

§ 86.529-78

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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.

§ 86.529-78 Road load force and inertia weight determination.

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

$$F = A + CV^2$$

The values for coefficients *A* and *C* and the test inertia are given in Figure F78-9. Velocity (*V*) is in km/h and force (*F*) is in newtons. The forces given by this equation shall be simulated to the best ability of the equipment being used.

(b) The inertia given in Figure F78-9 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 F78-9

Loaded vehicle mass (kg)	Equivalent inertial mass (kg)	Force coefficients		Force at 65 km/h (nt)	70 to 60 kn/h coastdown calibration times		
		A (nt)	C (nt/(km/h) ²)		Target time (sec)	Allowable tolerance	
						Longest time (sec)	Shortest time (sec)
95-105	100	0.0	0.224	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	0.230	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	18.39	.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	30.05	.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
376-385	380	24.42	.0301	151.7	6.98	7.2	6.8

FIGURE F78-9—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) ²)		Target time (sec)	Allowable tolerance	
						Longest time (sec)	Shortest time (sec)
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	51.91	.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
756-760	760	57.63	.0337	200.1	10.58	10.9	10.3

(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.

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

§ 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