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the engine obviously is lugging. For those modes which require these vehicles to decelerate to zero, manual transmission clutches shall be disengaged when the speed drops below 25 km/h (15.5 mph) for vehicles with engine displacement equal to or greater than 280 cc (17.1 cu. in.), when the speed drops below 20 km/h (12.4 mph) for vehicles with engine displacements less than 280 cc (17.1 cu. in.), when engine roughness is evident, or when engine stalling is imminent. While the clutch is disengaged and during these deceleration modes, the vehicle shall be shifted to the appropriate gear for starting the next mode.

(h) If shift speeds are not recommended by the manufacturer, manual transmission vehicles shall be shifted as follows:

(1) For Class I and II motorcycles:

Shift	Speed
1st to 2d gear .....	19 km/h (11.8 mi/h).
2d to 3d gear .....	33 km/h (20.5 mi/h).
3d to 4th gear .....	44 km/h (27.3 mi/h).
4th to 5th gear .....	53 km/h (32.9 mi/h).

(2) For Class III motorcycles:

Shift	Speed
1st to 2d gear .....	30 km/h (18.6 mi/h).
2d to 3d gear .....	45 km/h (28.0 mi/h).
3d to 4th gear .....	60 km/h (37.3 mi/h).
4th to 5th gear .....	75 km/h (46.6 mi/h).

(3) Higher gears may be used at the manufacturer's option.

§ 86.529-98 Road load force and inertia weight determination.

(a)(1) Road load as a function of speed is given by the following equation:

$$F = A + CV^2$$

(2) The values for coefficients A and C and the test inertia are given in Figure F98-9 of this section. Velocity V is in km/h and force (F) is in newtons. The forces given by the equation in paragraph (a)(1) of this section shall be simulated to the best ability of the equipment being used.

(b) The inertia given in Figure F98-9 shall be used. Motorcycles with loaded vehicle mass outside these limits shall be tested at an equivalent inertial mass and road load force specified by the Administrator. Figure F98-9 follows:

FIGURE F98-9

Loaded vehicle mass (kg)	Equivalent inertial mass (kg)	Force coefficients		Force at 65 km/h (nt)	70 to 60 km/h coastdown calibration times		
		A (nt)	C (nt/(km/h) <sup>2</sup> )		Target time (sec)	Allowable tolerance	
						Longest time (sec)	Shortest time (sec)
95-105 .....	100	0.0	.0224	94.8	2.95	3.1	2.8
106-115 .....	110	0.82	.0227	96.8	3.18	3.3	3.0
116-125 .....	120	1.70	.0230	98.8	3.39	3.6	3.2
126-135 .....	130	2.57	.0233	100.9	3.60	3.8	3.4
136-145 .....	140	3.44	.0235	102.9	3.80	4.0	3.6
146-155 .....	150	4.32	.0238	104.9	3.99	4.2	3.8
156-165 .....	160	5.19	.0241	107.0	4.10	4.4	4.0
166-175 .....	170	6.06	.0244	109.0	4.36	4.6	4.2
176-185 .....	180	6.94	.0246	111.0	4.53	4.7	4.3
186-195 .....	190	7.81	.0249	113.1	4.69	4.9	4.5
196-205 .....	200	8.69	.0252	115.1	4.85	5.1	4.6
206-215 .....	210	9.56	.0255	117.1	5.00	5.2	4.8
216-225 .....	220	10.43	.0257	119.2	5.15	5.4	4.9
226-235 .....	230	11.31	.0260	121.2	5.30	5.5	5.1
236-245 .....	240	12.18	.0263	123.2	5.43	5.7	5.2
246-255 .....	250	13.06	.0266	125.3	5.57	5.8	5.4
256-265 .....	260	13.93	.0268	127.3	5.70	5.9	5.5
266-275 .....	270	14.80	.0271	129.3	5.82	6.1	5.6
276-285 .....	280	15.68	.0274	131.4	5.95	6.2	5.7
286-295 .....	290	16.55	.0277	133.4	6.06	6.3	5.8
296-305 .....	300	17.43	.0279	135.4	6.18	6.4	6.0
306-315 .....	310	18.30	.0282	137.5	6.29	6.5	6.1
316-325 .....	320	19.17	.0285	139.5	6.40	6.6	6.2
326-335 .....	330	20.05	.0288	141.6	6.50	6.7	6.3
336-345 .....	340	20.92	.0290	143.6	6.60	6.8	6.4
346-355 .....	350	21.80	.0293	145.6	6.70	6.9	6.5
356-365 .....	360	22.67	.0296	147.7	6.80	7.0	6.6
366-375 .....	370	23.54	.0299	149.7	6.89	7.1	6.7

FIGURE F98-9—Continued

Loaded vehicle mass (kg)	Equivalent inertial mass (kg)	Force coefficients		Force at 65 km/h (nt)	70 to 60 km/h coastdown calibration times		
		A (nt)	C (nt/(km/h) <sup>2</sup> )		Target time (sec)	Allowable tolerance	
						Longest time (sec)	Shortest time (sec)
376-385	380	24.42	.0301	151.7	6.98	7.2	6.8
386-395	390	25.29	.0304	153.8	7.07	7.3	6.9
396-405	400	26.17	.0307	155.8	7.16	7.4	6.9
406-415	410	27.04	.0310	157.8	7.24	7.5	7.0
416-425	420	27.91	.0312	159.9	7.33	7.6	7.1
426-435	430	28.79	.0315	161.9	7.41	7.6	7.2
436-445	440	29.66	.0317	163.7	7.49	7.7	7.3
446-455	450	30.54	.0318	164.9	7.61	7.8	7.4
456-465	460	31.41	.0319	166.0	7.73	8.0	7.5
466-475	470	32.28	.0319	167.1	7.84	8.1	7.6
476-485	480	33.16	.0320	168.3	7.95	8.2	7.7
486-495	490	34.03	.0320	169.4	8.06	8.3	7.8
496-505	500	34.90	.0321	170.5	8.17	8.4	7.9
506-515	510	35.78	.0322	171.7	8.28	8.5	8.0
516-525	520	36.65	.0322	172.8	8.39	8.6	8.2
526-535	530	37.53	.0323	173.9	8.49	8.7	8.3
536-545	540	38.40	.0323	175.1	8.60	8.8	8.4
546-555	550	39.27	.0324	176.2	8.70	9.0	8.5
556-565	560	40.15	.0325	177.3	8.80	9.1	8.6
566-575	570	41.02	.0325	178.5	8.90	9.2	8.7
576-585	580	41.90	.0326	179.6	9.00	9.3	8.8
586-595	590	42.77	.0327	180.8	9.10	9.4	8.9
596-605	600	43.64	.0327	181.9	9.19	9.5	8.9
606-615	610	44.52	.0328	183.0	9.29	9.5	9.0
616-625	620	45.39	.0328	184.2	9.38	9.6	9.1
626-635	630	46.27	.0329	185.3	9.47	9.7	9.2
636-645	640	47.14	.0330	186.4	9.56	9.8	9.3
646-655	650	48.01	.0330	187.6	9.65	9.9	9.4
656-665	660	48.89	.0331	188.7	9.74	10.0	9.5
666-675	670	49.76	.0332	189.8	9.83	10.1	9.6
676-685	680	50.64	.0332	191.0	9.92	10.2	9.7
686-695	690	51.51	.0333	192.1	10.01	10.3	9.8
696-705	700	52.38	.0333	193.2	10.09	10.4	9.8
706-715	710	53.26	.0334	194.4	10.17	10.4	9.9
716-725	720	54.13	.0335	195.5	10.26	10.5	10.0
726-735	730	55.01	.0335	196.6	10.34	10.6	10.1
736-745	740	55.88	.0336	197.8	10.42	10.7	10.2
746-755	750	56.75	.0336	198.9	10.50	10.8	10.2
756-765	760	57.63	.0337	200.1	10.58	10.9	10.3
766-775	770	58.50	.0338	201.2	10.66	10.9	10.3
776-785	780	59.38	.0338	203.3	10.74	11.0	10.4
786-795	790	60.25	.0339	204.5	10.82	11.1	10.5
796-805	800	61.12	.0339	205.6	10.91	11.2	10.6
806-815	810	62.00	.0340	206.7	10.99	11.3	10.7
816-825	820	62.87	.0341	207.9	11.07	11.4	10.8
826-835	830	63.75	.0341	209.0	11.15	11.5	10.8
836-845	840	64.62	.0342	210.1	11.24	11.5	10.9
846-855	850	65.49	.0343	211.3	11.32	11.6	11.0
856-865	860	66.37	.0343	212.4	11.40	11.7	11.1
866-873	870	67.24	.0344	213.5	11.48	11.8	11.2

(c) The dynamometer shall be adjusted to reproduce the specified road load as determined by the most recent calibration. Alternatively, the actual vehicle road load can be measured and duplicated:

(1) Make at least 5 replicate coastdowns in each direction from 70 to 60 km/h on a smooth, level track under balanced wind conditions. The driver

must have a mass of 80 ±10 kg and be in the normal driving position. Record the coastdown time.

(2) Average the coastdown times. Adjust the dynamometer load so that the coastdown time is duplicated with the vehicle and driver on the dynamometer.

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(3) Alternate procedures may be used if approved in advance by the Administrator.

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**§ 86.530-78 Test sequence, general requirements.**

(a) Ambient temperature levels encountered by the test vehicle throughout the test sequence shall not be less than 20 °C (68 °F) nor more than 30 °C (86 °F). The vehicle shall be approximately level during the emission test to prevent abnormal fuel distribution.

(b) [Reserved]

**§ 86.531-78 Vehicle preparation.**

(a) The manufacturer shall provide additional fittings and adapters, as required by the Administrator \* \* \*, such as \* \* \* to accommodate a fuel drain at the lowest point possible in the tank(s) as installed on the vehicle and to provide for exhaust sample collection.

(b) [Reserved]

**§ 86.532-78 Vehicle preconditioning.**

(a) The vehicle shall be moved to the test area and the following operations performed:

(1) The fuel tank(s) shall be drained through the provided fuel tank(s) drain(s) and charged with the specified test fuel, § 86.513, to half the tank(s) capacity.

(2) The vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through one Urban Dynamometer Driving Schedule test procedure (see § 86.515 and appendix I). The vehicle need not be cold, and may be used to set dynamometer horsepower.

(b) Within five (5) minutes of completion of preconditioning, the vehicle shall be removed from the dynamometer and may be driven or pushed to the soak area to be parked. The vehicle shall be stored for not less than the following times prior to the cold start exhaust test.

	Hours
Class I .....	6
Class II .....	8
Class III .....	12

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In no case shall the vehicle be stored for more than 36 hours prior to the cold start exhaust test.

**§ 86.535-90 Dynamometer procedure.**

(a) The dynamometer run consists of two tests, a “cold” start test and a “hot” start test following the “cold” start by 10 minutes. Engine startup (with all accessories turned off), operation over the driving schedule, and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air and a continuously proportional sample is collected for analysis during each phase. The composite samples collected in bags are analyzed for hydrocarbons, carbon monoxide, carbon dioxide, and, optionally, for oxides of nitrogen. A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and, optionally, for oxides of nitrogen. Methanol and formaldehyde samples (exhaust and dilution air) are collected and analyzed for methanol-fueled vehicles (a single dilution air formaldehyde sample covering the total time of the test may be collected in place of individual test phases).

(b) [Reserved]

(c) The vehicle speed, as measured from the dynamometer roll, shall be used. A speed *vs.* time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(d) Practice runs over the prescribed driving schedule may be performed at test points, provided an emission sample is not taken, for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship, or to permit sampling system adjustments.

(e) The drive wheel tires must be inflated to the manufacturer’s recommended pressure, ±15 kPa (±2.2 psi). The drive wheel tire pressure shall be reported with the test results.

(f) If the dynamometer has not been operated during the two-hour period immediately preceding the test, it shall be warmed up for 15 minutes by operating at 50 km/h (31 mph) using a