(1) If any numerical NTE requirements specified in the terms of any consent decree apply to the engine family, use those values as the NTE standards for testing under this subpart.

(2) If a numerical NTE requirement is not specified in a consent decree for the engine family, the NTE standards are 1.25 times the applicable FELs or the applicable emission standards specified in §86.004–11(a)(1) or §86.098–11(a)(1).

(e) In the report required in §86.1920(b), you must submit the deficiencies and limited testing region reports (see §86.007–11(a)(4)(iv) and §86.1370–2007(b)(6) and (7)) for 2006 and earlier model year engines tested under this section.

(f) Testing under this section may be extended as described in §86.1935(d).

§86.1935 What special provisions may apply as a consequence of a delay in the accuracy margin report for portable emission measurement systems?

(a) A memorandum entitled, ''Memorandum of Agreement, Program to Develop Emission Measurement Accuracy Margins for Heavy-Duty In-Use Testing'' describes a test program for establishing measurement accuracy margins related to testing under §86.1912(a)(4). This document is available at *http://www.epa.gov/otaq/hd-hwy.htm* or at the mailing address specified in §86.1905(g).

(b) If there is a delay in receiving the written final report for either gaseous emissions or PM emissions described in the agreement referenced in paragraph (a) of this section, and that delay is not attributable to engine manufacturers failing to meet their commitments under that agreement, the following provisions apply for the respective pollutant type (gaseous or PM emissions):

(1) If the delay is 3 months or less, we will delay the designation of engine families for testing in the applicable calendar year, as described in §86.1905(d), by the same number of additional whole months (rounded up) needed to complete the report.

(2) If the delay is more than 3 months but less than 12 months, we may continue to designate engine families for testing under the special provisions described in §86.1930 for an additional year.

(3) If the delay is longer than 12 months, the following approach is established for the applicable calendar year:

(i) If the delay is longer than 12 months but less than 15 months, we will follow the steps described in paragraph (b)(1) of this section.

(ii) If the delay is longer than 15 months but less than 24 months, we will follow the steps described in paragraph (b)(2) of this section for the applicable calendar year.

(iii) If the delay is longer than 24 months, the applicable gaseous or PM emission testing program will go into abeyance.

(c) If one or more engine manufacturers fail to meet commitments under the agreement described in paragraph (a) of this section and such a failure results in a delay in the final written report for either gaseous emissions (NO_X, NMHC and CO) or PM emissions described in the agreement, the following provisions apply for the respective pollutant type (gaseous or PM emissions):

(1) If the delay is 3 months or less, we will delay the designation of engine families for testing in the applicable calendar year, as described in §86.1905(d), by the same number of additional whole months (rounded up) needed to complete the report.

(2) If the delay is more than 3 months but less than 12 months, the provisions of this subpart will not apply for the otherwise applicable calendar year (2007 for gaseous emissions and 2008 for PM emissions), subject to the following provisions:

(i) We may identify the number of engine families that would otherwise have been designated for testing in that calendar year for the delayed pollutant type and direct manufacturers to test that number of engine families under the special provisions described in §86.1930 and additionally in any later calendar year once the provisions of this subpart begin for that pollutant type, without counting those accumulated engine families toward the allowable annual cap on the number of engine families specified in §86.1905.

(ii) A delay for PM emissions would not be a sufficient basis for delaying

the program for gaseous emissions. Similarly, a delay for gaseous emissions would not be a sufficient basis for delaying the program for PM emissions.

(iii) The normal 18-month period for testing and reporting results specified in §86.1905(d) is extended to 24 months for any accumulated engine-family designation described in paragraph (c)(2)(i) of this section. The additional time extensions for testing and reporting results as specified in §86.1905(d) also apply.

(3) If the delay is longer than 12 months, the following approach is established for the applicable calendar year:

(i) If the delay is longer than 12 months but less than 15 months, we will follow the steps described in paragraph (c)(1) of this section.

(ii) If the delay is longer than 15 months but less than 24 months, we will follow the steps described in paragraph (c)(2) of this section for the applicable calendar year.

(iii) If the delay is longer than 24 months, we will continue to follow the steps described in paragraphs (c)(1) and (c)(2) of this section, including the accumulation of engine families for testing, until the report is received and the fully implemented program commences.

(d) We may determine that any individual manufacturer's failure under paragraph (c) of this section constitutes a failure by all engine manufacturers.

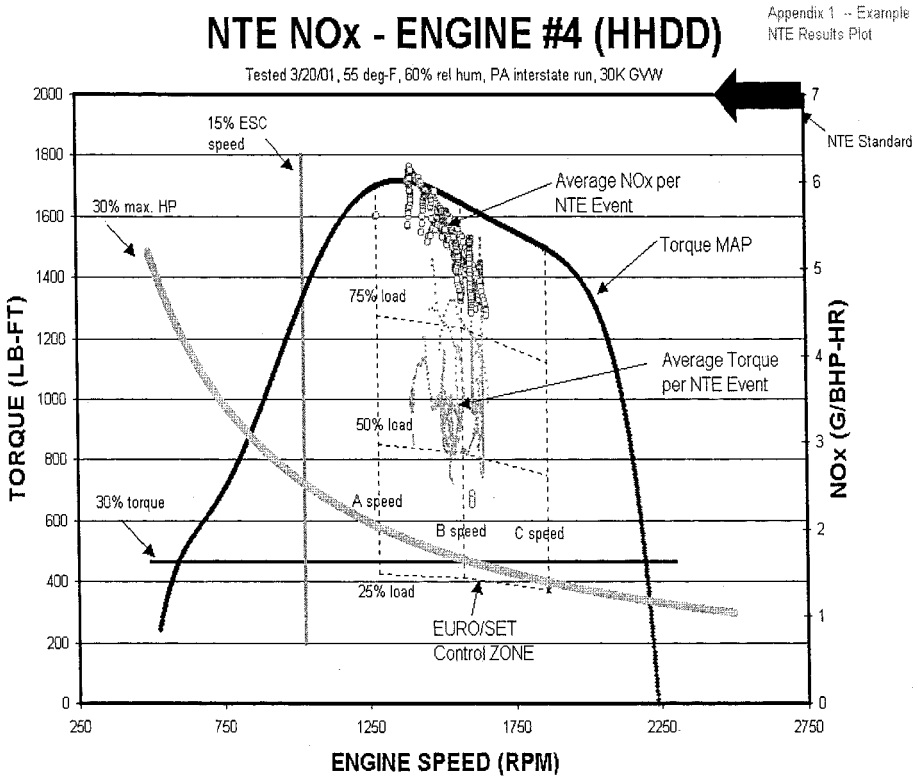
(e) Nothing in this section affects our ability to select engines from any model year beginning with model year 2007.

(f) If we determine that fundamental technical problems with portable in-use PM measurement systems are not resolvable in a reasonable time, the provisions of this subpart, as they apply to PM, will go into abeyance until we determine that suitable emission-measurement devices are available for in-use testing.

(g) As described in §86.1930(b), engine manufacturers contributing to the test programs described in the agreement referenced in paragraph (a) of this section may limit their testing under the special provisions described in §86.1930 to five engines in each selected engine family.

APPENDIX I TO SUBPART T—SAMPLE GRAPHICAL SUMMARY OF NTE EMISSION RESULTS

The following figure shows an example of a graphical summary of NTE emission results:



APPENDIX I TO PART 86—URBAN DYNAMOMETER SCHEDULES

(a) EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

EPA URBAN DYNAMOMETER DRIVING SCHEDULE

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
0	0.0	1	0.0	2	0.0
3	0.0	4	0.0	5	0.0
6	0.0	7	0.0	8	0.0
9	0.0	10	0.0	11	0.0
12	0.0	13	0.0	14	0.0
15	0.0	16	0.0	17	0.0
18	0.0	19	0.0	20	0.0
21	3.0	22	5.9	23	8.6
24	11.5	25	14.3	26	16.9
27	17.3	28	18.1	29	20.7
30	21.7	31	22.4	32	22.5
33	22.1	34	21.5	35	20.9
36	20.4	37	19.8	38	17.0
39	14.9	40	14.9	41	15.2
42	15.5	43	16.0	44	17.1

EPA URBAN DYNAMOMETER—Continued DRIVING SCHEDULE

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
45	19.1	46	21.1	47	22.7
48	22.9	49	22.7	50	22.6
51	21.3	52	19.0	53	17.1
54	15.8	55	15.8	56	17.7
57	19.8	58	21.6	59	23.2
60	24.2	61	24.6	62	24.9
63	25.0	64	24.6	65	24.5
66	24.7	67	24.8	68	24.7
69	24.6	70	24.6	71	25.1
72	25.6	73	25.7	74	25.4
75	24.9	76	25.0	77	25.4
78	26.0	79	26.0	80	25.7
81	26.1	82	26.7	83	27.5
84	28.6	85	29.3	86	29.8
87	30.1	88	30.4	89	30.7
90	30.7	91	30.5	92	30.4
93	30.3	94	30.4	95	30.8
96	30.4	97	29.9	98	29.5
99	29.8	100	30.3	101	30.7
102	30.9	103	31.0	104	30.9
105	30.4	106	29.8	107	29.9
108	30.2	109	30.7	110	31.2
111	31.8	112	32.2	113	32.4

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
114	32.2	115	31.7	116	28.6
117	25.3	118	22.0	119	18.7
120	15.4	121	12.1	122	8.8
123	5.5	124	2.2	125	0.0
126	0.0	127	0.0	128	0.0
129	0.0	130	0.0	131	0.0
132	0.0	133	0.0	134	0.0
135	0.0	136	0.0	137	0.0
138	0.0	139	0.0	140	0.0
141	0.0	142	0.0	143	0.0
144	0.0	145	0.0	146	0.0
147	0.0	148	0.0	149	0.0
150	0.0	151	0.0	152	0.0
153	0.0	154	0.0	155	0.0
156	0.0	157	0.0	158	0.0
159	0.0	160	0.0	161	0.0
162	0.0	163	0.0	164	3.3
165	6.6	166	9.9	167	13.2
168	16.5	169	19.8	170	22.2
171	24.3	172	25.8	173	26.4
174	25.7	175	25.1	176	24.7
177	25.0	178	25.2	179	25.4
180	25.8	181	27.2	182	26.5
183	24.0	184	22.7	185	19.4
186	17.7	187	17.2	188	18.1
189	18.6	190	20.0	191	22.2
192	24.5	193	27.3	194	30.5
195	33.5	196	36.2	197	37.3
198	39.3	199	40.5	200	42.1
201	43.5	202	45.1	203	46.0
204	46.8	205	47.5	206	47.5
207	47.3	208	47.2	209	47.0
210	47.0	211	47.0	212	47.0
213	47.0	214	47.2	215	47.4
216	47.9	217	48.5	218	49.1
219	49.5	220	50.0	221	50.6
222	51.0	223	51.5	224	52.2
225	53.2	226	54.1	227	54.6
228	54.9	229	55.0	230	54.9
231	54.6	232	54.6	233	54.8
234	55.1	235	55.5	236	55.7
237	56.1	238	56.3	239	56.6
240	56.7	241	56.7	242	56.5
243	56.5	244	56.5	245	56.5
246	56.5	247	56.5	248	56.4
249	56.1	250	55.8	251	55.1
252	54.6	253	54.2	254	54.0
255	53.7	256	53.6	257	53.9
258	54.0	259	54.1	260	54.1
261	53.8	262	53.4	263	53.0
264	52.6	265	52.1	266	52.4
267	52.0	268	51.9	269	51.7
270	51.5	271	51.6	272	51.8
273	52.1	274	52.5	275	53.0
276	53.5	277	54.0	278	54.9
279	55.4	280	55.6	281	56.0
282	56.0	283	55.8	284	55.2
285	54.5	286	53.6	287	52.5
288	51.5	289	51.5	290	51.5
291	51.1	292	50.1	293	50.0
294	50.1	295	50.0	296	49.6
297	49.5	298	49.5	299	49.5
300	49.1	301	48.6	302	48.1
303	47.2	304	46.1	305	45.0
306	43.8	307	42.6	308	41.5
309	40.3	310	38.5	311	37.0
312	35.2	313	33.8	314	32.5
315	31.5	316	30.6	317	30.5
318	30.0	319	29.0	320	27.5

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
321	24.8	322	21.5	323	20.1
324	19.1	325	18.5	326	17.0
327	15.5	328	12.5	329	10.8
330	8.0	331	4.7	332	1.4
333	0.0	334	0.0	335	0.0
336	0.0	337	0.0	338	0.0
339	0.0	340	0.0	341	0.0
342	0.0	343	0.0	344	0.0
345	0.0	346	0.0	347	1.0
348	4.3	349	7.6	350	10.9
351	14.2	352	17.3	353	20.0
354	22.5	355	23.7	356	25.2
357	26.6	358	28.1	359	30.0
360	30.8	361	31.6	362	32.1
363	32.8	364	33.6	365	34.5
366	34.6	367	34.9	368	34.8
369	34.5	370	34.7	371	35.5
372	36.0	373	36.0	374	36.0
375	36.0	376	36.0	377	36.0
378	36.1	379	36.4	380	36.5
381	36.4	382	36.0	383	35.1
384	34.1	385	33.5	386	31.4
387	29.0	388	25.7	389	23.0
390	20.3	391	17.5	392	14.5
393	12.0	394	8.7	395	5.4
396	2.1	397	0.0	398	0.0
399	0.0	400	0.0	401	0.0
402	0.0	403	2.6	404	5.9
405	9.2	406	12.5	407	15.8
408	19.1	409	22.4	410	25.0
411	25.6	412	27.5	413	29.0
414	30.0	415	30.1	416	30.0
417	29.7	418	29.3	419	28.8
420	28.0	421	25.0	422	21.7
423	18.4	424	15.1	425	11.8
426	8.5	427	5.2	428	1.9
429	0.0	430	0.0	431	0.0
432	0.0	433	0.0	434	0.0
435	0.0	436	0.0	437	0.0
438	0.0	439	0.0	440	0.0
441	0.0	442	0.0	443	0.0
444	0.0	445	0.0	446	0.0
447	0.0	448	3.3	449	6.6
450	9.9	451	13.2	452	16.5
453	19.8	454	23.1	455	26.4
456	27.8	457	29.1	458	31.5
459	33.0	460	33.6	461	34.8
462	35.1	463	35.6	464	36.1
465	36.0	466	36.1	467	36.2
468	36.0	469	35.7	470	36.0
471	36.0	472	35.6	473	35.5
474	35.4	475	35.2	476	35.2
477	35.2	478	35.2	479	35.2
480	35.2	481	35.0	482	35.1
483	35.2	484	35.5	485	35.2
486	35.0	487	35.0	488	35.0
489	34.8	490	34.6	491	34.5
492	33.5	493	32.0	494	30.1
495	28.0	496	25.5	497	22.5
498	19.8	499	16.5	500	13.2
501	10.3	502	7.2	503	4.0
504	1.0	505	0.0	506	0.0
507	0.0	508	0.0	509	0.0
510	0.0	511	1.2	512	3.5
513	5.5	514	6.5	515	8.5
516	9.6	517	10.5	518	11.9
519	14.0	520	16.0	521	17.7
522	19.0	523	20.1	524	21.0
525	22.0	526	23.0	527	23.8

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
528	24.5	529	24.9	530	25.0
531	25.0	532	25.0	533	25.0
534	25.0	535	25.0	536	25.6
537	25.8	538	26.0	539	25.6
540	25.2	541	25.0	542	25.0
543	25.0	544	24.4	545	23.1
546	19.8	547	16.5	548	13.2
549	9.9	550	6.6	551	3.3
552	0.0	553	0.0	554	0.0
555	0.0	556	0.0	557	0.0
558	0.0	559	0.0	560	0.0
561	0.0	562	0.0	563	0.0
564	0.0	565	0.0	566	0.0
567	0.0	568	0.0	569	3.3
570	6.6	571	9.9	572	13.0
573	14.6	574	16.0	575	17.0
576	17.0	577	17.0	578	17.5
579	17.7	580	17.7	581	17.5
582	17.0	583	16.9	584	16.6
585	17.0	586	17.1	587	17.0
588	16.6	589	16.5	590	16.5
591	16.6	592	17.0	593	17.6
594	18.5	595	19.2	596	20.2
597	21.0	598	21.1	599	21.2
600	21.6	601	22.0	602	22.4
603	22.5	604	22.5	605	22.5
606	22.7	607	23.7	608	25.1
609	26.0	610	26.5	611	27.0
612	26.1	613	22.8	614	19.5
615	16.2	616	12.9	617	9.6
618	6.3	619	3.0	620	0.0
621	0.0	622	0.0	623	0.0
624	0.0	625	0.0	626	0.0
627	0.0	628	0.0	629	0.0
630	0.0	631	0.0	632	0.0
633	0.0	634	0.0	635	0.0
636	0.0	637	0.0	638	0.0
639	0.0	640	0.0	641	0.0
642	0.0	643	0.0	644	0.0
645	0.0	646	2.0	647	4.5
648	7.8	649	10.2	650	12.5
651	14.0	652	15.3	653	17.5
654	19.6	655	21.0	656	22.2
657	23.3	658	24.5	659	25.3
660	25.6	661	26.0	662	26.1
663	26.2	664	26.2	665	26.4
666	26.5	667	26.5	668	26.0
669	25.5	670	23.6	671	21.4
672	18.5	673	16.4	674	14.5
675	11.6	676	8.7	677	5.8
678	3.5	679	2.0	680	0.0
681	0.0	682	0.0	683	0.0
684	0.0	685	0.0	686	0.0
687	0.0	688	0.0	689	0.0
690	0.0	691	0.0	692	0.0
693	0.0	694	1.4	695	3.3
696	4.4	697	6.5	698	9.2
699	11.3	700	13.5	701	14.6
702	16.4	703	16.7	704	16.5
705	16.5	706	18.2	707	19.2
708	20.1	709	21.5	710	22.5
711	22.5	712	22.1	713	22.7
714	23.3	715	23.5	716	22.5
717	21.6	718	20.5	719	18.0
720	15.0	721	12.0	722	9.0
723	6.2	724	4.5	725	3.0
726	2.1	727	0.5	728	0.5
729	3.2	730	6.5	731	9.6
732	12.5	733	14.0	734	16.0

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
735	18.0	736	19.6	737	21.5
738	23.1	739	24.5	740	25.5
741	26.5	742	27.1	743	27.6
744	27.9	745	28.3	746	28.6
747	28.6	748	28.3	749	28.2
750	28.0	751	27.5	752	26.8
753	25.5	754	23.5	755	21.5
756	19.0	757	16.5	758	14.9
759	12.5	760	9.4	761	6.2
762	3.0	763	1.5	764	1.5
765	0.5	766	0.0	767	3.0
768	6.3	769	9.6	770	12.9
771	15.8	772	17.5	773	18.4
774	19.5	775	20.7	776	22.0
777	23.2	778	25.0	779	26.5
780	27.5	781	28.0	782	28.3
783	28.9	784	28.9	785	28.9
786	28.8	787	28.5	788	28.3
789	28.3	790	28.3	791	28.2
792	27.6	793	27.5	794	27.5
795	27.5	796	27.5	797	27.5
798	27.5	799	27.6	800	28.0
801	28.5	802	30.0	803	31.0
804	32.0	805	33.0	806	33.0
807	33.6	808	34.0	809	34.3
810	34.2	811	34.0	812	34.0
813	33.9	814	33.6	815	33.1
816	33.0	817	32.5	818	32.0
819	31.9	820	31.6	821	31.5
822	30.6	823	30.0	824	29.9
825	29.9	826	29.9	827	29.9
828	29.6	829	29.5	830	29.5
831	29.3	832	28.9	833	28.2
834	27.7	835	27.0	836	25.5
837	23.7	838	22.0	839	20.5
840	19.2	841	19.2	842	20.1
843	20.9	844	21.4	845	22.0
846	22.6	847	23.2	848	24.0
849	25.0	850	26.0	851	26.6
852	26.6	853	26.8	854	27.0
855	27.2	856	27.8	857	28.1
858	28.8	859	28.9	860	29.0
861	29.1	862	29.0	863	28.1
864	27.5	865	27.0	866	25.8
867	25.0	868	24.5	869	24.8
870	25.1	871	25.5	872	25.7
873	26.2	874	26.9	875	27.5
876	27.8	877	28.4	878	29.0
879	29.2	880	29.1	881	29.0
882	28.9	883	28.5	884	28.1
885	28.0	886	28.0	887	27.6
888	27.2	889	26.6	890	27.0
891	27.5	892	27.8	893	28.0
894	27.8	895	28.0	896	28.0
897	28.0	898	27.7	899	27.4
900	26.9	901	26.6	902	26.5
903	26.5	904	26.5	905	26.3
906	26.2	907	26.2	908	25.9
909	25.6	910	25.6	911	25.9
912	25.8	913	25.5	914	24.6
915	23.5	916	22.2	917	21.6
918	21.6	919	21.7	920	22.6
921	23.4	922	24.0	923	24.2
924	24.4	925	24.9	926	25.1
927	25.2	928	25.3	929	25.5
930	25.2	931	25.0	932	25.0
933	25.0	934	24.7	935	24.5
936	24.3	937	24.3	938	24.5
939	25.0	940	25.0	941	24.6

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
942	24.6	943	24.1	944	24.5
945	25.1	946	25.6	947	25.1
948	24.0	949	22.0	950	20.1
951	16.9	952	13.6	953	10.3
954	7.0	955	3.7	956	0.4
957	0.0	958	0.0	959	0.0
960	2.0	961	5.3	962	8.6
963	11.9	964	15.2	965	17.5
966	18.6	967	20.0	968	21.1
969	22.0	970	23.0	971	24.5
972	26.3	973	27.5	974	28.1
975	28.4	976	28.5	977	28.5
978	28.5	979	27.7	980	27.5
981	27.2	982	26.8	983	26.5
984	26.0	985	25.7	986	25.2
987	24.0	988	22.0	989	21.5
990	21.5	991	21.8	992	22.5
993	23.0	994	22.8	995	22.8
996	23.0	997	22.7	998	22.7
999	22.7	1000	23.5	1001	24.0
1002	24.6	1003	24.8	1004	25.1
1005	25.5	1006	25.6	1007	25.5
1008	25.0	1009	24.1	1010	23.7
1011	23.2	1012	22.9	1013	22.5
1014	22.0	1015	21.6	1016	20.5
1017	17.5	1018	14.2	1019	10.9
1020	7.6	1021	4.3	1022	1.0
1023	0.0	1024	0.0	1025	0.0
1026	0.0	1027	0.0	1028	0.0
1029	0.0	1030	0.0	1031	0.0
1032	0.0	1033	0.0	1034	0.0
1035	0.0	1036	0.0	1037	0.0
1038	0.0	1039	0.0	1040	0.0
1041	0.0	1042	0.0	1043	0.0
1044	0.0	1045	0.0	1046	0.0
1047	0.0	1048	0.0	1049	0.0
1050	0.0	1051	0.0	1052	0.0
1053	1.2	1054	4.0	1055	7.3
1056	10.6	1057	13.9	1058	17.0
1059	18.5	1060	20.0	1061	21.8
1062	23.0	1063	24.0	1064	24.8
1065	25.6	1066	26.5	1067	26.8
1068	27.4	1069	27.9	1070	28.3
1071	28.0	1072	27.5	1073	27.0
1074	27.0	1075	26.3	1076	24.5
1077	22.5	1078	21.5	1079	20.6
1080	18.0	1081	15.0	1082	12.3
1083	11.1	1084	10.6	1085	10.0
1086	9.5	1087	9.1	1088	8.7
1089	8.6	1090	8.8	1091	9.0
1092	8.7	1093	8.6	1094	8.0
1095	7.0	1096	5.0	1097	4.2
1098	2.6	1099	1.0	1100	0.0
1101	0.1	1102	0.6	1103	1.6
1104	3.6	1105	6.9	1106	10.0
1107	12.8	1108	14.0	1109	14.5
1110	16.0	1111	18.1	1112	20.0
1113	21.0	1114	21.2	1115	21.3
1116	21.4	1117	21.7	1118	22.5
1119	23.0	1120	23.8	1121	24.5
1122	25.0	1123	24.9	1124	24.8
1125	25.0	1126	25.4	1127	25.8
1128	26.0	1129	26.4	1130	26.6
1131	26.9	1132	27.0	1133	27.0
1134	27.0	1135	26.9	1136	26.8
1137	26.8	1138	26.5	1139	26.4
1140	26.0	1141	25.5	1142	24.6
1143	23.5	1144	21.5	1145	20.0
1146	17.5	1147	16.0	1148	14.0

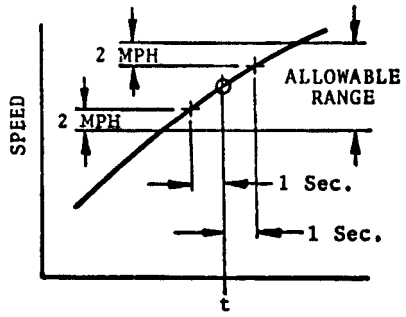
EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

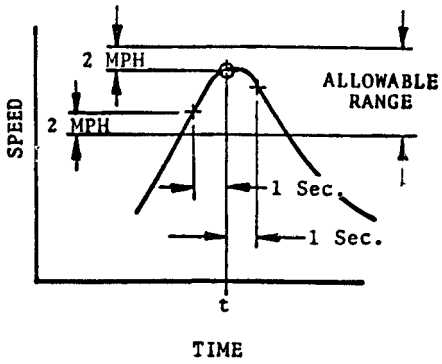
Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
1149	10.7	1150	7.4	1151	4.1
1152	0.8	1153	0.0	1154	0.0
1155	0.0	1156	0.0	1157	0.0
1158	0.0	1159	0.0	1160	0.0
1161	0.0	1162	0.0	1163	0.0
1164	0.0	1165	0.0	1166	0.0
1167	0.0	1168	0.0	1169	2.1
1170	5.4	1171	8.7	1172	12.0
1173	15.3	1174	18.6	1175	21.1
1176	23.0	1177	23.5	1178	23.0
1179	22.5	1180	20.0	1181	16.7
1182	13.4	1183	10.1	1184	6.8
1185	3.5	1186	0.2	1187	0.0
1188	0.0	1189	0.0	1190	0.0
1191	0.0	1192	0.0	1193	0.0
1194	0.0	1195	0.0	1196	0.0
1197	0.2	1198	1.5	1199	3.5
1200	6.5	1201	9.8	1202	12.0
1203	12.9	1204	13.0	1205	12.6
1206	12.8	1207	13.1	1208	13.1
1209	14.0	1210	15.5	1211	17.0
1212	18.6	1213	19.7	1214	21.0
1215	21.5	1216	21.8	1217	21.8
1318	21.5	1219	21.2	1220	21.5
1221	21.8	1222	22.0	1223	21.9
1224	21.7	1225	21.5	1226	21.5
1227	21.4	1228	20.1	1229	19.5
1230	19.2	1231	19.6	1232	19.8
1233	20.0	1234	19.5	1235	17.5
1236	15.5	1237	13.0	1238	10.0
1239	8.0	1240	6.0	1241	4.0
1242	2.5	1243	0.7	1244	0.0
1245	0.0	1246	0.0	1247	0.0
1248	0.0	1249	0.0	1250	0.0
1251	0.0	1252	1.0	1253	1.0
1254	1.0	1255	1.0	1256	1.0
1257	1.6	1258	3.0	1259	4.0
1260	5.0	1261	6.3	1262	8.0
1263	10.0	1264	10.5	1265	9.5
1266	8.5	1267	7.6	1268	8.8
1269	11.0	1270	14.0	1271	17.0
1272	19.5	1273	21.0	1274	21.8
1275	22.2	1276	23.0	1277	23.6
1278	24.1	1279	24.5	1280	24.5
1281	24.0	1282	23.5	1283	23.5
1284	23.5	1285	23.5	1286	23.5
1287	23.5	1288	24.0	1289	24.1
1290	24.5	1291	24.7	1292	25.0
1293	25.4	1294	25.6	1295	25.7
1296	26.0	1297	26.2	1298	27.0
1299	27.8	1300	28.3	1301	29.0
1302	29.1	1303	29.0	1304	28.0
1305	24.7	1306	21.4	1307	18.1
1308	14.8	1309	11.5	1310	8.2
1311	4.9	1312	1.6	1313	0.0
1314	0.0	1315	0.0	1316	0.0
1317	0.0	1318	0.0	1319	0.0
1320	0.0	1321	0.0	1322	0.0
1323	0.0	1324	0.0	1325	0.0
1326	0.0	1327	0.0	1328	0.0
1329	0.0	1330	0.0	1331	0.0
1332	0.0	1333	0.0	1334	0.0
1335	0.0	1336	0.0	1337	0.0
1338	1.5	1339	4.8	1340	8.1
1341	11.4	1342	13.2	1343	15.1
1344	16.8	1345	18.3	1346	19.5
1347	20.3	1348	21.3	1349	21.9
1350	22.1	1351	22.4	1352	22.0
1353	21.6	1354	21.1	1355	20.5

EPA URBAN DYNAMOMETER—Continued
DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
1356	20.0	1357	19.6	1358	18.5
1359	17.5	1360	16.5	1361	15.5
1362	14.0	1363	11.0	1364	8.0
1365	5.2	1366	2.5	1367	0.0
1368	0.0	1369	0.0	1370	0.0
1371	0.0	1372	0.0	.....	.....

The diagrams below show the range of acceptable speed tolerances for typical points. The curve on the left is typical of portions of the speed curve which are increasing or decreasing throughout the 2 second time interval. The curve on the right is typical of portions of the speed curve which include a maximum or minimum value.





(b) EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles, Light-Duty Trucks, and Motorcycles with engine displacements equal to or greater than 170 cc (10.4 cu. in.).

SPEED VERSUS TIME SEQUENCE

Time (seconds)	Speed (kilometers per hour)
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	4.8
22	9.5
23	13.8
24	18.5
25	23.0
26	27.2
27	27.8
28	29.1
29	33.3
30	34.9
31	36.0
32	36.2
33	35.6
34	34.6
35	33.6
36	32.8
37	31.9
38	27.4
39	24.0
40	24.0
41	24.5
42	24.9
43	25.7
44	27.5
45	30.7
46	34.0
47	36.5
48	36.9
49	36.5
50	36.4
51	34.3
52	30.6
53	27.5
54	25.4
55	25.4
56	28.5
57	31.9
58	34.8
59	37.3
60	38.9
61	39.6
62	40.1
63	40.2
64	39.6
65	39.4
66	39.8
67	39.9
68	39.8
69	39.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
70	39.6
71	40.4
72	41.2
73	41.4
74	40.9
75	40.1
76	40.2
77	40.9
78	41.8
79	41.8
80	41.4
81	42.0
82	43.0
83	44.3
84	46.0
85	47.2
86	48.0
87	48.4
88	48.9
89	49.4
90	49.4
91	49.1
92	48.9
93	48.8
94	48.9
95	49.6
96	48.9
97	48.1
98	47.5
99	48.0
100	48.8
101	49.4
102	49.7
103	49.9
104	49.7
105	48.9
106	48.0
107	48.1
108	48.6
109	49.4
110	50.2
111	51.2
112	51.8
113	52.1
114	51.8
115	51.0
116	46.0
117	40.7
118	35.4
119	30.1
120	24.8
121	19.5
122	14.2
123	8.9
124	3.5
125	0
126	0
127	0
128	0
129	0
130	0
131	0
132	0
133	0
134	0
135	0
136	0
137	0
138	0
139	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
140	0
141	0
142	0
143	0
144	0
145	0
146	0
147	0
148	0
149	0
150	0
151	0
152	0
153	0
154	0
155	0
156	0
157	0
158	0
159	0
160	0
161	0
162	0
163	0
164	5.3
165	10.6
166	15.9
167	21.2
168	26.6
169	31.9
170	35.7
171	39.1
172	41.5
173	42.5
174	41.4
175	40.4
176	39.8
177	40.2
178	40.6
179	40.9
180	41.5
181	43.8
182	42.6
183	38.6
184	36.5
185	31.2
186	28.5
187	27.7
188	29.1
189	29.9
190	32.2
191	35.7
192	39.4
193	43.9
194	49.1
195	53.9
196	58.3
197	60.0
198	63.2
199	65.2
200	67.8
201	70.0
202	72.6
203	74.0
204	75.3
205	76.4
206	76.4
207	76.1
208	76.0
209	75.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
210	75.6
211	75.6
212	75.6
213	75.6
214	76.0
215	76.3
216	77.1
217	78.1
218	79.0
219	79.7
220	80.5
221	81.4
222	82.1
223	82.9
224	84.0
225	85.6
226	87.1
227	87.9
228	88.4
229	88.5
230	88.4
231	87.9
232	87.9
233	88.2
234	88.7
235	89.3
236	89.6
237	90.3
238	90.6
239	91.1
240	91.2
241	91.2
242	90.9
243	90.9
244	90.9
245	90.9
246	90.9
247	90.9
248	90.8
249	90.3
250	89.8
251	88.7
252	87.9
253	87.2
254	86.9
255	86.4
256	86.3
257	86.7
258	86.9
259	87.1
260	87.1
261	86.6
262	85.9
263	85.3
264	84.7
265	83.8
266	84.3
267	83.7
268	83.5
269	83.2
270	82.9
271	83.0
272	83.4
273	83.8
274	84.5
275	85.3
276	86.1
277	86.9
278	88.4
279	89.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
280	89.5
281	90.1
282	90.1
283	89.8
284	88.8
285	87.7
286	86.3
287	84.5
288	82.9
289	82.9
290	82.9
291	82.2
292	80.6
293	80.5
294	80.6
295	80.5
296	79.8
297	79.7
298	79.7
299	79.7
300	79.0
301	78.2
302	77.4
303	76.0
304	74.2
305	72.4
306	70.5
307	68.6
308	66.8
309	64.9
310	62.0
311	59.5
312	56.6
313	54.4
314	52.3
315	50.7
316	49.2
317	49.1
318	48.3
319	46.7
320	44.3
321	39.9
322	34.6
323	32.3
324	30.7
325	29.8
326	27.4
327	24.9
328	20.1
329	17.4
330	12.9
331	7.6
332	2.3
333	0
334	0
335	0
336	0
337	0
338	0
339	0
340	0
341	0
342	0
343	0
344	0
345	0
346	0
347	1.6
348	6.9
349	12.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
350	17.5
351	22.9
352	27.8
353	32.2
354	36.2
355	38.1
356	40.6
357	42.8
358	45.2
359	48.3
360	49.6
361	50.9
362	51.7
363	52.8
364	54.1
365	55.5
366	55.7
367	56.2
368	56.0
369	55.5
370	55.8
371	57.1
372	57.9
373	57.9
374	57.9
375	57.9
377	57.9
376	57.9
378	58.1
379	58.6
380	58.7
381	58.6
382	57.9
383	56.5
384	54.9
385	53.9
386	50.5
387	46.7
388	41.4
389	37.0
390	32.7
391	28.2
392	23.3
393	19.3
394	14.0
395	8.7
396	3.4
397	0
398	0
399	0
400	0
401	0
402	0
403	4.2
404	9.5
405	14.8
406	20.1
407	25.4
408	30.7
409	36.0
410	40.2
411	41.2
412	44.3
413	46.7
414	48.3
415	48.4
416	48.3
417	47.8
418	47.2
419	46.3

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
420	45.1
421	40.2
422	34.9
423	29.6
424	24.3
425	19.0
426	13.7
427	8.4
428	3.1
429	0
430	0
431	0
432	0
433	0
434	0
435	0
436	0
437	0
438	0
439	0
440	0
441	0
442	0
443	0
444	0
445	0
446	0
447	0
448	5.3
449	10.6
450	15.9
451	21.2
452	26.6
453	31.9
454	37.2
455	42.5
456	44.7
457	46.8
458	50.7
459	53.1
460	54.1
461	56.0
462	56.5
463	57.3
464	58.1
465	57.9
466	58.1
467	58.3
468	57.9
469	57.5
470	57.9
471	57.9
472	57.3
473	57.1
474	57.0
475	56.6
476	56.6
477	56.6
478	56.6
479	56.6
480	56.6
481	56.3
482	56.5
483	56.6
484	57.1
485	56.6
486	56.3
487	56.3
488	56.3
489	56.0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
490	55.7
491	55.5
492	53.9
493	51.5
494	48.4
495	45.1
496	41.0
497	36.2
498	31.9
499	26.6
500	21.2
501	16.6
502	11.6
503	6.4
504	1.6
505	0
506	0
507	0
508	0
509	0
510	0
511	1.9
512	5.6
513	8.9
514	10.5
515	13.7
516	15.4
517	16.9
518	19.2
519	22.5
520	25.7
521	28.5
522	30.6
523	32.3
524	33.8
525	35.4
526	37.0
527	38.3
528	39.4
529	40.1
530	40.2
531	40.2
532	40.2
533	40.2
534	40.2
535	40.2
536	41.2
537	41.5
538	41.8
539	41.2
540	40.6
541	40.2
542	40.2
543	40.2
544	39.3
545	37.2
546	31.9
547	26.6
548	21.2
549	15.9
550	10.6
551	5.3
552	0
553	0
554	0
555	0
556	0
557	0
558	0
559	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
560	0
561	0
562	0
563	0
564	0
565	0
566	0
567	0
568	0
569	5.3
570	10.6
571	15.9
572	20.9
573	23.5
574	25.7
575	27.4
576	27.4
577	27.4
578	28.2
579	28.5
580	28.5
581	28.2
582	27.4
583	27.2
584	26.7
585	27.4
586	27.5
587	27.4
588	26.7
589	26.6
590	26.6
591	26.7
592	27.4
593	28.3
594	29.8
595	30.9
596	32.5
597	33.8
598	34.0
599	34.1
600	34.8
601	35.4
602	36.0
603	36.2
604	36.2
605	36.2
606	36.5
607	38.1
608	40.4
609	41.8
610	42.6
611	43.5
612	42.0
613	36.7
614	31.4
615	26.1
616	20.8
617	15.4
618	10.1
619	4.8
620	0
621	0
622	0
623	0
624	0
625	0
626	0
627	0
628	0
629	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
630	0
631	0
632	0
633	0
634	0
635	0
636	0
637	0
638	0
639	0
640	0
641	0
642	0
643	0
644	0
645	0
646	3.2
647	7.2
648	12.6
649	16.4
650	20.1
651	22.5
652	24.6
653	28.2
654	31.5
655	33.8
656	35.7
657	37.5
658	39.4
659	40.7
660	41.2
661	41.8
662	42.0
663	42.2
664	42.2
665	42.5
666	42.6
667	42.6
668	41.8
669	41.0
670	38.0
671	34.4
672	29.8
673	26.4
674	23.3
675	18.7
676	14.0
677	9.3
678	5.6
679	3.2
680	0
681	0
682	0
683	0
684	0
685	0
686	0
687	0
688	0
689	0
690	0
691	0
692	0
693	0
694	2.3
695	5.3
696	7.1
697	10.5
698	14.8
699	18.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
700	21.7
701	23.5
702	26.4
703	26.9
704	26.6
705	26.6
706	29.3
707	30.9
708	32.3
709	34.6
710	36.2
711	36.2
712	35.6
713	36.5
714	37.5
715	37.8
716	36.2
717	34.8
718	33.0
719	29.0
720	24.1
721	19.3
722	14.5
723	10.0
724	7.2
725	4.8
726	3.4
727	0.8
728	0.8
729	5.1
730	10.5
731	15.4
732	20.1
733	22.5
734	25.7
735	29.0
736	31.5
737	34.6
738	37.2
739	39.4
740	41.0
741	42.6
742	43.6
743	44.4
744	44.9
745	45.5
746	46.0
747	46.0
748	45.5
749	45.4
750	45.1
751	44.3
752	43.1
753	41.0
754	37.8
755	34.6
756	30.6
757	26.6
758	24.0
759	20.1
760	15.1
761	10.0
762	4.8
763	2.4
764	2.4
765	0.8
766	0
767	4.8
768	10.1
769	15.4

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
770	20.8
771	25.4
772	28.2
773	29.6
774	31.4
775	33.3
776	35.4
777	37.3
778	40.2
779	42.6
780	44.3
781	45.1
782	45.5
783	46.5
784	46.5
785	46.5
786	46.3
787	45.9
788	45.5
789	45.5
790	45.5
791	45.4
792	44.4
793	44.3
794	44.3
795	44.3
796	44.3
797	44.3
798	44.3
799	44.4
800	45.1
801	45.9
802	48.3
803	49.9
804	51.5
805	53.1
806	53.1
807	54.1
808	54.7
809	55.2
810	55.0
811	54.7
812	54.7
813	54.6
814	54.1
815	53.3
816	53.1
817	52.3
818	51.5
819	51.3
820	50.9
821	50.7
822	49.2
823	48.3
824	48.1
825	48.1
826	48.1
827	48.1
828	47.6
829	47.5
830	47.5
831	47.2
832	46.5
833	45.4
834	44.6
835	43.5
836	41.0
837	38.1
838	35.4
839	33.0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
840	30.9
841	30.9
842	32.3
843	33.6
844	34.4
845	35.4
846	36.4
847	37.3
848	38.6
849	40.2
850	41.8
851	42.8
852	42.8
853	43.1
854	43.5
855	43.8
856	44.7
857	45.2
858	46.3
859	46.5
860	46.7
861	46.8
862	46.7
863	45.2
864	44.3
865	43.5
866	41.5
867	40.2
868	39.4
869	39.9
870	40.4
871	41.0
872	41.4
873	42.2
874	43.3
875	44.3
876	44.7
877	45.7
878	46.7
879	47.0
880	46.8
881	46.7
882	46.5
883	45.9
884	45.2
885	45.1
886	45.1
887	44.4
888	43.8
889	42.8
890	43.5
891	44.3
892	44.7
893	45.1
894	44.7
895	45.1
896	45.1
897	45.1
898	44.6
899	44.1
900	43.3
901	42.8
902	42.6
903	42.6
904	42.6
905	42.3
906	42.2
907	42.2
908	41.7
909	41.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
910	41.2
911	41.7
912	41.5
913	41.0
914	39.6
915	37.8
916	35.7
917	34.8
918	34.8
919	34.9
920	36.4
921	37.7
922	38.6
923	38.9
924	39.3
925	40.1
926	40.4
927	40.6
928	40.7
929	41.0
930	40.6
931	40.2
932	40.2
933	40.2
934	39.8
935	39.4
936	39.1
937	39.1
938	39.4
939	40.2
940	40.2
941	39.6
942	39.6
943	38.8
944	39.4
945	40.4
946	41.2
947	40.4
948	38.6
949	35.4
950	32.3
951	27.2
952	21.9
953	16.6
954	11.3
955	6.0
956	0.6
957	0
958	0
959	0
960	3.2
961	8.5
962	13.8
963	19.2
964	24.5
965	28.2
966	29.9
967	32.2
968	34.0
969	35.4
970	37.0
971	39.4
972	42.3
973	44.3
974	45.2
975	45.7
976	45.9
977	45.9
978	45.9
979	44.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
980	44.3
981	43.8
982	43.1
983	42.6
984	41.8
985	41.4
986	40.6
987	38.6
988	35.4
989	34.6
990	34.6
991	35.1
992	36.2
993	37.0
994	36.7
995	36.7
996	37.0
997	36.5
998	36.5
999	36.5
1,000	37.8
1,001	38.6
1,002	39.6
1,003	39.9
1,004	40.4
1,005	41.0
1,006	41.2
1,007	41.0
1,008	40.2
1,009	38.8
1,010	38.1
1,011	37.3
1,012	36.9
1,013	36.2
1,014	35.4
1,015	34.8
1,016	33.0
1,017	28.2
1,018	22.9
1,019	17.5
1,020	12.2
1,021	6.9
1,022	1.6
1,023	0
1,024	0
1,025	0
1,026	0
1,027	0
1,028	0
1,029	0
1,030	0
1,031	0
1,032	0
1,033	0
1,034	0
1,035	0
1,036	0
1,037	0
1,038	0
1,039	0
1,040	0
1,041	0
1,042	0
1,043	0
1,044	0
1,045	0
1,046	0
1,047	0
1,048	0
1,049	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,050	0
1,051	0
1,052	0
1,053	1.9
1,054	6.4
1,055	11.7
1,056	17.1
1,057	22.4
1,058	27.4
1,059	29.8
1,060	32.2
1,061	35.1
1,062	37.0
1,063	38.6
1,064	39.9
1,065	41.2
1,066	42.6
1,067	43.1
1,068	44.1
1,069	44.9
1,070	45.5
1,071	45.1
1,072	44.3
1,073	43.5
1,074	43.5
1,075	42.3
1,076	39.4
1,077	36.2
1,078	34.6
1,079	33.2
1,080	29.0
1,081	24.1
1,082	19.8
1,083	17.9
1,084	17.1
1,085	16.1
1,086	15.3
1,087	14.6
1,088	14.0
1,089	13.8
1,090	14.2
1,091	14.5
1,092	14.0
1,093	13.8
1,094	12.9
1,095	11.3
1,096	8.0
1,097	6.8
1,098	4.2
1,099	1.6
1,100	0
1,101	0.2
1,102	1.0
1,103	2.6
1,104	5.8
1,105	11.1
1,106	16.1
1,107	20.6
1,108	22.5
1,109	23.3
1,110	25.7
1,111	29.1
1,112	32.2
1,113	33.8
1,114	34.1
1,115	34.3
1,116	34.4
1,117	34.9
1,118	36.2
1,119	37.0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,120	38.3
1,121	39.4
1,122	40.2
1,123	40.1
1,124	39.9
1,125	40.2
1,126	40.9
1,127	41.5
1,128	41.8
1,129	42.5
1,130	42.8
1,131	43.3
1,132	43.5
1,133	43.5
1,134	43.5
1,135	43.3
1,136	43.1
1,137	43.1
1,138	42.6
1,139	42.5
1,140	41.8
1,141	41.0
1,142	39.6
1,143	37.8
1,144	34.6
1,145	32.2
1,146	28.2
1,147	25.7
1,148	22.5
1,149	17.2
1,150	11.9
1,151	6.6
1,152	1.3
1,153	0
1,154	0
1,155	0
1,156	0
1,157	0
1,158	0
1,159	0
1,160	0
1,161	0
1,162	0
1,163	0
1,164	0
1,165	0
1,166	0
1,167	0
1,168	0
1,169	3.4
1,170	8.7
1,171	14.0
1,172	19.3
1,173	24.6
1,174	29.9
1,175	34.0
1,176	37.0
1,177	37.8
1,178	37.0
1,179	36.2
1,180	32.2
1,181	26.9
1,182	21.6
1,183	16.3
1,184	10.9
1,185	5.6
1,186	0.3
1,187	0
1,188	0
1,189	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,190	0
1,191	0
1,192	0
1,193	0
1,194	0
1,195	0
1,196	0
1,197	0.3
1,198	2.4
1,199	5.6
1,200	10.5
1,201	15.8
1,202	19.3
1,203	20.8
1,204	20.9
1,205	20.3
1,206	20.6
1,207	21.1
1,208	21.1
1,209	22.5
1,210	24.9
1,211	27.4
1,212	29.9
1,213	31.7
1,214	33.8
1,215	34.6
1,216	35.1
1,217	35.1
1,218	34.6
1,219	34.1
1,220	34.6
1,221	35.1
1,222	35.4
1,223	35.2
1,224	34.9
1,225	34.6
1,226	34.6
1,227	34.4
1,228	32.3
1,229	31.4
1,230	30.9
1,231	31.5
1,232	31.9
1,233	32.2
1,234	31.4
1,235	28.2
1,236	24.9
1,237	20.9
1,238	16.1
1,239	12.9
1,240	9.7
1,241	6.4
1,242	4.0
1,243	1.1
1,244	0
1,245	0
1,246	0
1,247	0
1,248	0
1,249	0
1,250	0
1,251	0
1,252	1.6
1,253	1.6
1,254	1.6
1,255	1.6
1,256	1.6
1,257	2.6
1,258	4.8
1,259	6.4

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,260	8.0
1,261	10.1
1,262	12.9
1,263	16.1
1,264	16.9
1,265	15.3
1,266	13.7
1,267	12.2
1,268	14.2
1,269	17.7
1,270	22.5
1,271	27.4
1,272	31.4
1,273	33.8
1,274	35.1
1,275	35.7
1,276	37.0
1,277	38.0
1,278	38.8
1,279	39.4
1,280	39.4
1,281	38.6
1,282	37.8
1,283	37.8
1,284	37.8
1,285	37.8
1,286	37.8
1,287	37.8
1,288	38.6
1,289	38.8
1,290	39.4
1,291	39.8
1,292	40.2
1,293	40.9
1,294	41.2
1,295	41.4
1,296	41.8
1,297	42.2
1,298	43.5
1,299	44.7
1,300	45.5
1,301	46.7
1,302	46.8
1,303	46.7
1,304	45.1
1,305	39.8
1,306	34.4
1,307	29.1
1,308	23.8
1,309	18.5
1,310	13.2
1,311	7.9
1,312	2.6
1,313	0
1,314	0
1,315	0
1,316	0
1,317	0
1,318	0
1,319	0
1,320	0
1,321	0
1,322	0
1,323	0
1,324	0
1,325	0
1,326	0
1,327	0
1,328	0
1,329	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,330	0
1,331	0
1,332	0
1,333	0
1,334	0
1,335	0
1,336	0
1,337	0
1,338	2.4
1,339	7.7
1,340	13.0
1,341	18.3
1,342	21.2
1,343	24.3
1,344	27.0
1,345	29.5
1,346	31.4
1,347	32.7
1,348	34.3
1,349	35.2
1,350	35.6
1,351	36.0
1,352	35.4
1,353	34.8
1,354	34.0
1,355	33.0
1,356	32.2
1,357	31.5
1,358	29.8
1,359	28.2
1,360	26.6
1,361	24.9
1,362	22.5
1,363	17.7
1,364	12.9
1,365	8.4
1,366	4.0
1,367	0
1,368	0
1,369	0
1,370	0
1,371	0

(c) EPA Urban Dynamometer Driving Schedule for motorcycles with engine displacements less than 170 cc (10.4 cu. in.).

SPEED VERSUS TIME SEQUENCE

Time (seconds)	Speed (kilometers per hour)
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	4.8
22	9.5
23	13.8
24	18.5
25	23.0
26	27.2
27	27.8
28	29.1
29	33.3
30	34.9
31	36.0
32	36.2
33	35.6
34	34.6
35	33.6
36	32.8
37	31.9
38	27.4
39	24.0
40	24.0
41	24.5
42	24.9
43	25.7
44	27.5
45	30.7
46	34.0
47	36.5
48	36.9
49	36.5
50	36.4
51	34.3
52	30.6
53	27.5
54	25.4
55	25.4
56	28.6
57	31.9
58	34.8
59	37.3
60	38.9
61	39.6
62	40.1
63	40.2
64	39.6
65	39.4
66	39.8
67	39.9
68	39.8
69	39.6
70	39.6
71	40.4
72	41.2
73	41.4
74	40.9
75	40.1
76	40.2
77	40.9
78	41.8
79	41.8
80	41.4
81	42.0
82	43.0
83	44.3
84	46.0
85	47.2
86	48.0
87	48.4

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
88	48.9
89	49.4
90	49.4
91	49.1
92	48.9
93	48.8
94	48.9
95	49.6
96	48.9
97	48.1
98	47.5
99	48.0
100	48.8
101	49.4
102	49.7
103	49.9
104	49.7
105	48.9
106	48.0
107	48.1
108	48.6
109	49.4
110	50.2
111	51.2
112	51.8
113	52.1
114	51.8
115	51.0
116	46.0
117	40.7
118	35.4
119	30.1
120	24.8
121	19.5
122	14.2
123	8.9
124	3.5
125	0
126	0
127	0
128	0
129	0
130	0
131	0
132	0
133	0
134	0
135	0
136	0
137	0
138	0
139	0
140	0
141	0
142	0
143	0
144	0
145	0
146	0
147	0
148	0
149	0
150	0
151	0
152	0
153	0
154	0
155	0
156	0
157	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
158	0
159	0
160	0
161	0
162	0
163	0
164	3.4
165	6.8
166	10.3
167	13.7
168	17.1
169	20.5
170	23.0
171	25.2
172	26.7
173	27.4
174	26.6
175	26.0
176	25.6
177	25.9
178	26.1
179	26.3
180	26.7
181	28.2
182	27.5
183	24.9
184	23.5
185	20.1
186	18.3
187	17.8
188	18.8
189	19.3
190	20.7
191	23.0
192	25.4
193	28.3
194	31.6
195	34.7
196	37.5
197	38.6
198	40.7
199	42.0
200	43.6
201	45.1
202	46.7
203	47.7
204	48.5
205	49.2
206	49.2
207	49.0
208	48.9
209	48.7
210	48.7
211	48.7
212	48.7
213	48.7
214	48.9
215	49.1
216	49.6
217	50.2
218	50.9
219	51.3
220	51.8
221	52.4
222	52.8
223	53.4
224	54.1
225	55.1
226	56.0
227	56.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
228	56.9
229	57.0
230	56.9
231	56.6
232	56.6
233	56.8
234	57.1
235	57.5
236	57.7
237	58.1
238	58.3
239	58.6
240	58.7
241	58.7
242	58.5
243	58.5
244	58.5
245	58.5
246	58.5
247	58.5
248	58.4
249	58.1
250	57.8
251	57.1
252	56.6
253	56.2
254	55.9
255	55.6
256	55.5
257	55.8
258	55.9
259	56.0
260	56.0
261	55.7
262	55.3
263	54.9
264	54.5
265	54.0
266	54.3
267	53.9
268	53.8
269	53.6
270	53.4
271	53.5
272	53.7
273	54.0
274	54.4
275	54.9
276	55.4
277	55.9
278	56.9
279	57.4
280	57.6
281	58.0
282	58.0
283	57.8
284	57.2
285	56.5
286	55.5
287	54.4
288	53.4
289	53.4
290	53.4
291	52.9
292	51.9
293	51.8
294	51.9
295	51.8
296	51.4
297	51.3

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
298	51.3
299	51.3
300	50.9
301	50.3
302	49.8
303	48.9
304	47.8
305	46.6
306	45.4
307	44.1
308	43.0
309	41.8
310	39.9
311	38.3
312	36.5
313	35.0
314	33.7
315	32.6
316	31.7
317	31.6
318	31.1
319	30.0
320	28.5
321	25.7
322	22.3
323	20.8
324	19.8
325	19.2
326	17.6
327	16.1
328	12.9
329	11.2
330	8.3
331	4.9
332	1.5
333	0
334	0
335	0
336	0
337	0
338	0
339	0
340	0
341	0
342	0
343	0
344	0
345	0
346	0
347	1.6
348	6.9
349	12.2
350	17.5
351	22.9
352	27.8
353	32.2
354	36.2
355	38.1
356	40.6
357	42.8
358	45.2
359	48.3
360	49.6
361	50.9
362	51.7
363	52.8
364	54.1
365	55.5
366	55.7
367	56.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
368	56.0
369	55.5
370	55.8
371	57.1
372	57.9
373	57.9
374	57.9
375	57.9
376	57.9
377	57.9
378	58.1
379	58.6
380	58.7
381	58.6
382	57.9
383	56.5
384	54.9
385	53.9
386	50.5
387	46.7
388	41.4
389	37.0
390	32.7
391	26.2
392	23.3
393	19.3
394	14.0
395	8.7
396	3.4
397	0
398	0
399	0
400	0
401	0
402	0
403	4.2
404	9.5
405	14.8
406	20.1
407	25.4
408	30.7
409	36.0
410	40.2
411	41.2
412	44.3
413	46.7
414	48.3
415	48.4
416	48.3
417	47.8
418	47.2
419	46.3
420	45.1
421	40.2
422	34.9
423	29.6
424	24.3
425	19.0
426	13.7
427	8.4
428	3.1
429	0
430	0
431	0
432	0
433	0
434	0
435	0
436	0
437	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
438	0
439	0
440	0
441	0
442	0
443	0
444	0
445	0
446	0
447	0
448	5.3
449	10.6
450	15.9
451	21.2
452	26.6
453	31.9
454	37.2
455	42.5
456	44.7
457	46.8
458	50.7
459	53.1
460	54.1
461	56.0
462	56.5
463	57.3
464	58.1
465	57.9
466	58.1
467	58.3
468	57.9
469	57.5
470	57.9
471	57.9
472	57.3
473	57.1
474	57.0
475	56.6
476	56.6
477	56.6
478	56.6
479	56.6
480	56.6
481	56.3
482	56.5
483	56.6
484	57.1
485	56.6
486	56.3
487	56.3
488	56.3
489	56.0
490	55.7
491	55.5
492	53.9
493	51.5
494	48.4
495	45.1
496	41.0
497	36.2
498	31.9
499	26.6
500	21.2
501	16.6
502	11.6
503	6.4
504	1.6
505	0
506	0
507	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
508	0
509	0
510	0
511	1.9
512	5.6
513	8.9
514	10.5
515	13.7
516	15.4
517	16.9
518	19.2
519	22.5
520	25.7
521	28.5
522	30.6
523	32.3
524	33.8
525	35.4
526	37.0
527	38.3
528	39.4
529	40.1
530	40.2
531	40.2
532	40.2
533	40.2
534	40.2
535	40.2
536	41.2
537	41.5
538	41.8
539	41.2
540	40.6
541	40.2
542	40.2
543	40.2
544	39.3
545	37.2
546	31.9
547	26.6
548	21.2
549	15.9
550	10.6
551	5.2
552	0
553	0
554	0
555	0
556	0
557	0
558	0
559	0
560	0
561	0
562	0
563	0
564	0
565	0
566	0
567	0
568	0
569	5.3
570	10.6
571	15.9
572	20.9
573	23.5
574	25.7
575	27.4
576	27.4
577	27.4

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
578	28.2
579	28.5
580	28.5
581	28.2
582	27.4
583	27.2
584	26.7
585	27.4
586	27.5
587	27.4
588	26.7
589	26.6
590	26.6
591	26.7
592	27.4
593	28.3
594	29.8
595	30.9
596	32.5
597	33.8
598	34.0
599	34.1
600	34.8
601	35.4
602	36.0
603	36.2
604	36.2
605	36.2
606	36.5
607	38.1
608	40.4
609	41.8
610	42.6
611	43.5
612	42.0
613	36.7
614	31.4
615	26.1
616	20.8
617	15.4
618	10.1
619	4.8
620	0
621	0
622	0
623	0
624	0
625	0
626	0
627	0
628	0
629	0
630	0
631	0
632	0
633	0
634	0
635	0
636	0
637	0
638	0
639	0
640	0
641	0
642	0
643	0
644	0
645	0
646	3.2
647	7.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
648	12.6
649	16.4
650	20.1
651	22.5
652	24.6
653	28.2
654	31.5
655	33.8
656	35.7
657	37.5
658	39.4
659	40.7
660	41.2
661	41.8
662	42.0
663	42.2
664	42.2
665	42.5
666	42.6
667	42.6
668	41.8
669	41.0
670	38.0
671	34.4
672	29.8
673	26.4
674	23.3
675	18.7
676	14.0
677	9.3
678	5.6
679	3.2
680	0
681	0
682	0
683	0
684	0
685	0
686	0
687	0
688	0
689	0
690	0
691	0
692	0
693	0
694	2.3
695	5.3
696	7.1
697	10.5
698	14.8
699	18.2
700	21.7
701	23.5
702	26.4
703	26.9
704	26.6
705	26.6
706	29.3
707	30.9
708	32.3
709	34.6
710	36.2
711	36.2
712	35.6
713	36.5
714	37.5
715	37.8
716	36.2
717	34.8

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
718	33.0
719	29.0
720	24.1
721	19.3
722	14.5
723	10.0
724	7.2
725	4.8
726	3.4
727	0.8
728	0.8
729	5.1
730	10.5
731	15.4
732	20.1
733	22.5
734	25.7
735	29.0
736	31.5
737	34.6
738	37.2
739	39.4
740	41.0
741	42.6
742	43.6
743	44.4
744	44.9
745	45.5
746	46.0
747	46.0
748	45.5
749	45.4
750	45.1
751	44.3
752	43.1
753	41.0
754	37.8
755	34.6
756	30.6
757	26.6
758	24.0
759	20.1
760	15.1
761	10.0
762	4.8
763	2.4
764	2.4
765	0.8
766	0
767	4.8
768	10.1
769	15.4
770	20.8
771	25.4
772	28.2
773	29.6
774	31.4
775	33.3
776	35.4
777	37.3
778	40.2
779	42.6
780	44.3
781	45.1
782	45.5
783	46.5
784	46.5
785	46.5
786	46.3
787	45.9

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
788	45.5
789	45.5
790	45.5
791	45.4
792	44.4
793	44.3
794	44.3
795	44.3
796	44.3
797	44.3
798	44.3
799	44.4
800	45.1
801	45.9
802	48.3
803	49.9
804	51.5
805	53.1
806	53.1
807	54.1
808	54.7
809	55.2
810	55.0
811	54.7
812	54.7
813	54.6
814	54.1
815	53.3
816	53.1
817	52.3
818	51.5
819	51.3
820	50.9
821	50.7
822	49.2
823	48.3
824	48.1
825	48.1
826	48.1
827	48.1
828	47.6
829	47.5
830	47.5
831	47.2
832	46.5
833	45.4
834	44.6
835	43.5
836	41.0
837	38.1
838	35.4
839	33.0
840	30.9
841	30.9
842	32.3
843	33.6
844	34.4
845	35.4
846	36.4
847	37.3
848	38.6
849	40.2
850	41.8
851	42.8
852	42.8
853	43.1
854	43.5
855	43.8
856	44.7
857	45.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
858	46.3
859	46.5
860	46.7
861	46.8
862	46.7
863	45.2
864	44.3
865	43.5
866	41.5
867	40.2
868	39.4
869	39.9
870	40.4
871	41.0
872	41.4
873	42.2
874	43.3
875	44.3
876	44.7
877	45.7
878	46.7
879	47.0
880	46.8
881	46.7
882	46.5
883	45.9
884	45.2
885	45.1
886	45.1
887	44.4
888	43.8
889	42.8
890	43.5
891	44.3
892	44.7
893	45.1
894	44.7
895	45.1
896	45.1
897	45.1
898	44.6
899	44.1
900	43.3
901	42.8
902	42.6
903	42.6
904	42.6
905	42.3
906	42.2
907	42.2
908	41.7
909	41.2
910	41.2
911	41.7
912	41.5
913	41.0
914	39.6
915	37.8
916	35.7
917	34.8
918	34.8
919	34.9
920	36.4
921	37.7
922	38.6
923	38.9
924	39.3
925	40.1
926	40.4
927	40.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
928	40.7
929	41.0
930	40.6
931	40.2
932	40.2
933	40.2
934	39.8
935	39.4
936	39.1
937	39.1
938	39.4
939	40.2
940	40.2
941	39.6
942	39.6
943	38.8
944	39.4
945	40.4
946	41.2
947	40.4
948	38.6
949	35.4
950	32.3
951	27.2
952	21.9
953	16.6
954	11.3
955	6.0
956	0.6
957	0
958	0
959	0
960	3.2
961	8.5
962	13.8
963	19.2
964	24.5
965	28.2
966	29.9
967	32.2
968	34.0
969	35.4
970	37.0
971	39.4
972	42.3
973	44.3
974	45.2
975	45.7
976	45.9
977	45.9
978	45.9
979	44.6
980	44.3
981	43.8
982	43.1
983	42.6
984	41.8
985	41.4
986	40.6
987	38.6
988	35.4
989	34.6
990	34.6
991	35.1
992	36.2
993	37.0
994	36.7
995	36.7
996	37.0
997	36.5

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
998	36.5
999	36.5
1,000	37.8
1,001	38.6
1,002	39.6
1,003	39.9
1,004	40.4
1,005	41.0
1,006	41.2
1,007	41.0
1,008	40.2
1,009	38.8
1,010	38.1
1,011	37.3
1,012	36.9
1,013	36.2
1,014	35.4
1,015	34.8
1,016	33.0
1,017	28.2
1,018	22.9
1,019	17.5
1,020	12.2
1,021	6.9
1,022	1.6
1,023	0
1,024	0
1,025	0
1,026	0
1,027	0
1,028	0
1,029	0
1,030	0
1,031	0
1,032	0
1,033	0
1,034	0
1,035	0
1,036	0
1,037	0
1,038	0
1,039	0
1,040	0
1,041	0
1,042	0
1,043	0
1,044	0
1,045	0
1,046	0
1,047	0
1,048	0
1,049	0
1,050	0
1,051	0
1,052	0
1,053	1.9
1,054	6.4
1,055	11.7
1,056	17.1
1,057	22.4
1,058	27.4
1,059	29.8
1,060	32.2
1,061	35.1
1,062	37.0
1,063	38.6
1,064	39.9
1,065	41.2
1,066	42.6
1,067	43.1

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,068	44.1
1,069	44.9
1,070	45.5
1,071	45.1
1,072	44.3
1,073	43.5
1,074	43.5
1,075	42.3
1,076	39.4
1,077	36.2
1,078	34.6
1,079	33.2
1,080	29.0
1,081	24.1
1,082	19.8
1,083	17.9
1,084	17.1
1,085	16.1
1,086	15.3
1,087	14.6
1,088	14.0
1,089	13.8
1,090	14.2
1,091	14.5
1,092	14.0
1,093	13.8
1,094	12.9
1,095	11.3
1,096	8.0
1,097	6.8
1,098	4.2
1,099	1.6
1,100	0.9
1,101	0.2
1,102	1.0
1,103	2.6
1,104	5.8
1,105	11.1
1,106	16.1
1,107	20.6
1,108	22.5
1,109	23.3
1,110	25.7
1,111	29.1
1,112	32.2
1,113	33.8
1,114	34.1
1,115	34.3
1,116	34.4
1,117	34.9
1,118	36.2
1,119	37.0
1,120	38.3
1,121	39.4
1,122	40.2
1,123	40.1
1,124	39.9
1,125	40.2
1,126	40.9
1,127	41.5
1,128	41.8
1,129	42.5
1,130	42.8
1,131	43.3
1,132	43.5
1,133	43.5
1,134	43.5
1,135	43.3
1,136	43.1
1,137	43.1

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,138	42.6
1,139	42.5
1,140	41.8
1,141	41.0
1,142	39.6
1,143	37.8
1,144	34.6
1,145	32.2
1,146	28.2
1,147	25.7
1,148	22.5
1,149	17.2
1,150	11.9
1,151	6.6
1,152	1.3
1,153	0
1,154	0
1,155	0
1,156	0
1,157	0
1,158	0
1,159	0
1,160	0
1,161	0
1,162	0
1,163	0
1,164	0
1,165	0
1,166	0
1,167	0
1,168	0
1,169	3.4
1,170	8.7
1,171	14.0
1,172	19.3
1,173	24.6
1,174	29.9
1,175	34.0
1,176	37.0
1,177	37.8
1,178	37.0
1,179	36.2
1,180	32.2
1,181	26.9
1,182	21.6
1,183	16.3
1,184	10.9
1,185	5.6
1,186	0.3
1,187	0
1,188	0
1,189	0
1,190	0
1,191	0
1,192	0
1,193	0.0
1,194	0.0
1,195	0.0
1,196	0.0
1,197	0.3
1,198	2.4
1,199	5.6
1,200	10.5
1,201	15.8
1,202	19.3
1,203	20.8
1,204	20.9
1,205	20.3
1,206	20.6
1,207	21.1

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,208	21.1
1,209	22.5
1,210	24.9
1,211	27.4
1,212	29.9
1,213	31.7
1,214	33.8
1,215	34.6
1,216	35.1
1,217	35.1
1,218	34.6
1,219	34.1
1,220	34.6
1,221	35.1
1,222	35.4
1,223	35.2
1,224	34.9
1,225	34.6
1,226	34.6
1,227	34.4
1,228	32.3
1,229	31.4
1,230	30.9
1,231	31.5
1,232	31.9
1,233	32.2
1,234	31.4
1,235	28.2
1,236	24.9
1,237	20.9
1,238	16.1
1,239	12.9
1,240	9.7
1,241	6.4
1,242	4.0
1,243	1.1
1,244	0
1,245	0
1,246	0
1,247	0
1,248	0
1,249	0
1,250	0
1,251	0
1,252	1.6
1,253	1.6
1,254	1.6
1,255	1.6
1,256	1.6
1,257	2.6
1,258	4.8
1,259	6.4
1,260	8.0
1,261	10.1
1,262	12.9
1,263	16.1
1,264	16.9
1,265	15.3
1,266	13.7
1,267	12.2
1,268	14.2
1,269	17.7
1,270	22.5
1,271	27.4
1,272	31.4
1,273	33.8
1,274	35.1
1,275	35.7
1,276	37.0
1,277	38.0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,278	38.8
1,279	39.4
1,280	39.4
1,281	38.6
1,282	37.8
1,283	37.8
1,284	37.8
1,285	37.8
1,286	37.8
1,287	37.8
1,288	38.6
1,289	38.8
1,290	39.4
1,291	39.8
1,292	40.2
1,293	40.9
1,294	41.2
1,295	41.4
1,296	41.8
1,297	42.2
1,298	43.5
1,299	44.7
1,300	45.5
1,301	46.7
1,302	46.8
1,303	46.7
1,304	45.1
1,305	39.8
1,306	34.4
1,307	29.1
1,308	23.8
1,309	18.5
1,310	13.2
1,311	7.9
1,312	2.6
1,313	0
1,314	0
1,315	0
1,316	0
1,317	0
1,318	0
1,319	0
1,320	0
1,321	0
1,322	0
1,323	0
1,324	0
1,325	0
1,326	0
1,327	0
1,328	0
1,329	0
1,330	0
1,331	0
1,332	0
1,333	0
1,334	0
1,335	0
1,336	0
1,337	0
1,338	2.4
1,339	7.7
1,340	13.0
1,341	16.3
1,342	21.2
1,343	24.3
1,344	27.0
1,345	29.5
1,346	31.4
1,347	32.7

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,348	34.3
1,349	35.2
1,350	35.6
1,351	36.0
1,352	35.4
1,353	34.8
1,354	34.0
1,355	33.0
1,356	32.2
1,357	31.8
1,358	29.8
1,359	28.2
1,360	26.6
1,361	24.9
1,362	22.5
1,363	17.7
1,364	12.9
1,365	8.4
1,366	4.0
1,367	0
1,368	0
1,369	0
1,370	0
1,371	0

(d) EPA Urban Dynamometer Driving Schedule for Heavy-Duty Vehicles.

SPEED VERSUS TIME SEQUENCE

Record (sec)	Speed (mph)
0	0.0
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0
19	0.0
20	0.0
21	0.0
22	0.0
23	0.0
24	0.0
25	0.19
26	1.00
27	1.51
28	2.66
29	4.64
30	6.96
31	8.86
32	7.71
33	7.45
34	9.22
35	10.00
36	9.08

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
37	10.08
38	11.24
39	12.79
40	14.00
41	12.58
42	12.87
43	13.00
44	13.00
45	13.68
46	15.00
47	15.00
48	13.37
49	12.08
50	12.26
51	14.29
52	14.56
53	15.20
54	16.76
55	17.00
56	17.00
57	17.23
58	18.77
59	20.54
60	19.60
61	18.14
62	17.98
63	17.00
64	16.34
65	15.00
66	15.00
67	15.00
68	15.96
69	12.35
70	15.28
71	14.27
72	12.59
73	12.25
74	9.28
75	8.00
76	8.00
77	8.38
78	9.53
79	10.69
80	11.00
81	9.00
82	9.00
83	9.32
84	10.00
85	9.36
86	9.00
87	9.95
88	14.33
89	17.53
90	19.42
91	20.00
92	20.74
93	21.00
94	21.11
95	23.84
96	27.00
97	27.00
98	29.05
99	32.52
100	31.01
101	31.00
102	31.62
103	33.00
104	32.37
105	30.43
106	30.00
107	30.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
108	30.51
109	32.41
110	33.00
111	32.27
112	32.00
113	31.04
114	32.20
115	33.36
116	34.00
117	34.00
118	34.00
119	33.01
120	31.86
121	30.10
122	26.17
123	23.39
124	21.46
125	17.28
126	15.83
127	13.76
128	12.60
129	10.33
130	8.28
131	5.38
132	2.91
133	0.0
134	0.0
135	0.0
136	0.0
137	0.0
138	0.0
139	0.0
140	0.0
141	0.0
142	0.0
143	0.0
144	0.0
145	0.0
146	0.0
147	0.0
148	0.0
149	0.0
150	0.0
151	0.0
152	0.0
153	0.0
154	0.0
155	0.0
156	0.0
157	0.0
158	0.0
159	0.0
160	0.0
161	0.0
162	0.0
163	0.0
164	0.0
165	0.0
166	0.0
167	0.0
168	0.0
169	0.0
170	0.0
171	0.0
172	0.0
173	0.0
174	0.51
175	0.33
176	0.0
177	0.0
178	0.0

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
179	0.0
180	0.0
181	0.0
182	0.0
183	0.0
184	0.0
185	0.0
186	0.0
187	0.0
188	0.0
189	0.0
190	0.0
191	0.0
192	0.0
193	0.0
194	0.0
195	0.0
196	0.0
197	0.13
198	0.71
199	0.0
200	0.0
201	0.0
202	0.0
203	4.15
204	6.00
205	6.00
206	6.00
207	5.30
208	4.14
209	1.96
210	0.0
211	0.0
212	0.0
213	0.0
214	0.0
215	0.0
216	0.0
217	0.0
218	0.0
219	0.0
220	0.0
221	0.0
222	0.0
223	0.0
224	0.0
225	0.0
226	0.0
227	0.0
228	0.0
229	0.0
230	0.0
231	0.48
232	1.64
233	0.41
234	0.0
235	0.0
236	0.0
237	0.0
238	0.0
239	0.0
240	0.0
241	0.0
242	0.0
243	0.0
244	0.0
245	0.0
246	0.0
247	0.0
248	0.0
249	0.0

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
250	0.0
251	0.0
252	0.0
253	0.0
254	0.0
255	0.0
256	0.0
257	0.0
258	0.0
259	0.0
260	0.0
261	0.0
262	0.0
263	0.0
264	0.0
265	0.0
266	0.0
267	0.0
268	0.0
269	0.0
270	0.0
271	0.0
272	0.0
273	0.0
274	0.0
275	0.0
276	0.0
277	0.0
278	0.0
279	0.0
280	0.0
281	0.0
282	0.0
283	0.0
284	0.0
285	0.0
286	0.0
287	0.0
288	0.0
289	0.0
290	0.0
291	0.0
292	0.0
293	0.0
294	0.0
295	0.0
296	0.0
297	0.0
298	0.0
299	0.0
300	0.24
301	0.60
302	0.0
303	1.42
304	2.00
305	3.08
306	5.63
307	4.00
308	4.00
309	3.34
310	1.37
311	1.00
312	0.0
313	0.0
314	0.0
315	0.0
316	0.0
317	0.0
318	0.0
319	0.23
320	1.39

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
321	2.00
322	4.11
323	5.00
324	6.02
325	7.18
326	7.33
327	6.49
328	7.00
329	7.00
330	7.00
331	7.00
332	7.00
333	7.43
334	8.00
335	8.00
336	7.09
337	11.06
338	12.89
339	14.49
340	11.46
341	13.08
342	16.55
343	16.00
344	15.34
345	12.32
346	13.00
347	13.00
348	13.00
349	15.86
350	12.00
351	11.73
352	11.00
353	11.00
354	11.00
355	11.90
356	12.89
357	10.36
358	7.26
359	4.95
360	4.68
361	6.68
362	8.00
363	7.84
364	7.00
365	6.53
366	7.89
367	10.57
368	11.00
369	10.10
370	10.74
371	10.42
372	11.00
373	12.46
374	14.77
375	14.09
376	16.20
377	17.00
378	17.00
379	17.00
380	17.00
381	15.02
382	15.71
383	14.00
384	14.92
385	15.38
386	15.78
387	16.00
388	16.00
389	16.25
390	17.41
391	18.56

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
392	19.00
393	19.88
394	21.00
395	21.00
396	21.00
397	20.49
398	20.00
399	19.18
400	19.00
401	18.86
402	18.29
403	19.00
404	19.61
405	20.00
406	20.00
407	20.00
408	20.00
409	20.00
410	19.45
411	20.42
412	21.87
413	20.97
414	20.37
415	22.00
416	22.00
417	22.66
418	23.00
419	23.97
420	25.51
421	29.00
422	29.00
423	29.00
424	30.51
425	31.00
426	30.00
427	30.00
428	30.00
429	30.54
430	31.00
431	31.86
432	31.00
433	31.17
434	32.33
435	33.00
436	33.00
437	33.80
438	34.00
439	35.12
440	36.00
441	36.00
442	34.82
443	33.25
444	32.09
445	32.00
446	32.00
447	32.00
448	32.00
449	32.00
450	32.85
451	33.01
452	34.00
453	33.68
454	32.52
455	32.00
456	32.00
457	32.95
458	33.00
459	33.00
460	33.42
461	34.00
462	34.74

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
463	35.00
464	35.00
465	35.00
466	35.00
467	35.00
468	35.00
469	35.84
470	37.99
471	38.00
472	37.69
473	38.41
474	39.37
475	39.00
476	39.00
477	38.10
478	39.00
479	39.41
480	40.57
481	41.73
482	42.00
483	41.92
484	40.00
485	40.00
486	39.49
487	37.66
488	37.00
489	36.01
490	34.86
491	33.70
492	32.54
493	29.54
494	26.46
495	22.28
496	19.91
497	18.76
498	17.60
499	16.44
500	14.57
501	13.13
502	11.97
503	10.81
504	9.31
505	7.50
506	6.34
507	4.37
508	3.03
509	1.87
510	0.71
511	0.0
512	0.0
513	0.0
514	0.0
515	0.0
516	0.0
517	0.0
518	0.0
519	0.0
520	0.0
521	0.0
522	0.0
523	0.0
524	0.0
525	0.0
526	0.0
527	0.0
528	0.0
529	0.0
530	0.0
531	0.0
532	0.0
533	0.0

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
534	0.0
535	0.0
536	0.0
537	0.0
538	0.0
539	0.0
540	0.0
541	0.0
542	0.0
543	0.0
544	2.36
545	3.94
546	5.31
547	8.26
548	9.42
549	11.15
550	12.73
551	14.78
552	16.05
553	17.41
554	19.72
555	21.52
556	23.35
557	24.83
558	25.99
559	27.15
560	28.31
561	29.46
562	30.62
563	31.78
564	32.94
565	34.18
566	36.25
567	37.41
568	38.56
569	39.72
570	40.00
571	40.00
572	40.00
573	40.00
574	40.00
575	40.00
576	40.82
577	41.00
578	41.00
579	41.30
580	42.00
581	42.00
582	42.00
583	42.93
584	43.00
585	43.00
586	43.00
587	43.56
588	44.71
589	45.00
590	44.97
591	44.18
592	44.66
593	44.00
594	44.00
595	44.81
596	45.00
597	45.00
598	45.00
599	45.44
600	46.00
601	46.00
602	46.92
603	47.00
604	47.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
605	47.00
606	47.00
607	47.00
608	47.00
609	47.04
610	49.00
611	49.33
612	49.51
613	49.00
614	49.00
615	49.00
616	49.00
617	48.72
618	48.87
619	50.00
620	50.00
621	50.00
622	50.00
623	49.78
624	49.00
625	49.00
626	49.69
627	50.00
628	50.00
629	50.00
630	49.68
631	49.00
632	49.00
633	48.20
634	48.00
635	48.00
636	48.27
637	49.00
638	49.58
639	50.00
640	50.00
641	50.00
642	50.00
643	50.00
644	50.00
645	50.00
646	50.00
647	50.00
648	50.00
649	50.00
650	50.47
651	51.00
652	51.00
653	51.00
654	51.00
655	51.00
656	51.42
657	52.00
658	52.00
659	52.00
660	52.00
661	52.20
662	53.00
663	53.00
664	53.00
665	53.00
666	53.00
667	53.00
668	53.00
669	53.00
670	52.38
671	52.00
672	52.93
673	52.91
674	52.25
675	53.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
676	53.00
677	53.00
678	53.00
679	53.00
680	53.00
681	53.00
682	53.00
683	53.00
684	53.00
685	53.98
686	55.00
687	55.00
688	55.00
689	55.00
690	55.00
691	55.00
692	55.00
693	55.00
694	55.00
695	55.00
696	55.00
697	55.00
698	55.00
699	55.00
700	55.00
701	54.50
702	54.66
703	55.00
704	54.03
705	54.00
706	54.00
707	54.00
708	54.00
709	54.00
710	54.00
711	54.00
712	54.00
713	54.77
714	56.00
715	56.00
716	56.00
717	56.02
718	57.00
719	56.67
720	56.00
721	56.00
722	56.00
723	56.00
724	56.00
725	56.00
726	56.00
727	56.00
728	56.00
729	56.91
730	57.00
731	57.00
732	57.00
733	57.00
734	57.00
735	57.85
736	58.00
737	58.00
738	58.00
739	58.00
740	58.00
741	58.00
742	58.00
743	58.00
744	58.00
745	57.15
746	56.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
747	56.00
748	56.00
749	56.00
750	56.00
751	55.63
752	55.00
753	55.00
754	55.00
755	55.00
756	55.00
757	55.00
758	55.00
759	55.00
760	54.22
761	54.00
762	54.00
763	54.00
764	54.00
765	54.00
766	54.00
767	54.00
768	54.00
769	54.00
770	54.00
771	54.00
772	54.00
773	54.00
774	53.01
775	50.86
776	49.70
777	48.54
778	47.39
779	46.23
780	45.07
781	43.91
782	42.51
783	40.60
784	39.44
785	38.28
786	37.13
787	35.94
788	33.81
789	32.66
790	30.50
791	28.34
792	26.37
793	25.03
794	21.87
795	19.85
796	16.56
797	15.40
798	14.24
799	12.17
800	10.71
801	6.08
802	2.61
803	1.45
804	0.30
805	0.0
806	0.0
807	0.0
808	0.0
809	0.0
810	0.0
811	0.0
812	0.0
813	0.0
814	0.0
815	0.0
816	0.0
817	0.0

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
818	0.0
819	0.0
820	0.0
821	0.0
822	0.0
823	0.0
824	0.0
825	0.0
826	0.0
827	0.0
828	0.0
829	0.0
830	0.0
831	0.19
832	1.00
833	1.51
834	2.66
835	4.64
836	6.96
837	8.86
838	7.71
839	7.45
840	9.22
841	10.00
842	9.08
843	10.08
844	11.24
845	12.79
846	14.00
847	12.58
848	12.87
849	13.00
850	13.00
851	13.68
852	15.00
853	15.00
854	13.37
855	12.03
856	12.26
857	14.29
858	14.56
859	15.20
860	16.76
861	17.00
862	17.00
863	17.23
864	18.77
865	20.54
866	19.60
867	18.14
868	17.98
869	17.00
870	16.34
871	15.00
872	15.00
873	15.00
874	15.96
875	12.35
876	15.28
877	14.27
878	12.59
879	12.25
880	9.28
881	8.00
882	8.00
883	8.38
884	9.53
885	10.69
886	11.00
887	9.00
888	9.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
889	9.32
890	10.00
891	9.36
892	9.00
893	9.95
894	14.33
895	17.53
896	19.42
897	20.00
898	20.74
899	21.00
900	21.11
901	23.84
902	27.00
903	27.00
904	29.05
905	32.52
906	31.01
907	31.00
908	31.62
909	33.00
910	32.37
911	30.43
912	30.00
913	30.00
914	30.51
915	32.41
916	33.00
917	32.27
918	32.00
919	31.04
920	32.20
921	33.36
922	34.00
923	34.00
924	34.00
925	33.01
926	31.86
927	30.10
928	26.17
929	23.39
930	21.46
931	17.28
932	15.83
933	13.76
934	12.60
935	10.33
936	8.28
937	5.38
938	2.91
939	0.0
940	0.0
941	0.0
942	0.0
943	0.0
944	0.0
945	0.0
946	0.0
947	0.0
948	0.0
949	0.0
950	0.0
951	0.0
952	0.0
953	0.0
954	0.0
955	0.0
956	0.0
957	0.0
958	0.0
959	0.0

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
960	0.0
961	0.0
962	0.0
963	0.0
964	0.0
965	0.0
966	0.0
967	0.0
968	0.0
969	0.0
970	0.0
971	0.0
972	0.0
973	0.0
974	0.0
975	0.0
976	0.0
977	0.0
978	0.0
979	0.0
980	0.51
981	0.33
982	0.0
983	0.0
984	0.0
985	0.0
986	0.0
987	0.0
988	0.0
989	0.0
990	0.0
991	0.0
992	0.0
993	0.0
994	0.0
995	0.0
996	0.0
997	0.0
998	0.0
999	0.0
1000	0.0
1001	0.0
1002	0.0
1003	0.13
1004	0.71
1005	0.0
1006	0.0
1007	0.0
1008	0.0
1009	4.15
1010	6.00
1011	6.00
1012	6.00

SPEED VERSUS TIME SEQUENCE—Continued

Record (sec)	Speed (mph)
1013	5.30
1014	4.14
1015	1.96
1016	0.0
1017	0.0
1018	0.0
1019	0.0
1020	0.0
1021	0.0
1022	0.0
1023	0.0
1024	0.0
1025	0.0
1026	0.0
1027	0.0
1028	0.0
1029	0.0
1030	0.0
1031	0.0
1032	0.0
1033	0.0
1034	0.0
1035	0.0
1036	0.0
1037	0.48
1038	1.64
1039	0.41
1040	0.0
1041	0.0
1042	0.0
1043	0.0
1044	0.0
1045	0.0
1046	0.0
1047	0.0
1048	0.0
1049	0.0
1050	0.0
1051	0.0
1052	0.0
1053	0.0
1054	0.0
1055	0.0
1056	0.0
1057	0.0
1058	0.0
1059	0.0
1060	0.0

(e) EPA New York City Cycle for Light-Duty Vehicles and Light-Duty Trucks.

EPA NEW YORK CITY CYCLE

[Speed versus time sequence]

Time (sec)	Speed (mph)	Time (sec)	Speed (mph)	Time (sec)	Speed (mph)
0	0	1	0	2	0
3	0	4	0	5	0
6	0	7	0	8	0
9	0	10	0	11	0
12	0	13	0	14	0
15	0	16	0	17	0
18	0	19	0	20	0
21	0	22	0	23	0
24	0	25	0	26	0
27	0	28	0	29	0
30	0	31	0	32	0
33	0	34	0	35	0

EPA NEW YORK CITY CYCLE—Continued

[Speed versus time sequence]

Time (sec)	Speed (mph)	Time (sec)	Speed (mph)	Time (sec)	Speed (mph)
36	0	37	0	38	0
39	0	40	0	41	0
42	0	43	0	44	0
45	0	46	0	47	0.4
48	2.8	49	5.6	50	7.0
51	7.6	52	7.6	53	6.2
54	6.4	55	7.6	56	9.5
57	8.9	58	8.6	59	9.6
60	12.4	61	15.0	62	17.8
63	21.0	64	22.9	65	21.7
66	18.2	67	14.5	68	10.2
69	5.6	70	2.5	71	2.1
72	3.1	73	5.7	74	9.0
75	10.8	76	10.8	77	9.5
78	6.5	79	3.9	80	2.6
81	1.0	82	0.8	83	0.1
84	0	85	0	86	0
87	0	88	0	89	0
90	0	91	0	92	0
93	0	94	0	95	0
96	2.7	97	8.3	98	12.4
99	15.7	100	17.4	101	17.3
102	17.2	103	15.1	104	11.2
105	8.6	106	5.9	107	5.4
108	6.8	109	6.9	110	4.8
111	5.7	112	7.1	113	6.8
114	5.9	115	6.0	116	6.0
117	5.9	118	5.6	119	5.5
120	7.2	121	9.9	122	10.8
123	11.4	124	11.9	125	12.1
126	12.6	127	12.3	128	10.6
129	9.9	130	9.4	131	8.9
132	7.6	133	6.1	134	5.0
135	3.7	136	2.6	137	1.0
138	0.8	139	0.1	140	0.4
141	0.2	142	0	143	0
144	0	145	1.3	146	6.0
147	10.2	148	12.1	149	13.8
150	15.1	151	16.2	152	15.9
153	16.0	154	16.8	155	17.5
156	18.0	157	19.6	158	21.7
159	23.1	160	23.7	161	24.1
162	24.5	163	25.0	164	25.2
165	24.6	166	24.3	167	23.3
168	22.7	169	22.1	170	21.6
171	21.1	172	20.3	173	19.2
174	17.0	175	13.9	176	14.1
177	14.6	178	14.6	179	14.5
180	14.4	181	14.2	182	14.2
183	13.2	184	11.5	185	8.4
186	5.5	187	3.7	188	2.9
189	1.3	190	0.8	191	0.3
192	0.1	193	0.1	194	0
195	1.3	196	3.9	197	9.9
198	15.9	199	19.3	200	20.7
201	21.4	202	21.4	203	20.5
204	19.0	205	16.7	206	13.1
207	11.2	208	14.9	209	19.8
210	23.8	211	25.7	212	26.2
213	26.4	214	23.3	215	19.6
216	18.9	217	19.3	218	19.4
219	18.5	220	17.5	221	16.4
222	15.6	223	15.6	224	16.0
225	16.8	226	17.5	227	18.0
228	19.6	229	21.7	230	23.5
231	24.6	232	25.0	233	24.3
234	23.1	235	20.7	236	17.2
237	13.5	238	9.2	239	3.3
240	0	241	0	242	0
243	0	244	0	245	0
246	0	247	0	248	0

EPA NEW YORK CITY CYCLE—Continued

[Speed versus time sequence]

Time (sec)	Speed (mph)	Time (sec)	Speed (mph)	Time (sec)	Speed (mph)
249	0	250	0	251	0
252	0	253	0	254	0.2
255	2.0	256	4.5	257	6.4
258	7.2	259	7.6	260	7.2
261	6.6	262	6.5	263	5.1
264	4.4	265	5.5	266	3.0
267	3.4	268	3.0	269	2.9
270	1.3	271	0.8	272	0.3
273	0	274	0	275	0.3
276	4.7	277	9.7	278	13.9
279	16.7	280	19.1	281	20.5
282	20.5	283	19.7	284	19.9
285	20.4	286	20.9	287	21.4
288	21.9	289	22.4	290	22.1
291	21.4	292	20.8	293	20.3
294	20.5	295	19.3	296	17.3
297	17.1	298	16.7	299	14.3
300	11.9	301	10.7	302	10.2
303	9.4	304	10.6	305	12.8
306	13.7	307	12.3	308	10.4
309	8.6	310	5.5	311	3.2
312	2.0	313	0.6	314	0
315	0	316	0	317	0
318	0	319	0	320	0
321	0	322	0	323	2.5
324	6.1	325	5.5	326	3.2
327	3.6	328	6.1	329	9.1
330	9.8	331	8.6	332	6.8
333	5.9	334	5.6	335	6.0
336	7.2	337	8.4	338	9.3
339	7.6	340	5.5	341	2.5
342	0.1	343	0	344	0
345	0	346	0	347	0
348	0	349	0	350	0
351	0	352	0	353	0
354	0	355	0	356	0
357	0	358	0	359	0
360	0	361	0	362	0
363	0	364	0	365	0
366	0	367	0	368	0
369	0	370	0	371	0
372	0	373	0	374	0
375	0	376	0	377	0
378	0	379	0	380	0
381	0	382	0	383	0
384	0	385	0	386	0
387	0	388	0	389	0
390	0	391	0	392	0
393	0	394	0	395	0.2
396	1.6	397	3.0	398	3.0
399	2.1	400	2.3	401	4.6
402	7.8	403	9.9	404	10.7
405	10.2	406	10.1	407	10.7
408	10.9	409	11.4	410	11.1
411	10.0	412	8.8	413	8.2
414	8.6	415	10.2	416	11.8
417	13.0	418	13.3	419	12.8
420	11.7	421	11.7	422	12.4
423	13.7	424	14.4	425	14.3
426	14.7	427	15.1	428	15.3
429	15.8	430	14.5	431	12.2
432	11.1	433	12.0	434	13.1
435	12.2	436	8.9	437	7.7
438	7.6	439	8.0	440	5.5
441	3.3	442	2.4	443	1.4
444	0.6	445	0	446	0
447	0	448	0	449	0
450	0	451	0	452	0
453	0	454	0	455	0
456	0	457	0	458	0
459	0	460	0	461	0

EPA NEW YORK CITY CYCLE—Continued

[Speed versus time sequence]

Time (sec)	Speed (mph)	Time (sec)	Speed (mph)	Time (sec)	Speed (mph)
462	0	463	0	464	0
465	0	466	0	467	0
468	0	469	0	470	0
471	0	472	0	473	0
474	0	475	0	476	0
477	0	478	0	479	0
480	0	481	0	482	0
483	0	484	0	485	0
486	0	487	0	488	0
489	0	490	0	491	0
492	0	493	0	494	0
495	1.0	496	4.1	497	7.4
498	10.2	499	11.3	500	11.8
501	12.2	502	14.3	503	16.0
504	17.8	505	18.6	506	19.6
507	20.2	508	19.9	509	19.7
510	20.8	511	21.0	512	18.8
513	17.6	514	13.0	515	7.5
516	2.9	517	0.8	518	0
519	0.2	520	0.7	521	1.4
522	2.3	523	2.7	524	3.0
525	2.6	526	1.2	527	0.1
528	0.7	529	1.8	530	3.1
531	3.9	532	5.3	533	7.8
534	9.7	535	10.3	536	10.2
537	9.4	538	7.1	539	6.8
540	8.9	541	10.6	542	11.9
543	15.5	544	19.6	545	22.8
546	25.1	547	26.0	548	26.7
549	27.3	550	27.7	551	27.6
552	27.3	553	25.7	554	23.3
555	20.6	556	17.8	557	14.9
558	11.3	559	7.4	560	4.6
561	1.7	562	0.7	563	0
564	0	565	0	566	0
567	0	568	0	569	0
570	0	571	0	572	0
573	0	574	0	575	0
576	0	577	0	578	0
579	0	580	0	581	0
582	0	583	0	584	0
585	0	586	0	587	0
588	0	589	0	590	0
591	0	592	0	593	0
594	0	595	0	596	0
597	0	598	0	599	0
600	0				

(f)(1) EPA Engine Dynamometer Schedules for Heavy-duty Otto-cycle engines.

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	7.00	44.40
26	16.00	85.40
27	27.00	97.80

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
28	38.00	100.00
29	45.00	100.00
30	51.00	100.00
31	54.00	97.50
32	53.00	90.00
33	49.00	75.20
34	45.00	50.00
35	40.00	10.00
36	34.00	2.30
37	27.00	0.0
38	21.00	2.30
39	16.00	12.00
40	12.00	35.30
41	8.50	4.90
42	5.00	−10.00
43	3.00	−10.00
44	0.0	0.0
45	0.0	0.0
46	0.0	0.0
47	0.0	0.0
48	0.0	0.0
49	0.0	0.0
50	0.0	0.0
51	3.00	10.00
52	11.00	40.20
53	20.00	53.00
54	27.50	64.80
55	32.00	78.00
56	32.00	78.00
57	27.50	56.00
58	26.00	24.40
59	24.00	−8.40
60	23.00	−10.00
61	24.00	−10.00
62	27.00	−10.00
63	34.00	−10.00
64	44.00	28.00
65	57.00	74.40
66	60.00	74.40
67	53.00	33.60
68	48.00	−10.00
69	44.00	−10.00
70	40.00	−10.00
71	40.00	7.00
72	44.00	22.70
73	46.00	30.00
74	46.00	32.00
75	44.00	25.00
76	40.00	18.00
77	37.00	14.00
78	36.00	10.00
79	34.00	0.0
80	34.00	−10.00
81	32.00	−10.00
82	31.00	−10.00
83	36.00	39.90
84	42.00	84.70
85	48.00	90.00
86	50.00	90.00
87	50.00	90.00
88	47.00	85.00
89	43.00	75.00
90	38.00	60.00
91	36.00	36.00
92	36.00	7.50
93	36.30	−10.00
94	45.00	64.50
95	53.00	67.00
96	58.00	64.50
97	62.00	60.30
98	63.00	55.50
99	62.00	52.30
100	61.00	47.00
101	55.00	44.00
102	50.00	39.00
103	45.00	36.00
104	40.00	34.00
105	36.00	30.00
106	34.00	25.80
107	32.00	20.00
108	30.00	14.60
109	26.00	10.00
110	23.00	0.0
111	18.00	−8.00
112	16.00	−10.00
113	18.00	−8.00
114	20.00	27.60
115	17.00	4.00
116	14.00	−8.00
117	12.00	−10.00
118	9.00	−10.00
119	7.00	−10.00
120	7.00	−10.00
121	5.00	−10.00
122	4.00	−10.00
123	3.00	−10.00
124	2.00	−8.00
125	0.0	0.0
126	0.0	0.0
127	0.0	0.0
128	0.0	0.0
129	0.0	0.0
130	5.00	8.00
131	8.00	16.30
132	10.00	27.50
133	8.00	27.50
134	5.00	9.00
135	2.00	1.80
136	0.0	0.0
137	0.0	0.0
138	0.0	0.0
139	0.0	0.0
140	0.0	0.0
141	0.0	0.0
142	0.0	0.0
143	0.0	0.0
144	0.0	0.0
145	0.0	0.0
146	0.0	0.0
147	0.0	0.0
148	0.0	0.0
149	2.00	4.80
150	1.00	4.50
151	0.0	0.0
152	0.0	0.0
153	0.0	0.0
154	0.0	0.0
155	0.0	0.0
156	0.0	0.0
157	0.0	0.0
158	0.0	0.0
159	0.0	0.0
160	0.0	0.0
161	0.0	0.0
162	0.0	0.0
163	0.0	0.0
164	0.0	0.0
165	0.0	0.0
166	0.0	0.0
167	8.00	27.00
168	18.00	65.00
169	23.00	82.50

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
170	23.00	88.00
171	21.00	88.00
172	18.00	81.30
173	17.00	32.00
174	15.00	−10.00
175	13.00	−10.00
176	11.00	−10.00
177	8.00	−10.00
178	6.00	−10.00
179	4.00	−10.00
180	2.00	−10.00
181	0.0	0.0
182	0.0	0.0
183	0.0	0.0
184	0.0	0.0
185	0.0	0.0
186	0.0	0.0
187	0.0	0.0
188	0.0	0.0
189	0.0	0.0
190	0.0	0.0
191	0.0	0.0
192	0.0	0.0
193	0.0	0.0
194	0.0	0.0
195	0.0	0.0
196	0.0	0.0
197	0.0	0.0
198	0.0	0.0
199	0.0	0.0
200	0.0	0.0
201	0.0	0.0
202	0.0	0.0
203	0.0	0.0
204	0.0	4.00
205	0.50	7.70
206	5.00	14.00
207	11.00	24.70
208	15.00	42.30
209	16.00	70.00
210	17.00	70.00
211	17.00	50.00
212	16.00	26.30
213	14.00	5.00
214	10.00	−10.00
215	10.00	−10.00
216	14.00	73.30
217	18.00	83.00
218	19.00	84.80
219	18.00	84.80
220	16.00	82.80
221	11.00	74.00
222	7.00	8.50
223	4.00	0.0
224	0.0	0.0
225	0.0	0.0
226	0.0	0.0
227	0.0	0.0
228	0.0	0.0
229	0.0	0.0
230	0.0	0.0
231	0.0	0.0
232	0.0	0.0
233	6.00	17.60
234	6.00	19.60
235	5.00	14.00
236	3.00	9.80
237	1.00	5.50
238	0.0	3.00
239	0.0	0.0
240	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
241	0.0	0.0
242	0.0	0.0
243	0.0	0.0
244	0.0	0.0
245	0.0	0.0
246	0.0	0.0
247	0.0	0.0
248	0.0	0.0
249	0.0	0.0
250	0.0	0.0
251	0.0	0.0
252	0.0	0.0
253	0.0	0.0
254	0.0	0.0
255	0.0	0.0
256	0.0	0.0
257	0.0	0.0
258	0.0	0.0
259	0.0	0.0
260	0.0	0.0
261	0.0	0.0
262	0.0	0.0
263	0.0	0.0
264	0.0	0.0
265	0.0	0.0
266	0.0	0.0
267	0.0	0.0
268	0.0	0.0
269	0.0	0.0
270	0.0	0.0
271	0.0	0.0
272	0.0	0.0
273	0.0	0.0
274	0.0	0.0
275	0.0	0.0
276	0.0	0.0
277	0.0	0.0
278	0.0	0.0
279	0.0	0.0
280	0.0	0.0
281	0.0	7.00
282	1.00	10.00
283	2.00	11.50
284	1.00	10.00
285	0.0	0.0
286	0.0	0.0
287	0.0	0.0
288	0.0	0.0
289	0.0	0.0
290	0.0	0.0
291	0.0	0.0
292	0.0	0.0
293	0.0	0.0
294	0.0	0.0
295	0.0	0.0
296	0.0	0.0
297	0.0	0.0
298	0.0	0.0
299	0.0	28.00
300	0.0	30.00
301	2.00	32.00
302	6.00	34.00
303	14.00	36.00
304	19.00	36.00
305	24.50	36.00
306	24.50	36.00
307	24.00	30.00
308	19.00	24.00
309	13.00	18.00
310	9.00	14.00
311	7.00	8.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
312	6.00	0.0
313	4.00	3.00
314	3.00	6.80
315	0.0	0.0
316	0.0	0.0
317	0.0	0.0
318	0.0	0.0
319	0.0	0.0
320	0.0	0.0
321	0.0	0.0
322	0.0	0.0
323	0.0	18.00
324	3.00	40.00
325	8.00	86.00
326	18.00	97.00
327	38.00	100.00
328	45.50	100.00
329	45.00	96.00
330	44.00	84.40
331	43.00	53.60
332	41.00	5.00
333	43.00	47.60
334	44.00	90.00
335	45.00	90.00
336	44.00	73.00
337	40.00	54.00
338	38.00	34.70
339	36.00	10.00
340	35.00	10.00
341	35.00	10.00
342	35.50	60.00
343	36.00	57.90
344	37.00	53.00
345	39.00	50.00
346	40.50	50.00
347	43.00	50.00
348	45.00	50.00
349	48.00	50.00
350	51.00	52.00
351	56.00	58.70
352	64.00	70.00
353	68.00	70.00
354	70.00	70.00
355	65.50	64.60
356	61.00	28.90
357	55.00	−5.00
358	50.00	−10.00
359	45.00	−10.00
360	38.00	−10.00
361	28.00	−10.00
362	19.00	−10.00
363	14.00	−10.00
364	7.00	−10.00
365	2.00	−5.00
366	3.00	5.00
367	7.00	25.00
368	9.00	38.00
369	7.00	17.00
370	4.00	2.00
371	3.00	−9.00
372	3.00	−10.00
373	11.00	70.00
374	15.00	97.60
375	16.00	100.00
376	19.00	100.00
377	26.00	100.00
378	29.00	95.00
379	25.00	63.00
380	19.00	−10.00
381	12.00	−10.00
382	8.00	−10.00
383	5.00	−10.00
384	2.00	−10.00
385	1.00	−10.00
386	0.0	0.0
387	0.0	0.0
388	0.0	0.0
389	0.0	0.0
390	0.0	0.0
391	0.0	0.0
392	0.0	0.0
393	0.0	0.0
394	0.0	0.0
395	0.0	0.0
396	0.0	0.0
397	0.0	0.0
398	0.0	0.0
399	0.0	0.0
400	0.0	0.0
401	0.0	0.0
402	0.0	0.0
403	0.0	0.0
404	0.0	0.0
405	0.0	0.0
406	0.0	0.0
407	0.0	0.0
408	0.0	0.0
409	0.0	0.0
410	0.0	0.0
411	0.0	0.0
412	0.0	0.0
413	0.0	0.0
414	0.0	0.0
415	0.0	0.0
416	0.0	0.0
417	0.0	0.0
418	0.0	0.0
419	4.00	20.00
420	4.00	20.00
421	0.0	0.0
422	0.0	0.0
423	0.0	0.0
424	0.0	0.0
425	0.0	0.0
426	0.0	0.0
427	0.0	0.0
428	0.0	0.0
429	0.0	0.0
430	2.00	0.0
431	6.00	2.00
432	14.00	28.80
433	20.00	30.00
434	24.40	11.00
435	24.00	10.00
436	24.00	12.00
437	28.00	52.00
438	32.00	52.00
439	34.00	46.00
440	34.00	30.00
441	34.50	30.00
442	35.00	30.00
443	36.00	35.00
444	39.00	40.00
445	45.00	50.00
446	49.00	56.00
447	50.00	−8.00
448	45.00	−10.00
449	39.00	−10.00
450	34.00	−10.00
451	28.00	−10.00
452	25.00	−10.00
453	21.00	−10.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
454	18.00	−10.00
455	15.00	−10.00
456	12.00	−10.00
457	18.00	−8.00
458	29.00	19.80
459	40.00	54.00
460	52.00	82.00
461	64.00	95.00
462	71.00	99.00
463	77.00	100.00
464	84.00	100.00
465	85.00	99.00
466	85.00	95.00
467	84.00	90.00
468	82.00	84.60
469	80.00	78.50
470	78.00	78.50
471	77.00	70.00
472	76.00	65.50
473	74.00	61.50
474	72.00	56.00
475	70.00	52.00
476	68.00	46.00
477	66.50	40.00
478	65.00	32.00
479	63.00	26.00
480	61.00	25.60
481	61.00	72.00
482	61.00	78.00
483	58.00	72.00
484	50.00	64.00
485	44.00	55.00
486	35.00	40.00
487	26.00	20.00
488	21.00	−4.00
489	18.00	−10.00
490	16.00	−10.00
491	19.00	−8.00
492	24.00	2.00
493	32.00	68.50
494	45.00	78.00
495	51.00	86.00
496	58.00	92.00
497	64.00	97.00
498	71.00	100.00
499	73.00	98.00
500	73.00	94.00
501	73.00	86.00
502	73.00	82.00
503	76.00	84.00
504	80.00	98.00
505	84.00	100.00
506	85.00	100.00
507	84.00	100.00
508	81.00	92.00
509	75.00	80.00
510	73.00	70.00
511	70.00	60.00
512	67.00	53.00
513	65.00	45.00
514	63.00	36.50
515	62.00	28.00
516	61.00	22.50
517	60.00	23.00
518	60.00	24.00
519	60.00	24.00
520	60.00	26.00
521	61.00	60.00
522	62.00	64.00
523	63.00	64.00
524	64.00	64.00
525	62.00	64.00
526	56.00	60.00
527	53.00	−7.00
528	49.00	−10.00
529	47.00	−10.00
530	46.00	−10.00
531	45.00	−7.00
532	45.00	30.00
533	46.00	50.00
534	46.00	50.00
535	47.00	50.00
536	47.00	50.00
537	47.00	30.00
538	46.00	12.00
539	45.00	10.50
540	44.00	10.00
541	41.00	10.00
542	37.00	9.00
543	36.00	2.00
544	35.00	−10.00
545	38.00	67.00
546	35.00	−10.00
547	31.00	15.00
548	28.00	55.00
549	34.00	44.00
550	35.00	38.50
551	36.00	38.50
552	36.00	38.50
553	37.00	38.50
554	39.00	36.00
555	42.00	27.00
556	45.00	62.00
557	48.00	45.00
558	51.00	15.00
559	51.00	8.00
560	51.00	6.00
561	48.00	10.00
562	46.00	11.00
563	44.00	13.00
564	41.00	17.00
565	37.00	20.00
566	34.00	20.00
567	30.00	17.00
568	26.00	14.00
569	23.00	7.00
570	19.00	2.00
571	15.00	−5.00
572	11.00	−10.00
573	8.00	−10.00
574	5.00	−8.00
575	2.00	−5.00
576	0.0	0.0
577	0.0	0.0
578	0.0	0.0
579	0.0	0.0
580	0.0	0.0
581	0.0	0.0
582	0.0	0.0
583	4.00	15.00
584	19.00	31.00
585	30.00	46.00
586	37.00	68.00
587	40.00	76.00
588	41.00	77.00
589	40.50	78.00
590	40.00	77.00
591	40.00	64.00
592	38.00	10.00
593	38.00	25.00
594	40.00	50.00
595	40.00	36.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
596	40.00	31.00
597	40.00	31.00
598	41.00	37.00
599	42.00	97.00
600	43.00	100.00
601	45.00	100.00
602	47.00	100.00
603	48.00	100.00
604	49.00	100.00
605	51.00	97.00
606	52.00	94.00
607	53.00	90.00
608	54.00	87.00
609	56.00	86.00
610	56.00	85.00
611	55.50	85.00
612	55.00	81.00
613	54.00	77.00
614	53.00	72.00
615	52.00	67.00
616	49.00	60.00
617	46.00	45.00
618	45.00	12.00
619	44.00	10.00
620	44.00	10.00
621	45.00	12.00
622	46.00	14.00
623	47.00	24.00
624	49.00	88.00
625	50.00	90.00
626	51.00	90.00
627	52.00	90.00
628	53.00	90.00
629	54.00	90.00
630	54.00	90.00
631	54.00	87.00
632	54.00	84.00
633	54.00	80.00
634	53.50	77.00
635	53.00	76.00
636	53.00	75.00
637	52.00	73.00
638	51.00	69.00
639	50.00	65.00
640	50.00	60.00
641	49.00	55.00
642	49.00	50.00
643	49.00	50.00
644	49.50	60.00
645	49.50	65.00
646	50.00	70.00
647	50.50	75.00
648	51.00	80.00
649	52.00	85.00
650	53.00	90.00
651	54.00	90.00
652	55.00	90.00
653	55.00	88.00
654	55.00	84.00
655	55.00	79.00
656	55.00	74.00
657	55.00	69.00
658	55.00	64.00
659	55.00	59.00
660	55.00	54.00
661	55.00	49.00
662	55.00	44.50
663	55.00	39.00
664	55.00	34.00
665	55.00	27.00
666	55.00	18.00
667	55.00	8.00
668	55.00	6.00
669	55.00	13.00
670	55.00	27.00
671	55.50	30.00
672	56.00	30.00
673	57.00	30.00
674	58.00	34.00
675	59.00	46.00
676	59.00	89.00
677	59.00	90.00
678	59.00	91.00
679	59.00	91.00
680	60.00	91.00
681	60.00	91.00
682	60.50	90.00
683	61.00	89.00
684	61.50	88.00
685	62.00	83.00
686	63.00	73.00
687	65.00	70.00
688	66.00	71.00
689	67.00	74.00
690	67.50	79.00
691	68.00	85.00
692	68.50	90.00
693	69.00	94.00
694	69.50	96.00
695	70.00	98.00
696	70.50	100.00
697	71.00	100.00
698	72.00	100.00
699	72.00	100.00
700	72.00	100.00
701	72.00	100.00
702	72.00	100.00
703	72.00	100.00
704	72.00	100.00
705	72.00	100.00
706	72.00	100.00
707	72.50	100.00
708	73.00	100.00
709	73.50	100.00
710	74.00	100.00
711	74.00	100.00
712	74.50	100.00
713	75.00	100.00
714	75.00	100.00
715	75.00	100.00
716	75.00	100.00
717	75.00	100.00
718	75.00	100.00
719	75.00	100.00
720	75.00	100.00
721	75.00	100.00
722	75.00	100.00
723	75.00	98.00
724	75.00	90.00
725	75.00	34.00
726	74.00	15.00
727	72.00	3.00
728	70.00	−7.00
729	69.00	−10.00
730	68.00	−10.00
731	70.50	53.00
732	73.00	80.00
733	75.00	88.00
734	77.00	94.00
735	79.00	97.00
736	82.00	97.00
737	85.00	98.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
738	85.00	98.00
739	87.00	97.00
740	90.00	95.00
741	92.00	90.00
742	93.00	88.00
743	94.00	86.00
744	95.00	83.00
745	96.00	79.00
746	97.00	74.00
747	98.00	68.00
748	99.00	62.00
749	100.00	54.00
750	100.00	30.00
751	100.00	22.00
752	100.00	20.00
753	100.00	22.00
754	100.00	30.00
755	100.00	65.00
756	100.00	76.00
757	100.00	80.00
758	100.00	78.00
759	100.00	72.00
760	100.00	54.00
761	95.00	30.00
762	85.00	12.00
763	68.00	−5.00
764	57.00	−9.00
765	56.00	−10.00
766	57.00	−9.00
767	57.00	−5.00
768	57.00	22.00
769	58.00	40.00
770	59.00	45.00
771	59.00	46.00
772	59.50	45.00
773	60.00	33.00
774	60.00	0.0
775	60.00	−10.00
776	60.00	−10.00
777	60.00	34.00
778	60.00	50.00
779	60.00	60.00
780	60.00	69.00
781	60.00	75.00
782	60.00	79.00
783	61.00	83.00
784	61.00	84.00
785	61.00	85.00
786	62.00	85.00
787	62.00	85.00
788	62.00	85.00
789	63.00	85.00
790	63.00	85.00
791	64.00	85.00
792	64.00	85.00
793	64.00	85.00
794	64.00	85.00
795	64.00	85.00
796	64.00	84.50
797	64.00	84.00
798	64.00	83.00
799	64.00	82.00
800	64.00	81.00
801	64.00	77.00
802	64.00	72.00
803	65.00	67.00
804	66.00	64.00
805	67.00	60.00
806	69.00	62.30
807	72.00	84.00
808	73.00	90.50
809	74.00	91.00
810	74.00	90.00
811	74.00	84.50
812	73.00	74.00
813	72.00	66.00
814	71.00	60.00
815	70.00	54.00
816	69.00	50.00
817	68.00	49.00
818	68.00	48.00
819	68.00	48.00
820	68.00	48.50
821	68.00	49.00
822	68.00	51.00
823	68.00	53.50
824	68.00	55.00
825	68.00	58.00
826	68.00	60.00
827	68.00	62.00
828	68.00	64.00
829	68.00	67.00
830	69.00	68.50
831	70.00	70.00
832	70.00	70.00
833	70.00	70.00
834	70.00	70.00
835	70.00	70.00
836	70.00	70.00
837	71.00	66.00
838	73.00	64.00
839	75.00	64.00
840	77.00	98.00
841	79.00	100.00
842	81.00	100.00
843	82.00	100.00
844	83.00	100.00
845	84.00	98.00
846	84.00	94.00
847	85.00	93.00
848	86.00	94.00
849	87.00	98.00
850	89.00	100.00
851	92.00	100.00
852	95.00	100.00
853	97.50	100.00
854	100.00	100.00
855	100.00	100.00
856	100.00	100.00
857	100.00	100.00
858	100.00	97.00
859	96.00	−6.00
860	94.00	−10.00
861	91.00	−10.00
862	88.00	−10.00
863	86.00	−10.00
864	84.00	−10.00
865	82.00	−10.00
866	79.00	−10.00
867	77.00	−10.00
868	75.00	−10.00
869	73.00	−10.00
870	72.00	−10.00
871	72.00	−10.00
872	72.00	−8.00
873	71.00	8.00
874	68.00	9.00
875	64.00	−9.00
876	58.00	−8.00
877	56.00	53.00
878	56.00	67.00
879	56.00	70.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
880	56.00	67.00
881	55.00	60.00
882	54.00	60.00
883	49.00	75.00
884	38.00	80.00
885	30.00	78.00
886	25.00	53.00
887	18.00	32.00
888	14.00	16.00
889	9.00	3.00
890	5.00	−6.00
891	1.00	−10.00
892	0.0	0.0
893	0.0	0.0
894	0.0	0.0
895	0.0	0.0
896	0.0	0.0
987	0.0	0.0
898	0.0	0.0
899	0.0	0.0
900	0.0	0.0
901	0.0	0.0
902	0.0	0.0
903	0.0	0.0
904	0.0	0.0
905	0.0	0.0
906	0.0	0.0
907	0.0	0.0
908	0.0	0.0
909	0.0	0.0
910	0.0	0.0
911	0.0	0.0
912	0.0	0.0
913	0.0	0.0
914	0.0	0.0
915	0.0	0.0
916	0.0	0.0
917	0.0	0.0
918	0.0	0.0
919	0.0	0.0
920	4.50	47.00
921	12.00	85.00
922	30.00	97.00
923	42.00	100.00
924	51.00	100.00
925	54.00	100.00
926	54.00	97.00
927	52.00	90.00
928	48.00	75.00
929	44.00	57.00
930	37.00	47.00
931	29.00	40.00
932	24.00	34.00
933	21.00	27.00
934	22.00	24.00
935	22.50	22.00
936	20.00	16.00
937	15.00	7.00
938	10.00	0.0
939	5.00	−7.00
940	2.00	−10.00
941	1.00	−10.00
942	0.0	0.0
943	0.0	0.0
944	0.0	0.0
945	1.00	0.0
946	5.00	20.00
947	15.00	43.00
948	28.00	52.00
949	34.00	64.00
950	37.00	74.00
951	37.50	90.00
952	37.00	56.00
953	36.00	27.00
954	35.00	−2.00
955	33.00	−8.00
956	29.00	−10.00
957	29.00	−8.00
958	29.00	−2.00
959	34.00	30.00
960	38.00	75.00
961	34.00	70.00
962	31.00	25.00
963	28.00	−7.00
964	26.00	−10.00
965	24.00	−7.00
966	23.00	4.00
967	23.00	22.00
968	24.00	30.00
969	23.00	32.00
970	22.00	25.00
971	18.00	18.00
972	16.00	14.00
973	15.00	10.00
974	15.00	0.0
975	15.00	−7.00
976	15.00	−10.00
977	18.00	−8.00
978	25.00	40.00
979	37.00	90.00
980	46.00	90.00
981	49.00	90.00
982	49.00	90.00
983	49.00	85.00
984	47.00	77.00
985	44.00	59.00
986	43.00	36.00
987	42.00	13.00
988	40.00	−10.00
989	41.00	65.00
990	44.00	65.00
991	45.00	65.00
992	45.00	62.00
993	44.00	56.00
994	42.00	46.00
995	41.00	36.00
996	39.00	20.00
997	38.00	4.00
998	37.00	33.00
999	38.00	39.00
1,000	36.00	40.00
1,001	35.00	40.00
1,002	33.00	39.00
1,003	30.00	36.00
1,004	27.00	33.00
1,005	22.00	24.00
1,006	21.00	−5.00
1,007	20.00	−10.00
1,008	18.00	−6.00
1,009	17.00	28.00
1,010	16.00	5.00
1,011	14.00	−5.00
1,012	12.00	−9.00
1,013	9.00	−10.00
1,014	7.00	−10.00
1,015	5.00	−10.00
1,016	4.00	−10.00
1,017	3.00	−10.00
1,018	2.00	−10.00
1,019	0.0	0.0
1,020	0.0	0.0
1,021	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1,022	0.0	0.0
1,023	0.0	0.0
1,024	0.0	0.0
1,025	2.00	7.00
1,026	6.00	15.00
1,027	10.00	28.00
1,028	11.00	26.00
1,029	10.00	10.00
1,030	8.00	3.00
1,031	5.00	0.0
1,032	2.00	0.0
1,033	0.0	0.0
1,034	0.0	0.0
1,035	0.0	0.0
1,036	0.0	0.0
1,037	0.0	0.0
1,038	0.0	0.0
1,039	0.0	0.0
1,040	0.0	0.0
1,041	0.0	0.0
1,042	0.0	0.0
1,043	0.0	0.0
1,044	0.0	0.0
1,045	0.0	0.0
1,046	0.0	0.0
1,047	0.0	0.0
1,048	0.0	0.0
1,049	0.0	0.0
1,050	0.0	0.0
1,051	0.0	0.0
1,052	0.0	0.0
1,053	0.0	0.0
1,054	0.0	0.0
1,055	0.0	0.0
1,056	0.0	0.0
1,057	0.0	0.0
1,058	0.0	0.0
1,059	0.0	0.0
1,060	0.0	0.0
1,061	4.00	05.00
1,062	11.00	35.00
1,063	21.00	73.00
1,064	25.00	86.00
1,065	26.00	90.00
1,066	25.00	90.00
1,067	23.00	83.00
1,068	20.00	32.00
1,069	16.00	−6.00
1,070	14.00	−10.00
1,071	10.00	−10.00
1,072	7.00	−10.00
1,073	3.00	−10.00
1,074	1.00	−10.00
1,075	0.0	0.0
1,076	0.0	0.0
1,077	0.0	0.0
1,078	0.0	0.0
1,079	0.0	0.0
1,080	0.0	0.0
1,081	0.0	0.0
1,082	0.0	0.0
1,083	0.0	0.0
1,084	0.0	0.0
1,085	0.0	0.0
1,086	0.0	0.0
1,087	0.0	0.0
1,088	0.0	0.0
1,089	0.0	0.0
1,090	0.0	0.0
1,091	0.0	0.0
1,092	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1,093	0.0	0.0
1,094	0.0	0.0
1,095	0.0	0.0
1,096	0.0	0.0
1,097	0.0	0.0
1,098	1.00	3.00
1,099	3.00	6.00
1,100	6.00	13.00
1,101	9.00	14.00
1,102	12.00	16.00
1,103	15.00	28.00
1,104	18.00	60.00
1,105	20.00	47.00
1,106	21.00	31.00
1,107	21.00	15.00
1,108	20.00	−2.00
1,109	20.00	−10.00
1,110	20.00	−2.00
1,111	20.00	70.00
1,112	21.00	83.00
1,113	22.00	84.00
1,114	22.00	83.00
1,115	18.00	78.00
1,116	14.00	68.00
1,117	8.00	10.00
1,118	4.00	4.00
1,119	1.00	0.0
1,120	0.0	0.0
1,121	0.0	0.0
1,122	0.0	0.0
1,123	0.0	0.0
1,124	0.0	0.0
1,125	0.0	1.00
1,126	1.00	5.00
1,127	5.00	18.00
1,128	9.00	19.00
1,129	12.00	18.00
1,130	12.00	15.00
1,131	9.00	10.00
1,132	5.00	5.00
1,133	2.00	2.00
1,134	0.0	0.0
1,135	0.0	0.0
1,136	0.0	0.0
1,137	0.0	0.0
1,138	0.0	0.0
1,139	0.0	0.0
1,140	0.0	0.0
1,141	0.0	0.0
1,142	0.0	0.0
1,143	0.0	0.0
1,144	0.0	0.0
1,145	0.0	0.0
1,146	0.0	0.0
1,147	0.0	0.0
1,148	0.0	0.0
1,149	0.0	0.0
1,150	0.0	0.0
1,151	0.0	0.0
1,152	0.0	0.0
1,153	0.0	0.0
1,154	0.0	0.0
1,155	0.0	0.0
1,156	0.0	0.0
1,157	0.0	0.0
1,158	0.0	0.0
1,159	0.0	0.0
1,160	0.0	0.0
1,161	0.0	0.0
1,162	0.0	0.0
1,163	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1,164	0.0	0.0
1,165	0.0	0.0
1,166	0.0	0.0
1,167	0.0	0.0

(2) EPA Engine Dynamometer Schedule for Heavy-Duty Diesel Engines.

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	0.0	3.67
26	0.0	47.69
27	3.11	59.41
28	9.09	84.54
29	15.62	80.00
30	33.49	80.00
31	37.93	79.29
32	31.20	38.25
33	21.99	26.67
34	30.00	15.10
35	22.23	16.47
36	19.61	28.05
37	20.00	20.38
38	18.33	(1)
39	6.55	(1)
40	15.82	(1)
41	23.63	(1)
42	17.51	(1)
43	14.19	62.52
44	16.64	69.36
45	27.77	60.00
46	37.03	63.79
47	47.36	75.36
48	54.77	80.00
49	57.70	80.00
50	54.03	79.92
51	58.00	65.03
52	58.65	43.23
53	62.88	50.00
54	69.83	50.00
55	72.00	42.05
56	75.81	40.00
57	84.22	42.20
58	83.86	41.28
59	80.55	(1)
60	80.51	(1)
61	78.00	(1)
62	79.79	(1)
63	80.33	30.54
64	85.58	42.12
65	81.78	50.00
66	78.00	50.00
67	80.74	43.16
68	92.10	73.65
69	88.01	(1)
70	84.00	(1)
71	84.00	(1)
72	81.17	(1)
73	70.46	(1)
74	66.00	13.57
75	62.23	29.43
76	64.00	20.00
77	63.48	17.42
78	60.34	10.00
79	56.85	10.00
80	56.00	(1)
81	52.45	(1)
82	39.91	10.00
83	36.38	10.00
84	30.00	10.00
85	27.93	10.00
86	26.00	16.74
87	27.66	3.36
88	28.00	(1)
89	27.41	(1)
90	20.96	(1)
91	12.15	(1)
92	3.81	(1)
93	0.0	0.0
94	0.0	0.0
95	0.0	0.91
96	0.0	7.52
97	0.0	0.0
98	0.0	0.0
99	0.0	0.0
100	0.0	0.0
101	0.0	0.0
102	0.0	0.0
103	0.0	0.0
104	0.0	0.0
105	0.0	0.0
106	0.0	0.0
107	0.0	0.0
108	0.0	0.0
109	0.0	0.0
110	0.0	0.0
111	0.0	0.0
112	0.0	0.0
113	0.0	0.0
114	0.0	0.0
115	0.0	0.0
116	0.0	0.0
117	0.0	0.0
118	0.0	0.0
119	0.0	0.0
120	0.0	0.0
121	0.0	0.0
122	0.0	0.0
123	0.0	0.0
124	0.0	0.0
125	0.0	0.0
126	0.0	0.0
127	0.0	0.0
128	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
129	1.77	(1)
130	1.60	(1)
131	0.0	0.0
132	0.0	0.0
133	2.14	9.28
134	3.08	0.0
135	0.0	0.0
136	0.0	0.0
137	0.0	0.0
138	0.0	0.0
139	0.0	0.0
140	0.0	0.0
141	0.0	0.0
142	0.0	0.0
143	0.0	0.0
144	0.0	0.0
145	0.0	0.0
146	0.0	0.0
147	0.0	5.51
148	0.0	11.34
149	0.0	0.0
150	0.0	0.0
151	0.0	0.0
152	0.0	0.0
153	0.0	0.0
154	0.0	0.0
155	0.0	0.0
156	0.0	0.0
157	0.0	0.0
158	0.0	0.21
159	0.0	30.00
160	0.0	26.78
161	0.0	20.00
162	0.0	20.00
163	0.0	4.12
164	0.0	0.0
165	0.0	0.0
166	0.0	0.0
167	0.0	0.0
168	0.0	0.0
169	0.0	0.0
170	0.0	0.0
171	0.0	0.0
172	0.0	0.0
173	0.0	0.0
174	0.0	0.0
175	0.0	0.0
176	0.0	0.0
177	0.0	0.0
178	0.0	0.0
179	0.0	0.0
180	0.0	0.0
181	0.0	0.0
182	0.0	0.0
183	0.0	0.0
184	0.0	20.00
185	0.0	20.00
186	0.0	11.73
187	0.0	0.0
188	0.0	0.0
189	0.0	0.0
190	0.0	0.0
191	0.0	0.0
192	0.0	0.0
193	0.0	0.0
194	0.0	0.0
195	0.0	0.0
196	0.0	0.0
197	0.0	0.0
198	0.0	0.0
199	0.0	0.0
200	0.0	0.0
201	0.0	0.0
202	0.0	0.0
203	0.0	0.0
204	0.0	0.0
205	0.0	0.0
206	0.0	0.0
207	0.0	0.0
208	0.0	0.0
209	0.0	0.0
210	0.0	0.0
211	0.0	0.0
212	0.0	0.0
213	0.0	0.0
214	0.0	73.41
215	0.0	90.00
216	31.30	81.30
217	41.15	90.00
218	44.00	90.00
219	46.41	90.00
220	51.04	82.41
221	66.66	80.00
222	75.03	90.00
223	89.85	90.00
224	96.78	93.88
225	96.91	50.94
226	94.60	17.02
227	99.16	28.60
228	100.00	39.83
229	100.00	30.00
230	100.00	26.69
231	100.98	20.00
232	100.71	20.00
233	100.00	36.06
234	96.16	40.00
235	95.77	30.00
236	94.55	32.75
237	96.86	35.68
238	99.18	30.00
239	100.00	44.93
240	101.81	50.00
241	86.54	(1)
242	63.56	(1)
243	56.00	(1)
244	46.00	(1)
245	41.86	45.18
246	38.31	78.47
247	35.98	80.00
248	31.03	80.00
249	25.36	80.00
250	23.05	60.97
251	18.20	27.34
252	12.84	43.71
253	10.10	68.95
254	3.79	68.95
255	1.48	44.28
256	0.0	0.0
257	0.0	0.0
258	0.0	0.0
259	0.0	0.0
260	0.0	0.0
261	0.0	0.0
262	0.0	0.0
263	0.0	24.97
264	0.0	17.16
265	0.0	6.20
266	0.0	10.00
267	0.0	10.00
268	0.0	0.0
269	0.0	0.0
270	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
271	0.0	0.0
272	0.0	0.0
273	0.0	0.0
274	0.0	0.0
275	0.0	0.0
276	0.0	0.0
277	0.0	0.0
278	0.0	0.0
279	0.0	0.0
280	0.0	0.0
281	0.0	0.0
282	0.0	0.0
283	0.0	0.0
284	0.0	0.0
285	0.0	0.0
286	0.0	0.0
287	0.0	0.0
288	0.0	0.0
289	0.0	0.0
290	0.0	0.0
291	0.0	0.0
292	0.0	0.0
293	0.0	0.0
294	0.0	0.0
295	0.0	0.0
296	0.0	0.0
297	0.0	0.0
298	0.0	0.0
299	0.0	0.0
300	0.0	0.0
301	0.0	0.0
302	0.0	0.0
303	0.0	0.0
304	0.0	0.0
305	0.0	0.0
306	0.0	0.0
307	0.0	0.0
308	0.0	0.0
309	0.0	0.0
310	0.0	0.0
311	0.0	0.0
312	0.0	0.0
313	0.0	0.0
314	0.0	0.0
315	0.0	0.0
316	0.0	0.0
317	0.0	0.0
318	0.0	0.0
319	0.0	0.0
320	0.0	0.0
321	0.0	15.55
322	0.0	20.00
323	24.18	19.08
324	23.00	10.00
325	11.56	1.86
326	6.87	(1)
327	6.00	(1)
328	0.72	(1)
329	0.0	0.0
330	0.0	0.0
331	0.0	0.0
332	0.0	0.0
333	0.0	0.0
334	0.0	0.0
335	0.0	0.0
336	0.0	0.0
337	0.0	0.0
338	0.0	0.0
339	0.0	0.0
340	0.0	0.0
341	0.0	0.0
342	0.0	0.0
343	0.0	0.0
344	0.0	0.0
345	0.0	0.0
346	0.0	0.0
347	0.0	0.0
348	0.0	0.0
349	0.0	0.0
350	0.0	0.0
351	0.0	0.0
352	0.0	0.0
353	0.0	0.0
354	0.0	0.0
355	0.0	0.0
356	0.0	0.0
357	0.0	0.0
358	0.0	0.0
359	0.0	0.0
360	0.0	0.0
361	0.0	0.0
362	0.0	0.0
363	0.0	0.0
364	0.0	0.0
365	0.0	0.0
366	0.0	0.0
367	0.0	0.0
368	0.0	0.0
369	0.0	0.0
370	0.0	0.0
371	0.0	0.0
372	0.0	0.0
373	0.0	0.0
374	0.0	0.0
375	0.0	0.0
376	0.0	0.0
377	0.0	29.59
378	−1.50	87.46
379	8.88	100.00
380	46.04	100.00
381	76.89	100.00
382	80.00	100.00
383	82.14	94.64
384	85.39	83.07
385	87.70	88.51
386	92.00	79.83
387	92.00	61.66
388	94.58	66.77
389	102.88	60.00
390	106.00	72.76
391	109.18	8.43
392	111.91	(1)
393	82.00	(1)
394	79.33	(1)
395	71.15	(1)
396	68.84	(1)
397	78.35	49.17
398	82.00	70.00
399	80.65	69.46
400	92.85	60.00
401	97.48	60.00
402	98.95	60.00
403	100.74	60.00
404	103.68	43.17
405	104.00	10.04
406	80.62	20.00
407	83.37	20.00
408	81.06	15.29
409	80.00	10.00
410	76.86	(1)
411	74.11	(1)
412	71.60	(1)

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
413	70.58	(1)
414	78.00	(1)
415	80.29	1.45
416	80.54	17.30
417	78.23	11.13
418	78.45	19.55
419	84.36	24.16
420	72.16	80.00
421	79.10	74.83
422	90.09	16.04
423	74.04	(1)
424	68.02	(1)
425	68.53	(1)
426	59.39	(1)
427	63.54	(1)
428	70.00	2.38
429	73.10	17.76
430	72.13	(1)
431	67.27	(1)
432	36.03	(1)
433	20.75	(1)
434	11.49	(1)
435	−2.09	0.0
436	−0.73	0.0
437	8.57	60.00
438	30.55	61.93
439	67.10	63.00
440	86.03	39.85
441	89.33	30.00
442	91.64	30.00
443	97.88	10.40
444	97.73	1.37
445	96.00	10.00
446	96.00	0.96
447	96.00	(1)
448	85.27	28.34
449	87.54	30.76
450	86.16	29.18
451	88.00	20.00
452	87.21	20.00
453	86.00	20.00
454	87.42	20.00
455	88.00	11.32
456	77.84	(1)
457	72.00	(1)
458	71.32	(1)
459	70.00	0.04
460	70.00	(1)
461	74.88	(1)
462	74.06	(1)
463	67.74	(1)
464	66.00	(1)
465	64.23	(1)
466	62.00	(1)
467	55.94	(1)
468	54.00	(1)
469	66.43	(1)
470	75.21	70.00
471	86.00	54.53
472	86.00	24.56
473	88.81	(1)
474	90.00	(1)
475	105.48	(1)
476	74.00	(1)
477	73.34	(1)
478	71.02	10.00
479	76.46	29.38
480	81.61	40.00
481	78.16	30.39
482	74.13	26.46
483	90.00	0.0
484	90.87	0.0
485	92.00	(1)
486	93.50	(1)
487	94.00	(1)
488	94.13	(1)
489	88.96	(1)
490	63.25	(1)
491	62.00	(1)
492	49.54	45.37
493	52.49	86.99
494	64.00	90.00
495	64.99	90.00
496	71.93	93.22
497	78.87	95.21
498	82.00	83.64
499	86.76	80.00
500	93.71	80.00
501	94.87	80.00
502	103.60	80.00
503	101.23	41.89
504	95.48	24.85
505	98.00	50.00
506	99.79	50.00
507	106.21	46.82
508	110.84	(1)
509	98.55	(1)
510	70.95	(1)
511	67.27	(1)
512	60.96	(1)
513	48.03	(1)
514	52.31	(1)
515	54.00	(1)
516	65.27	(1)
517	78.00	(1)
518	57.61	(1)
519	42.58	(1)
520	38.81	(1)
521	22.37	(1)
522	3.52	(1)
523	0.0	0.0
524	−1.46	36.39
525	−0.23	5.75
526	0.0	0.0
527	0.0	0.0
528	0.0	0.0
529	0.0	0.0
530	0.0	0.0
531	0.0	0.0
532	0.0	0.0
533	0.0	0.0
534	0.0	0.0
535	0.0	0.0
536	0.0	0.0
537	0.0	0.0
538	0.0	0.0
539	0.0	0.0
540	0.0	0.0
541	0.0	0.0
542	0.0	0.0
543	0.0	0.0
544	0.0	(1)
545	0.0	0.0
546	−0.75	0.0
547	−0.56	0.0
548	4.00	(1)
549	0.68	(1)
550	0.0	0.0
551	0.0	0.0
552	0.0	2.60
553	0.0	20.00
554	0.0	20.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
555	0.0	7.96
556	0.0	0.0
557	0.0	0.0
558	0.0	78.53
559	1.85	60.00
560	11.10	63.88
561	16.00	70.00
562	30.05	70.00
563	42.88	70.00
564	56.10	70.00
565	63.39	66.52
566	70.66	59.94
567	72.98	80.00
568	77.87	86.46
569	88.03	90.00
570	90.00	90.00
571	92.23	100.00
572	94.00	100.00
573	94.86	100.00
574	96.00	100.00
575	97.49	100.00
576	108.84	100.00
577	110.00	83.92
578	104.77	(1)
579	87.50	(1)
580	90.00	0.0
581	91.38	(1)
582	81.84	(1)
583	65.99	(1)
584	63.68	(1)
585	60.73	(1)
586	57.05	(1)
587	53.47	(1)
588	50.42	(1)
589	44.31	(1)
590	37.58	37.91
591	33.48	20.00
592	31.16	20.00
593	28.85	20.00
594	22.13	20.00
595	9.31	(1)
596	0.0	0.0
597	0.0	0.0
598	0.0	0.0
599	0.0	0.0
600	0.0	0.0
601	0.0	0.0
602	0.0	0.0
603	0.0	0.0
604	0.0	0.0
605	0.0	0.0
606	2.52	6.30
607	10.30	17.87
608	13.89	20.00
609	20.20	20.00
610	24.07	22.59
611	33.33	17.50
612	40.30	(1)
613	47.85	(1)
614	66.00	7.78
615	68.00	10.93
616	67.59	32.04
617	66.00	40.00
618	67.04	40.00
619	68.00	40.00
620	68.00	48.33
621	75.93	99.53
622	78.00	100.00
623	78.00	100.00
624	77.07	100.00
625	76.00	100.00
626	76.00	100.00
627	76.00	100.00
628	75.63	100.00
629	73.00	97.50
630	76.81	90.00
631	80.26	90.00
632	83.44	90.00
633	84.00	98.79
634	84.00	100.00
635	83.61	100.00
636	82.00	100.00
637	83.02	94.91
638	86.67	90.00
639	89.65	90.00
640	90.00	99.81
641	89.45	100.00
642	86.00	100.00
643	86.00	95.47
644	87.22	90.00
645	88.00	90.00
646	88.00	80.74
647	88.00	79.17
648	88.00	77.21
649	88.00	100.00
650	88.00	94.45
651	88.00	90.00
652	88.00	90.00
653	90.00	90.00
654	89.63	90.00
655	88.68	90.00
656	90.00	90.00
657	90.00	90.00
658	91.63	81.86
659	92.00	80.00
660	90.00	81.29
661	89.43	92.86
662	87.11	100.00
663	86.00	100.00
664	86.00	100.00
665	89.66	100.00
666	90.00	99.27
667	90.46	90.00
668	92.78	90.00
669	95.09	90.00
670	100.22	82.97
671	102.00	80.00
672	102.00	70.18
673	102.00	80.00
674	97.34	50.07
675	87.02	(1)
676	86.00	(1)
677	73.12	22.19
678	75.77	39.62
679	75.76	48.80
680	75.11	37.23
681	78.00	34.34
682	80.37	40.00
683	77.51	47.49
684	81.44	50.00
685	82.13	39.36
686	84.00	27.79
687	84.00	16.21
688	84.00	15.36
689	85.39	26.93
690	86.00	30.00
691	86.00	30.08
692	85.67	40.00
693	84.65	40.00
694	86.00	35.20
695	87.28	30.00
696	88.00	22.05

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
697	86.09	(1)
698	83.78	(1)
699	81.47	(1)
700	81.70	(1)
701	85.16	(1)
702	84.52	(1)
703	82.21	(1)
704	79.89	(1)
705	77.58	(1)
706	76.00	6.31
707	79.16	0.0
708	75.16	27.36
709	72.00	40.00
710	72.00	40.00
711	74.00	38.44
712	74.00	30.00
713	74.00	30.00
714	74.00	36.28
715	72.43	47.86
716	68.23	59.43
717	73.80	50.00
718	72.52	50.00
719	74.00	45.85
720	72.85	57.18
721	76.38	62.70
722	81.55	60.00
723	80.18	60.00
724	83.60	60.00
725	83.44	56.40
726	86.00	50.00
727	87.35	50.00
728	86.34	50.00
729	86.00	40.11
730	88.29	61.47
731	88.78	63.92
732	86.92	50.00
733	86.76	50.00
734	87.55	42.24
735	88.00	49.34
736	86.00	50.91
737	86.00	67.45
738	86.00	81.88
739	87.13	70.00
740	89.44	77.21
741	91.76	88.78
742	90.07	89.65
743	92.00	80.00
744	92.70	80.00
745	94.00	80.00
746	94.00	80.00
747	94.00	80.00
748	94.00	80.00
749	94.00	81.37
750	94.59	87.05
751	96.00	57.40
752	96.00	42.19
753	96.00	42.33
754	96.00	40.00
755	96.00	38.37
756	96.00	12.83
757	96.00	(1)
758	96.00	(1)
759	96.00	(1)
760	97.74	7.37
761	100.05	19.74
762	102.00	11.83
763	102.00	26.81
764	103.00	49.96
765	104.00	60.00
766	102.37	60.00
767	103.94	60.00
768	104.00	40.00
769	104.00	25.75
770	103.12	(1)
771	100.80	(1)
772	100.00	(1)
773	101.83	44.88
774	102.00	36.40
775	102.00	(1)
776	102.00	(1)
777	100.91	(1)
778	101.40	(1)
779	100.28	(1)
780	97.97	(1)
781	96.00	(1)
782	96.00	10.00
783	96.00	0.23
784	96.00	(1)
785	96.00	(1)
786	94.08	(1)
787	78.00	(1)
788	77.45	(1)
789	71.67	28.96
790	67.18	80.00
791	66.50	87.48
792	71.43	90.00
793	74.13	90.00
794	75.56	92.20
795	74.75	100.00
796	77.07	94.65
797	79.38	83.08
798	80.00	71.51
799	80.01	69.93
800	82.33	58.36
801	84.00	50.00
802	84.00	59.58
803	84.00	76.36
804	84.00	80.00
805	84.00	70.49
806	82.00	80.00
807	81.47	82.66
808	80.00	90.00
809	77.68	90.00
810	74.52	75.24
811	77.58	78.96
812	81.89	80.00
813	80.42	80.00
814	82.00	83.68
815	83.05	79.50
816	84.00	70.00
817	84.00	61.60
818	84.00	50.03
819	86.00	60.00
820	86.00	60.00
821	86.00	69.39
822	88.51	73.73
823	88.43	70.00
824	88.00	70.00
825	94.00	70.99
826	94.51	80.00
827	95.17	80.00
828	95.14	80.00
829	94.54	80.00
830	94.00	80.00
831	94.00	77.89
832	94.00	31.99
833	94.00	43.57
834	94.00	60.28
835	94.00	63.29
836	94.00	76.57
837	94.00	89.86
838	94.29	90.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
839	97.80	87.00
840	102.91	80.00
841	104.00	73.85
842	104.00	62.28
843	104.00	69.29
844	106.00	70.00
845	106.00	62.70
846	106.00	40.00
847	104.88	40.00
848	104.00	32.85
849	104.00	30.00
850	104.00	0.30
851	103.63	11.87
852	100.62	13.12
853	98.00	5.01
854	96.68	10.00
855	96.00	(1)
856	96.00	(1)
857	96.00	(1)
858	95.43	(1)
859	94.00	(1)
860	94.00	(1)
861	95.52	5.18
862	97.83	(1)
863	98.00	(1)
864	98.00	(1)
865	97.22	(1)
866	96.00	6.35
867	96.00	12.98
868	96.00	10.00
869	95.93	10.00
870	92.00	10.00
871	92.00	10.00
872	92.98	14.89
873	94.00	13.54
874	90.79	42.12
875	88.08	40.40
876	86.23	30.00
877	88.00	32.75
878	87.14	44.32
879	84.82	50.00
880	82.51	50.00
881	82.00	50.00
882	82.12	40.00
883	83.13	35.64
884	80.00	20.00
885	84.26	51.95
886	86.62	66.21
887	84.31	60.00
888	81.99	9.96
889	79.35	1.61
890	75.36	19.56
891	73.05	40.00
892	70.73	8.35
893	68.42	(1)
894	47.15	8.95
895	35.79	10.00
896	32.95	7.38
897	29.16	(1)
898	16.47	(1)
899	2.13	(1)
900	0.0	0.0
901	0.0	0.0
902	0.0	0.0
903	0.0	0.0
904	0.0	0.0
905	0.0	0.0
906	0.0	0.0
907	0.0	0.0
908	0.0	0.0
909	0.0	0.0
910	0.0	0.0
911	0.0	0.0
912	0.0	0.0
913	0.0	0.0
914	0.0	0.0
915	0.0	0.0
916	0.0	0.0
917	0.0	0.0
918	0.0	0.0
919	0.0	0.0
920	0.0	0.0
921	0.0	0.0
922	0.0	0.0
923	0.0	0.0
924	0.0	0.0
925	0.0	0.0
926	0.0	0.0
927	0.0	3.67
928	0.0	47.69
929	3.11	59.41
930	9.09	84.54
931	15.62	80.00
932	33.49	80.00
933	37.93	79.29
934	31.20	38.25
935	21.99	26.67
936	30.00	15.10
937	22.23	16.47
938	19.61	28.05
939	20.00	20.38
940	18.33	(1)
941	6.55	(1)
942	15.82	(1)
943	23.63	(1)
944	17.51	(1)
945	14.19	62.52
946	16.64	69.36
947	27.77	60.00
948	37.03	63.79
949	47.36	75.36
950	54.77	80.00
951	57.70	80.00
952	54.03	79.92
953	58.00	65.03
954	58.65	43.23
955	62.88	50.00
956	69.83	50.00
957	72.00	42.05
958	75.81	40.00
959	84.22	42.20
960	83.86	41.28
961	80.55	(1)
962	80.51	(1)
963	78.00	(1)
964	79.79	(1)
965	80.33	30.54
966	85.58	42.12
967	81.78	50.00
968	78.00	50.00
969	80.74	43.16
970	92.10	73.65
971	88.01	(1)
972	84.00	(1)
973	84.00	(1)
974	81.17	(1)
975	70.46	(1)
976	66.00	13.57
977	62.23	29.43
978	64.00	20.00
979	63.48	17.42
980	60.34	10.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
981	56.85	10.00
982	56.00	(1)
983	52.45	(1)
984	39.91	10.00
985	36.38	10.00
986	30.00	10.00
987	27.93	10.00
988	26.00	16.74
989	27.66	3.36
990	28.00	(1)
991	27.41	(1)
992	20.96	(1)
993	12.15	(1)
994	3.81	(1)
995	0.0	0.0
996	0.0	0.0
997	0.0	0.91
998	0.0	7.52
999	0.0	0.0
1,000	0.0	0.0
1,001	0.0	0.0
1,002	0.0	0.0
1,003	0.0	0.0
1,004	0.0	0.0
1,005	0.0	0.0
1,006	0.0	0.0
1,007	0.0	0.0
1,008	0.0	0.0
1,009	0.0	0.0
1,010	0.0	0.0
1,011	0.0	0.0
1,012	0.0	0.0
1,013	0.0	0.0
1,014	0.0	0.0
1,015	0.0	0.0
1,016	0.0	0.0
1,017	0.0	0.0
1,018	0.0	0.0
1,019	0.0	0.0
1,020	0.0	0.0
1,021	0.0	0.0
1,022	0.0	0.0
1,023	0.0	0.0
1,024	0.0	0.0
1,025	0.0	0.0
1,026	0.0	0.0
1,027	0.0	0.0
1,028	0.0	0.0
1,029	0.0	0.0
1,030	0.0	0.0
1,031	1.77	(1)
1,032	1.60	(1)
1,033	0.0	0.0
1,034	0.0	0.0
1,035	2.14	9.28
1,036	3.08	0.0
1,037	0.0	0.0
1,038	0.0	0.0
1,039	0.0	0.0
1,040	0.0	0.0
1,041	0.0	0.0
1,042	0.0	0.0
1,043	0.0	0.0
1,044	0.0	0.0
1,045	0.0	0.0
1,046	0.0	0.0
1,047	0.0	0.0
1,048	0.0	0.0
1,049	0.0	5.51
1,050	0.0	11.34
1,051	0.0	0.0
1,052	0.0	0.0
1,053	0.0	0.0
1,054	0.0	0.0
1,055	0.0	0.0
1,056	0.0	0.0
1,057	0.0	0.0
1,058	0.0	0.0
1,059	0.0	0.0
1,060	0.0	0.21
1,061	0.0	30.00
1,062	0.0	26.78
1,063	0.0	20.00
1,064	0.0	20.00
1,065	0.0	4.12
1,066	0.0	0.0
1,067	0.0	0.0
1,068	0.0	0.0
1,069	0.0	0.0
1,070	0.0	0.0
1,071	0.0	0.0
1,072	0.0	0.0
1,073	0.0	0.0
1,074	0.0	0.0
1,075	0.0	0.0
1,076	0.0	0.0
1,077	0.0	0.0
1,078	0.0	0.0
1,079	0.0	0.0
1,080	0.0	0.0
1,081	0.0	0.0
1,082	0.0	0.0
1,083	0.0	0.0
1,084	0.0	0.0
1,085	0.0	0.0
1,086	0.0	20.00
1,087	0.0	20.00
1,088	0.0	11.73
1,089	0.0	0.0
1,090	0.0	0.0
1,091	0.0	0.0
1,092	0.0	0.0
1,093	0.0	0.0
1,094	0.0	0.0
1,095	0.0	0.0
1,096	0.0	0.0
1,097	0.0	0.0
1,098	0.0	0.0
1,099	0.0	0.0
1,100	0.0	0.0
1,101	0.0	0.0
1,102	0.0	0.0
1,103	0.0	0.0
1,104	0.0	0.0
1,105	0.0	0.0
1,106	0.0	0.0
1,107	0.0	0.0
1,108	0.0	0.0
1,109	0.0	0.0
1,110	0.0	0.0
1,111	0.0	0.0
1,112	0.0	0.0
1,113	0.0	0.0
1,114	0.0	0.0
1,115	0.0	0.0
1,116	0.0	73.41
1,117	0.0	90.00
1,118	31.30	81.30
1,119	41.15	90.00
1,120	44.00	90.00
1,121	46.41	90.00
1,122	51.04	82.41

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1,123	66.66	80.00
1,124	75.03	90.00
1,125	89.85	90.00
1,126	96.78	93.88
1,127	96.91	50.94
1,128	94.60	17.02
1,129	99.16	28.60
1,130	100.00	39.83
1,131	100.00	30.00
1,132	100.00	26.69
1,133	100.98	20.00
1,134	100.71	20.00
1,135	100.00	36.06
1,136	96.16	40.00
1,137	95.77	30.00
1,138	94.55	32.75
1,139	96.86	35.68
1,140	99.18	30.00
1,141	100.00	44.93
1,142	101.81	50.00
1,143	86.54	[1]
1,144	63.56	[1]
1,145	56.00	[1]
1,146	46.00	[1]
1,147	41.86	45.18
1,148	38.31	78.47
1,149	35.98	80.00
1,150	31.03	80.00
1,151	25.36	80.00
1,152	23.05	60.97
1,153	18.20	27.34
1,154	12.84	43.71
1,155	10.10	68.95
1,156	3.79	68.95
1,157	1.48	44.28
1,158	0.0	0.0
1,159	0.0	0.0
1,160	0.0	0.0
1,161	0.0	0.0
1,162	0.0	0.0
1,163	0.0	0.0
1,164	0.0	0.0
1,165	0.0	24.97
1,166	0.0	17.16
1,167	0.0	6.20
1,168	0.0	10.00
1,169	0.0	10.00
1,170	0.0	0.0
1,171	0.0	0.0
1,172	0.0	0.0
1,173	0.0	0.0
1,174	0.0	0.0
1,175	0.0	0.0
1,176	0.0	0.0
1,177	0.0	0.0
1,178	0.0	0.0
1,179	0.0	0.0
1,180	0.0	0.0
1,181	0.0	0.0
1,182	0.0	0.0
1,183	0.0	0.0
1,184	0.0	0.0
1,185	0.0	0.0
1,186	0.0	0.0
1,187	0.0	0.0
1,188	0.0	0.0
1,189	0.0	0.0
1,190	0.0	0.0
1,191	0.0	0.0
1,192	0.0	0.0
1,193	0.0	0.0
1,194	0.0	0.0
1,195	0.0	0.0
1,196	0.0	0.0
1,197	0.0	0.0
1,198	0.0	0.0
1,199	0.0	0.0

[1] Closed throttle motoring.

(3) Optional EPA Engine Dynamometer Schedule for Heavy-duty Otto-cycle engines.

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	−1.78	44.40
26	0.0	85.35
27	4.25	100.00
28	27.47	100.00
29	42.96	100.00
30	45.79	100.00
31	48.11	99.46
32	50.42	90.00
33	52.74	75.23
34	54.00	50.00
35	44.42	8.96
36	45.05	−10.00
37	46.00	9.99
38	37.69	−10.00
39	31.61	5.68
40	22.94	35.29
41	24.00	4.87
42	20.86	−10.00
43	12.45	−10.00
44	6.00	−10.00
45	6.52	−10.00
46	7.17	−10.00
47	2.56	−10.00
48	0.0	0.0
49	0.0	0.0
50	0.0	0.0
51	0.0	10.11
52	4.32	46.40
53	8.90	45.17
54	1.95	50.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
55	3.33	41.68
56	4.00	89.46
57	13.76	55.60
58	26.43	26.96
59	33.85	6.16
60	36.00	−10.00
61	34.45	−10.00
62	34.00	−10.00
63	35.64	−10.00
64	32.99	27.39
65	36.00	80.00
66	41.63	74.37
67	60.41	26.76
68	48.44	−10.00
69	43.86	−10.00
70	40.39	−10.00
71	38.50	4.01
72	35.05	30.00
73	40.66	16.70
74	43.64	26.45
75	45.96	−10.00
76	47.10	−10.00
77	49.29	−10.00
78	37.10	−10.00
79	36.00	−10.00
80	34.47	−10.00
81	32.15	−10.00
82	31.67	−10.00
83	28.48	13.89
84	32.38	90.00
85	36.00	90.00
86	41.69	90.00
87	45.74	90.00
88	49.95	80.00
89	49.10	80.00
90	50.59	62.97
91	45.99	34.98
92	42.76	7.23
93	35.12	−10.00
94	32.06	67.92
95	35.53	62.55
96	46.57	68.60
97	49.77	48.85
98	52.00	60.00
99	58.06	60.00
100	63.66	23.42
101	64.14	17.84
102	59.58	3.76
103	38.00	42.26
104	39.09	30.00
105	40.00	30.00
106	34.85	47.18
107	32.03	10.33
108	34.00	33.48
109	34.00	50.00
110	33.02	20.69
111	25.54	−10.00
112	15.57	−10.00
113	14.00	−10.00
114	14.47	27.64
115	18.00	4.49
116	17.13	−10.00
117	16.00	−10.00
118	10.02	−10.00
119	9.81	−10.00
120	5.88	−10.00
121	4.00	−10.00
122	4.00	−10.00
123	2.93	−10.00
124	0.62	−10.00
125	0.0	0.0
126	0.0	0.0
127	0.0	0.0
128	0.0	0.0
129	0.0	0.0
130	0.0	10.00
131	0.0	10.00
132	0.0	29.02
133	0.0	27.83
134	0.0	7.34
135	0.0	0.0
136	0.0	0.0
137	0.0	0.0
138	0.0	0.0
139	0.0	0.0
140	0.0	0.0
141	0.0	0.0
142	0.0	0.0
143	0.0	0.0
144	0.0	0.0
145	0.0	0.0
146	2.00	0.0
147	1.38	0.0
148	0.0	0.0
149	0.0	6.27
150	0.0	2.16
151	0.0	0.0
152	0.0	0.0
153	0.0	0.0
154	0.83	−10.00
155	2.00	−10.00
156	0.54	−10.00
157	0.0	0.0
158	0.0	0.0
159	0.0	0.0
160	0.0	0.0
161	0.0	0.0
162	0.0	0.0
163	0.0	0.0
164	0.0	0.0
165	0.0	0.0
166	0.0	0.0
167	0.0	22.01
168	1.23	72.29
169	6.63	80.00
170	17.29	89.29
171	22.17	90.00
172	24.00	82.70
173	24.00	31.96
174	24.00	−10.00
175	22.57	−10.00
176	22.00	−10.00
177	13.88	−10.00
178	10.00	−10.00
179	9.31	−10.00
180	3.99	−10.00
181	0.0	0.0
182	0.0	0.0
183	0.0	0.0
184	0.0	0.0
185	0.0	0.0
186	0.0	0.0
187	0.0	0.0
188	0.0	0.0
189	0.0	0.0
190	0.0	0.0
191	0.0	0.0
192	0.0	0.0
193	0.0	0.0
194	0.0	0.0
195	0.0	0.0
196	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
197	0.0	0.0
198	0.0	0.0
199	0.0	0.0
200	0.0	0.0
201	0.0	0.0
202	0.0	0.0
203	0.0	0.0
204	−2.52	6.30
205	−4.22	15.28
206	0.0	10.00
207	0.0	10.00
208	0.0	10.00
209	0.0	75.93
210	0.0	32.22
211	1.67	35.00
212	15.48	29.82
213	25.46	−10.00
214	24.22	−10.00
215	23.44	−10.00
216	12.41	80.00
217	8.94	83.61
218	7.26	84.82
219	16.70	80.00
220	24.67	63.33
221	0.24	79.81
222	0.0	8.52
223	0.0	0.0
224	0.0	0.0
225	0.0	0.0
226	0.0	0.0
227	0.0	0.0
228	0.0	0.0
229	0.0	0.0
230	0.0	0.0
231	0.0	0.0
232	0.0	0.0
233	0.0	17.59
234	0.0	19.63
235	0.0	10.00
236	0.0	10.00
237	0.0	10.00
238	0.0	3.34
239	0.0	0.0
240	0.0	0.0
241	0.0	0.0
242	0.0	0.0
243	0.0	0.0
244	0.0	0.0
245	0.0	0.0
246	0.0	0.0
247	0.0	0.0
248	0.0	0.0
249	0.0	0.0
250	0.0	0.0
251	0.0	0.0
252	0.0	0.0
253	0.0	0.0
254	0.0	0.0
255	0.0	0.0
256	0.0	0.0
257	0.0	0.0
258	0.0	0.0
259	0.0	0.0
260	0.0	0.0
261	0.0	0.0
262	0.0	0.0
263	0.0	0.0
264	0.0	0.0
265	0.0	0.0
266	0.0	0.0
267	0.0	0.0
268	0.0	0.0
269	0.0	0.0
270	0.0	0.0
271	0.0	0.0
272	0.0	0.0
273	0.0	0.0
274	0.0	0.0
275	0.0	0.0
276	0.0	0.0
277	0.0	0.0
278	0.0	0.0
279	0.0	0.0
280	0.0	0.0
281	0.0	4.17
282	1.15	10.00
283	2.00	10.00
284	0.22	10.00
285	0.0	0.0
286	0.0	0.0
287	0.0	0.0
288	0.0	0.0
289	0.0	0.0
290	0.0	0.0
291	0.0	0.0
292	0.0	0.0
293	0.0	0.0
294	0.0	0.0
295	0.0	0.0
296	0.0	0.0
297	0.0	0.0
298	0.0	0.0
299	0.0	0.0
300	0.0	4.07
301	0.0	10.00
302	0.0	17.22
303	0.0	20.00
304	0.0	20.37
305	2.33	31.94
306	16.22	36.48
307	24.00	24.91
308	24.00	13.34
309	19.06	10.00
310	18.00	−10.00
311	17.17	−10.00
312	9.04	−10.00
313	1.09	−10.00
314	0.0	0.0
315	0.0	0.0
316	0.0	0.0
317	0.0	0.0
318	0.0	0.0
319	0.0	0.0
320	0.0	0.0
321	0.0	0.0
322	0.0	0.0
323	0.0	0.82
324	0.37	41.08
325	2.68	90.00
326	6.00	94.99
327	11.94	100.00
328	15.63	100.00
329	41.26	90.28
330	46.26	90.00
331	44.56	67.08
332	36.00	1.12
333	27.58	50.12
334	23.52	90.00
335	24.00	90.00
336	26.29	70.00
337	30.00	65.38
338	30.00	34.47

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
339	30.00	10.00
340	30.00	10.00
341	30.00	10.00
342	30.18	60.00
343	40.00	58.25
344	40.67	50.00
345	41.02	50.00
346	40.00	50.00
347	41.61	50.00
348	42.00	50.00
349	46.00	50.00
350	48.22	50.00
351	59.21	58.69
352	67.18	70.00
353	71.00	70.00
354	72.00	70.00
355	72.13	68.08
356	74.89	28.94
357	68.91	−10.00
358	49.71	−10.00
359	41.84	−10.00
360	38.30	−10.00
361	35.93	−10.00
362	28.00	−10.00
363	23.48	−10.00
364	10.16	−10.00
365	4.72	−10.00
366	0.82	5.90
367	−9.53	19.53
368	2.20	45.60
369	20.53	7.33
370	21.15	0.0
371	17.67	−10.00
372	13.04	−10.00
373	8.41	79.70
374	10.33	100.00
375	17.27	100.00
376	22.00	100.00
377	25.16	100.00
378	29.37	100.00
379	36.73	66.35
380	40.00	−10.00
381	23.50	−10.00
382	9.37	−10.00
383	8.00	−10.00
384	6.74	−10.00
385	2.86	−10.00
386	0.11	−10.00
387	0.0	0.0
388	0.0	0.0
389	0.0	0.0
390	0.0	0.0
391	0.0	0.0
392	0.0	0.0
393	0.0	0.0
394	0.0	0.0
395	0.0	0.0
396	0.0	0.0
397	0.0	0.0
398	0.0	0.0
399	0.0	0.0
400	0.0	0.0
401	0.0	0.0
402	0.0	0.0
403	0.0	0.0
404	0.0	0.0
405	0.0	0.0
406	0.0	0.0
407	0.0	0.0
408	0.0	0.0
409	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
410	0.0	0.0
411	0.0	0.0
412	0.0	0.0
413	0.0	0.0
414	0.0	0.0
415	0.0	0.0
416	0.0	0.0
417	0.0	0.0
418	0.0	0.0
419	2.27	20.00
420	2.82	14.11
421	0.0	0.0
422	0.0	0.0
423	0.0	0.0
424	0.0	0.0
425	0.0	0.0
426	0.0	0.0
427	0.0	0.0
428	0.0	0.0
429	0.0	0.0
430	0.0	0.0
431	0.26	0.78
432	16.60	31.83
433	45.32	29.78
434	43.00	10.00
435	40.69	10.00
436	35.12	10.00
437	28.18	19.70
438	28.26	47.45
439	30.00	30.00
440	30.00	30.00
441	30.00	30.00
442	34.54	30.00
443	36.00	30.00
444	36.43	30.00
445	43.84	30.00
446	50.00	30.00
447	50.00	24.56
448	50.00	20.00
449	50.00	−10.00
450	37.97	−10.00
451	35.30	−10.00
452	30.68	−10.00
453	27.02	−10.00
454	26.00	−10.00
455	26.00	−10.00
456	20.24	−10.00
457	14.00	−10.00
458	13.45	18.27
459	9.40	52.99
460	10.72	81.81
461	15.50	97.48
462	19.62	100.00
463	20.25	100.00
464	25.76	100.00
465	35.02	100.00
466	42.14	94.65
467	44.00	90.00
468	45.70	90.00
469	51.99	60.00
470	50.00	60.00
471	51.29	63.22
472	54.96	70.00
473	56.00	70.00
474	62.35	38.25
475	71.61	30.00
476	76.22	50.00
477	78.00	50.00
478	78.00	41.53
479	55.93	12.58
480	38.52	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
481	34.42	71.65
482	36.11	79.47
483	38.84	67.90
484	42.74	60.00
485	44.00	54.75
486	49.46	36.35
487	52.00	30.00
488	32.05	−10.00
489	25.69	0.0
490	24.00	0.0
491	24.00	−10.00
492	20.24	−10.00
493	10.16	68.43
494	8.00	80.58
495	10.20	80.99
496	13.54	90.00
497	18.00	94.13
498	20.28	100.00
499	22.00	100.00
500	23.77	91.15
501	28.08	90.00
502	30.00	86.01
503	32.85	80.70
504	32.86	100.00
505	33.37	100.00
506	36.00	100.00
507	51.77	100.00
508	60.57	95.72
509	64.00	70.00
510	64.91	70.00
511	75.83	70.00
512	82.00	70.00
513	85.72	51.42
514	86.17	49.14
515	88.49	35.13
516	90.00	15.99
517	91.12	26.74
518	92.00	32.85
519	93.74	30.00
520	89.29	−10.00
521	66.00	41.87
522	67.38	56.88
523	80.02	54.96
524	93.95	66.34
525	97.63	63.69
526	94.11	60.00
527	85.66	−10.00
528	70.00	−10.00
529	69.11	−10.00
530	66.80	−10.00
531	64.48	−10.00
532	53.00	44.98
533	52.73	49.27
534	62.00	40.00
535	62.00	43.88
536	64.18	44.55
537	53.36	4.88
538	46.28	15.79
539	46.00	19.83
540	45.65	10.00
541	45.99	10.00
542	48.05	10.00
543	44.71	3.54
544	48.82	−10.00
545	51.92	66.82
546	47.53	−10.00
547	36.31	9.23
548	17.73	55.68
549	29.43	38.22
550	36.00	37.46
551	36.00	40.00
552	34.00	40.00
553	34.00	40.00
554	34.00	36.25
555	38.26	24.68
556	43.38	61.38
557	50.78	46.12
558	52.00	19.92
559	52.32	0.0
560	52.09	3.19
561	48.00	10.00
562	48.00	10.00
563	48.00	10.00
564	30.94	19.48
565	28.00	20.00
566	28.00	20.00
567	28.00	15.81
568	28.00	10.00
569	26.53	10.00
570	26.00	10.00
571	23.71	−10.00
572	17.59	−10.00
573	11.65	−10.00
574	1.92	−10.00
575	0.0	0.0
576	0.0	0.0
577	0.0	0.0
578	0.0	0.0
579	0.0	0.0
580	0.0	0.0
581	0.0	0.0
582	0.0	0.0
583	1.26	25.19
584	6.72	47.87
585	13.67	40.56
586	16.20	80.00
587	18.52	80.00
588	25.83	75.83
589	35.15	70.00
590	38.93	77.31
591	41.78	80.00
592	40.00	10.00
593	40.00	20.18
594	40.00	52.78
595	40.00	34.82
596	40.00	30.00
597	40.00	38.33
598	40.00	30.09
599	38.30	100.00
600	40.61	100.00
601	42.00	100.00
602	42.00	100.00
603	42.00	100.00
604	42.00	100.00
605	42.00	100.00
606	42.50	97.50
607	43.19	85.93
608	43.13	85.65
609	44.00	90.00
610	44.00	90.00
611	44.00	80.00
612	44.00	80.00
613	44.70	80.00
614	46.00	74.91
615	46.00	63.34
616	46.00	60.00
617	46.00	60.00
618	44.00	10.00
619	44.00	10.00
620	43.09	10.00
621	42.00	10.00
622	42.00	10.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
623	43.85	19.26
624	50.00	90.00
625	50.00	90.00
626	50.00	90.00
627	50.00	90.00
628	50.00	90.00
629	48.26	90.00
630	48.00	89.73
631	48.37	80.00
632	49.32	80.00
633	48.00	80.00
634	48.00	80.00
635	48.00	80.00
636	48.00	70.28
637	48.00	70.00
638	48.00	70.00
639	48.00	74.44
640	48.00	61.96
641	49.52	50.00
642	50.00	50.00
643	50.00	40.00
644	50.00	44.62
645	50.78	60.00
646	52.00	49.09
647	52.00	40.00
648	52.00	40.00
649	52.04	40.89
650	54.00	90.00
651	54.00	90.00
652	54.00	85.10
653	55.29	73.53
654	56.00	70.00
655	56.00	70.00
656	56.00	60.00
657	56.00	57.23
658	56.00	50.00
659	56.00	38.17
660	56.00	30.00
661	56.00	30.00
662	54.00	39.36
663	54.00	27.79
664	54.00	20.00
665	54.00	20.00
666	54.00	20.00
667	54.00	11.49
668	54.00	0.08
669	54.00	13.31
670	54.00	30.00
671	54.96	30.00
672	57.28	30.00
673	56.41	30.00
674	57.91	30.00
675	58.22	36.60
676	60.00	90.00
677	60.00	90.00
678	60.00	95.82
679	60.00	92.60
680	60.00	90.00
681	60.00	90.00
682	60.42	90.00
683	62.74	90.00
684	65.05	90.00
685	66.00	83.16
686	66.00	71.59
687	66.00	70.00
688	66.00	70.00
689	66.00	73.14
690	66.00	80.00
691	66.00	86.28
692	66.00	90.00
693	66.00	90.00
694	68.20	100.00
695	70.00	100.00
696	70.00	100.00
697	70.00	100.00
698	74.38	100.00
699	76.00	100.00
700	72.09	100.00
701	73.60	100.00
702	72.00	100.00
703	72.00	100.00
704	72.00	100.00
705	72.00	100.00
706	72.00	100.00
707	72.29	100.00
708	73.39	100.00
709	72.92	100.00
710	74.00	100.00
711	74.00	100.00
712	77.73	100.00
713	78.00	100.00
714	77.50	100.00
715	76.00	100.00
716	76.00	100.00
717	76.00	100.00
718	72.49	100.00
719	71.79	100.00
720	67.16	100.00
721	72.70	100.00
722	75.02	100.00
723	73.34	100.00
724	73.64	91.78
725	74.00	31.21
726	78.27	28.63
727	80.00	17.05
728	80.00	5.48
729	80.00	−10.00
730	80.00	−10.00
731	80.00	63.93
732	84.00	80.00
733	85.43	82.39
734	87.62	93.96
735	84.00	100.00
736	84.00	100.00
737	84.00	91.32
738	86.00	100.00
739	86.73	100.00
740	90.00	96.59
741	91.99	90.00
742	94.00	90.00
743	95.63	81.87
744	96.00	89.70
745	100.00	98.72
746	100.57	78.60
747	102.88	50.00
748	104.00	73.99
749	104.00	90.00
750	104.00	25.98
751	103.71	20.00
752	99.54	20.00
753	98.00	20.00
754	99.09	25.44
755	98.60	65.08
756	103.15	80.00
757	100.03	80.00
758	102.35	80.00
759	104.00	73.38
760	104.00	55.11
761	101.42	30.62
762	98.39	11.97
763	57.65	−10.00
764	58.00	−10.00

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
765	57.45	−10.00
766	56.00	−10.00
767	56.00	−10.00
768	56.00	27.39
769	56.00	40.00
770	56.00	50.00
771	56.00	45.60
772	56.00	33.77
773	56.00	40.00
774	60.15	5.40
775	62.00	−10.00
776	62.00	−10.00
777	62.00	41.64
778	62.00	59.65
779	62.00	75.21
780	62.00	76.36
781	62.00	80.00
782	62.00	80.00
783	62.00	80.00
784	62.00	80.00
785	61.15	80.00
786	60.00	80.00
787	60.00	87.38
788	60.00	90.00
789	60.00	90.00
790	60.00	90.00
791	60.00	90.00
792	60.00	90.00
793	60.00	83.17
794	60.00	80.00
795	60.00	89.97
796	62.31	90.00
797	64.00	86.88
798	64.00	80.00
799	64.00	80.00
800	64.00	80.00
801	64.00	80.00
802	66.00	70.00
803	66.51	70.00
804	68.00	65.87
805	68.00	60.00
806	68.00	60.00
807	73.31	86.55
808	74.00	90.00
809	74.00	90.00
810	73.29	90.00
811	72.00	84.86
812	73.34	73.29
813	74.00	70.00
814	72.03	70.00
815	71.71	50.00
816	70.00	50.00
817	70.00	50.00
818	68.77	56.15
819	68.00	60.00
820	68.00	60.00
821	68.00	58.28
822	68.00	40.00
823	68.00	48.01
824	68.00	60.00
825	68.00	60.00
826	68.00	60.00
827	68.00	60.00
828	68.00	61.87
829	68.00	70.00
830	69.00	70.00
831	70.00	70.00
832	70.00	70.00
833	70.00	70.00
834	70.00	70.00
835	70.00	70.00
836	70.00	70.00
837	73.61	70.00
838	76.00	62.41
839	76.00	60.00
840	76.00	100.00
841	76.92	100.00
842	80.78	100.00
843	82.00	100.00
844	83.40	100.00
845	84.00	100.00
846	83.97	90.00
847	82.35	90.00
848	85.33	93.31
849	89.95	100.00
850	88.13	100.00
851	89.21	100.00
852	95.76	100.00
853	100.23	100.00
854	102.00	100.00
855	104.59	100.00
856	112.71	100.00
857	113.01	100.00
858	112.00	100.00
859	104.00	−10.00
860	103.56	−10.00
861	102.75	−10.00
862	102.94	−10.00
863	99.24	−10.00
864	94.61	−10.00
865	93.99	−10.00
866	92.32	−10.00
867	93.36	−10.00
868	92.00	−10.00
869	90.73	−10.00
870	88.42	−10.00
871	84.21	−10.00
872	82.00	10.00
873	82.00	7.38
874	82.00	−10.00
875	82.00	−10.00
876	68.79	48.69
877	64.00	70.00
878	64.00	70.00
879	58.66	67.95
880	37.27	60.00
881	34.96	60.00
882	32.65	73.54
883	30.33	80.00
884	28.02	80.00
885	25.70	50.00
886	23.39	37.76
887	21.07	10.00
888	18.76	10.00
889	14.89	−10.00
890	12.13	−10.00
891	5.45	−10.00
892	0.0	0.0
893	0.0	0.0
894	0.0	0.0
895	0.0	0.0
896	0.0	0.0
897	0.0	0.0
898	0.0	0.0
899	0.0	0.0
900	0.0	0.0
901	0.0	0.0
902	0.0	0.0
903	0.0	0.0
904	0.0	0.0
905	0.0	0.0
906	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
907	0.0	0.0
908	0.0	0.0
909	0.0	0.0
910	0.0	0.0
911	0.0	0.0
912	0.0	0.0
913	0.0	0.0
914	0.0	0.0
915	0.0	0.0
916	0.0	0.0
917	0.0	0.0
918	0.0	0.0
919	0.0	0.0
920	−1.78	44.40
921	0.0	85.35
922	4.25	100.00
923	27.47	100.00
924	42.96	100.00
925	45.79	100.00
926	48.11	99.46
927	50.42	90.00
928	52.74	75.23
929	54.00	50.00
930	44.42	8.96
931	45.05	−10.00
932	46.00	9.99
933	37.69	−10.00
934	31.61	5.68
935	22.94	35.29
936	24.00	4.87
937	20.86	−10.00
938	12.45	−10.00
939	6.00	−10.00
940	6.52	−10.00
941	7.17	−10.00
942	2.56	−10.00
943	0.0	0.0
944	0.0	0.0
945	0.0	0.0
946	0.0	10.11
947	4.32	46.40
948	8.90	45.17
949	1.95	50.00
950	3.33	41.68
951	4.00	89.46
952	13.76	55.60
953	26.43	26.96
954	33.85	6.16
955	36.00	−10.00
956	34.45	−10.00
957	34.00	−10.00
958	35.64	−10.00
959	32.99	27.39
960	36.00	80.00
961	41.63	74.37
962	60.41	26.76
963	48.44	−10.00
964	43.86	−10.00
965	40.39	−10.00
966	38.50	4.01
967	35.05	30.00
968	40.66	16.70
969	43.64	26.45
970	45.96	−10.00
971	47.10	−10.00
972	49.29	−10.00
973	37.10	−10.00
974	36.00	−10.00
975	34.47	−10.00
976	32.15	−10.00
977	31.67	−10.00
978	28.48	13.89
979	32.38	90.00
980	36.00	90.00
981	41.69	90.00
982	45.74	90.00
983	49.95	80.00
984	49.10	80.00
985	50.59	62.97
986	45.99	34.98
987	42.76	7.23
988	35.12	−10.00
989	32.06	67.92
990	35.53	62.55
991	46.57	68.60
992	49.77	48.85
993	52.00	60.00
994	58.06	60.00
995	63.66	23.42
996	64.14	17.84
997	59.58	3.76
998	38.00	42.26
999	39.09	30.00
1,000	40.00	30.00
1,001	34.85	47.18
1,002	32.03	10.33
1,003	34.00	33.48
1,004	34.00	50.00
1,005	33.02	20.69
1,006	25.54	−10.00
1,007	15.57	−10.00
1,008	14.00	−10.00
1,009	14.47	27.64
1,010	18.00	4.49
1,011	17.13	−10.00
1,012	16.00	−10.00
1,013	10.02	−10.00
1,014	9.81	−10.00
1,015	5.88	−10.00
1,016	4.00	−10.00
1,017	4.00	−10.00
1,018	2.93	−10.00
1,019	0.62	−10.00
1,020	0.0	0.0
1,021	0.0	0.0
1,022	0.0	0.0
1,023	0.0	0.0
1,024	0.0	0.0
1,025	0.0	10.00
1,026	0.0	10.00
1,027	0.0	29.02
1,028	0.0	27.83
1,029	0.0	7.34
1,030	0.0	0.0
1,031	0.0	0.0
1,032	0.0	0.0
1,033	0.0	0.0
1,034	0.0	0.0
1,035	0.0	0.0
1,036	0.0	0.0
1,037	0.0	0.0
1,038	0.0	0.0
1,039	0.0	0.0
1,040	0.0	0.0
1,041	2.00	0.0
1,042	1.38	0.0
1,043	0.0	0.0
1,044	0.0	6.27
1,045	0.0	2.16
1,046	0.0	0.0
1,047	0.0	0.0
1,048	0.0	0.0

Record (seconds)	Percent	
	Normalized revolutions per minute	Normalized torque
1,049	0.83	−10.00
1,050	2.00	−10.00
1,051	0.54	−10.00
1,052	0.0	0.0
1,053	0.0	0.0
1,054	0.0	0.0
1,055	0.0	0.0
1,056	0.0	0.0
1,057	0.0	0.0
1,058	0.0	0.0
1,059	0.0	0.0
1,060	0.0	0.0
1,061	0.0	0.0
1,062	0.0	22.01
1,063	1.23	72.29
1,064	6.63	80.00
1,065	17.29	89.29
1,066	22.17	90.00
1,067	24.00	82.70
1,068	24.00	31.96
1,069	24.00	−10.00
1,070	22.57	−10.00
1,071	22.00	−10.00
1,072	13.88	−10.00
1,073	10.00	−10.00
1,074	9.31	−10.00
1,075	3.99	−10.00
1,076	0.0	0.0
1,077	0.0	0.0
1,078	0.0	0.0
1,079	0.0	0.0
1,080	0.0	0.0
1,081	0.0	0.0
1,082	0.0	0.0
1,083	0.0	0.0
1,084	0.0	0.0
1,085	0.0	0.0
1,086	0.0	0.0
1,087	0.0	0.0
1,088	0.0	0.0
1,089	0.0	0.0
1,090	0.0	0.0
1,091	0.0	0.0
1,092	0.0	0.0
1,093	0.0	0.0
1,094	0.0	0.0
1,095	0.0	0.0
1,096	0.0	0.0
1,097	0.0	0.0
1,098	0.0	0.0
1,099	−2.52	6.30
1,100	−4.22	15.28
1,101	0.0	10.00
1,102	0.0	10.00
1,103	0.0	10.00
1,104	0.0	75.93
1,105	0.0	32.22
1,106	1.67	35.00
1,107	15.48	29.82
1,108	25.46	−10.00
1,109	24.22	−10.00
1,110	23.44	−10.00
1,111	12.41	80.00
1,112	8.94	83.61
1,113	7.26	84.82
1,114	16.70	80.00
1,115	24.67	63.33
1,116	0.24	79.81
1,117	0.0	8.52
1,118	0.0	0.0
1,119	0.0	0.0
1,120	0.0	0.0
1,121	0.0	0.0
1,122	0.0	0.0
1,123	0.0	0.0
1,124	0.0	0.0
1,125	0.0	0.0
1,126	0.0	0.0
1,127	0.0	0.0
1,128	0.0	17.59
1,129	0.0	19.63
1,130	0.0	10.00
1,131	0.0	10.00
1,132	0.0	10.00
1,133	0.0	3.34
1,134	0.0	0.0
1,135	0.0	0.0
1,136	0.0	0.0
1,137	0.0	0.0
1,138	0.0	0.0
1,139	0.0	0.0
1,140	0.0	0.0
1,141	0.0	0.0
1,142	0.0	0.0
1,143	0.0	0.0
1,144	0.0	0.0
1,145	0.0	0.0
1,146	0.0	0.0
1,147	0.0	0.0
1,148	0.0	0.0
1,149	0.0	0.0
1,150	0.0	0.0
1,151	0.0	0.0
1,152	0.0	0.0
1,153	0.0	0.0
1,154	0.0	0.0
1,155	0.0	0.0
1,156	0.0	0.0
1,157	0.0	0.0
1,158	0.0	0.0
1,159	0.0	0.0
1,160	0.0	0.0
1,161	0.0	0.0
1,162	0.0	0.0
1,163	0.0	0.0
1,164	0.0	0.0
1,165	0.0	0.0
1,166	0.0	0.0
1,167	0.0	0.0

(g) EPA US06 Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

EPA US06 Driving Schedule

[Speed versus Time Sequence]

Time (sec)	Speed (mph)
0	0.0
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.2
7	0.7
8	1.1
9	1.7
10	6.0
11	13.9

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
12	20.5
13	25.7
14	25.0
15	28.4
16	32.3
17	34.6
18	36.5
19	38.4
20	39.9
21	42.2
22	43.8
23	44.2
24	43.4
25	42.6
26	40.3
27	39.2
28	38.4
29	38.4
30	39.2
31	38.8
32	38.8
33	36.5
34	32.3
35	27.6
36	22.3
37	17.3
38	11.5
39	5.8
40	1.2
41	0.0
42	0.0
43	0.0
44	0.0
45	0.0
46	0.0
47	0.0
48	0.0
49	0.8
50	9.2
51	14.9
52	18.2
53	22.2
54	27.2
55	31.4
56	33.8
57	37.2
58	40.8
59	44.0
60	46.3
61	47.6
62	49.5
63	51.2
64	53.0
65	54.4
66	55.6
67	56.4
68	56.1
69	56.2
70	55.8
71	55.1
72	54.4
73	54.2
74	54.4
75	54.2
76	53.5
77	52.3
78	52.0
79	51.9
80	51.8
81	51.9

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
82	52.0
83	52.5
84	53.4
85	54.9
86	56.8
87	58.8
88	60.6
89	62.3
90	64.2
91	66.2
92	67.8
93	69.4
94	70.4
95	70.6
96	70.7
97	70.3
98	68.2
99	66.5
100	64.9
101	63.7
102	62.5
103	61.0
104	59.3
105	57.7
106	56.0
107	54.5
108	52.8
109	51.2
110	49.5
111	48.0
112	46.3
113	44.0
114	41.1
115	38.8
116	37.7
117	36.6
118	35.3
119	30.0
120	24.4
121	19.8
122	15.5
123	10.8
124	6.3
125	3.2
126	2.1
127	1.2
128	0.0
129	0.0
130	0.0
131	0.0
132	0.0
133	0.0
134	0.0
135	0.0
136	2.7
137	9.2
138	16.1
139	22.7
140	29.2
141	34.2
142	38.8
143	43.0
144	45.3
145	46.8
146	48.0
147	49.5
148	50.3
149	51.5
150	52.2
151	52.6

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
152	53.0
153	53.8
154	53.8
155	53.8
156	54.6
157	56.3
158	56.9
159	58.1
160	58.4
161	59.6
162	59.9
163	60.2
164	60.5
165	59.7
166	58.3
167	58.1
168	57.8
169	57.3
170	57.5
171	56.6
172	57.0
173	56.6
174	56.5
175	56.2
176	56.4
177	56.6
178	56.4
179	56.1
180	56.0
181	55.9
182	54.8
183	54.2
184	54.6
185	52.2
186	54.7
187	55.7
188	57.0
189	58.0
190	58.1
191	59.4
192	59.9
193	61.0
194	61.4
195	61.9
196	62.5
197	62.5
198	62.7
199	62.2
200	62.5
201	63.1
202	62.7
203	62.8
204	63.0
205	64.1
206	63.9
207	64.1
208	64.3
209	64.5
210	64.9
211	65.3
212	66.0
213	66.0
214	66.4
215	64.1
216	63.6
217	63.9
218	64.1
219	63.7
220	64.3
221	64.2

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
222	63.9
223	64.2
224	63.4
225	64.0
226	63.9
227	64.0
228	63.8
229	64.0
230	63.3
231	63.4
232	63.9
233	64.0
234	64.3
235	64.8
236	65.1
237	64.0
238	64.2
239	63.1
240	63.7
241	63.1
242	63.7
243	63.5
244	63.0
245	63.1
246	63.0
247	63.3
248	63.4
249	63.3
250	62.5
251	62.5
252	62.9
253	62.8
254	62.2
255	62.4
256	62.3
257	62.3
258	62.4
259	62.1
260	62.5
261	62.8
262	62.3
263	62.3
264	62.4
265	61.9
266	62.8
267	62.8
268	62.3
269	62.8
270	62.4
271	62.1
272	61.9
273	61.8
274	62.1
275	62.1
276	62.1
277	62.0
278	62.4
279	62.2
280	62.2
281	62.4
282	62.7
283	62.6
284	63.7
285	64.3
286	64.8
287	65.1
288	65.9
289	66.1
290	67.0
291	67.2

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
292	67.5
293	68.3
294	68.3
295	68.8
296	69.1
297	69.4
298	71.7
299	72.1
300	74.9
301	72.6
302	72.2
303	72.2
304	72.0
305	72.5
306	72.8
307	72.7
308	71.8
309	71.4
310	71.1
311	71.1
312	70.9
313	71.0
314	71.0
315	71.2
316	72.1
317	72.6
318	73.6
319	74.8
320	75.7
321	77.3
322	78.4
323	79.3
324	78.2
325	76.0
326	75.6
327	76.4
328	77.6
329	78.0
330	79.1
331	79.5
332	79.9
333	79.9
334	80.3
335	80.3
336	79.5
337	79.5
338	79.1
339	78.7
340	77.6
341	76.5
342	74.3
343	72.6
344	70.8
345	67.6
346	66.4
347	66.7
348	66.1
349	65.9
350	66.2
351	66.1
352	67.1
353	67.4
354	68.3
355	68.3
356	68.7
357	68.2
358	68.1
359	68.0
360	67.1
361	66.4

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
362	66.1
363	65.7
364	66.0
365	66.4
366	66.0
367	66.3
368	67.0
369	67.5
370	67.9
371	68.1
372	68.5
373	68.9
374	68.6
375	69.4
376	69.4
377	69.4
378	70.0
379	70.4
380	70.6
381	70.9
382	70.3
383	70.6
384	70.3
385	69.7
386	69.9
387	70.1
388	69.6
389	69.3
390	69.9
391	69.7
392	69.5
393	69.9
394	70.2
395	70.2
396	70.2
397	71.0
398	70.8
399	70.9
400	70.7
401	70.9
402	71.2
403	71.3
404	70.8
405	71.2
406	71.7
407	71.9
408	72.6
409	72.3
410	72.3
411	72.1
412	72.0
413	71.9
414	72.6
415	72.8
416	73.2
417	72.1
418	71.5
419	70.9
420	70.4
421	70.5
422	70.9
423	70.2
424	71.0
425	70.2
426	70.3
427	69.1
428	68.8
429	68.2
430	68.3
431	68.2

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
432	67.7
433	67.3
434	67.5
435	67.6
436	67.6
437	67.2
438	67.0
439	66.3
440	66.6
441	66.2
442	66.4
443	65.9
444	66.1
445	65.5
446	62.2
447	62.2
448	61.4
449	61.1
450	61.4
451	61.1
452	61.4
453	61.4
454	61.8
455	61.8
456	61.8
457	61.8
458	62.2
459	61.8
460	62.2
461	62.6
462	62.2
463	62.6
464	62.2
465	62.6
466	62.6
467	63.0
468	62.6
469	62.2
470	61.1
471	59.5
472	58.8
473	56.8
474	55.7
475	54.1
476	51.5
477	49.2
478	48.8
479	47.6
480	44.9
481	41.5
482	37.2
483	34.6
484	33.0
485	29.2
486	22.3
487	17.7
488	17.3
489	14.0
490	10.0
491	6.0
492	2.0
493	0.0
494	0.0
495	0.0
496	0.0
497	0.0
498	0.0
499	0.0
500	0.0
501	0.2

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
502	4.4
503	10.1
504	15.6
505	20.8
506	25.1
507	27.7
508	28.2
509	26.8
510	24.8
511	22.4
512	17.1
513	11.3
514	6.9
515	7.5
516	11.1
517	15.4
518	19.9
519	24.2
520	27.1
521	28.5
522	28.2
523	25.6
524	21.7
525	17.3
526	12.1
527	7.5
528	5.8
529	2.4
530	1.2
531	1.9
532	6.7
533	11.8
534	16.8
535	21.7
536	25.9
537	27.7
538	28.0
539	27.1
540	24.4
541	20.2
542	15.2
543	9.3
544	5.0
545	2.9
546	2.4
547	8.4
548	13.5
549	17.8
550	22.2
551	26.2
552	30.0
553	29.8
554	26.0
555	21.3
556	16.2
557	11.4
558	6.6
559	2.6
560	0.0
561	0.0
562	0.0
563	0.0
564	0.0
565	0.0
566	0.0
567	0.0
568	0.3
569	6.4
570	12.7
571	19.2

EPA US06 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
572	23.8
573	28.2
574	34.9
575	37.5
576	40.3
577	45.0
578	49.9
579	51.6
580	51.2
581	50.6
582	49.9
583	47.8
584	44.6
585	41.2
586	37.8
587	33.4
588	28.0
589	23.7
590	18.8
591	12.9
592	6.2
593	2.2
594	0.0
595	0.0
596	0.0
597	0.0
598	0.0
599	0.0
600	0.0

(h) EPA SC03 Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

EPA SC03 DRIVING SCHEDULE
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
0	0.0
1	0.0
2	0.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0
19	0.9
20	3.0
21	2.9
22	3.3
23	3.5
24	2.2
25	1.4
26	0.0
27	0.0
28	0.0
29	0.0

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
30	0.0
31	0.0
32	0.0
33	0.4
34	3.3
35	6.0
36	8.0
37	8.7
38	10.0
39	12.4
40	13.8
41	14.7
42	14.8
43	16.6
44	18.3
45	19.0
46	19.2
47	19.3
48	19.7
49	20.5
50	21.0
51	21.2
52	21.6
53	22.2
54	23.8
55	24.6
56	24.3
57	23.3
58	22.7
59	21.4
60	20.4
61	19.5
62	17.9
63	15.6
64	11.7
65	7.8
66	7.2
67	9.3
68	12.9
69	15.8
70	16.2
71	16.9
72	18.3
73	20.3
74	21.6
75	22.4
76	23.0
77	22.8
78	22.1
79	21.2
80	19.5
81	17.1
82	14.1
83	10.5
84	7.6
85	7.5
86	10.0
87	13.1
88	14.1
89	16.4
90	19.6
91	22.4
92	24.7
93	26.1
94	25.8
95	26.6
96	27.8
97	28.5
98	28.9
99	29.3

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
100	29.5
101	29.4
102	29.4
103	29.8
104	30.3
105	30.6
106	30.5
107	30.5
108	30.1
109	29.3
110	28.4
111	27.6
112	26.8
113	25.5
114	23.7
115	21.7
116	19.3
117	16.7
118	14.4
119	11.5
120	7.9
121	6.6
122	9.4
123	12.4
124	14.8
125	16.1
126	19.3
127	22.6
128	25.5
129	26.4
130	26.7
131	27.8
132	29.4
133	31.1
134	32.5
135	33.6
136	34.6
137	35.4
138	36.1
139	37.0
140	37.7
141	38.1
142	38.3
143	38.1
144	37.8
145	36.6
146	34.8
147	33.2
148	32.4
149	32.3
150	32.3
151	32.4
152	32.4
153	32.4
154	32.5
155	33.3
156	34.4
157	35.5
158	36.6
159	37.4
160	38.0
161	38.4
162	38.5
163	38.6
164	38.4
165	38.2
166	37.5
167	36.9
168	36.3
169	34.8

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
170	33.0
171	31.4
172	30.7
173	30.3
174	30.0
175	29.3
176	27.4
177	25.1
178	21.8
179	17.2
180	12.5
181	8.1
182	4.5
183	2.0
184	1.0
185	0.6
186	0.0
187	0.0
188	0.0
189	0.0
190	0.0
191	0.0
192	0.0
193	0.0
194	0.0
195	0.0
196	0.0
197	0.0
198	0.0
199	0.0
200	0.0
201	0.0
202	0.0
203	0.0
204	0.0
205	1.0
206	0.5
207	2.6
208	7.7
209	12.3
210	15.8
211	17.3
212	19.4
213	23.3
214	27.2
215	31.0
216	33.6
217	34.2
218	35.8
219	37.3
220	38.3
221	39.2
222	40.1
223	40.9
224	41.0
225	40.4
226	39.7
227	39.1
228	38.1
229	36.7
230	35.9
231	35.9
232	35.7
233	34.9
234	33.9
235	32.6
236	31.9
237	31.1
238	30.6
239	30.3

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
240	30.1
241	29.9
242	29.8
243	29.8
244	29.8
245	29.8
246	29.7
247	29.7
248	29.6
249	28.4
250	25.8
251	22.8
252	19.0
253	14.0
254	8.6
255	4.1
256	1.3
257	0.0
258	0.0
259	0.0
260	0.0
261	0.0
262	0.0
263	0.0
264	0.0
265	0.0
266	0.0
267	0.0
268	0.0
269	0.0
270	0.0
271	0.0
272	0.0
273	0.0
274	0.0
275	0.0
276	0.0
277	0.0
278	0.0
279	0.0
280	0.0
281	0.1
282	4.5
283	9.1
284	13.6
285	18.2
286	22.6
287	26.2
288	29.3
289	32.1
290	34.5
291	36.8
292	38.4
293	40.0
294	41.2
295	41.9
296	42.2
297	42.7
298	43.0
299	43.3
300	43.5
301	43.7
302	44.3
303	45.4
304	45.9
305	46.8
306	47.6
307	48.2
308	48.6
309	48.7

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
310	48.6
311	49.0
312	49.8
313	50.5
314	51.2
315	52.1
316	52.7
317	53.4
318	52.4
319	54.5
320	54.8
321	54.8
322	54.7
323	54.3
324	54.0
325	53.8
326	53.5
327	53.3
328	52.9
329	52.6
330	52.0
331	51.6
332	51.0
333	50.3
334	49.3
335	48.1
336	46.5
337	43.6
338	40.7
339	37.2
340	34.4
341	31.4
342	28.6
343	24.2
344	18.1
345	12.3
346	8.1
347	4.8
348	2.6
349	2.1
350	0.0
351	0.0
352	0.0
353	0.0
354	0.0
355	0.0
356	0.0
357	0.0
358	0.0
359	0.0
360	0.0
361	0.0
362	0.0
363	0.0
364	0.0
365	0.0
366	0.0
367	0.0
368	0.0
369	0.0
370	0.0
371	4.3
372	9.1
373	13.2
374	16.3
375	19.1
376	20.9
377	22.7
378	24.8
379	26.9

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
380	28.8
381	30.0
382	30.4
383	30.6
384	30.9
385	31.1
386	30.8
387	31.1
388	31.5
389	32.4
390	33.1
391	33.3
392	33.4
393	33.7
394	34.1
395	34.7
396	35.0
397	35.4
398	35.8
399	36.0
400	36.2
401	36.3
402	36.4
403	36.5
404	36.9
405	37.2
406	37.3
407	37.8
408	38.2
409	38.6
410	38.8
411	38.6
412	38.9
413	39.0
414	38.8
415	38.6
416	38.1
417	37.6
418	37.6
419	37.3
420	37.0
421	36.6
422	36.2
423	36.0
424	36.0
425	35.5
426	34.5
427	33.0
428	31.0
429	27.5
430	22.6
431	20.0
432	19.0
433	19.4
434	19.2
435	20.6
436	22.9
437	24.6
438	25.5
439	26.9
440	27.3
441	28.2
442	29.6
443	30.2
444	30.7
445	31.3
446	31.7
447	32.2
448	32.5
449	33.0

EPA SC03 DRIVING SCHEDULE—Continued
[Speed versus Time Sequence]

Time (sec)	Speed (mph)
450	33.2
451	33.3
452	33.1
453	32.7
454	32.3
455	31.9
456	31.5
457	31.2
458	30.8
459	30.5
460	30.2
461	29.9
462	30.2
463	30.6
464	30.9
465	31.2
466	31.8
467	32.4
468	32.5
469	32.3
470	32.3
471	32.8
472	32.9
473	32.8
474	32.8
475	33.3
476	33.4
477	32.9
478	32.9
479	32.8
480	32.9
481	32.8
482	32.8
483	32.4
484	31.6
485	30.6
486	30.3
487	30.3
488	29.8
489	29.3
490	28.9
491	28.8
492	29.3
493	30.0
494	30.2
495	30.4
496	30.7
497	30.8
498	29.8
499	28.7
500	28.9
501	29.2
502	29.4
503	28.6
504	27.0
505	27.2
506	26.6
507	23.2
508	21.2
509	21.2
510	20.8
511	17.9
512	13.2
513	9.5
514	6.4
515	4.1
516	2.5
517	0.0
518	0.0
519	0.0

EPA SC03 DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec)	Speed (mph)
520	0.0
521	0.0
522	0.0
523	0.0
524	0.0
525	0.0
526	0.0
527	0.0
528	0.0
529	0.0
530	0.0
531	0.0
532	0.0
533	0.0
534	0.0
535	0.0
536	0.0
537	0.6
538	3.3
539	5.9
540	8.9
541	10.2
542	10.4
543	9.9
544	9.9
545	10.5
546	11.3
547	12.4
548	12.8
549	14.0
550	14.6
551	15.5
552	17.0
553	17.5
554	18.1
555	18.4
556	18.5
557	18.2
558	18.5
559	18.3
560	18.2
561	17.9
562	17.7
563	17.7
564	17.3
565	17.4
566	16.8
567	17.5
568	17.7
569	17.5

EPA SC03 DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec)	Speed (mph)
570	17.6
571	17.3
572	17.4
573	17.6
574	17.6
575	17.9
576	18.0
577	17.8
578	17.7
579	17.5
580	17.7
581	17.7
582	18.1
583	18.4
584	19.2
585	18.9
586	18.0
587	15.6
588	13.3
589	10.0
590	7.7
591	5.8
592	3.7
593	2.4
594	0.0
595	0.0
596	0.0
597	0.0
598	0.0
599	0.0
600	0.0

[42 FR 32989, June 28, 1977, as amended at 43 FR 52924, Nov. 14, 1978; 45 FR 4214, Jan. 21, 1980; 48 FR 1465, Jan. 12, 1983; 48 FR 52239, Nov. 16, 1983; 49 FR 48148, Dec. 10, 1984; 52 FR 47876, Dec. 16, 1987; 54 FR 14612, Apr. 11, 1989; 58 FR 16067, Mar. 24, 1993; 61 FR 54901, Oct. 22, 1996; 63 FR 23501, Apr. 29, 1998; 70 FR 40443, July 13, 2005]

APPENDIX II TO PART 86—TEMPERATURE SCHEDULES

(a) Ambient temperature cycle for the diurnal emission portion of the evaporative emission test (see §86.133).

TABLE I—TEMPERATURE VERSUS TIME SEQUENCE

Use linear interpolation between hourly temperatures

Time (min)	Temp. (°F)	Time (min)	Temp. (°F)	Time (min)	Temp. (°F)
0	72.0	60	72.5	120	75.5
180	80.3	240	85.2	300	89.4
360	93.1	420	95.1	480	95.8
540	96.0	600	95.5	660	94.1
720	91.7	780	88.6	840	85.5
900	82.8	960	80.9	1020	79.0
1080	77.2	1140	75.8	1200	74.7
1260	73.9	1320	73.3	1380	72.6
1440	72.0	1500	72.5	1560	75.5
1620	80.3	1680	85.2	1740	89.4
1800	93.1	1860	95.1	1920	95.8
1980	96.0	2040	95.5	2100	94.1
2160	91.7	2220	88.6	2280	85.5

TABLE I—TEMPERATURE VERSUS TIME SEQUENCE—Continued

Use linear interpolation between hourly temperatures					
Time (min)	Temp. (°F)	Time (min)	Temp. (°F)	Time (min)	Temp. (°F)
2340	82.8	2400	80.9	2460	79.0
2520	77.2	2580	75.8	2640	74.7
2700	73.9	2760	73.3	2820	72.6
2880	72.0	2940	72.5	3000	75.5
3060	80.3	3120	85.2	3180	89.4
3240	93.1	3300	95.1	3360	95.8
3420	96.0	3480	95.5	3540	94.1
3600	91.7	3660	88.6	3720	85.5
3780	82.8	3840	80.9	3900	79.0
3960	77.2	4020	75.8	4080	74.7
4140	73.9	4200	73.3	4260	72.6
4320	72.9				

[58 FR 16070, Mar. 24, 1993]

APPENDIX III TO PART 86—CONSTANT VOLUME SAMPLER FLOW CALIBRATION

The following calibration procedure outlines the equipment, the test setup configuration, and the various parameters which must be measured to establish the flow rate of the constant volume sampler pump. All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump. The calculated flow rate (ft^3/rev@ pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value of a specific combination of pump parameters. The linear equation which relates the pump flow and the correlation function is then determined. In the event that a CVS has a multiple speed drive, a calibration for each range should be performed.

This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Three conditions must be maintained to assure the accuracy and integrity of the calibration curve. First, the pump pressures should be measured at taps on the pump rather than at the external piping on the pump inlet and outlet. Pressure taps that are mounted at the top and bottom center of the pump drive headplate are exposed to the actual pump cavity pressures, and therefore reflect the absolute pressure differentials. Secondly, temperature stability must be maintained during the calibration. The laminar flowmeter is sensitive to inlet temperature oscillations which cause the data points to be scattered. Gradual changes (±2 °F) in temperature are acceptable as long as they occur over a period of several minutes. Finally, all connections between the flowmeter and the CVS pump must be absolutely void of any leakage.

During a CVS emissions test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

After the calibration curve has been obtained, a verification test of the entire system can be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system.

Equipment:

The following list of equipment will be needed to perform this calibration procedure. Figure 1 illustrates a typical equipment arrangement used for calibration. All of the equipment involved should conform to the range and accuracy as specified in Figure 1.

Equipment List:

1. LFE—Laminar Flowmeter
2. Micromanometer
3. Thermometer
4. Timer
5. U-Tube Manometers
6. Temperature Indicator with type J Thermocouples
7. A variable flow restrictor with appropriate piping to connect the CVS pump and LFE.

After the system has been connected as shown in Figure 1, set the variable restrictor in the wide open position and run the CVS pump for twenty minutes. Record the calibration data.

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerance
Barometric pressure (corrected)	P_B	"Hg	±.01 "Hg.

CALIBRATION DATA MEASUREMENTS—Continued

Parameter	Symbol	Units	Tolerance
Ambient temperature	T_A	°F	±.5 °F.
Air Temperature into LFE	ETI	°F	±.1 °F.
Pressure depression upstream of LFE	EPI	''H20	±.1''H20.
Pressure drop across the LFE matrix	EDP	''H20	±.005''H20.
Air temperature at CVS pump inlet	PTI	°F	±.5 °F.
Pressure depression at CVS pump inlet	PPI	''Fluid	±.05''Fluid.
Specific gravity of manometer fluid	Sp. Gr.		
Pressure head at CVS pump outlet	PPO	''Fluid	±.05''Fluid.
Air temperature at CVS pump outlet (optional)	PTO	°F	±.5 °F.
Pump revolutions during test period	N	Revs	None.
Elapsed time for test period	t	Seconds	±.05 Seconds.

NOTE: The fluid level in the manometer tube should stabilize before the reading is made and the elapsed time for revolution counting should be greater than 120 seconds.

Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression (about 4″ H_2O) that will yield a minimum of six data points for the total calibration.

Allow the system to stabilize for 3 minutes and repeat the data acquisition.

Data Analysis:

The data recorded during the calibration are to be used in the following calculations.

1. The air flow rate at each test point is calculated in standard cubic feet per minute (Qs) from the flowmeter data using the manufacturer's prescribed method.

2. The air flow rate is then converted to pump flow, Vo, in cubic feet per revolution at absolute pump inlet temperature and pressure.

$V_o = Qs/n \times T_p/530 \times 29.92/P_p$

where:

Qs=Meter air flow rate in standard cubic feet per minute (flowmeter standard conditions are 70 °F, 29.92 ''Hg).

n=Pump speed in revolutions per minute.

P_p=Absolute pump inlet pressure, in (''Hg).

$P_p = P_B - PPI$ (SP.GR./13.57), T_p = PTI + 460.

3. The correlation function at each test point is then calculated from the calibration data, as follows:

$$X_o = \frac{1}{n}\sqrt{\frac{\Delta P_v}{P_e}}$$

ΔP_p = The pressure differential from pump inlet to pump outlet in (''Hg).

$\Delta P_p = P_e - P_p$

P_e=Absolute pump outlet pressure, in (''Hg).

$P_p = P_B + PPO$ (Sp. Gr./13.57)

See §86.177–22 for other definitions.

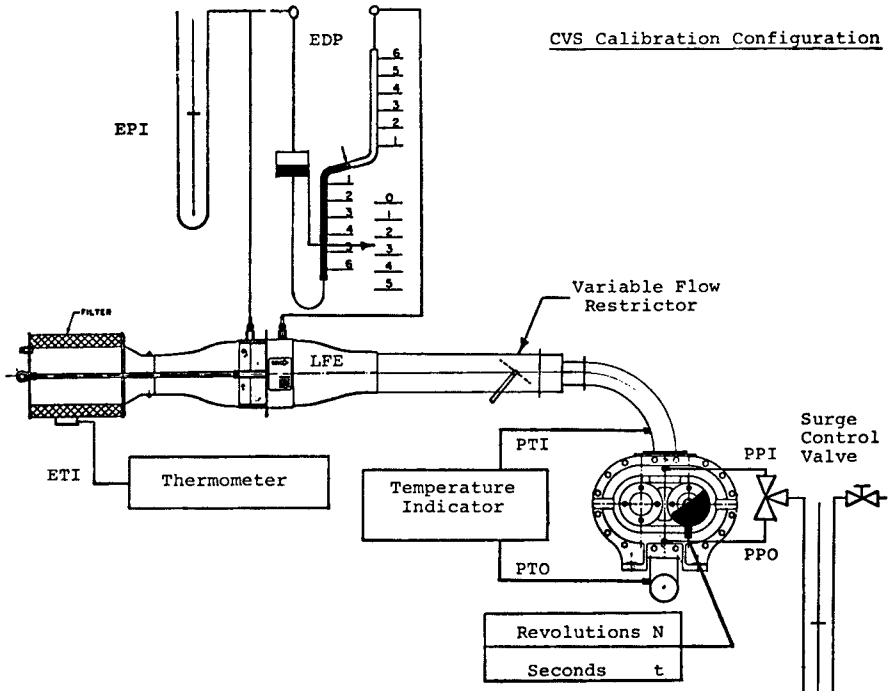
4. A linear least squares fit is performed to generate the calibration equations which have the forms

$V_o = D_o - M(X_o)$

$n = A - B(P_p)$

Do, M, A, and B are the slope-intercept constants describing the lines.

A CVS system that has multiple speeds should be calibrated on each speed used. The calibration curves generated for the ranges will be approximately parallel and the intercept values, D_o, will increase as the pump flow range decreases.



Unit		Range	Accuracy
	ETI	0-100 °F	± .1 °F
LFE	EPI	0-10 "H_2O	± .1 "H_2O
	EDP	0-10 "H_2O	± .005 "H_2O
	PTI	0-250 °F	± .5 °F
	PPI	0-36 "Fluid	± .05 "Fluid
	PPO	0-36 "Fluid	± .05 "Fluid
Pump	PTO	0-250 °F	± .5 °F
	N	0-100,000	± 0
	t	0-10,000 secs.	± .05 secs.

Note: Fluid used in 36 inch manometer should extend range to at least 0-60 "H_2O. Separate manometers for PPI and PPO may be used during calibration.

Figure I—CVS Calibration Configuration

If the calibration has been performed carefully, the calculated V_o values from the equation will be within ±.50% of the measured value of V_o. Values of M will vary from one pump to another, but values of D_o for pumps of the same make, model, and range should agree within ±3 percent of each other. Particulate influx from use will cause the pump slip to decrease as reflected by lower values for M. Calibrations should be performed at 0, 30, 100, 200, 400, etc. hours of pump operation to assure the stability of the pump slip rate. Analysis of mass injection data will also reflect pump slip stability.

CVS System Verification:

The following technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system.

1. Obtain a small cylinder that has been charged with pure propane or carbon monoxide gas (caution—carbon monoxide is poisonous!). Critical flow orifice devices can also be used for constant flow metering.

2. Determine a reference cylinder weight to the nearest 0.01 gram.

3. Operate the CVS in the normal manner and release a quantity of pure propane or

carbon monoxide into the system during the sampling period.

4. The calculations of §86.177–22 are performed in a normal way except, in the case of propane, the density of propane (17.30 grams/cu./ft./carbon atom) is used in place of the density of exhaust hydrocarbons. In the case of carbon monoxide, the density of 32.97 grams/cu. ft. is used.

5. The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

6. The cause for any discrepancy greater than ±2 percent should be found and corrected. The following list of parametric errors may assist the operator in locating the cause of large errors.

Positive Error (Indication is higher than true value):

1. Calculated V_o is greater than actual V_o.

a. Original calibration in error.

2. Pump inlet temperature recorder is reading low. A 6 °F. discrepancy will give a 1 percent error.

3. Pump inlet pressure indicator is reading high. A 3.5 in. H_2O high reading will give 1 percent error.

4. Background concentration reading is too low. Check analyzer zero. Check leakage at floor inlet.

5. Analyzer is reading high. Check span.

6. Barometer reading is in error (too high). Barometric pressure reading should be gravity and temperature corrected.

7. Revolution counter is reading high (Check pump speed and counters.)

8. Mixture is stratified causing the sample to be higher than the average concentration in the mixture. Negative Error (Indication is lower than true value):

1. Calculated V_o is less than actual V_o.

a. Original calibration in error.

b. Pump clearances decreased due to influx of some surface adherent material. Recalibration may be needed.

2. Pump inlet temperature recorder is reading high.

3. Pump inlet pressure indicator is reading low.

4. Background concentration reading is too high.

5. Analyzer is reading low.

6. Barometer reading is in error (too low).

7. Revolution counter is reading low.

8. There is a leak into the sampling system. Pressure check the lines and fittings on the intake side of sample transfer pumps on both the CVS and analyzer console.

[42 FR 33000, June 28, 1977]

APPENDIX IV TO PART 86—DURABILITY DRIVING SCHEDULES

(a) Durability Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

The schedule consists basically of 11 laps of a 3.7 mile course. The basic vehicle speed for each lap is listed below:

Lap	Speed miles per hour
1	40
2	30
3	40
4	40
5	35
6	30
7	35
8	45
9	35
10	55
11	70

During each of the first nine laps there are 4 stops with 15 second idle. Normal accelerations and decelerations are used. In addition, there are 5 light decelerations each lap from the base speed to 20 m.p.h. followed by light accelerations to the base speed.

The 10th lap is run at a constant speed of 55 m.p.h.

The 11th lap is begun with a wide open throttle acceleration from stop to 70 m.p.h. A normal deceleration to idle followed by a second wide open throttle acceleration occurs at the midpoint of the lap.

(b) Durability Driving Schedule for Motorcycles. The Durability Driving Schedule for Class III Motorcycles may be used for Light-Duty Vehicles and Light-Duty Trucks.

The schedule consists basically of 11 laps of a 6.0 km (3.7 mi) course. The basic vehicle speed for each lap is listed below:

SPEED (KILOMETERS PER HOUR)

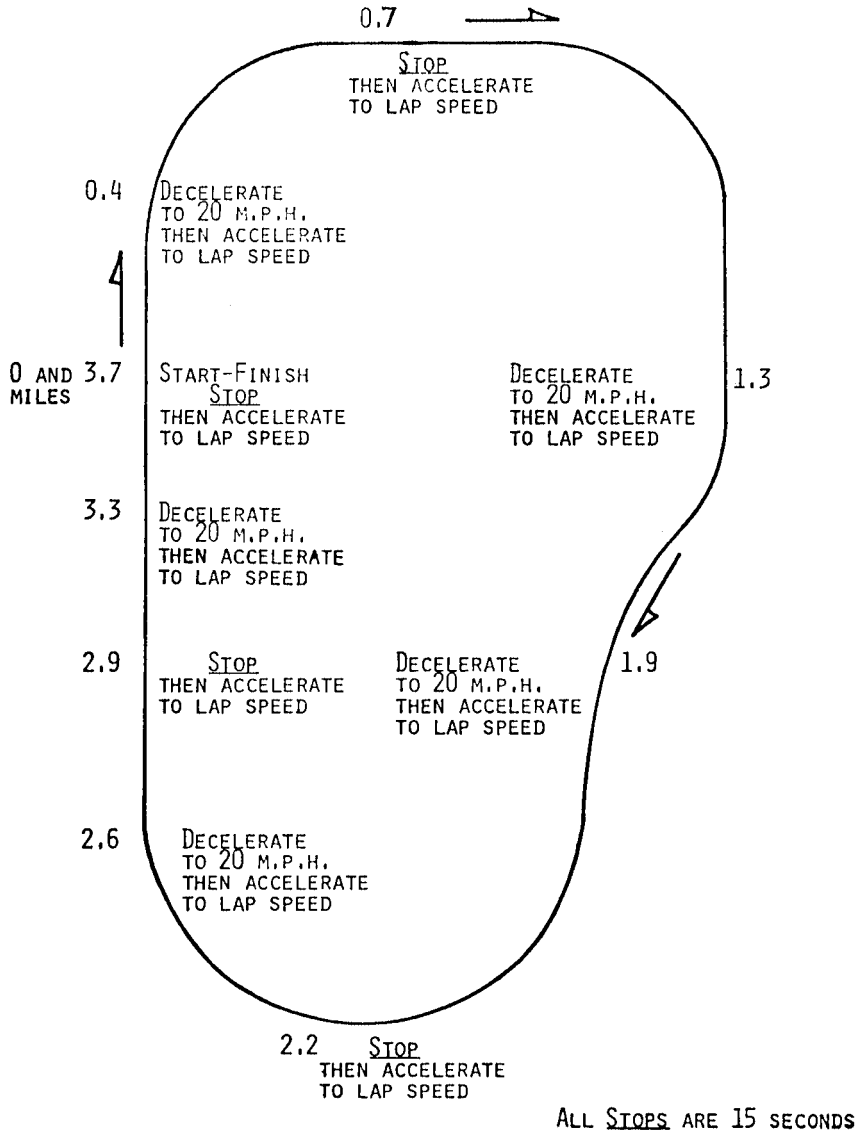
Lap	Class I	Class II	Class III
1	65	65	65
2	45	45	65
3	65	65	55
4	65	65	45
5	55	55	55
6	45	45	55
7	55	55	70
8	70	70	55
9	55	55	46
10	70	90	90
11	70	90	110

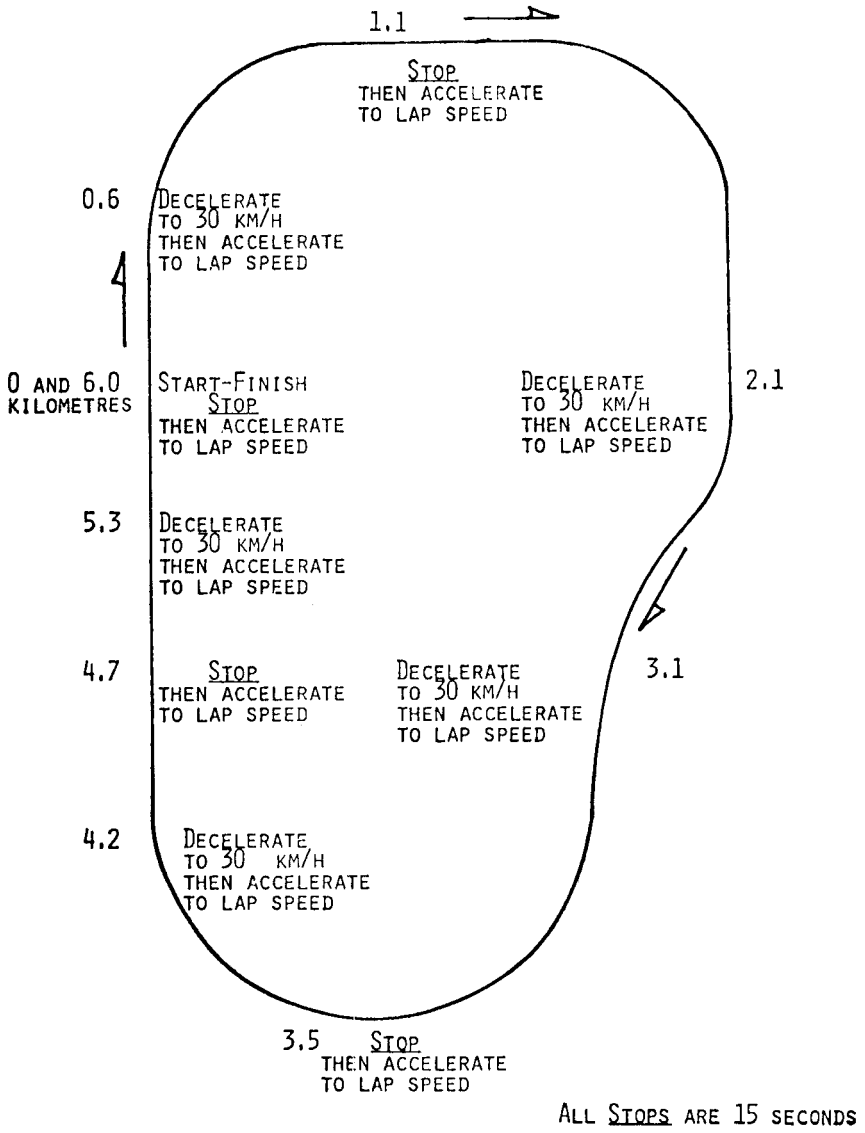
During each of the first nine laps there are 4 stops with 15 second idle. Normal accelerations and decelerations are used. In addition, there are 5 light declerations each lap from the base speed to 30 km/h followed by light accelerations to the base speed.

The 10th lap is run at a constant speed.

The 11th lap is begun with a wide open throttle acceleration from stop. A normal deceleration to idle followed by a second wide open throttle acceleration occurs at the midpoint of the lap.

This schedule may be modified with the advance approval of the Administrator if it results in unsafe operation of the vehicle.





[42 FR 33002, June 28, 1977]

APPENDIX V TO PART 86—THE STANDARD ROAD CYCLE (SRC)

1. The standard road cycle (SRC) is a mileage accumulation cycle that may be used for any vehicle which is covered by the applicability provisions of §86.1801. The vehicle may be run on a track or on a mileage accumulation dynamometer.

2. The cycle consists of 7 laps of a 3.7 mile course. The length of the lap may be changed to accommodate the length of the service-accumulation track.

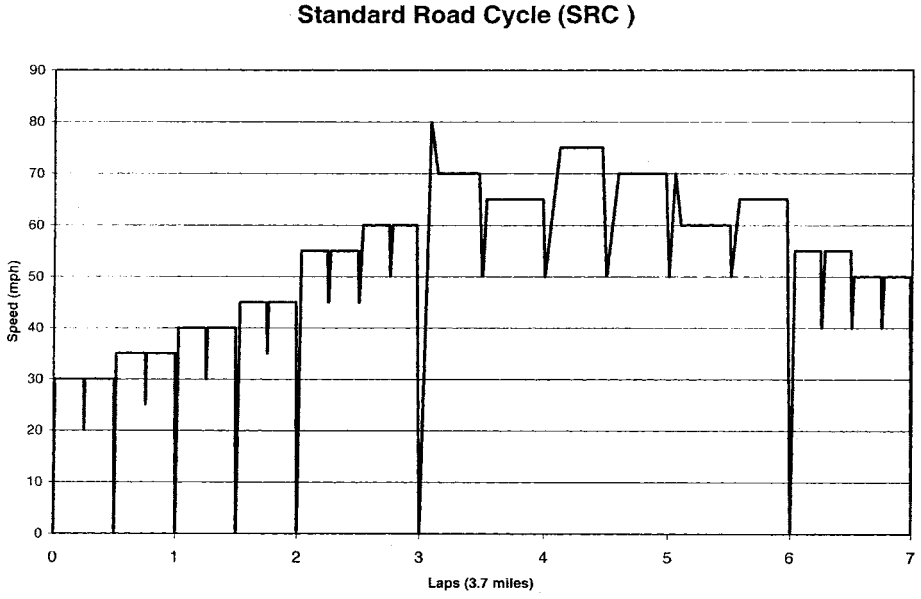
DESCRIPTION OF THE SRC

Lap	Description	Typical accel rate (MPH/s)
1	(start engine) Idle 10 sec	0
1	Mod accel to 30 MPH	4
1	Cruise at 30 MPH for ¼ lap	0
1	Mod. decel to 20 MPH	−5
1	Mod accel to 30 MPH	4
1	Cruise at 30 MPH for ¼ lap	0
1	Mod. decel to stop	−5
1	Idle 5 sec	0
1	Mod accel to 35 MPH	4
1	Cruise at 35 MPH for ¼ lap	0
1	Mod. decel to 25 MPH	−5
1	Mod accel to 35 MPH	4
1	Cruise at 35 MPH for ¼ lap	0
1	Mod. decel to stop	−5
2	Idle 10 sec	0
2	Mod accel to 40 MPH	3
2	Cruise at 40 MPH for ¼ lap	0
2	Mod. decel to 30 MPH	−5
2	Mod accel to 40 MPH	3
2	Cruise at 40 MPH for ¼ lap	0
2	Mod. decel to stop	−5
2	Idle 5 sec	0
2	Mod accel to 45 MPH	3
2	Cruise at 45 MPH for ¼ lap	0
2	Mod. decel to 35 MPH	−5
2	Mod accel to 45 MPH	3
2	Cruise at 45 MPH for ¼, lap	0
2	Mod. decel to stop	−5
3	Idle 10 sec	0
3	Hard accel to 55 MPH	4
3	Cruise at 55 MPH for ¼ lap	0
3	Mod. decel to 45 MPH	−5
3	Mod accel to 55 MPH	2
3	Cruise at 55 MPH for ¼ lap	0
3	Mod. decel to 45 MPH	−5
3	Mod accel to 60 MPH	2
3	Cruise at 60 MPH for ¼ lap	0
3	Mod. decel to 50 MPH	−5
3	Mod. accel to 60 MPH	2
3	Cruise at 60 MPH for ¼ lap	0
3	Mod. decel to stop	−4
4	Idle 10 sec	0
4	Hard accel to 80 MPH	3
4	Coastdown to 70 MPH	−1
4	Cruise at 70 MPH for ½ Lap	0
4	Mod. decel to 50 MPH	−3
4	Mod accel to 65 MPH	2
4	Cruise at 65 MPH for ½ lap	0
4	Mod. decel to 50 MPH	−3
5	Mod accel to 75 MPH	1
5	Cruise at 75 MPH for ½ lap	0
5	Mod. decel to 50 MPH	−3
5	Lt. accel to 70 MPH	1
5	Cruise at 70 MPH for ½ lap	0
5	Mod. decel 50 MPH	−3
6	Mod accel to 70 MPH	2
6	Coastdown to 60 MPH	−1
6	Cruise at 60 MPH for ½ lap	0
6	Mod. decel to 50 MPH	−4
6	Mod. accel to 65 MPH	1
6	Cruise at 65 MPH for ½ lap	0
6	Mod. decel to stop	−4
7	Idle 45 sec	0
7	Hard accel to 55 MPH	4
7	Cruise at 55 MPH for ¼ lap	0

DESCRIPTION OF THE SRC—Continued

Lap	Description	Typical accel rate (MPH/s)
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 55 MPH	2
7	Cruise at 55 MPH for ¼ lap	0
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 50 MPH	2
7	Cruise at 50 MPH for ¼ lap	0
7	Mod. decel to 40 MPH	−5
7	Mod. accel to 50 MPH	2
7	Cruise at 50 MPH for ¼ lap	0
7	Mod. decel to stop	−5

The standard road cycle is represented graphically in the following figure:



[71 FR 2837, Jan. 17, 2006]

APPENDIX VI TO PART 86—VEHICLE AND ENGINE COMPONENTS

(a) Light-Duty Vehicles, Light-Duty Trucks, Motorcycles, and Gasoline-Fueled Heavy-Duty Engines.

I. Basic Mechanical Components-Engine.

(1) Intake and exhaust valves.

(2) Drive belts.

(3) Manifold and cylinder head bolts.

(4) Engine oil and filter.

(5) Engine coolant.

(6) Cooling system hoses and connections.

(7) Vacuum fittings, hoses, and connections.

(8) Oil injection metering system.

II. Fuel System.

(1) Fuel specification-octane rating, lead content.

(2) Carburetor-idle RPM, mixture ratio.

(3) Choke mechanism.

(4) Fuel system filter and fuel system lines and connections.

(5) Choke plate and linkage.

III. Ignition Components.

(1) Ignition timing and advance systems.

(2) Distributor breaker points and condenser.
(3) Spark plugs.
(4) Ignition wiring.
(5) Operating parts of distributor.
IV. Crankcase Ventilation System.
(1) PCV valve.
(2) Ventilation hoses.
(3) Oil filter breather cap.
(4) Manifold inlet (carburetor spacer, etc.).
V. External Exhaust Emission Control System.
(1) Secondary air injection system hoses.
(2) Air system manifolds.
(3) Control valves and air pump.
(4) Manifold reactors.
(5) Catalytic converters.
(6) Exhaust recirculation.
(7) Water injection.
VI. Evaporative Emission Control System.
(1) Engine compartment hose connections.
(2) Carbon storage media.
(3) Fuel tank pressure-relief valve operation.
(4) Fuel vapor control valves.
VII. Air Inlet Components.
(1) Carburetor air cleaner filter.
(2) Hot air control valve.
(b) Diesel Light-Duty Vehicles, Diesel Light-Duty Trucks, and Diesel Heavy-Duty Engines.
I. Engine Mechanical Components.
(1) Valve train.
(2) Cooling system.
a. Coolant.
b. Thermostat.
c. Filter.
(3) Lubrication.
a. Oil filter.
b. Lubricant.
II. Fuel System.
(1) Fuel type.
(2) Fuel pump.
(3) Fuel filters.
(4) Injectors.
(5) Governor.
III. Air Inlet Components.
(1) Air cleaner.
(2) Inlet ducting.
IV. External Exhaust Emission Control System.
(1) Rack limiting devices (aneroid, throttle delay, etc.).
(2) Manifold reactors.
(3) Catalytic converters.
(4) Exhaust recirculation.
(5) Water injection.

[42 FR 33004, June 28, 1977]

APPENDIX VII TO PART 86—STANDARD BENCH CYCLE (SBC)

1. The standard bench aging durability procedures [Ref. §86.1823–08(d)] consist of aging a catalyst-oxygen-sensor system on an aging bench which follows the standard bench cycle (SBC) described in this appendix.

2. The SBC requires use of an aging bench with an engine as the source of feed gas for the catalyst.

3. The SBC is a 60-second cycle which is repeated as necessary on the aging bench to conduct aging for the required period of time. The SBC is defined based on the catalyst temperature, engine air/fuel (A/F) ratio, and the amount of secondary air injection which is added in front of the first catalyst.

CATALYST TEMPERATURE CONTROL

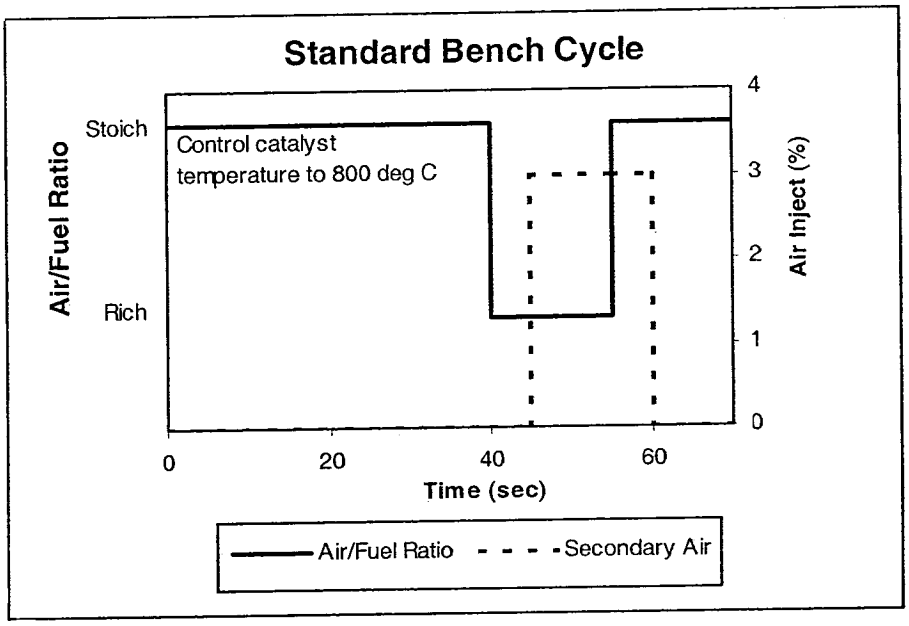
1. Catalyst temperature shall be measured in the catalyst bed at the location where the highest temperature occurs in the hottest catalyst. Alternatively, the feed gas temperature may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and aging bench to be used in the aging process.

2. Control the catalyst temperature at stoichiometric operation (01 to 40 seconds on the cycle) to a minimum of 800 °C (± 10 °C) by selecting the appropriate Engine speed, load, and spark timing for the engine. Control the maximum catalyst temperature that occurs during the cycle to 890 °C (± 10 °C) by selecting the appropriate A/F ratio of the engine during the ''rich'' phase described in the table below.

3. If a low control temperature other than 800 °C is utilized, the high control temperature shall be 90 °C higher than the low control temperature.

STANDARD BENCH CYCLE (SBC)

Time (seconds)	Engine air/fuel ratio	Secondary air injection
01–40	14.7 (stoichiometric, with load, spark timing, and engine speed controlled to achieve a minimum catalyst temperature of 800 °C).	None
41–45	''Rich'' (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C, or 90° higher than low control temperature).	None
46–55	''Rich'' (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C, or 90° higher than low control temperature).	3% (± 0.1%)
56–60	14.7 (stoichiometric, same load, spark timing, and engine speed as used in the 01–40 sec period of the cycle).	3% (± 0.1%)



[71 FR 2837, Jan. 17, 2006]

APPENDIX VIII TO PART 86—AGING BENCH EQUIPMENT AND PROCEDURES

This appendix provides specifications for standard aging bench equipment and aging procedures which may be used to conduct bench aging durability under the provisions of §86.1823–08.

1. Aging Bench Configuration

The aging bench must provide the appropriate exhaust flow rate, temperature, air-fuel ratio, exhaust constituents and secondary air injection at the inlet face of the catalyst.

a. The EPA standard aging bench consists of an engine, engine controller, and engine dynamometer. Other configurations may be acceptable (*e.g.* whole vehicle on a dynamometer, or a burner that provides the correct exhaust conditions), as long as the catalyst inlet conditions and control features specified in this appendix are met.

b. A single aging bench may have the exhaust flow split into several streams providing that each exhaust stream meets the requirements of this appendix. If the bench has more than one exhaust stream, multiple catalyst systems may be aged simultaneously.

2. Fuel and Oil

The fuel used by the engine shall comply with the mileage accumulation fuel provisions of §86.113 for the applicable fuel type (*e.g.*, gasoline or diesel fuel). The oil used in the engine shall be representative of commercial oils and selected using good engineering judgement.

3. Exhaust System Installation

a. The entire catalyst(s)-plus-oxygen-sensor(s) system, together with all exhaust piping which connects these components, [the ''catalyst system''] will be installed on the bench. For engines with multiple exhaust streams (such as some V6 and V8 engines), each bank of the exhaust system will be installed separately on the bench.

b. For exhaust systems that contain multiple in-line catalysts, the entire catalyst system including all catalysts, all oxygen sensors and the associated exhaust piping will be installed as a unit for aging. Alternatively, each individual catalyst may be separately aged for the appropriate period of time.

4. Temperature Measurement

Catalyst temperature shall be measured using a thermocouple placed in the catalyst

bed at the location where the highest temperature occurs in the hottest catalyst (typically this occurs approximately one-inch behind the front face of the first catalyst at its longitudinal axis). Alternatively, the feed gas temperature just before the catalyst inlet face may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and aging bench to be used in the aging process. The catalyst temperature must be stored digitally at the speed of 1 hertz (one measurement per second).

5. Air/Fuel Measurement

Provisions must be made for the measurement of the air/fuel (A/F) ratio (such as a wide-range oxygen sensor) as close as possible to the catalyst inlet and outlet flanges. The information from these sensors must be stored digitally at the speed of 1 hertz (one measurement per second).

6. Exhaust Flow Balance

Provisions must be made to assure that the proper amount of exhaust (measured in grams/second at stoichiometry, with a tolerance of ±5 grams/second) flows through each catalyst system that is being aged on the bench. The proper flow rate is determined based upon the exhaust flow that would occur in the original vehicle's engine at the steady state engine speed and load selected for the bench aging in paragraph (7).

7. Setup

a. The engine speed, load, and spark timing are selected to achieve a catalyst bed temperature of 800 °C (±10 °C) at steady-state stoichiometric operation.

b. The air injection system is set to provide the necessary air flow to produce 3.0% oxygen (±0.1%) in the steady-state stoichiometric exhaust stream just in front of the first catalyst. A typical reading at the upstream A/F measurement point (required in paragraph 5) is lambda 1.16 (which is approximately 3% oxygen).

c. With the air injection on, set the ''Rich'' A/F ratio to produce a catalyst bed temperature of 890 °C (±10 °C). A typical A/F value for this step is lambda 0.94 (approximately 2% CO).

8. Aging Cycle

The standard bench aging procedures use the standard bench cycle (SBC) which is described in Appendix VII to Part 86. The SBC is repeated until the amount of aging calculated from the bench aging time (BAT) equation [ref. §86.1823–08 (d)(3)] is achieved.

9. Quality Assurance

a. The temperatures and A/F ratio information that is required to be measured in paragraphs (4) and (5) shall be reviewed periodically (at least every 50 hours) during aging. Necessary adjustments shall be made to assure that the SBC is being appropriately followed throughout the aging process.

b. After the aging has been completed, the catalyst time-at-temperature collected during the aging process shall be tabulated into a histogram with temperature bins of no larger than 10 °C. The BAT equation and the calculated effective reference temperature for the aging cycle [ref. §86.1823–08(d)] will be used to determine if the appropriate amount of thermal aging of the catalyst has in fact occurred. Bench aging will be extended if the thermal effect of the calculated aging time is not at least 95% of the target thermal aging.

10. Startup and Shutdown

Care should be taken to assure that the maximum catalyst temperature for rapid deterioration (*e.g.*, 1050 °C) does not occur during startup or shutdown. Special low temperature startup and shutdown procedures may be used to alleviate this concern.

[71 FR 2837, Jan. 17, 2006]

APPENDIX IX TO PART 86—EXPERIMENTALLY DETERMINING THE R-FACTOR FOR BENCH AGING DURABILITY PROCEDURES

The R-Factor is the catalyst thermal reactivity coefficient used in the bench aging time (BAT) equation [Ref. §86.1826–08(d)(3)]. Manufacturers may determine the value of R experimentally using the following procedures.

1. Using the applicable bench cycle and aging bench hardware, age several catalysts (minimum of 3 of the same catalyst design) at different control temperatures between the normal operating temperature and the damage limit temperature. Measure emissions (or catalyst inefficiency (1-catalyst efficiency)) for each constituent. Assure that the final testing yields data between one- and two-times the standard.

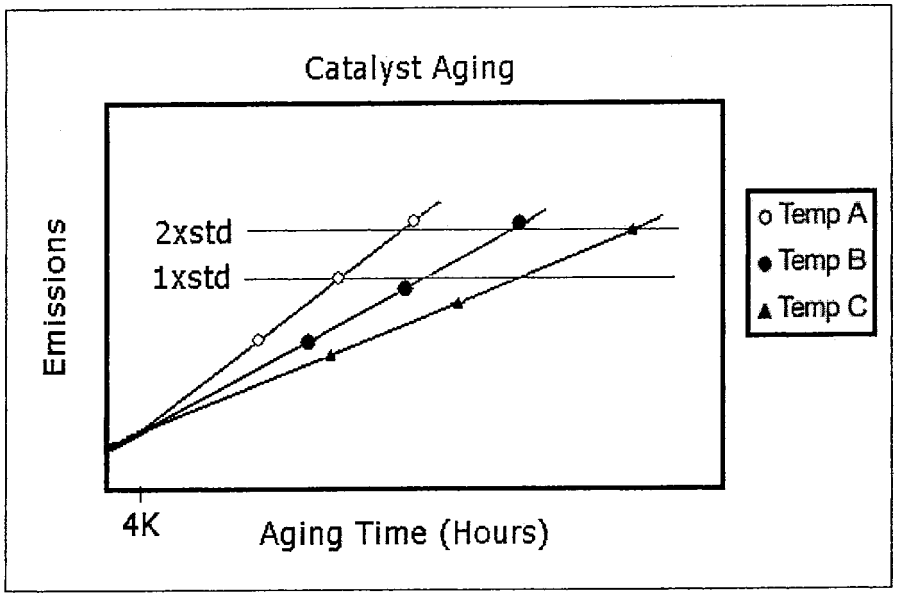
2. Estimate the value of R and calculate the effective reference temperature (T_r) for the bench aging cycle for each control temperature according to the procedure described in §86.1826–08(d)(4).

3. Plot emissions (or catalyst inefficiency) versus aging time for each catalyst. Calculate the least-squared best-fit line through the data. For the data set to be useful for this purpose the data should have an approximately common intercept between 0 and 4000 miles. See the following graph for an example.

4. Calculate the slope of the best-fit line for each aging temperature.

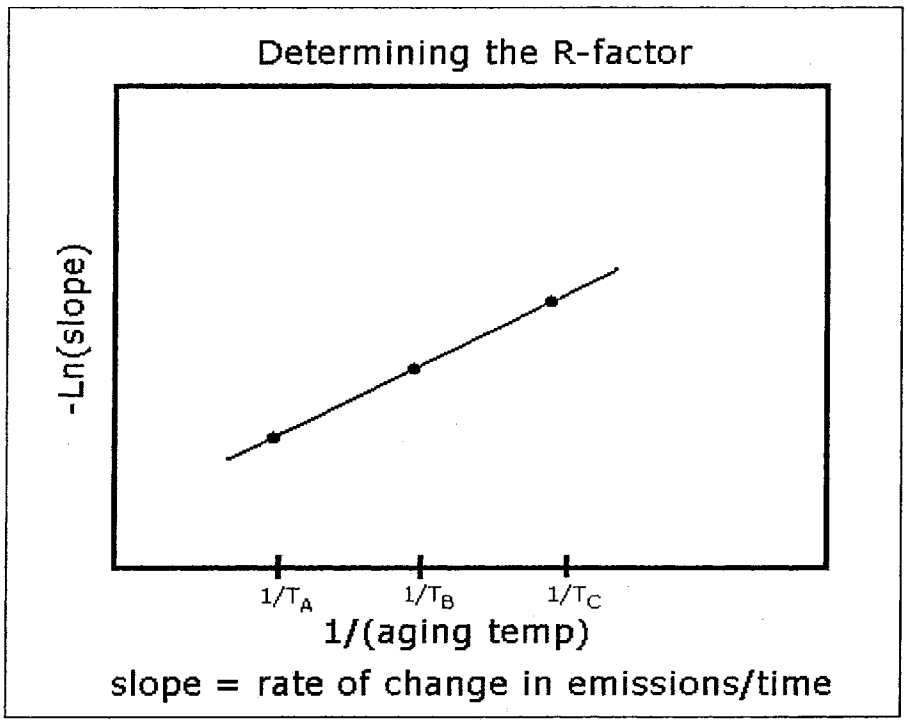
5. Plot the natural log (ln) of the slope of each best-fit line (determined in step 4)

along the vertical axis, versus the inverse of aging temperature (1/(aging temperature, deg K)) along the horizontal axis, Calculate the least-squared best-fit lines through the data. The slope of the line is the R-factor. See the following graph for an example.



6. Compare the R-factor to the initial value that was used in Step 2. If the calculated R-factor differs from the initial value by more than 5%, choose a new R-factor that is between the initial and calculated values, then repeat Steps 2–6 to derive a new R-factor. Repeat this process until the calculated R-factor is within 5% of the initially assumed R-factor.

7. Compare the R-factor determined separately for each constituent. Use the lowest R-factor (worst case) for the BAT equation.



[71 FR 2837, Jan. 17, 2006]

APPENDIX X TO PART 86—SAMPLING PLANS FOR SELECTIVE ENFORCEMENT AUDITING OF HEAVY-DUTY ENGINES AND LIGHT-DUTY TRUCKS

TABLE 1—SAMPLING PLAN CODE LETTER

Annual sales	Code letter
50–99	A.
100–299	B.
300–499	C.
500 or greater	D.

TABLE 2—SAMPLING PLAN FOR CODE LETTER "A"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	(1)	(2)	16	6	11
2	(1)	(2)	17	7	12
3	(1)	(2)	18	7	12
4	0	(2)	19	8	13
5	0	(2)	20	8	13
6	1	6	21	9	14

TABLE 2—SAMPLING PLAN FOR CODE LETTER "A"—Continued

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
7	1	7	22	10	14
8	2	7	23	10	15
9	2	8	24	11	15
10	3	8	25	11	16
11	3	8	26	12	16
12	4	9	27	12	17
13	5	10	28	13	17
14	5	10	29	14	17
15	6	11	30	16	17

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

TABLE 3—SAMPLING PLAN FOR CODE LETTER "B"

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
1	(1)	(2)
2	(1)	(2)
3	(1)	(2)
4	(1)	(2)
5	0	(2)
6	1	6

TABLE 3—SAMPLING PLAN FOR CODE LETTER "B"—Continued

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
7	1	7
8	2	7
9	2	8
10	3	8
11	3	9
12	4	9
13	4	10
14	5	10
15	5	11
16	6	12
17	6	12
18	7	13
19	8	13
20	8	14
21	9	14
22	9	15
23	10	15
24	10	16
25	11	16
26	11	17
27	12	17
28	12	18
29	13	18
30	13	19
31	14	19
32	14	20
33	15	20
34	16	21
35	16	21
36	17	22
37	17	22
38	18	22
39	18	22
40	21	22

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

TABLE 4—SAMPLING PLAN FOR CODE LETTER "C"

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
1	[1]	[2]
2	[1]	[2]
3	[1]	[2]
4	[1]	[2]
5	0	[2]
6	0	6
7	1	7
8	2	7
9	2	8
10	3	9
11	3	9
12	4	10
13	4	10
14	5	11
15	5	11
16	6	12
17	6	12
18	7	13
19	7	13
20	8	14
21	8	14
22	9	15
23	10	15
24	10	16
25	11	16

TABLE 4—SAMPLING PLAN FOR CODE LETTER "C"—Continued

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
26	11	17
27	12	17
28	12	18
29	13	18
30	13	19
31	14	19
32	14	20
33	15	20
34	15	21
35	16	21
36	16	22
37	17	22
38	18	23
39	18	23
40	19	24
41	19	24
42	20	25
43	20	25
44	21	26
45	21	27
46	22	27
47	22	27
48	23	27
49	23	27
50	26	27

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

TABLE 5—SAMPLING PLAN FOR CODE LETTER "D"

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
1	([1])	([2])
2	([1])	([2])
3	([1])	([2])
4	([1])	([2])
5	0	([2])
6	0	6
7	1	7
8	2	8
9	2	8
10	3	9
11	3	9
12	4	10
13	4	10
14	5	11
15	5	11
16	6	12
17	6	12
18	7	13
19	7	13
20	8	14
21	8	14
22	9	15
23	9	15
24	10	16
25	11	16
26	11	17
27	12	17
28	12	18
29	13	19
30	13	19
31	14	20
32	14	20
33	15	21
34	15	21

TABLE 5—SAMPLING PLAN FOR CODE LETTER "D"—Continued

[Sample Inspection Criteria]

Stage	Pass No.	Fail No.
35	16	22
36	16	22
37	17	23
38	17	23
39	18	24
40	18	24
41	19	25
42	19	26
43	20	26
44	21	27
45	21	27
46	22	28
47	22	28
48	23	29
49	23	29
50	24	30
51	24	30
52	25	31
53	25	31
54	26	32
55	26	32
56	27	33
57	27	33
58	28	33
59	28	33
60	32	33

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

[48 FR 1414, Jan. 12, 1983, as amended at 48 FR 52209, Nov. 16, 1983]

APPENDIX XI TO PART 86—SAMPLING PLANS FOR SELECTIVE ENFORCEMENT AUDITING OF LIGHT-DUTY VEHICLES

40% AQL

TABLE 1—SAMPLING PLAN CODE LETTER

Annual sales of configuration	Code letter
50–99	A
100–299	B
300–499	C
500 or greater	D

TABLE 2—SAMPLING PLAN FOR CODE LETTER "A" 40% AQL

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	([1])	([2])
2	([1])	([2])
3	([1])	([2])
4	0	([2])
5	0	([2])
6	1	6
7	1	7
8	2	7
9	2	8
10	3	8
11	3	9
12	4	9

TABLE 2—SAMPLING PLAN FOR CODE LETTER "A" 40% AQL—Continued

[Sample inspection criteria]

Stage	Pass No.	Fail No.
13	5	10
14	5	10
15	6	11
16	6	11
17	7	12
18	7	12
19	8	13
20	8	13
21	9	14
22	10	14
23	10	15
24	11	15
25	11	16
26	12	16
27	12	17
28	13	17
29	14	17
30	16	17

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

TABLE 3—SAMPLING PLAN FOR CODE LETTER "B" 40% AQL

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	([1])	([2])
2	([1])	([2])
3	([1])	([2])
4	([1])	([2])
5	0	([2])
6	1	6
7	1	7
8	2	7
9	2	8
10	3	8
11	3	9
12	4	9
13	4	10
14	5	10
15	5	11
16	6	12
17	6	12
18	7	13
19	8	13
20	8	14
21	9	14
22	9	15
23	10	15
24	10	16
25	11	16
26	11	17
27	12	17
28	12	18
29	13	18
30	13	19
31	14	19
32	14	20
33	15	20
34	16	21
35	16	21
36	17	22
37	17	22
38	18	22
39	18	22
40	21	22

[1] Test sample passing not permitted at this stage.

[2] Test sample failure not permitted at this stage.

TABLE 4—SAMPLING PLAN FOR CODE LETTER "C" 40% AQL

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	[1]	[2]
2	[1]	[2]
3	[1]	[2]
4	[1]	[2]
5	0	[2]
6	0	6
7	1	7
8	2	7
9	2	8
10	3	9
11	3	9
12	4	10
13	4	10
14	5	11
15	5	11
16	6	12
17	6	12
18	7	13
19	7	13
20	8	14
21	8	14
22	9	15
23	10	15
24	10	16
25	11	16
26	11	17
27	12	17
28	12	18
29	13	18
30	13	19
31	14	19
32	14	20
33	15	20
34	15	21
35	16	21
36	16	22
37	17	22
38	18	23
39	18	23
40	19	24
41	19	24
42	20	25
43	20	25
44	21	26
45	21	27
46	22	27
47	22	27
48	23	27
49	23	27
50	26	27

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

TABLE 5—SAMPLING PLAN FOR CODE LETTER "D" 40% AQL

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	[1]	[2]
2	[1]	[2]
3	[1]	[2]
4	[1]	[2]
5	0	[2]
6	0	6
7	1	7
8	2	8
9	2	8
10	3	9
11	3	9
12	4	10
13	4	10
14	5	11
15	5	11
16	6	12
17	6	12
18	7	13
19	7	13
20	8	14
21	8	14
22	9	15
23	9	15
24	10	16
25	11	16
26	11	17
27	12	17
28	12	18
29	13	19
30	13	19
31	14	20
32	14	20
33	15	21
34	15	21
35	16	22
36	16	22
37	17	23
38	17	23
39	18	24
40	18	24
41	19	25
42	19	26
43	20	26
44	21	27
45	21	27
46	22	28
47	22	28
48	23	29
49	23	29
50	24	30
51	24	30
52	25	31
53	25	31
54	26	32
55	26	32
56	27	33
57	27	33
58	28	33
59	28	33
60	32	33

TABLE 5—SAMPLING PLAN FOR CODE LETTER "D" 40% AQL—Continued

[Sample inspection criteria]

[1] Test sample passing not permitted at this stage.
[2] Test sample failure not permitted at this stage.

[49 FR 48485, Dec. 12, 1984]

APPENDIX XII TO PART 86—TABLES FOR PRODUCTION COMPLIANCE AUDITING OF HEAVY-DUTY ENGINES AND HEAVY-DUTY VEHICLES, INCLUDING LIGHT-DUTY TRUCKS

TABLE 1—COMPLIANCE LEVEL DETERMINATION USING THE PRIMARY PCA SAMPLING PLAN

	Compliance level[2]
PCA test sample size.[1]	
24	15
25	15
26	16
27	17
28	17
29	18
30	18
31	19
32	20
33	20
34	21
35	21
36	22
37	23
38	23
39	24
40	24
41	25
42	26
43	26
44	27
45	27
46	28
47	29
48	29
49	30
50	30
51	31
52	32
53	32
54	33
55	33
56	34
57	35
58	35
59	36
60	36

[1] Including the number of SEA tests if applicable.
[2] Is the test result of the sequence number: (The lowest test result is sequence No. 1).

TABLE 2—VALUES OF K FOR THE REDUCED FIXED PCA SAMPLING PLAN

	Value of K
Sample size:	
3	1.602
4	1.114
5	0.895
6	0.764
7	0.674
8	0.608
9	0.555
10	0.513
11	0.478
12	0.448
13	0.422
14	0.399
15	0.379

TABLE 2—VALUES OF K FOR THE REDUCED FIXED PCA SAMPLING PLAN—Continued

	Value of K
16	0.360
17	0.343
18	0.328
19	0.314
20	0.301
21	0.289
22	0.277
23	0.266

TABLE 3—VALUES OF K FOR THE REDUCED SEQUENTIAL PCA SAMPLING PLAN

	Value of K
Sample size:	
4	1.671
8	0.912
12	0.672
16	0.540
20	0.451

[50 FR 35401, Aug. 30, 1985]

APPENDIX XIII TO PART 86—STATE REQUIREMENTS INCORPORATED BY REFERENCE IN PART 86 OF THE CODE OF FEDERAL REGULATIONS

The following is an informational list of the California regulatory requirements applicable to the National Low Emission Vehicle program (October, 1996) incorporated by reference in part 86 of the Code of Federal Regulations (see §86.1).

CALIFORNIA STATE REGULATIONS

(a) State of California; Air Resources Board: California Assembly-Line Test Procedures for 1983 Through 1997 Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, adopted November 24, 1981, amended June 24, 1996.

(b) State of California; Air Resources Board: California Assembly-Line Test Procedures for 1998 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, adopted June 24, 1996.

(c) California Code of Regulations, Title 13, Division 3, Sections 2108, 2109, 2110.

(d) State of California; Air Resources Board: California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, adopted May 20, 1987, amended June 24, 1996, Section 9.a.

(e) State of California; Air Resources Board: California Non-Methane Organic Gas Test Procedures, adopted July 12, 1991, amended June 24, 1996.

(f) State of California; Air Resources Board: Regulations Regarding Malfunction and Diagnostic System Requirements—1994

and Later Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II), California Mail Out #95–34, September 26, 1995, excluding paragraphs (d), (m)(4), and (m)(5).

(g) State of California; Air Resources Board: California Motor Vehicle Emission Control Label Specifications, adopted March 1, 1978, amended June 24, 1996, excluding paragraphs 2(b), 3.5, and 10.

[62 FR 31264, June 6, 1997]

APPENDIX XIV TO PART 86—DETERMINATION OF ACCEPTABLE DURABILITY TEST SCHEDULE FOR LIGHT-DUTY VEHICLES AND LIGHT LIGHT-DUTY TRUCKS CERTIFYING TO THE PROVISIONS OF PART 86, SUBPART R

A manufacturer may determine mileage test intervals for durability-data vehicles subject to the conditions specified in §86.1726. The following procedure shall be used to determine if the schedule is acceptable to the Administrator:

1. Select exhaust system mileage test points and maintenance mileage test points for proposed (prop) schedule.

2. Calculate the sums of the squares corrected to the mean of the system mileages at the proposed test points:

$$A_{prop} = [\sum(X_p)^2 - ((\sum X_p)^2 / N_p))_{prop}$$

Where:

X_p = Individual mileages at which the vehicle will be tested.

N_p = Total number of tests (including before and after maintenance tests).

(Subscript ''p'' refers to proposed test schedule).

3. Determine exhaust system mileage test points and maintenance mileage test points based on testing at five thousand mile intervals from 5,000 miles through the final testing point and maintenance mileage test points selected for the proposed schedule in step 1 of this appendix. This schedule will be designated as the standard (std) test schedule.

4. Calculate the sums of squares corrected to the mean of the standard schedule:

$$B_{std}=[\sum(X_s)^2-((\sum X_s)^2/N_s))_{std}$$

Where:

X_s = Individual mileages at which the vehicle will be tested.

N_s = Total number of tests (including before and after maintenance).

(Subscript ''s'' refers to standard test schedule).

5. Refer to table I and determine t_p at $(N_p - 2)_{prop}$ degrees of freedom and t_s at $(N_s - 2)_{std}$.

6. If $(A_{prop})^{1/2} \geq t_p/t_s \times (B_{std})^{1/2}$ the proposed plan is acceptable.

TABLE I TO APPENDIX XIV

Degrees of freedom (N–2)	t
1	6.314
2	2.920
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.860
9	1.833
10	1.812
11	1.796
12	1.782
13	1.771
14	1.761
15	1.753
16	1.746
17	1.740
18	1.734
19	1.729
20	1.725
21	1.721
22	1.717
23	1.714
24	1.711
25	1.708

[62 FR 31264, June 6, 1997]

APPENDIX XV TO PART 86—PROCEDURE FOR DETERMINING AN ACCEPTABLE EXHAUST REGENERATION DURABILITY-DATA TEST SCHEDULE FOR DIESEL CYCLE VEHICLES EQUIPPED WITH PERIODICALLY REGENERATING TRAP OXIDIZER SYSTEMS CERTIFYING TO THE PROVISIONS OF PART 86, SUBPART R

1. Select exhaust system mileage test points for proposed (prop) schedule.

2. Calculate the sums of the squares corrected to the mean of the system mileages at the proposed test points:

$$A_{prop} = [\sum(X_p)^2 - ((\sum X_p)^2 / N_p))_{prop}$$

Where:

X_p = Individual mileages at which the vehicle will be tested.

N_p = Total number of tests (including before and after maintenance tests).

(Subscript ''p'' refers to proposed test schedule).

3. The exhaust system mileage tests points at 5,000, 25,000, 50,000, 75,000, and 100,000 miles will be designated as the standard (std) test schedule.

4. Calculate the sums of square corrected to the mean of the standard tests schedule:

$$B_{std} = [\sum(X_s)^2 - ((\sum X_s)^2 / N_s))_{std}$$

Where:

X_s = Individual mileages at which the vehicle will be tested.

N_s = Total number of regeneration emission tests.

(Subscript ''s'' refers to standard test schedule)

5. Refer to table I and determine t_p at $(N_p - 2)_{prop}$ degrees of freedom and t_s at $(N_s - 2)_{std}$ degrees of freedom.

6. If $(A_{prop})^{1/2} \geq t_p / t_s \times (B_{std})^{1/2}$ the proposed plan is acceptable.

TABLE I TO APPENDIX XV

Degrees of freedom (N–2)	t
1	6.314
2	2.920
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.860
9	1.833
10	1.812
11	1.796
12	1.782
13	1.771
14	1.761
15	1.753

[62 FR 31264, June 6, 1997]

APPENDIX XVI TO PART 86—POLLUTANT MASS EMISSIONS CALCULATION PROCEDURE FOR GASEOUS-FUELED VEHICLES AND FOR VEHICLES EQUIPPED WITH PERIODICALLY REGENERATING TRAP OXIDIZER SYSTEMS CERTIFYING TO THE PROVISIONS OF PART 86, SUBPART R

(a) Gaseous-Fueled Vehicle Pollutant Mass Emission Calculation Procedure.

(1) For all TLEVs, LEVs, and ULEVs, the calculation procedures specified in Chapter 5 of the California Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996) shall apply. These procedures are incorporated by reference (see §86.1).

(b) Pollutant Mass Emissions Calculation Procedure for Vehicles Equipped with Periodically Regenerating Trap Oxidizer Systems.

(1) Exhaust Emissions. (i) The provisions of §86.1777 apply to vehicles equipped with periodically regenerating trap oxidizer systems, except that the following shall apply instead of the requirements in §86.144–94(a):

(ii) The final reported test results shall be computed by the use of the following formula:

(iii) For light-duty vehicles and light-duty trucks:

$Y_{wm} = 0.43 ((Yct + Ys) / (Dct + Ds)) + 0.57 ((Yht + Ys) / (Dht + Ds))$.

(iv) For purposes of adjusting emissions for regeneration:

$Re = ((Yr1 - Yct) + (Yr2 - Ys) + (Yr3 - Yht)) / (Dct + Ds + Dht)$.

$Yr = Ywm + Re$.

Where:

Ywm = Weighted mass emissions of each pollutant, i.e., HC, CO, NO_X or CO , in grams per vehicle mile.

Yct = Mass emissions as calculated from the ''transient'' phase of the cold start test, in grams per test phase.

Yht = Mass emissions as calculated from the ''transient'' phase of the hot start test in grams per test phase.

Ys = Mass emissions as calculated from the ''stabilized'' phase of the cold start test, in grams per test phase.

Dct = The measured driving distance from the ''transient'' phase of the cold start test, in miles.

Dht = The measured distance from the ''transient'' phase of the hot start test, in miles.

Ds = The measured driving distance from the ''stabilized'' phase of the cold start test, in miles.

Yr = Regeneration emission test.

Re = Mass emissions of each pollutant attributable to regeneration in grams per mile.

Yr1 = Mass emissions, during a regeneration emission test, as calculated from the ''transient'' phase of the cold start test, in grams per test phase.

Yr2 = Mass emissions, during a regeneration emission test, as calculated from the ''stabilized'' phase of the cold start test, in grams per test phase.

Yr3 = Mass emissions, during a regeneration emission test, as calculated from the ''transient'' phase of the hot start test in grams per test phase.

(2) Particulate Emissions. (i) The provisions of §86.1778 apply to vehicles equipped with periodically regenerating trap oxidizer systems, except that the following shall apply instead of the requirements §86.145–82(a):

(ii) The final reported test results for the mass particulate (Mp) in grams/mile shall be computed as follows.

(iii) For purposes of adjusting emissions for regeneration:

$Mp = 0.43(Mp1 + Mp2) / (Dct + Ds) + 0.57 (Mp3 + Mp2) / (Dht + Ds)$

$Re = ((Mpr1 - Mp1) + (Mpr2 - Mp2) + (Mpr3 - Mp3) / (Dct + Ds + Dht)$

$Mpr = Mp + Re$

Where:

(1) Mp1 = Mass of particulate determined from the ''transient'' phase of the cold start test, in grams per test phase. (See §86.110–94(d)(1) for determination.)

(2) Mp2 = Mass of particulate determined from the ''stabilized'' phase of the cold start test, in grams per test phase. (See §86.110–94(d)(1) for determination.)
(3) Mp3 = Mass of particulate determined from the ''transient'' phase of the hot start test, in grams per test phase. (See §86.110–94(d)(1) for determination.)
(4) Dct = The measured driving distance from the ''transient'' phase of the cold start test, in miles.
(5) Ds = The measured driving distance from the ''stabilized'' phase of the cold start test, in miles.
(6) Dht = The measured driving distance from the ''transient'' phase of the hot start test, in miles.
(7) Mpr = Regeneration emission test
(8) Re = Mass of particulate attributable to regeneration in grams/mile.
(9) Mpr1 = Mass of particulate determined, during a regeneration emission test, from the ''transient'' phase of the cold start test in grams per test phase. (See §86.110–94(d)(1) for determination.)
(10) Mpr2 = Mass of particulate determined, during a regeneration emission test, from ''stabilized'' phase of the cold start test, in grams per test phase. (See §86.110–94(d)(1) for determination.)
(11) Mpr3 = Mass of particulate determined, during a regeneration emission test, from the ''transient'' phase of the hot start test, in grams per test phase. (See §86.110–94(d)(1) for determination.)

(c) Fuel Economy Calculations for Gaseous Fuels Based on the Cold Start CVS–1975 Federal Test Procedure.

(1) Assume the fuel meets HD–5 specifications (95% C_3H_8, 5% nC_4H_{10}, by volume).

(i) Physical constants of Propane and Normal Butane:

Component	Mol. Wt.	Sp. Gr.	Liquid density (lb/gal @ 60 °F)		Liquid density of Hd–5 (lb/gal @ 60 °F)		
C_3H_8	44.094	0.508	4.235	×	0.95	=	4.0233
nC_4H_{10}	58.12	0.584	4.868	×	0.05	=	0.2434
							4.2667

(ii) Density of the HD–5 fuel:

$(0.95 \times 4.235) + (0.05 \times 4.868) = 4.267$ lb/gal @ 60 °F

(iii) Molecular Weights:

(A)

Species	Mol. Wt.
C	12.01115
H	1.00797
0	15.9994
CO	28.01055
CO_2	44.00995
$CH_{2.658}$*	14.6903

*Average ratio of Hydrogen to carbon atoms in HD–5 fuel.

(B)

C_3H_8	8/3	=	2.666×0.95 (% propane)	=	2.533
nC_4H_{10}	10/4	=	2.5×0.05 (% Butane)	=	0.125
					2.568

(iv) Weight of Carbon in:

CO = wt. of CO × (12.01115 / 28.01055) = wt CO × (0.429)

CO_2 = wt. of CO_2 × (12.01115 / 44.00995) wt CO_2 × (0.273)

$CH_{2.658}$ = wt. of $CH_{2.658}$ × (12.01115 / 14.6903) = wt $CH_{2.658}$ × (0.818)

(v) Wt. of Carbon per gallon of LPG:

wt. of carbon = 4.2667 lbs/gal × 453.59 gms/lb × 0.818 = 1583 grams C/gal HD–5

(vi) Fuel economy:

$$\frac{\text{grams C/gal}}{\text{grams C in exhaust/mi}} = \text{miles/gal}$$

$$\text{LPG} = \frac{1583 \text{ gms C/gal}}{(0.818)(\text{HC}) + (0.429)(\text{CO}) + (0.273)(\text{CO}_2)}$$

Where:

HC = CVS HC in grams/mile
CO = CVS CO in grams/mile
CO_2 = CVS CO_2 in grams/mile
For gasoline:
= 2421 / ((0.866)(HC) + (0.429)(CO) + (0.273)(CO_2))
For Natural Gas:
= 1535 / ((0.759)(HC) + (0.429)(CO) + (0.273)(CO_2))

[62 FR 31265, June 6, 1997]

APPENDIX XVII TO PART 86—PROCEDURE FOR DETERMINING VEHICLE EMISSION CONTROL TECHNOLOGY CATEGORY/FUEL REACTIVITY ADJUSTMENT FACTORS FOR LIGHT-DUTY VEHICLES AND LIGHT LIGHT-DUTY TRUCKS CERTIFYING TO THE PROVISIONS OF PART 86, SUBPART R

The following procedure shall be used by the Administrator to establish the reactivity adjustment factor for exhaust emissions of non-methane organic gases (NMOG) and establish the ''methane reactivity adjustment factor'' for exhaust methane emissions from

natural gas vehicles, for the purpose of certifying a vehicle of specific emission control technology category and fuel for the National LEV program provisions of subpart R of this part.

(a) The Administrator shall determine representative speciated NMOG exhaust emission profiles for light-duty conventional gasoline-fueled TLEVs, LEVs, and ULEVs according to the following conditions:

(1) All testing will be conducted using a specified gasoline blend representative of commercial gasoline and having the specifications listed in §86.1771.

(2) Speciated NMOG profiles shall be obtained from a statistically valid number of TLEVs, LEVs, and ULEVs.

(3) The speciated NMOG profiles shall identify and quantify, in units of g/mile or mg/mile, as many constituents as possible in accordance with the procedures specified in Chapter 5 of the California Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996). These procedures are incorporated by reference (see §86.1).

(b) The ''g ozone potential per mile'' of each NMOG identified in the speciated profile shall be determined by multiplying the ''g/mile NMOG'' emission value of the constituent NMOG by its maximum incremental reactivity in paragraph (j) of this appendix.

(c) The ''total g ozone potential per mile'' of NMOG exhaust emissions from the vehicle/fuel system shall be the sum of all the constituent NMOG ''g ozone potential per mile'' values calculated in paragraph (b) of this appendix.

(d) The ''g ozone potential per g NMOG'' for the vehicle/fuel system shall be determined by dividing the ''total g ozone potential per mile'' value calculated in paragraph (c) of this appendix by the ''total g/mile of NMOG emissions''.

(e) For light-duty candidate vehicle/fuel systems not powered by conventional gasoline, the Administrator shall establish ''reactivity adjustment factors'' calculated from exhaust emission profiles derived according to the same conditions specified in paragraphs (a)(1) and (a)(2) of this appendix.

(f) The ''g ozone potential per g NMOG'' for candidate vehicle/fuel systems not powered by conventional gasoline shall be determined according to paragraphs (b), (c), and (d) of this appendix.

(g)(1) The candidate vehicle/fuel ''reactivity adjustment factor'' shall be determined by dividing the ''g ozone potential per g NMOG'' calculated in paragraph (f) of this appendix by the ''g ozone potential per g NMOG'' value for the vehicle in the same emission control technology category operated on conventional gasoline. The ''g ozone potential per g NMOG'' values for conventional gasoline vehicles are listed in §86.1777(b)(5) or shall be established by the Administrator pursuant to this appendix. For candidate vehicle/fuel systems powered by methanol or liquefied petroleum gas, the quotient calculated above shall be multiplied by 1.1. The resulting value shall constitute the ''reactivity adjustment factor'' for the methanol or liquefied petroleum gas-powered vehicle/fuel system.

(2) For candidate vehicle/fuel systems operating on natural gas, a ''methane reactivity adjustment factor'' shall be calculated by dividing the maximum incremental reactivity value for methane given in paragraph (j) of this appendix by the ''g ozone potential per g NMOG'' value for the vehicle in the same emission control technology category operated on conventional gasoline as listed in §86.1777(b)(5) or established by the Administrator pursuant to this appendix.

(h) The Administrator shall assign a reactivity adjustment factor unique to a specific engine family at the request of a vehicle manufacturer provided that each of the following occurs:

(1)(i) The manufacturer submits speciated NMOG exhaust emission profiles to the Administrator obtained from emission testing a minimum of four different vehicles representative of vehicles that will be certified in the engine family. The test vehicles shall include the official emission-data vehicle(s) for the engine family, and the mileage accumulation of each vehicle shall be at or greater than 4000 miles. One speciated profile shall be submitted for each test vehicle. Emission levels of each constituent NMOG shall be measured according to Chapter 5 of the California Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996). These procedures are incorporated by reference (see §86.1). For the emission-data vehicle(s), the speciated profile(s) shall be obtained from the same test used to obtain the official exhaust emission test results for the emission-data vehicle at the 4,000 mile test point. The manufacturer shall calculate ''g ozone potential per g NMOG'' values for each speciated NMOG exhaust emission profile in accordance with the procedures specified in paragraphs (b), (c), and (d) of this appendix. By using these ''g ozone potential per g NMOG'' values, the manufacturer shall calculate a ''reactivity adjustment factor'' for each test vehicle in accordance with the procedure specified in paragraph (g) of this appendix. A ''reactivity adjustment factor'' for the engine family shall be calculated by taking the arithmetic mean of the ''reactivity adjustment factor'' obtained for each test vehicle. The 95 percent upper confidence bound (95% UCB) shall be calculated according to the equation:

$$95\%\ UCB = RAF_m + 1.96 \times \left[\frac{\sum_{i=1}^{n} (RAF_i - RAF_m)^2}{(n-1)} \right]^{1/2}$$

Where:

RAF_m = mean ''reactivity adjustment factor'' calculated for the engine family.

RAF_i = ''reactivity adjustment factor'' calculated for the i'th test vehicle.

n = number of test vehicles.

(ii) The 95 percent upper confidence bound of the ''reactivity adjustment factor'' for the engine family shall be less than or equal to 115 percent of the engine family ''reactivity adjustment factor.''

(2) The manufacturer submits an ''ozone deterioration factor'' for the engine family. To determine the ''ozone deterioration factor,'' the manufacturer shall perform two tests at each mileage interval for one or more durability vehicle(s) tested in accordance with the procedures and conditions specified in subpart R of this part for calculating mass deterioration factors. The Administrator shall approve the use of other mileage intervals and procedures if the manufacturer can demonstrate that equivalently representative ''ozone deterioration factors'' are obtained. One speciated profile shall be submitted for each test. Emission levels of each constituent NMOG shall be measured according to Chapter 5 of the California Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996). These procedures are incorporated by reference (see §86.1). A mean g/mi NMOG mass value and a mean ''g ozone per g NMOG'' value shall be calculated by taking the arithmetic mean of each measurement from the speciated profiles. These results shall be multiplied together to obtain a mean ''total g ozone potential per mile'' value at each mileage interval. A mean ''ozone deterioration factor'' shall be calculated in accordance with the procedures in §86.1777 and this appendix except that the mean total ''g ozone potential per mile'' value determined at each mileage interval shall be used in place of measured mass emissions. If the ''ozone deterioration factor'' is determined to be less than 1.00, the ''ozone deterioration factor'' shall be assigned a value of 1.00. The ''ozone deterioration factor'' shall be multiplied by the product of the official exhaust NMOG mass emission results at the 4000 mile test point and the mean ''reactivity adjustment factor'' for the engine family to obtain the NMOG certification levels used to determine compliance with the NMOG emission standards.

(3) The speciated profiles, mean ''reactivity adjustment factor'' for the engine family, and ''ozone deterioration factor'' are provided to the Administrator with the certification application for the engine family.

(i) Gasoline meeting the specifications listed in the following tables shall be used to determine the ''g ozone potential per g NMOG'' of conventional gasoline (the test methods used for each fuel property shall be the same as the test method for the identical fuel property listed in §86.1771):

Fuel property	Limit
Sulfur, ppm by weight	300 ±50
Benzene, volume percent	1.6 ±0.3
Reid vapor pressure, psi	8.7 ±0.3
Distillation, D–86 degrees F	
10%	115–135
50%, maximum	240
90%	323–333
EP, maximum	420
Hydrocarbon Type, volume percent	
Total Aromatics	32 ±3.0
Multi-substituted alkyl aromatics	21 ±3.0
Olefins	12 ±3.0
Saturates	remainder

(j) The maximum incremental reactivities to be used in paragraph (b) of this appendix are provided in the table in this paragraph (j). Any manufacturer which intends to use the table shall submit to the Administrator a list which provides the specific organic gases measured by the manufacturer and the maximum incremental reactivity value assigned to each organic gas prior to or with the submittal of a request for the use of a reactivity adjustment factor unique to a specific engine family. The Administrator may deny such requests if he or she determines that the maximum incremental reactivity value assignments are made incorrectly. The table follows:

MAXIMUM INCREMENTAL REACTIVITY (MIR) VALUES

[Units: grams ozone/gram organic gas]

CAS#	Compound	MIR
Alcohols		
00067–56–1	methanol	0.56
00064–17–5	ethanol	1.34
Light End and Mid-Range Hydrocarbons (Listed in approximate elution order)		
	methane	0.0148
00074–85–1	ethene	7.29
00074–86–2	ethyne	0.50
00074–84–0	ethane	0.25
00115–07–1	propene	9.40
00074–98–6	propane	0.48
00463–49–0	1,2-propadiene	10.89
00074–99–7	1-propyne	4.10
00075–28–5	methylpropane	1.21
00115–11–7	2-methylpropene	5.31

MAXIMUM INCREMENTAL REACTIVITY (MIR) VALUES—Continued

[Units: grams ozone/gram organic gas]

CAS#	Compound	MIR
00106–98–9	1-butene	8.91
00106–99–0	1,3-butadiene	10.89
00106–97–8	n-butane	1.02
00624–64–6	trans-2-butene	9.94
00463–82–1	2,2-dimethylpropane	0.37
00107–00–6	1-butyne	9.24
00590–18–1	cis-2-butene	9.94
00563–45–1	3-methyl-1-butene	6.22
00078–78–4	2-methylbutane	1.38
00503–17–3	2-butyne	9.24
00109–67–1	1-pentene	6.22
00563–46–2	2-methyl-1-butene	4.90
00109–66–0	n-pentane	1.
00078–79–5	2-methyl-1,3-butadiene	9.08
00646–04–8	trans-2-pentene	8.80
00558–37–2	3,3-dimethyl-1-butene	4.42
00627–20–3	cis-2-pentene	8.80
00689–97–4	1-buten-3-yne	9.24
00513–35–9	2-methyl-2-butene	6.41
00542–92–7	1,3-cyclopentadiene	7.66
00075–83–2	2,2-dimethylbutane	0.82
00142–29–0	cyclopentene	7.66
00691–37–2	4-methyl-1-pentene	4.42
00760–20–3	3-methyl-1-pentene	4.42
00287–92–3	cyclopentane	2.38
00079–29–8	2,3-dimethylbutane	1.07
01634–04–4	1-methyl-tert-butyl-ether	0.62
00691–38–3	4-methyl-cis-2-pentene	6.69
00107–83–5	2-methylpentane	1.53
00674–76–0	4-methyl-trans-2-pentene	6.69
00096–14–0	3-methylpentane	1.52
00763–29–1	2-methyl-1-pentene	4.42
00592–41–6	1-hexene	4.42
00110–54–3	n-hexane	0.98
13269–52–8	trans-3-hexene	6.69
07642–09–3	cis-3-hexene	6.69
04050–45–7	trans-2-hexene	6.69
00616–12–6	3-methyl-trans-2-pentene	6.69
00625–27–4	2-methyl-2-pentene	6.69
01120–62–3	3-methylcyclopentene	5.65
07688–21–3	cis-2-hexene	6.69
00637–92–3	1-ethyl-tert-butyl-ether	1.98
00922–62–3	3-methyl-cis-2-pentene	6.69
00590–35–2	2,2-dimethylpentane	1.40
00096–37–7	methylcyclopentane	2.82
00108–08–7	2,4-dimethylpentane	1.78
00464–06–2	2,2,3-trimethylbutane	1.32
07385–78–6	3,4-dimethyl-1-pentene	3.48
00693–89–0	1-methylcyclopentene	7.66
00071–43–2	benzene	0.42
03404–61–3	3-methyl-1-hexene	3.48
00562–49–2	3,3-dimethylpentane	0.71
00110–82–7	cyclohexane	1.28
00591–76–4	2-methylhexane	1.08
00565–59–3	2,3-dimethylpentane	1.51
00110–83–8	cyclohexene	5.67
00589–34–4	3-methylhexane	1.40
02532–58–3	cis-1,3-dimethylcyclopentane	2.55
00617–78–7	3-ethylpentane	1.40
00822–50–4	trans-1,2-dimethylcyclopentane	1.85
00592–76–7	1-heptene	3.48
00540–84–1	2,2,4-trimethylpentane	0.93
14686–14–7	trans-3-heptene	5.53
00142–82–5	n-heptane	0.81
02738–19–4	2-methyl-2-hexene	5.53
03899–36–3	3-methyl-trans-3-hexene	5.53
14686–13–6	trans-2-heptene	5.53
00816–79–5	3-ethyl-2-pentene	5.53
00107–39–1	2,4,4-trimethyl-1-pentene	2.69

MAXIMUM INCREMENTAL REACTIVITY (MIR) VALUES—Continued

[Units: grams ozone/gram organic gas]

CAS#	Compound	MIR
10574–37–5	2,3-dimethyl-2-pentene	5.53
06443–92–1	cis-2-heptene	5.53
00108–87–2	methylcyclohexane	1.85
00590–73–8	2,2-dimethylhexane	1.20
00107–40–4	2,4,4-trimethyl-2-pentene	5.29
01640–89–7	ethylcyclopentane	2.31
00592–13–2	2,5-dimethylhexane	1.63
00589–43–5	2,4-dimethylhexane	1.50
00563–16–6	3,3-dimethylhexane	1.20
00565–75–3	2,3,4-trimethylpentane	1.60
00560–21–4	2,3,3-trimethylpentane	1.20
00108–88–3	toluene	2.73
00584–94–1	2,3-dimethylhexane	1.32
00592–27–8	2-methylheptane	0.96
00589–53–7	4-methylheptane	1.20
00589–81–1	3-methylheptane	0.99
15890–40–1	(1a,2a,3b) -1,2,3-trimethylcyclopentane.	1.94
00638– –0	cis-1,3-dimethylcyclohexane	1.94
02207– –7	trans-1,4-dimethylcyclohexane	1.94
03522–94–9	2,2,5-trimethylhexane	0.97
00111–66–0	1-octene	2.69
14850–23–8	trans-4-octene	5.29
00111–65–9	n-octane	0.61
13389–42–9	trans-2-octene	5.29
02207–03–6	trans-1,3-dimethylcyclohexane	1.94
07642– –8	cis-2-octene	5.29
01069–53–0	2,3,5-trimethylhexane	1.14
02213–23–2	2,4-dimethylheptane	1.34
02207–01–4	cis-1,2-dimethylcyclohexane	1.94
01678–91–7	ethylcyclohexane	1.94
00926–82–9	3,5-dimethylheptane	1.14
00100–41–4	ethylbenzene	2.70
03074–71–3	2,3-dimethylheptane	1.14
00108–38–3	m-&p-xylene	7.64
02216–34–4	4-methyloctane	1.14
03221–61–2	2-methyloctane	1.14
02216–33–3	3-methyloctane	1.14
00100–42–5	styrene(ethenylbenzene)	2.22
00095–47–6	o-xylene	6.46
00124–11–8	1-nonene	2.23
00111–84–2	n-nonane	0.54
00098–82–8	(1-methylethyl)benzene	2.24
15869–87–1	2,2-dimethyloctane	1.01
04032–94–4	2,4-dimethyloctane	1.01
00103–65–1	n-propylbenzene	2.12
00620–14–4	1-methyl-3-ethylbenzene	7.20
00622–96–8	1-methyl-4-ethylbenzene	7.20
00108–67–8	1,3,5-trimethylbenzene	10.12
00611–14–3	1-methyl-2-ethylbenzene	7.20
00095–63–6	1,2,4-trimethylbenzene	8.83
00124–18–5	n-decane	0.47
00538–93–2	(2-methylpropyl)benzene	1.87
00135–98–8	(1-methylpropyl)benzene	1.89
00535–77–3	1-methyl-3-(1-methylethyl)benzene.	6.45
00526–73–8	1,2,3-trimethylbenzene	8.85
00099–87–6	1-methyl-4-(1-methylethyl)benzene.	6.45
00496–11–7	2,3-dihydroindene(indan)	1.06
00527–84–4	1-methyl-2-(1-methylethyl)benzene.	6.45
00141–93–5	1,3-diethylbenzene	6.45
00105–05–5	1,4-diethylbenzene	6.45
01074–43–7	1-methyl-3-n-propylbenzene	6.45
01074–55–1	1-methyl-4-n-propylbenzene	6.45
00135–01–3	1,2-diethylbenzene	6.45
01074–17–5	1-methyl-2-n-propylbenzene	6.45
01758–88–9	1,4-dimethyl-2-ethylbenzene	9.07

MAXIMUM INCREMENTAL REACTIVITY (MIR) VALUES—Continued

[Units: grams ozone/gram organic gas]

CAS#	Compound	MIR
00874–41–9	1,3-dimethyl-4-ethylbenzene	9.07
00934–80–5	1,2-dimethyl-4-ethylbenzene	9.07
02870–04–4	1,3-dimethyl-2-ethylbenzene	9.07
01120–21–4	n-undecane(hendecane)	0.42
00933–98–2	1,2-dimethyl-3-ethylbenzene	9.07
00095–93–2	1,2,4,5-tetramethylbenzene	9.07
03968–85–2	(2-methylbutyl)benzene	1.07
00527–53–7	1,2,3,5-tetramethylbenzene	9.07
01074–92–6	1-(1,1-dimethylethyl)-2-methylbenzene.	5.84
00488–23–3	1,2,3,4-tetramethylbenzene	9.07
00538–68–1	n-pentylbenzene	1.70
00098–19–1	1-(1,1-dimethylethyl)-3,5-DMbenzene.	7.50
00091–20–3	naphthalene	1.18
00112–40–3	n-dodecane	0.38
	Carbonyl Compounds	
00050–00–0	formaldehyde	7.15
00075–07–0	acetaldehyde	5.52
00107–02–8	acrolein	6.77
00067–64–1	acetone	0.56
00123–33–6	propionaldehyde	6.53
00123–72–8	butyraldehyde	5.26
00066–25–1	hexanaldehyde	3.79
00100–52–7	benzaldehyde	-0.55
00078–93–3	methyl ethyl ketone (2-butanone).	1.18
00078–85–3	methacrolein	6.77
04170–30–3	crotonaldehyde	5.42
00110–62–3	valeraldehyde	4.41
00620–23–5	m-tolualdehyde	-0.55

[62 FR 31266, June 6, 1997]

APPENDIX XVIII TO PART 86—STATISTICAL OUTLIER IDENTIFICATION PROCEDURE FOR LIGHT-DUTY VEHICLES AND LIGHT LIGHT-DUTY TRUCKS CERTIFYING TO THE PROVISIONS OF PART 86, SUBPART R

Residual normal deviates to indicate outliers are used routinely and usefully in analyzing regression data, but suffer theoretical deficiencies if statistical significance tests are required. Consequently, the procedure for testing for outliers outlined by Snedecor and Cochran, 6th ed., *Statistical Methods*, PP. 157–158, will be used. The method will be described generally, then by appropriate formulae, and finally a numerical example will be given.

(a) Linearity is assumed (as in the rest of the deterioration factor calculation procedure), and each contaminant is treated separately. The procedure is as follows:

(1) Calculate the deterioration factor regression as usual, and determine the largest residual in absolute value. Then recalculate the regression with the suspected outlier omitted. From the new regression line calculate the residual at the deleted point, denoted as $(y_i - y_i')$. Obtain a statistic by dividing $(y_i - y_i')$ by the square root of the estimated variance of $(y_i - y_i')$. Find the tailed probability, p, from the t-distribution corresponding to the quotient (double-tailed), with n-3 degrees of freedom, with n the original sample size.

(2) This probability, p, assumes the suspected outlier is randomly selected, which is not true. Therefore, the outlier will be rejected only if $1 - (1\text{-}p)^n < 0.05$.

(3) The procedure will be repeated for each contaminant individually until the above procedure indicates no outliers are present.

(4) When an outlier is found, the vehicle test-log will be examined. If an unusual vehicle malfunction is indicated, data for all contaminants at that test-point will be rejected; otherwise, only the identified outlier will be omitted in calculating the deterioration factor.

(b) Procedure for the calculation of the t-Statistic for Deterioration Data Outlier Test.

(1) Given a set of n points, (x_1, y_1), $(x_2. y_2)$ * * * (x_n, y_n).

Where:

x_i is the mileage of the i^{th} data point.

y_i is the emission of the i^{th} data point.

Assume model:

$y = a + \beta(x - \bar{x}) + \epsilon$

(2)(i) Calculate the regression line.

$\hat{y} = a + b(x - \bar{x})$

(ii) Suppose the absolute value of the i^{th} residual

$(y_i - \hat{y}_i)$ is the largest.

(3)(i) Calculate the regression line with the i^{th} point deleted.

$\hat{y}' = a' + b'(x - \bar{x})$

(ii)

$$\text{Let } t = \frac{\left((y_i - \hat{y}_i^{'}\right)}{\sqrt{\hat{var}\left(y_i - \hat{y}_i^{'}\right)}}$$

Where:

y_1 is the observed suspected outlier.

$\hat{y}'_i$ is the predicted value with the suspected outlier deleted.

$$\hat{var}\left(y_i - \hat{y}_i^{'}\right) = S_2\left(1 + \frac{1}{n-1} + \frac{(x_i - x)^2}{\sum_{j=1}^{n}(x - \bar{x})^2}\right), j \neq i$$

(x is calculated without the suspected outlier)

$$S_2 = \frac{\sum_{j=1}^{n}\left(y_j - \bar{y}_j'\right)^2}{n-3}, j \neq i$$

(iii) Find p from the t-statistic table

Where:

p = prob (|t(n-3) | ≥ t)

t(n–3) is a t-distributed variable with n–3 degrees of freedom.

(iv) y_i is an outlier if $1-(1-p)^n < .05$

x	y	$\hat{y}$	$y - \hat{y}$
8	59	56.14	2.86
6	58	58.17	−0.17
11	56	53.10	2.90
22[1]	53	41.96	11.04
14	50	50.06	−0.06
17	45	47.03	−2.03
18	43	46.01	−3.01
24	42	39.94	2.06
19	39	45.00	−6.00
23	38	40.95	−2.95
26	30	37.91	−7.91
40	27	23.73	3.27

[1] Suspected outlier.

(4)(i) Assume model:

$y = a + \beta(x - \bar{x}) + \epsilon$

$y = 45 - 1.013(x - \bar{x})$

(ii) Suspected point out of regression:

$y = 44.273 - 1.053(x - \bar{x})$

$y = 44.273 - 1.053(22 - 18.727) = 40.827$

$y_i - \hat{y}'_i = 12.173$

$$\hat{\text{var}}\left(y_i - \hat{y}_i'\right) = S^2\left(1 + \frac{1}{11} + \frac{10.711}{914.182}\right)$$

[62 FR 31270, June 6, 1997; 62 FR 45289, Aug. 26, 1997, as amended at 63 FR 987, Jan. 7, 1998]