166 -12	3.7605 -12
2900	3.2102 -13	4.8203 -13	7.7386 -13	1.3252 -12	2.4184 -12	4.6774 -12
3000	4.1481 -13	6.1780 -13	9.8247 -13	1.6644 -12	3.0007 -12	5.7268 -12
3100	5.2660 -13	7.7832 -13	1.2268 -12	2.0575 -12	3.6675 -12	6.9124 -12
3200	6.5787 -13	9.6540 -13	1.5091 -12	2.5071 -12	4.4217 -12	8.2367 -12
3300	8.1001 -13	1.1807 -12	1.8313 -12	3.0154 -12	5.2654 -12	9.7008 -12
3400	9.8421 -13	1.4255 -12	2.1949 -12	3.5840 -12	6.1997 -12	1.1304 -11
3500	1.1815 -12	1.7011 -12	2.6012 -12	4.2140 -12	7.2250 -12	1.3046 -11
3600	1.4028 -12	2.0083 -12	3.0509 -12	4.9059 -12	8.3411 -12	1.4923 -11
3700	1.6487 -12	2.3478 -12	3.5446 -12	5.6598 -12	9.5469 -12	1.6932 -11
3800	1.9197 -12	2.7200 -12	4.0825 -12	6.4753 -12	1.0841 -11	1.9068 -11
3900	2.2161 -12	3.1250 -12	4.6643 -12	7.3514 -12	1.2220 -11	2.1326 -11
4000	2.5381 -12	3.5628 -12	5.2898 -12	8.2872 -12	1.3683 -11	2.3701 -11

Table 17. (continued)

T(K)	v=3, J=4	v=3, J=5	v=3, J=6	v=3, J=7	v=3, J=8	v=3, J=9
4100	2.8857 -12	4.0331 -12	5.9581 -12	9.2808 -12	1.5225 -11	2.6186 -11
4200	3.2586 -12	4.5356 -12	6.6683 -12	1.0331 -11	1.6843 -11	2.8775 -11
4300	3.6566 -12	5.0694 -12	7.4192 -12	1.1435 -11	1.8534 -11	3.1461 -11
4400	4.0791 -12	5.6340 -12	8.2096 -12	1.2590 -11	2.0294 -11	3.4236 -11
4500	4.5257 -12	6.2284 -12	9.0380 -12	1.3795 -11	2.2117 -11	3.7094 -11
4600	4.9956 -12	6.8515 -12	9.9026 -12	1.5046 -11	2.4001 -11	4.0027 -11
4700	5.4880 -12	7.5021 -12	1.0802 -11	1.6341 -11	2.5939 -11	4.3028 -11
4800	6.0022 -12	8.1792 -12	1.1733 -11	1.7677 -11	2.7929 -11	4.6090 -11
4900	6.5372 -12	8.8813 -12	1.2696 -11	1.9051 -11	2.9965 -11	4.9205 -11
5000	7.0920 -12	9.6071 -12	1.3687 -11	2.0460 -11	3.2042 -11	5.2368 -11
5500	1.0127 -11	1.3542 -11	1.9007 -11	2.7929 -11	4.2908 -11	6.8658 -11
6000	1.3498 -11	1.7856 -11	2.4749 -11	3.5854 -11	5.4207 -11	8.5222 -11
6500	1.7073 -11	2.2379 -11	3.0691 -11	4.3928 -11	6.5520 -11	1.0148 -10
7000	2.0732 -11	2.6963 -11	3.6643 -11	5.1908 -11	7.6529 -11	1.1702 -10
7500	2.4379 -11	3.1491 -11	4.2461 -11	5.9613 -11	8.7006 -11	1.3158 -10
8000	2.7938 -11	3.5874 -11	4.8037 -11	6.6914 -11	9.6805 -11	1.4498 -10
8500	3.1351 -11	4.0046 -11	5.3298 -11	7.3730 -11	1.0584 -10	1.5716 -10
9000	3.4581 -11	4.3965 -11	5.8198 -11	8.0013 -11	1.1407 -10	1.6809 -10
9500	3.7602 -11	4.7606 -11	6.2712 -11	8.5745 -11	1.2148 -10	1.7780 -10
10000	4.0399 -11	5.0955 -11	6.6831 -11	9.0925 -11	1.2810 -10	1.8635 -10
11000	4.5308 -11	5.6775 -11	7.3904 -11	9.9688 -11	1.3910 -10	2.0021 -10
12000	4.9327 -11	6.1476 -11	7.9520 -11	1.0650 -10	1.4741 -10	2.1031 -10
13000	5.2529 -11	6.5165 -11	8.3844 -11	1.1161 -10	1.5344 -10	2.1727 -10
14000	5.5009 -11	6.7972 -11	8.7057 -11	1.1529 -10	1.5757 -10	2.2169 -10
15000	5.6865 -11	7.0026 -11	8.9331 -11	1.1776 -10	1.6015 -10	2.2407 -10
16000	5.8193 -11	7.1446 -11	9.0826 -11	1.1926 -10	1.6147 -10	2.2481 -10
17000	5.9077 -11	7.2339 -11	9.1679 -11	1.1996 -10	1.6178 -10	2.2429 -10
18000	5.9593 -11	7.2798 -11	9.2009 -11	1.2002 -10	1.6130 -10	2.2276 -10
19000	5.9804 -11	7.2902 -11	9.1915 -11	1.1957 -10	1.6019 -10	2.2047 -10
20000	5.9766 -11	7.2717 -11	9.1480 -11	1.1871 -10	1.5859 -10	2.1759 -10
21000	5.9525 -11	7.2299 -11	9.0773 -11	1.1752 -10	1.5661 -10	2.1428 -10
22000	5.9120 -11	7.1694 -11	8.9851 -11	1.1609 -10	1.5434 -10	2.1064 -10
23000	5.8583 -11	7.0941 -11	8.8760 -11	1.1446 -10	1.5186 -10	2.0677 -10
24000	5.7941 -11	7.0072 -11	8.7539 -11	1.1269 -10	1.4922 -10	2.0275 -10
25000	5.7217 -11	6.9112 -11	8.6219 -11	1.1082 -10	1.4648 -10	1.9864 -10
26000	5.6429 -11	6.8084 -11	8.4826 -11	1.0887 -10	1.4366 -10	1.9447 -10
27000	5.5592 -11	6.7005 -11	8.3382 -11	1.0687 -10	1.4081 -10	1.9029 -10
28000	5.4720 -11	6.5890 -11	8.1903 -11	1.0484 -10	1.3794 -10	1.8612 -10
29000	5.3822 -11	6.4751 -11	8.0404 -11	1.0280 -10	1.3508 -10	1.8200 -10
30000	5.2908 -11	6.3598 -11	7.8895 -11	1.0076 -10	1.3224 -10	1.7793 -10

Table 18. Rate constant for hydrogen molecule in v=3 and J=10-15 states.

T(K)	v=3, J=10	v=3, J=11	v=3, J=12	v=3, J=13	v=3, J=14	v=3, J=15
100	---	---	---	---	---	---
200	---	---	---	---	---	--
300	---	---	---	4.0110 -29	9.0693 -27	2.3948 -24
400	7.5895 -29	2.8223 -27	1.3083 -25	6.9793 -24	4.3626 -22	3.0625 -20
500	8.4618 -25	1.6150 -23	3.6867 -22	9.4247 -21	2.7251 -19	8.6396 -18
600	4.1295 -22	5.0532 -21	7.1934 -20	1.1262 -18	1.9484 -17	3.6365 -16
700	3.3806 -20	3.0119 -19	3.0598 -18	3.3754 -17	4.0475 -16	5.1744 -15
800	9.0823 -19	6.3787 -18	5.0316 -17	4.2687 -16	3.8893 -15	3.7440 -14
900	1.1622 -17	6.7842 -17	4.3957 -16	3.0405 -15	2.2377 -14	1.7278 -13
1000	8.8558 -17	4.4587 -16	2.4683 -15	1.4500 -14	8.9974 -14	5.8241 -13
1100	4.6310 -16	2.0659 -15	1.0055 -14	5.1684 -14	2.7894 -13	1.5631 -12
1200	1.8268 -15	7.3684 -15	3.2216 -14	1.4815 -13	7.1184 -13	3.5378 -12
1300	5.8035 -15	2.1495 -14	8.5829 -14	3.5922 -13	1.5645 -12	7.0249 -12
1400	1.5557 -14	5.3561 -14	1.9787 -13	7.6393 -13	3.0587 -12	1.2590 -11
1500	3.6412 -14	1.1767 -13	4.0640 -13	1.4630 -12	5.4463 -12	2.0791 -11
1600	7.6344 -14	2.3343 -13	7.6005 -13	2.5739 -12	8.9898 -12	3.2131 -11
1700	1.4622 -13	4.2579 -13	1.3161 -12	4.2229 -12	1.3944 -11	4.7025 -11
1800	2.5977 -13	7.2428 -13	2.1377 -12	6.5379 -12	2.0536 -11	6.5778 -11
1900	4.3319 -13	1.1618 -12	3.2903 -12	9.6404 -12	2.8959 -11	8.8578 -11
2000	6.8465 -13	1.7732 -12	4.8383 -12	1.3639 -11	3.9360 -11	1.1550 -10
2100	1.0335 -12	2.5934 -12	6.8423 -12	1.8627 -11	5.1836 -11	1.4651 -10
2200	1.4995 -12	3.6562 -12	9.3562 -12	2.4675 -11	6.6439 -11	1.8150 -10
2300	2.1023 -12	4.9932 -12	1.2426 -11	3.1835 -11	8.3175 -11	2.2027 -10
2400	2.8602 -12	6.6319 -12	1.6087 -11	4.0136 -11	1.0201 -10	2.6257 -10
2500	3.7902 -12	8.5960 -12	2.0367 -11	4.9587 -11	1.2288 -10	3.0811 -10
2600	4.9070 -12	1.0904 -11	2.5280 -11	6.0180 -11	1.4568 -10	3.5657 -10
2700	6.2232 -12	1.3570 -11	3.0835 -11	7.1888 -11	1.7029 -10	4.0761 -10
2800	7.7487 -12	1.6603 -11	3.7029 -11	8.4672 -11	1.9658 -10	4.6088 -10
2900	9.4907 -12	2.0006 -11	4.3850 -11	9.8480 -11	2.2440 -10	5.1606 -10
3000	1.1454 -11	2.3779 -11	5.1283 -11	1.1325 -10	2.5360 -10	5.7280 -10
3100	1.3641 -11	2.7917 -11	5.9302 -11	1.2892 -10	2.8400 -10	6.3079 -10
3200	1.6050 -11	3.2413 -11	6.7880 -11	1.4541 -10	3.1547 -10	6.8971 -10
3300	1.8680 -11	3.7254 -11	7.6984 -11	1.6264 -10	3.4783 -10	7.4929 -10
3400	2.1527 -11	4.2426 -11	8.6578 -11	1.8054 -10	3.8093 -10	8.0927 -10
3500	2.4583 -11	4.7913 -11	9.6625 -11	1.9903 -10	4.1463 -10	8.6939 -10
3600	2.7842 -11	5.3697 -11	1.0708 -10	2.1803 -10	4.4879 -10	9.2944 -10
3700	3.1295 -11	5.9758 -11	1.1792 -10	2.3747 -10	4.8327 -10	9.8921 -10
3800	3.4930 -11	6.6075 -11	1.2908 -10	2.5727 -10	5.1796 -10	1.0485 -09
3900	3.8739 -11	7.2627 -11	1.4054 -10	2.7736 -10	5.5274 -10	1.1072 -09
4000	4.2709 -11	7.9392 -11	1.5225 -10	2.9768 -10	5.8750 -10	1.1652 -09

Table 18. (continued)

T(K)	v=3, J=10	v=3, J=11	v=3, J=12	v=3, J=13	v=3, J=14	v=3, J=15
4100	4.6829 -11	8.6350 -11	1.6418 -10	3.1815 -10	6.2214 -10	1.2222 -09
4200	5.1086 -11	9.3477 -11	1.7628 -10	3.3872 -10	6.5658 -10	1.2783 -09
4300	5.5468 -11	1.0075 -10	1.8853 -10	3.5934 -10	6.9074 -10	1.3333 -09
4400	5.9963 -11	1.0816 -10	2.0089 -10	3.7995 -10	7.2455 -10	1.3871 -09
4500	6.4559 -11	1.1567 -10	2.1332 -10	4.0050 -10	7.5794 -10	1.4397 -09
4600	6.9243 -11	1.2327 -10	2.2580 -10	4.2095 -10	7.9086 -10	1.4910 -09
4700	7.4005 -11	1.3095 -10	2.3830 -10	4.4127 -10	8.2325 -10	1.5410 -09
4800	7.8833 -11	1.3867 -10	2.5079 -10	4.6140 -10	8.5508 -10	1.5896 -09
4900	8.3715 -11	1.4643 -10	2.6324 -10	4.8133 -10	8.8630 -10	1.6368 -09
5000	8.8642 -11	1.5421 -10	2.7565 -10	5.0101 -10	9.1689 -10	1.6826 -09
5500	1.1360 -10	1.9293 -10	3.3615 -10	5.9500 -10	1.0595 -09	1.8903 -09
6000	1.3836 -10	2.3031 -10	3.9281 -10	6.8011 -10	1.1837 -09	2.0631 -09
6500	1.6213 -10	2.6534 -10	4.4447 -10	7.5533 -10	1.2895 -09	2.2035 -09
7000	1.8440 -10	2.9743 -10	4.9060 -10	8.2049 -10	1.3778 -09	2.3149 -09
7500	2.0488 -10	3.2631 -10	5.3108 -10	8.7598 -10	1.4501 -09	2.4009 -09
8000	2.2340 -10	3.5191 -10	5.6608 -10	9.2246 -10	1.5081 -09	2.4651 -09
8500	2.3995 -10	3.7431 -10	5.9592 -10	9.6075 -10	1.5535 -09	2.5108 -09
9000	2.5454 -10	3.9365 -10	6.2099 -10	9.9171 -10	1.5879 -09	2.5409 -09
9500	2.6728 -10	4.1017 -10	6.4175 -10	1.0162 -09	1.6129 -09	2.5578 -09
10000	2.7828 -10	4.2408 -10	6.5863 -10	1.0350 -09	1.6298 -09	2.5640 -09
11000	2.9560 -10	4.4507 -10	6.8246 -10	1.0584 -09	1.6441 -09	2.5508 -09
12000	3.0756 -10	4.5846 -10	6.9556 -10	1.0669 -09	1.6387 -09	2.5131 -09
13000	3.1521 -10	4.6588 -10	7.0048 -10	1.0645 -09	1.6194 -09	2.4593 -09
14000	3.1940 -10	4.6866 -10	6.9924 -10	1.0541 -09	1.5906 -09	2.3954 -09
15000	3.2090 -10	4.6788 -10	6.9344 -10	1.0382 -09	1.5554 -09	2.3256 -09
15900	3.2043 -10	4.6487 -10	6.8533 -10	1.0204 -09	1.5203 -09	2.2600 -09
17000	3.1806 -10	4.5895 -10	6.7274 -10	9.9581 -10	1.4746 -09	2.1786 -09
18000	3.1460 -10	4.5200 -10	6.5952 -10	9.7162 -10	1.4318 -09	2.1048 -09
19000	3.1022 -10	4.4398 -10	6.4516 -10	9.4644 -10	1.3886 -09	2.0323 -09
20000	3.0516 -10	4.3521 -10	6.3009 -10	9.2081 -10	1.3457 -09	1.9617 -09
21000	2.9962 -10	4.2595 -10	6.1462 -10	8.9511 -10	1.3035 -09	1.8933 -09
22000	2.9373 -10	4.1638 -10	5.9899 -10	8.6961 -10	1.2623 -09	1.8275 -09
23000	2.8762 -10	4.0665 -10	5.8338 -10	8.4451 -10	1.2223 -09	1.7642 -09
24000	2.8138 -10	3.9688 -10	5.6791 -10	8.1996 -10	1.1836 -09	1.7036 -09
25000	2.7509 -10	3.8714 -10	5.5268 -10	7.9606 -10	1.1462 -09	1.6457 -09
26000	2.6880 -10	3.7752 -10	5.3777 -10	7.7286 -10	1.1102 -09	1.5904 -09
27000	2.6255 -10	3.6804 -10	5.2323 -10	7.5040 -10	1.0757 -09	1.5376 -09
28000	2.5637 -10	3.5876 -10	5.0908 -10	7.2871 -10	1.0426 -09	1.4872 -09
29000	2.5030 -10	3.4969 -10	4.9535 -10	7.0779 -10	1.0108 -09	1.4392 -09
30000	2.4435 -10	3.4085 -10	4.8205 -10	6.8764 -10	9.8033 -10	1.3934 -09

Table 19. Rate constant for hydrogen molecule in v=3 and J=16-21 states.

T(K)	v=3, J=16	v=3, J=17	v=3, J=18	v=3, J=19	v=3, J=20	v=3, J=21
100	---	---	---	3.5812 -28	4.1253 -21	6.3137 -14
200	5.8849 -29	3.0363 -25	1.6160 -21	7.9826 -18	2.5335 -14	7.6802 -11
300	6.9985 -22	2.2293 -19	7.0947 -17	2.0579 -14	4.2835 -12	7.6519 -10
400	2.2968 -18	1.8185 -16	1.4183 -14	1.0006 -12	5.3516 -11	2.3479 -09
500	2.8679 -16	9.8545 -15	3.3098 -13	1.0021 -11	2.3773 -10	4.5314 -09
600	7.0152 -15	1.3825 -13	2.6502 -12	4.5735 -11	6.3218 -10	6.9573 -09
700	6.7771 -14	8.9824 -13	1.1543 -11	1.3351 -10	1.2566 -09	9.3872 -09
800	3.6689 -13	3.6130 -12	3.4416 -11	2.9517 -10	2.0849 -09	1.1692 -08
900	1.3514 -12	1.0566 -11	7.9773 -11	5.4269 -10	3.0695 -09	1.3813 -08
1000	3.8046 -12	2.4741 -11	1.5514 -10	8.7746 -10	4.1585 -09	1.5730 -08
1100	8.8136 -12	4.9304 -11	2.6568 -10	1.2928 -09	5.3054 -09	1.7444 -08
1200	1.7647 -11	8.7098 -11	4.1374 -10	1.7769 -09	6.4723 -09	1.8964 -08
1300	3.1593 -11	1.4028 -10	5.9909 -10	2.3158 -09	7.6300 -09	2.0306 -08
1400	5.1815 -11	2.1017 -10	8.1943 -10	2.8953 -09	8.7576 -09	2.1486 -08
1500	7.9243 -11	2.9721 -10	1.0711 -09	3.5020 -09	9.8403 -09	2.2520 -08
1600	1.1452 -10	4.0112 -10	1.3495 -09	4.1240 -09	1.0869 -08	2.3423 -08
1700	1.5797 -10	5.2098 -10	1.6498 -09	4.7510 -09	1.1837 -08	2.4209 -08
1800	2.0966 -10	6.5546 -10	1.9672 -09	5.3747 -09	1.2742 -08	2.4890 -08
1900	2.6939 -10	8.0291 -10	2.2970 -09	5.9883 -09	1.3583 -08	2.5479 -08
2000	3.3675 -10	9.6152 -10	2.6350 -09	6.5865 -09	1.4361 -08	2.5983 -08
2100	4.1118 -10	1.1294 -09	2.9772 -09	7.1652 -09	1.5078 -08	2.6414 -08
2200	4.9203 -10	1.3048 -09	3.3203 -09	7.7215 -09	1.5735 -08	2.6777 -08
2300	5.7855 -10	1.4858 -09	3.6616 -09	8.2533 -09	1.6335 -08	2.7082 -08
2400	6.6998 -10	1.6709 -09	3.9985 -09	8.7593 -09	1.6882 -08	2.7332 -08
2500	7.6555 -10	1.8584 -09	4.3290 -09	9.2387 -09	1.7378 -08	2.7535 -08
2600	8.6448 -10	2.0471 -09	4.6515 -09	9.6913 -09	1.7826 -08	2.7695 -08
2700	9.6605 -10	2.2357 -09	4.9648 -09	1.0117 -08	1.8231 -08	2.7817 -08
2800	1.0696 -09	2.4231 -09	5.2678 -09	1.0516 -08	1.8593 -08	2.7904 -08
2900	1.1744 -09	2.6084 -09	5.5597 -09	1.0889 -08	1.8918 -08	2.7960 -08
3000	1.2799 -09	2.7909 -09	5.8401 -09	1.1238 -08	1.9206 -08	2.7988 -08
3100	1.3857 -09	2.9697 -09	6.1085 -09	1.1561 -08	1.9461 -08	2.7991 -08
3200	1.4911 -09	3.1445 -09	6.3648 -09	1.1862 -08	1.9686 -08	2.7971 -08
3300	1.5957 -09	3.3147 -09	6.6089 -09	1.2140 -08	1.9882 -08	2.7932 -08
3400	1.6993 -09	3.4799 -09	6.8408 -09	1.2396 -08	2.0051 -08	2.7874 -08
3500	1.8015 -09	3.6400 -09	7.0607 -09	1.2632 -08	2.0196 -08	2.7800 -08
3600	1.9019 -09	3.7946 -09	7.2687 -09	1.2849 -08	2.0319 -08	2.7711 -08
3700	2.0003 -09	3.9436 -09	7.4650 -09	1.3047 -08	2.0420 -08	2.7610 -08
3800	2.0966 -09	4.0870 -09	7.6501 -09	1.3228 -08	2.0503 -08	2.7496 -08
3900	2.1905 -09	4.2246 -09	7.8241 -09	1.3392 -08	2.0568 -08	2.7372 -08
4000	2.2820 -09	4.3565 -09	7.9874 -09	1.3541 -08	2.0616 -08	2.7239 -08

Table 19. (continued)

T(K)	v=3, J=16	v=3, J=17	v=3, J=18	v=3, J=19	v=3, J=20	v=3, J=21
4100	2.3709 -09	4.4827 -09	8.1404 -09	1.3675 -08	2.0649 -08	2.7097 -08
4200	2.4571 -09	4.6032 -09	8.2834 -09	1.3796 -08	2.0669 -08	2.6948 -08
4300	2.5406 -09	4.7181 -09	8.4169 -09	1.3903 -08	2.0676 -08	2.6793 -08
4400	2.6212 -09	4.8275 -09	8.5412 -09	1.3998 -08	2.0670 -08	2.6632 -08
4500	2.6991 -09	4.9315 -09	8.6567 -09	1.4082 -08	2.0655 -08	2.6465 -08
4600	2.7742 -09	5.0302 -09	8.7638 -09	1.4155 -08	2.0629 -08	2.6295 -08
4700	2.8465 -09	5.1238 -09	8.8628 -09	1.4217 -08	2.0594 -08	2.6120 -08
4800	2.9159 -09	5.2124 -09	8.9541 -09	1.4270 -08	2.0550 -08	2.5942 -08
4900	2.9826 -09	5.2961 -09	9.0380 -09	1.4315 -08	2.0499 -08	2.5761 -08
5000	3.0465 -09	5.3751 -09	9.1150 -09	1.4350 -08	2.0441 -08	2.5578 -08
5500	3.3266 -09	5.7046 -09	9.4059 -09	1.4422 -08	2.0064 -08	2.4638 -08
6000	3.5460 -09	5.9388 -09	9.5669 -09	1.4351 -08	1.9584 -08	2.3684 -08
6500	3.7125 -09	6.0951 -09	9.6283 -09	1.4181 -08	1.9042 -08	2.2740 -08
7000	3.8342 -09	6.1887 -09	9.6143 -09	1.3942 -08	1.8466 -08	2.1820 -08
7500	3.9185 -09	6.2323 -09	9.5437 -09	1.3655 -08	1.7876 -08	2.0934 -08
8000	3.9717 -09	6.2366 -09	9.4310 -09	1.3337 -08	1.7284 -08	2.0085 -08
8500	3.9997 -09	6.2099 -09	9.2877 -09	1.3001 -08	1.6700 -08	1.9276 -08
9000	4.0070 -09	6.1593 -09	9.1224 -09	1.2655 -08	1.6128 -08	1.8508 -08
9500	3.9976 -09	6.0902 -09	8.9418 -09	1.2305 -08	1.5574 -08	1.7780 -08
10000	3.9748 -09	6.0071 -09	8.7511 -09	1.1956 -08	1.5039 -08	1.7090 -08
11000	3.8996 -09	5.8125 -09	8.3543 -09	1.1273 -08	1.4031 -08	1.5821 -08
12000	3.7976 -09	5.5959 -09	7.9538 -09	1.0624 -08	1.3108 -08	1.4686 -08
13000	3.6802 -09	5.3705 -09	7.5621 -09	1.0014 -08	1.2266 -08	1.3670 -08
14000	3.5546 -09	5.1445 -09	7.1859 -09	9.4463 -09	1.1499 -08	1.2759 -08
15000	3.4260 -09	4.9229 -09	6.8289 -09	8.9204 -09	1.0801 -08	1.1939 -08
16000	3.2975 -09	4.7087 -09	6.4924 -09	8.4343 -09	1.0166 -08	1.1199 -08
17000	3.1713 -09	4.5037 -09	6.1767 -09	7.9855 -09	9.5856 -09	1.0530 -08
18000	3.0488 -09	4.3085 -09	5.8813 -09	7.5711 -09	9.0557 -09	9.9230 -09
19000	2.9307 -09	4.1237 -09	5.6053 -09	7.1883 -09	8.5705 -09	9.3703 -09
20000	2.8176 -09	3.9490 -09	5.3475 -09	6.8343 -09	8.1252 -09	8.8658 -09
21000	2.7096 -09	3.7842 -09	5.1069 -09	6.5066 -09	7.7158 -09	8.4039 -09
22000	2.6068 -09	3.6288 -09	4.8821 -09	6.2029 -09	7.3384 -09	7.9800 -09
23000	2.5091 -09	3.4825 -09	4.6720 -09	5.9208 -09	6.9900 -09	7.5899 -09
24000	2.4163 -09	3.3447 -09	4.4755 -09	5.6586 -09	6.6675 -09	7.2301 -09
25000	2.3282 -09	3.2149 -09	4.2916 -09	5.4145 -09	6.3685 -09	6.8974 -09
26000	2.2447 -09	3.0925 -09	4.1192 -09	5.1867 -09	6.0907 -09	6.5892 -09
27000	2.1655 -09	2.9771 -09	3.9575 -09	4.9740 -09	5.8321 -09	6.3029 -09
28000	2.0904 -09	2.8683 -09	3.8056 -09	4.7750 -09	5.5910 -09	6.0365 -09
29000	2.0192 -09	2.7654 -09	3.6628 -09	4.5886 -09	5.3658 -09	5.7882 -09
30000	1.9516 -09	2.6683 -09	3.5283 -09	4.4137 -09	5.1550 -09	5.5563 -09

Table 20. Rate constant for hydrogen molecule in v=3 and J=22-27 states.

T(K)	v=3, J=22	v=3, J=23	v=3, J=24	v=3, J=25	v=3, J=26	v=3, J=27
100	5.0627 -09	3.6784 -09	2.4011 -09	1.9463 -09	1.6871 -09	1.4962 -09
200	9.5523 -09	7.0169 -09	4.9660 -09	3.9294 -09	3.4060 -09	3.0578 -09
300	1.2979 -08	9.6396 -09	7.0878 -09	5.6837 -09	4.9572 -09	4.4564 -09
400	1.5688 -08	1.1802 -08	8.9176 -09	7.2655 -09	6.3735 -09	5.7263 -09
500	1.7891 -08	1.3637 -08	1.0530 -08	8.7007 -09	7.6685 -09	6.8850 -09
600	1.9718 -08	1.5222 -08	1.1965 -08	1.0005 -08	8.8519 -09	7.9442 -09
700	2.1256 -08	1.6605 -08	1.3250 -08	1.1190 -08	9.9321 -09	8.9128 -09
800	2.2562 -08	1.7820 -08	1.4403 -08	1.2266 -08	1.0917 -08	9.7984 -09
900	2.3680 -08	1.8891 -08	1.5437 -08	1.3242 -08	1.1813 -08	1.0607 -08
1000	2.4639 -08	1.9836 -08	1.6365 -08	1.4125 -08	1.2628 -08	1.1346 -08
1100	2.5463 -08	2.0670 -08	1.7196 -08	1.4922 -08	1.3367 -08	1.2018 -08
1200	2.6170 -08	2.1405 -08	1.7940 -08	1.5642 -08	1.4036 -08	1.2629 -08
1300	2.6776 -08	2.2052 -08	1.8604 -08	1.6289 -08	1.4641 -08	1.3184 -08
1400	2.7292 -08	2.2620 -08	1.9196 -08	1.6870 -08	1.5186 -08	1.3687 -08
1500	2.7730 -08	2.3116 -08	1.9721 -08	1.7390 -08	1.5677 -08	1.4140 -08
1600	2.8098 -08	2.3548 -08	2.0186 -08	1.7854 -08	1.6116 -08	1.4549 -08
1700	2.8404 -08	2.3921 -08	2.0595 -08	1.8266 -08	1.6509 -08	1.4915 -08
1800	2.8655 -08	2.4241 -08	2.0953 -08	1.8631 -08	1.6858 -08	1.5243 -08
1900	2.8856 -08	2.4513 -08	2.1265 -08	1.8952 -08	1.7168 -08	1.5535 -08
2000	2.9012 -08	2.4742 -08	2.1535 -08	1.9234 -08	1.7440 -08	1.5793 -08
2100	2.9129 -08	2.4931 -08	2.1766 -08	1.9479 -08	1.7679 -08	1.6021 -08
2200	2.9209 -08	2.5084 -08	2.1962 -08	1.9690 -08	1.7887 -08	1.6221 -08
2300	2.9258 -08	2.5204 -08	2.2125 -08	1.9870 -08	1.8067 -08	1.6394 -08
2400	2.9277 -08	2.5295 -08	2.2259 -08	2.0021 -08	1.8219 -08	1.6543 -08
2500	2.9270 -08	2.5359 -08	2.2366 -08	2.0147 -08	1.8348 -08	1.6670 -08
2600	2.9240 -08	2.5398 -08	2.2448 -08	2.0249 -08	1.8454 -08	1.6776 -08
2700	2.9189 -08	2.5415 -08	2.2507 -08	2.0329 -08	1.8540 -08	1.6863 -08
2800	2.9119 -08	2.5411 -08	2.2546 -08	2.0389 -08	1.8607 -08	1.6933 -08
2900	2.9031 -08	2.5389 -08	2.2566 -08	2.0430 -08	1.8656 -08	1.6986 -08
3000	2.8929 -08	2.5351 -08	2.2569 -08	2.0455 -08	1.8690 -08	1.7025 -08
3100	2.8812 -08	2.5298 -08	2.2556 -08	2.0464 -08	1.8709 -08	1.7050 -08
3200	2.8684 -08	2.5230 -08	2.2529 -08	2.0459 -08	1.8715 -08	1.7063 -08
3300	2.8544 -08	2.5151 -08	2.2489 -08	2.0442 -08	1.8709 -08	1.7064 -08
3400	2.8395 -08	2.5060 -08	2.2438 -08	2.0412 -08	1.8691 -08	1.7055 -08
3500	2.8237 -08	2.4960 -08	2.2375 -08	2.0372 -08	1.8663 -08	1.7036 -08
3600	2.8071 -08	2.4850 -08	2.2303 -08	2.0322 -08	1.8626 -08	1.7008 -08
3700	2.7899 -08	2.4732 -08	2.2222 -08	2.0264 -08	1.8580 -08	1.6972 -08
3800	2.7720 -08	2.4607 -08	2.2133 -08	2.0197 -08	1.8527 -08	1.6929 -08
3900	2.7537 -08	2.4475 -08	2.2037 -08	2.0123 -08	1.8466 -08	1.6879 -08
4000	2.7348 -08	2.4337 -08	2.1934 -08	2.0042 -08	1.8399 -08	1.6823 -08

Table 20. (continued)

T(K)	v=3, J=22	v=3, J=23	v=3, J=24	v=3, J=25	v=3, J=26	v=3, J=27
4100	2.7156 -08	2.4194 -08	2.1825 -08	1.9955 -08	1.8326 -08	1.6761 -08
4200	2.6960 -08	2.4047 -08	2.1712 -08	1.9862 -08	1.8247 -08	1.6694 -08
4300	2.6762 -08	2.3896 -08	2.1593 -08	1.9765 -08	1.8164 -08	1.6622 -08
4400	2.6561 -08	2.3740 -08	2.1470 -08	1.9663 -08	1.8076 -08	1.6546 -08
4500	2.6358 -08	2.3582 -08	2.1344 -08	1.9558 -08	1.7984 -08	1.6466 -08
4600	2.6153 -08	2.3421 -08	2.1214 -08	1.9448 -08	1.7889 -08	1.6383 -08
4700	2.5947 -08	2.3258 -08	2.1081 -08	1.9336 -08	1.7791 -08	1.6297 -08
4800	2.5741 -08	2.3093 -08	2.0946 -08	1.9220 -08	1.7690 -08	1.6208 -08
4900	2.5533 -08	2.2926 -08	2.0808 -08	1.9102 -08	1.7586 -08	1.6116 -08
5000	2.5325 -08	2.2758 -08	2.0668 -08	1.8982 -08	1.7480 -08	1.6022 -08
5500	2.4288 -08	2.1906 -08	1.9950 -08	1.8358 -08	1.6925 -08	1.5528 -08
6000	2.3270 -08	2.1051 -08	1.9218 -08	1.7712 -08	1.6345 -08	1.5008 -08
6500	2.2283 -08	2.0212 -08	1.8488 -08	1.7063 -08	1.5760 -08	1.4480 -08
7000	2.1337 -08	1.9397 -08	1.7774 -08	1.6423 -08	1.5180 -08	1.3955 -08
7500	2.0435 -08	1.8614 -08	1.7082 -08	1.5800 -08	1.4612 -08	1.3440 -08
8000	1.9579 -08	1.7865 -08	1.6416 -08	1.5197 -08	1.4063 -08	1.2940 -08
8500	1.8769 -08	1.7151 -08	1.5779 -08	1.4619 -08	1.3534 -08	1.2459 -08
9000	1.8003 -08	1.6474 -08	1.5171 -08	1.4066 -08	1.3028 -08	1.1996 -08
9500	1.7280 -08	1.5831 -08	1.4593 -08	1.3538 -08	1.2544 -08	1.1554 -08
10000	1.6598 -08	1.5223 -08	1.4044 -08	1.3036 -08	1.2083 -08	1.1132 -08
11000	1.5348 -08	1.4103 -08	1.3029 -08	1.2106 -08	1.1227 -08	1.0349 -08
12000	1.4234 -08	1.3100 -08	1.2117 -08	1.1267 -08	1.0455 -08	9.6401 -09
13000	1.3240 -08	1.2201 -08	1.1297 -08	1.0512 -08	9.7580 -09	9.0002 -09
14000	1.2350 -08	1.1394 -08	1.0558 -08	9.8307 -09	9.1288 -09	8.4219 -09
15000	1.1551 -08	1.0668 -08	9.8924 -09	9.2152 -09	8.5597 -09	7.8986 -09
16000	1.0831 -08	1.0012 -08	9.2900 -09	8.6578 -09	8.0441 -09	7.4241 -09
17000	1.0181 -08	9.4176 -09	8.7437 -09	8.1517 -09	7.5756 -09	6.9928 -09
18000	9.5910 -09	8.8780 -09	8.2469 -09	7.6911 -09	7.1490 -09	6.5999 -09
19000	9.0546 -09	8.3866 -09	7.7938 -09	7.2708 -09	6.7595 -09	6.2410 -09
20000	8.5653 -09	7.9377 -09	7.3796 -09	6.8862 -09	6.4030 -09	5.9125 -09
21000	8.1176 -09	7.5265 -09	6.9999 -09	6.5335 -09	6.0758 -09	5.6109 -09
22000	7.7070 -09	7.1489 -09	6.6509 -09	6.2091 -09	5.7749 -09	5.3334 -09
23000	7.3292 -09	6.8013 -09	6.3293 -09	5.9101 -09	5.4974 -09	5.0776 -09
24000	6.9809 -09	6.4804 -09	6.0324 -09	5.6338 -09	5.2410 -09	4.8411 -09
25000	6.6589 -09	6.1837 -09	5.7576 -09	5.3781 -09	5.0035 -09	4.6220 -09
26000	6.3607 -09	5.9085 -09	5.5027 -09	5.1408 -09	4.7832 -09	4.4187 -09
27000	6.0838 -09	5.6530 -09	5.2658 -09	4.9201 -09	4.5783 -09	4.2296 -09
28000	5.8262 -09	5.4151 -09	5.0452 -09	4.7146 -09	4.3874 -09	4.0534 -09
29000	5.5861 -09	5.1933 -09	4.8394 -09	4.5229 -09	4.2092 -09	3.8890 -09
30000	5.3619 -09	4.9860 -09	4.6471 -09	4.3436 -09	4.0426 -09	3.7352 -09