SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
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SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J1634

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ELECTRIC VEHICLE ENERGY CONSUMPTION AND RANGE TEST PROCEDURE

1. *Scope*—This SAE Recommended Practice establishes uniform procedures for testing electric battery-powered vehicles which are capable of being operated on public and private roads, and is to replace the range and vehicle energy economy sections SAE J227a. The procedure addresses electric vehicles (EVs) only. It is the intent of this practice to provide standard tests which will allow for determination of energy consumption and range based on the Federal Emission Test Procedure (FTP) and the Highway Fuel Economy Test Procedure (HWFET). Realistic alternatives should be allowed for new technology. Performance is judged on the total vehicle system and the battery.

   Dynamometer test procedures are specified in this document in order to minimize the test-to-test variations inherent with track testing and to adhere to standard industry practice for energy consumption and range testing.

   Section 2 provides definitions of terminology used in this document. Section 3 specifies test conditions and general instrumentation which are to be used for tests specified in this document. Section 4 identifies the data which are to be recorded. Section 5 specifies standard driving cycles. The specific tests covered by this document are:

   a. Vehicle Energy Consumption According to a Selected Driving Pattern (Section 6)
      (1) EPA Urban Driving Schedule (UDS)
      (2) Highway Fuel Economy Test Procedure (HWFET)
   b. Vehicle Range When Operated According to Selected Driving Patterns (Section 7)
      (1) Combined EPA Urban Driving Schedule (UDS) and Highway Fuel Economy Test Procedure (HWFET)
   c. Coastdown Testing (Section 8)

2. *References*

2.1 **Applicable Documents**—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J227—Electric Vehicle Test Procedure
SAE J1263—Road Load Measurement and Dynamometer Simulation Using Coastdown Techniques

Printed in U.S.A.
90-1202B EG

2.1.2 CFR PUBLICATION—Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

40 CFR Part 86—EPA; Control of Air Pollution from New and In-Use Motor Vehicles and New and In-Use Motor Vehicle Engines; Certification and Test Procedures

2.2 Terminology

2.2.1 CURB WEIGHT—The total weight of the vehicle with all standard equipment and including batteries, lubricants at nominal capacity, and the weight of optional equipment that is expected to be installed at a rate of over 33%, but excluding the driver, passengers, and other payloads; incomplete light-duty trucks shall have the curb weight specified by the manufacturer.

2.2.2 BATTERY

2.2.2.1 *Battery Ampere-Hour Capacity*—The capacity of a battery in ampere-hours obtained from a battery discharged at the C/3 current (see 2.2.2.4) such that a specified minimum cut-off voltage (see 2.2.2.5) is reached.

2.2.2.2 *State of Charge (SOC)*—The residual capacity in ampere-hours of a battery after a discharge (full or partial) expressed as a percent of the battery ampere-hour capacity determined in 2.2.2.1. Initial State of Charge is the SOC at the beginning of a test.

2.2.2.3 *Depth of Discharge (DOD)*—The ampere-hours removed from a battery expressed as a percentage of the battery ampere-hour capacity as determined in 2.2.2.1.

2.2.2.4 *C/3 Rate*—The constant current at which the battery can be discharged to 100% DOD from battery ampere-hour capacity in 3 h.

2.2.2.5 *Cut-Off Terminal Voltage*—The manufacturer-recommended minimum voltage as a function of load after which battery damage could occur.

2.2.3 START-OF-TEST—The point during a test at which the vehicle key switch is first placed in the "on" position, after following applicable manufacturer "starting" procedures.

2.2.4 END-OF-TEST—The point (in time and distance) at which the vehicle has been decelerated to a rest (zero velocity) condition after the appropriate test termination criteria have been met and the key switch is placed in the "off" position.

3. Test Conditions and Instrumentation Common to All Tests—The following conditions shall apply to all tests defined in this document unless otherwise stated in specific test procedures.

3.1 Condition of Vehicle

3.1.1 Vehicles shall be stabilized as determined by the manufacturer and shall have accumulated a minimum of 3219 km (2000 miles), but no more than 9978 km (6200 miles) on the Durability Driving Schedule as defined in 40 CFR Part 86, Appendix IV, Section (a) or an equivalent driving schedule.

3.1.2 Vehicle shall be tested with normal appendages (mirrors, bumpers, hub caps, etc.) for coastdown testing. Certain items (e.g., hub caps) may be removed where necessary for safety on the dynamometer. If any appendages are removed, the fact shall be noted.

3.1.3 Accessories shall be turned off. If the vehicle is equipped with air conditioning powered by the same electrical energy source as the vehicle drivetrain, 10% (up to 1.4 hp) is to be added to the road load curve (or to the 80.5 km/h (50 mph) set point).

3.1.4 The vehicle shall be tested at loaded vehicle weight—curb weight plus 136 kg (300 lb). The weight selected for testing shall be recorded.

NOTE—Trucks over 6000 lb GVW may be tested at curb weight plus one-half vehicle payload (ALVW).

3.1.5 Manufacturer's recommended tires shall be used. For dynamometer testing, tire pressures shall not exceed levels normally used in dynamometer testing (SAE J1263) and necessary for safe operation. Dynamometer tire pressure should be the same pressure as used to establish the dynamometer road load power setting.

3.1.6 Tires shall be conditioned as recommended by the vehicle manufacturer and shall have accumulated a minimum of 100 km (62 miles) and have at least 50% of the original usable tread depth remaining.

3.1.7 The lubricants normally specified by the manufacturer shall be employed.

3.1.8 The vehicle shall be soaked at ambient temperature (see 3.3.1) before the start of test. The soak period shall be of duration defined in 3.2.3.

3.1.9 If the vehicle has a manual transmission, gears shall be shifted at the speed/load points reasonably expected to be followed by vehicles in use.

3.1.10 If the vehicle has regenerative braking, the regenerative braking system shall be enabled for all dynamometer testing. For testing on electric dynamometers, regenerative braking during the test shall be representative of regenerative braking on the road for the applicable driving cycle, and the methodology for matching road regeneration shall be described. An example is provided in Appendix A.

3.2 Condition of Battery

3.2.1 The battery shall have been aged with the vehicle as defined in 3.1.1, or equivalent conditioning.

3.2.2 All batteries shall be cycled in accordance with the manufacturer's recommendations before starting testing. Battery ampere-hour capacity shall be verified against manufacturer's rating by constant current discharge at the C/3 rate or an average discharge rate corresponding to the vehicle tests described herein (Sections 6 and 7). The rate used for the verification shall be recorded along with the results obtained. The battery ampere-hour capacity shall exceed 85% of the manufacturer's brand-new battery measured capacity throughout the test period and shall be verified by periodic constant current discharge tests, including at least one test immediately following the completion of vehicle testing.

3.2.3 The battery (and thermal management system, if any) shall be soaked in the vehicle at ambient temperature (see 3.3.1) for at least 12 h, and shall remain on charge for the duration of soak. Soak shall not end before full charge is reached. The length of the soak/charge time shall be recorded. Maximum soak/charge duration is 36 h.

3.2.4 Full charge is to be established using manufacturer's recommended charging procedure and appropriate equipment.

3.3 Environmental Conditions

3.3.1 Temperature during vehicle and battery ambient soak/charge period shall be within the range of 20 to 30 °C (68 to 86 °F).

3.4 Dynamometer

3.4.1 Use of an electric dynamometer is preferred and recommended for electric vehicle testing. Electric dynamometers must have the capability of load adjustment at various vehicle speeds to allow the simulation of on-road vehicle load versus speed characteristics.

3.4.2 Dynamometer road load power settings shall be made based on SAE J1263 as modified in Section 8. Alternatively, the road load power setting using the frontal area method in 40 CFR 86.129-80, as detailed in Appendix B, may be used.

NOTE—SAE J1263, in its current state, may not fully apply to electric dynamometers—revisions may be needed.

3.4.3 Dynamometer inertia weight shall be selected with the nearest available inertia weight which equals or exceeds 1.015 times the vehicle test weight (see 3.1.4). The addition of the 1.5% is to account for rotating inertia, mainly the non-driven wheels, not accounted for under static conditions. The value of 1.015 may not be suitable for all vehicles. If an actual or estimated value for rotating inertia is known for the particular vehicle being tested, the more accurate value should be used. Alternately, vehicles may be tested at the dynamometer equivalent test weight specified in 40 CFR 86.129-80.

3.4.4 During dynamometer operation, a fixed speed cooling fan shall be positioned so as to direct cooling air to the vehicle in a manner consistent with the accepted practices for simulating road conditions. The fan capacity in general shall not exceed 2.5 m^3/s (5300 ft^3/min), but auxiliary fans may be employed if needed to more closely duplicate on-road conditions.

3.4.5 If the dynamometer has not been operated during the 2 h period immediately preceding the test, it shall be warmed up for 15 min by operating at 48 km/h (30 mph) using a nontest vehicle or as recommended by the dynamometer manufacturer.

3.4.6 Four-wheel drive or all-wheel drive vehicles shall be tested on a four-wheel dynamometer.

3.5 Test Instrumentation—This section provides a list of instruments which are required to perform the tests specified in this document. The overall error in recording or indicating instruments shall not exceed ± 2% of full scale, except for distance measurements which must be ± 0.5% of total distance travelled. Coastdown measurement instrument accuracy is described in SAE J1263.

3.5.1 GENERAL INSTRUMENTATION—All instrumentation must be NIST traceable. The following classes of instruments are typical of those required for the tests outlined in this procedure. Instruments used should meet the minimum or equivalent requirements provided in 3.5.

a. Ammeter
b. Voltmeter
c. AC kilowatt-hour meter
d. DC wideband watt-hour meter or watt-time recorder
e. DC wideband watt meter
f. DC wideband ampere-hour meter
g. Vehicle speed versus time recorder
h. Distance versus time recorder
i. Tire pressure gauge
j. Ambient temperature versus time meter
k. Barometer

3.5.2 Wideband instruments (bandwidth of at least 10 times that of the maximum fundamental frequency) are required where pulsed power electronics are implemented. Any watt-hour meter or ampere-hour meter using an integration technique shall have an integration period of less than 0.05 s so that short bursts of regeneration energy and current can be accommodated without causing integration errors.

3.5.3 The fifth wheel type device shall be used to measure speed and distance for dynamometer tests unless the dynamometer can measure vehicle speed and integrate distance accurate to 0.5% of maximum vehicle speed and 0.5% of actual distance.

4. Data to be Recorded for All Tests

4.1 General

4.1.1 Vehicle identification (manufacturer, model, year) and configuration (description of any nonstandard vehicle features; e.g., windows, sunroof, exterior mirrors, etc.).

4.1.2 Vehicle accumulated mileage at the start and end of test.

4.1.3 Curb weight and test weight to within ± 1%.

4.1.4 Battery

a. Manufacturer
b. Type
c. Nominal capacity rating at specified discharge rate.
d. Previous history of the battery, including chronological age, number and nature of charge/discharge cycles, description of the last discharge and recharge processes (including a description of the charging system utilized if not supplied by the vehicle manufacturer), and a brief description of known adverse usage conditions.
e. Initial state of charge using the definition of percent charge presented in Section 2.2.2.2.
f. DC watt-hours discharged during each cycle.
g. DC watt-hours returned to battery (regenerative) during each cycle.
h. DC ampere-hours discharged during each cycle.
i. DC ampere-hours returned to battery (regenerative) during each cycle.
j. AC watt-hours supplied to battery charger during recharge following test.
k. DC watt-hours returned to battery during recharge following test.
l. DC ampere-hours returned to battery during recharge following test.

4.1.5 Motor type and rating.

4.1.6 Motor controller type.

4.1.7 Overall drive train ratio(s) available, and those used during test, plus vehicle speeds at shift points if manual transmission.

4.1.8 Tire manufacturer, design, size, and pressures at start of test.

4.1.9 Environmental Conditions

a. Range of ambient temperature during test
b. Mean test site altitude relative to sea level
c. Barometric pressure

4.1.10 Soak and charge duration.

4.1.11 Date and starting and ending times of test.

4.1.12 List of all instrumentation used in test (manufacturer, model no., serial no.) and the last calibration date of the instruments (where applicable).

4.1.13 Any deviation from test procedure and reason for deviation.

4.2 Dynamometer Data

4.2.1 Description of dynamometer used (including drum or roll diameter, number of rolls, distance between rolls, if applicable, and method of vehicle restraint).

4.2.2 Road load power set points.

4.2.3 Dynamometer inertia weight.

4.2.4 Actual miles driven for each test cycle.

5. Test Cycles—The test cycles provided are the EPA Urban Driving Schedule (UDS) and the Highway Fuel Economy Test Procedure (HWFET) driving schedule.

5.1 UDS—The UDS test schedule is described in Table 1. It consists of a series of non-repetitive idle, acceleration, cruise, and deceleration modes of various time sequences and rates. The UDS has a duration of 1372 s, is 12 km (7.45 miles) long, and is the first portion of the Cold/Hot Federal Emission Test Procedure (FTP) driving schedule. Average speed is 31.5 km/h (19.6 mph), and maximum speed is 91.2 km/h (56.7 mph).

5.2 HWFET—The HWFET driving schedule, a speed-versus-time trace, is described in Table 2. A single highway schedule is 16.4 km (10.2 miles) and is 12 min, 44 s in duration. Average speed is 77.8 km/h (48.3 mph); maximum speed is 96.4 km/h (59.9 mph).

5.3 Speed Tolerance—The speed tolerance at any given time on the UDS and HWFET driving schedule is defined by the upper and lower limits shown in Figures 1 and 2. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences. The upper limit is 3.2 km/h (2 mph) higher than the highest point on the trace within 1 s of the given time. The lower limit is 3.2 km/h (2 mph) lower than the lowest point on the trace within 1 s of the given time. Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 s on any occasion. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences.

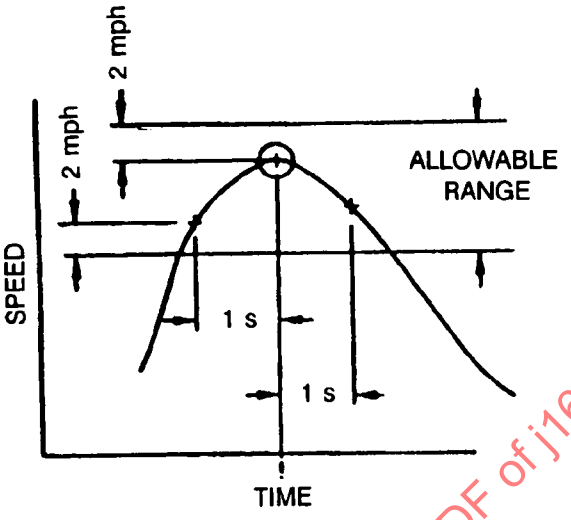

FIGURE 1—ALLOWABLE SPEED RANGE ON DRIVING SCHEDULES

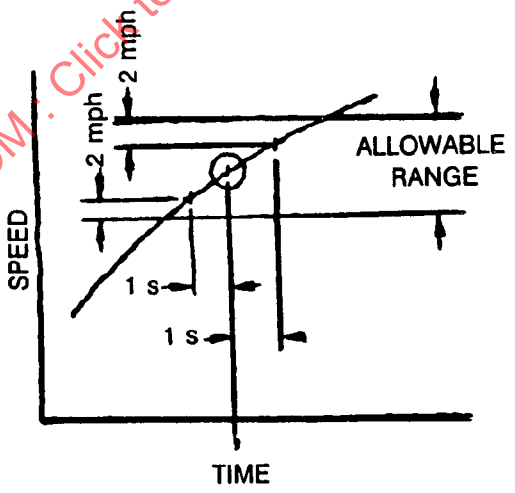

FIGURE 2—ALLOWABLE SPEED RANGE ON DRIVING SCHEDULES

6. *Vehicle Energy Consumption When Operated on a Selected Driving Pattern*

6.1 Purpose of Test—The purpose of this test is to determine the energy consumed by a test vehicle when operated on a dynamometer over repeatable driving cycles. It is the intent of this section to provide standard procedures for testing electric road vehicles so that the performance can be compared when operated over fixed driving patterns.

6.2 Definition of Energy Consumption—Energy consumption is the energy used by a vehicle in traveling a particular distance. In an electric vehicle utilizing an electrically rechargeable energy source, there is always a certain amount of the total AC energy supplied to the battery which is not available for vehicle propulsion due to charger and battery inefficiencies. Therefore, it is necessary to define three measures of energy consumption:

$$\text{System AC Energy Consumption} = \frac{\text{AC Energy to Charger for Recharge}}{\text{Distance Traveled}} \quad \text{(Eq.1)}$$

with units of AC W - h / km (AC W - h / mile)

$$\text{System DC Energy Consumption} = \frac{\text{DC Energy to Charger for Recharge}}{\text{Distance Traveled}} \quad \text{(Eq.2)}$$

with units of DC W - h / km (DC W - h / mile)

$$\text{Vehicle DC Energy Consumption} = \frac{\text{DC Energy from Battery While Driving}}{\text{Distance Traveled}} \quad \text{(Eq.3)}$$

with units of DC W - h / km (DC W - h / mile)

The system AC energy consumption shall be defined as the electrical economy value.

6.2.1 SYSTEM AC ENERGY CONSUMPTION—The AC energy required to return the battery to full charge shall be divided by the range of the vehicle on the particular driving test. This quotient shall be reported as the AC energy consumption of the electric vehicle for the particular conditions of the test. These data shall be presented in tabular form for each test performed.

6.2.2 SYSTEM DC ENERGY CONSUMPTION—The DC energy required from the charger to return the battery to full charge shall be divided by the range of vehicle for the particular driving test. This quotient shall be reported as the System DC energy consumption of the electric vehicle for the particular conditions of the test. These data shall be presented in tabular form for each test performed.

6.2.3 VEHICLE DC ENERGY CONSUMPTION—Vehicle DC energy consumed by the electric vehicle on a driving cycle shall be measured with a wideband watt-hour meter or a data logger. If a watt-hour meter is used, the total energy consumed from the start of the test to the defined end-of-test shall be recorded. For vehicles with regenerative braking, 2 W-h meters shall be used: one to measure the energy taken from the battery, and the second to measure energy returned to the battery by regenerative braking. Both the gross vehicle DC energy consumption (watt-hours from the battery divided by the distance traveled) and the net vehicle DC energy consumption (watt-hours from the battery during driving minus the watt-hours returned to the battery from regenerative braking divided by the distance traveled) shall be reported for each driving cycle. The vehicle DC energy consumption data shall be reported in tabular form for each test performed.

6.3 **Test Procedure**—The dynamometer test defined in this procedure is to be conducted subject to the test conditions and data requirements of Sections 3 and 4. The tests are to be started within 1 h of the end of soak/charge period and with the battery at 100% SOC as established in 3.2.3.

6.3.1 PRECONDITIONING—The vehicle shall be moved (pushed or towed—not driven) into position on the dynamometer. The vehicle drive train should be in a "cold" condition at the start of this test; therefore, the vehicle shall not be rolled more than 1.6 km (1 mile) between the end of the charge/soak period and the start of this test.

6.3.2 DRIVING SCHEDULES—The vehicle shall be operated over two successive UDS cycles as described in 5.1, separated by a 10-min soak with key switch in the "off" position, the hood closed, test cell fan(s) off. UDS cycles are to be followed by two HWFET driving schedules described in 5.2. The HWFET cycles are to be separated by 15 s at zero speed with the key switch "on" and the brake pedal depressed, and are to be performed within 3 h of the UDS cycles without the benefit of intermediate recharge. The key switch will be in the "off" position during the time between the UDS and HWFET cycles. Vehicle DC energy consumption shall be reported for the two UDS cycles and the second HWFET cycle. Any dynamometer coastdown "quick checks" are not part of energy consumption.

6.3.3 Following the test sequence, the vehicle battery shall be recharged to full capacity according to the manufacturer's recommended procedure. If the vehicle must be moved to a separate charging location at the end of the test, it shall be pushed or towed, not driven. Recharge energy and time shall be recorded. The total AC and DC recharge energy values shall be divided by the total distance traveled between the start-of-test and the end-of-test to provide, respectively, the system AC and DC average energy consumption values of the vehicle for that test.

6.4 **Special Reporting**—The actual SOC for each set of energy consumption measurements shall be determined based on the actual ampere-hours removed from the battery during the entire test.

7. Vehicle Range When Operated on Selected Driving Patterns

7.1 **Purpose of Test**—The purpose of this test is to determine the overall range of an electric vehicle when operated on a dynamometer over repeated driving cycles.

7.2 **Test Procedure**—The dynamometer tests defined in this procedure are to be conducted subject to the test conditions and data requirements of Sections 3 and 4. Recording of battery discharge, battery recharge, and regenerative data is optional for the range test. The test is to be started within 1 h of the end of the soak/charge period, and with the battery at 100% SOC, as defined in 3.2.3.

7.2.1 PRECONDITIONING—The vehicle shall be moved (pushed or towed—not driven) into position on the dynamometer. The vehicle drive train must be in a cold condition at the start of this test; therefore, the vehicle shall not be rolled more than 1.6 km (1 mile) between the end of charge/soak period and the start of test.

7.2.2 DRIVING SCHEDULE

7.2.2.1 Combined UDS/HWFET—The vehicle shall be operated over two successive UDS cycles as described in 5.1 followed by two HWFET driving cycles described in 5.2. The two HWFET cycles are to be separated by 15 s at zero speed with the key switch "On" and the brake pedal depressed. A 10-min soak will follow the two HWFET cycles. The key switch is placed in the "off" position, the hood closed and the test cell fan(s) off during soak periods, and the brake pedal shall not be depressed. This test sequence will be repeated until the test termination criteria are met. Then the vehicle shall be decelerated rapidly to a stop.

7.3 Test Termination Criteria—The UDS and HWFET were developed for and are used in the emissions and fuel economy testing of internal combustion engine (ICE) powered vehicles. They are defined as best-effort tests; i.e., speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences. Electric vehicles, in general, display decreasing acceleration and top speed capabilities as the traction batteries become increasingly discharged. Using the UDS or HWFET cycles for a driving range test with a best-effort performance criterion would enable the vehicle to continue the test until it could no longer move at all, as long as it was still being driven at maximum available output power. Since a driving range obtained from such a test would have little value, some performance-based test termination criterion is needed. The test termination criterion is defined as the vehicle's inability to accelerate fast enough to meet the specified speed profile within 2 s of the specified time, except under the following high-speed conditions. Starting at the 164-s mark of the UDS, the test shall be terminated if the vehicle cannot attain a minimum speed of 72 km/h (45 mph) within 30 s after the 187-s mark and then hold that speed until the 305-s mark. For the HWFET cycle, the test shall be terminated if the vehicle cannot maintain a minimum speed of 72 km/h (45 mph). The vehicle shall at all times be operated at its maximum possible level of performance in the attempt to follow the standard velocity/time profile. The test shall then be continued until the vehicle fails to meet the test termination criterion. When this occurs, the vehicle shall be decelerated rapidly to a stop. Other earlier test termination criteria may be specified by the vehicle manufacturer. For example, if continuing the range test might result in damage to the battery, the vehicle manufacturer may relate the end of driving range to some characteristic of the battery, such as terminal voltage under load. For those vehicles which are not designed to be operated above 72 km/h (45 mph) the maximum cruise speed shall be determined or recommended by the manufacturer. The test termination criterion for these vehicles is reached when the vehicle falls below 95% of the initially determined maximum cruise speed. If alternative criteria are employed because the vehicle is unable to meet above 72 km/h (45 mph) or 30-s criteria at initiation of the test, the substitute criteria shall be recorded.

7.4 Special Data Recording—In addition to recording the data specified in Section 4, the following special data shall be reported.

7.4.1 The range achieved and the number of test cycles successfully completed and fractions of test cycles shall be recorded.

7.4.2 The criteria used to define test termination in 7.3 shall be identified and reported.

7.4.3 As an option, following the range test, the vehicle battery shall be recharged to full capacity according to the manufacturer's recommended procedure. If the vehicle must be moved to a separate battery charging location at the end of the test, it shall be pushed or towed, not driven. Recharge energy and time shall be recorded. The total AC and DC recharge energy values shall be divided by the total distance traveled between the start-of-test and the end-of-test to provide, respectively, the system average AC and DC energy consumption values of the vehicle for the range test.

8. Coastdown Testing

8.1 Purpose of Test—The purpose of this procedure is to determine the road load force on a vehicle as a function of vehicle velocity so that accurate simulation of the road load force on a chassis dynamometer can be accomplished.

8.2 Test Procedure—Vehicle road power and energy consumption at various steady speeds are to be determined from coastdown tests which shall be performed according to SAE J1263 with the following modifications.

8.2.1 Vehicle regenerative braking shall be disabled during coastdown testing, minimizing any changes to the mechanical system.

8.2.2 Presently no procedure exists for vehicles that cannot obtain the vehicle speeds required in SAE J1263. When determining the road load power setting for these vehicles, good engineering practice should be used to modify these procedures for the lower speeds to determine the road load power setting. As an alternative, road load power settings may be determined by the frontal area method found in Appendix B.

8.3 Data to be Recorded—Data recording requirements shall be the same as those specified in SAE J1263.

8.4 Data Reduction

8.4.1 The vehicle speed versus time data obtained during the coastdown tests shall be processed as specified in SAE J1263 to calculate the 88 to 72 km/h (55 to 45 mph) coastdown time for use in chassis dynamometer simulation of vehicle road load.

8.4.2 The average coastdown characteristic curve (vehicle speed versus time) shall be plotted as shown in Figure 3.

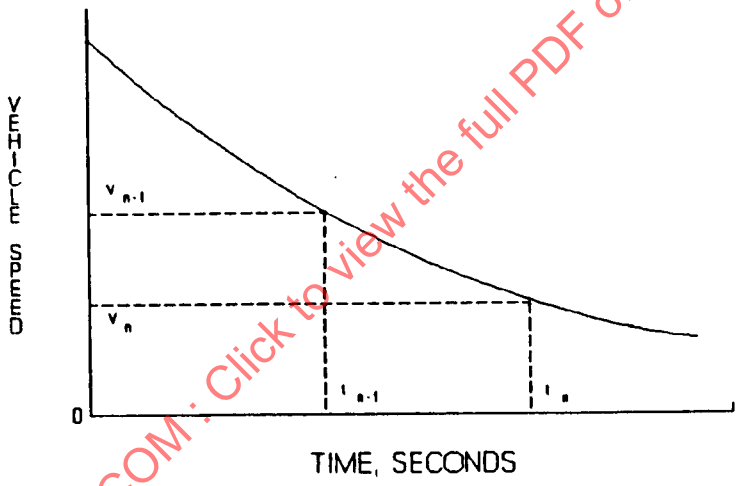

FIGURE 3—VEHICLE SPEED VERSUS TIME DURING COASTDOWN TESTING

PREPARED BY THE SAE LIGHT-DUTY VEHICLE PERFORMANCE AND ECONOMY MEASUREMENTS COMMITTEE

TABLE 1—URBAN DRIVING SCHEDULE

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
0	0.0	0.0	40	24.0	14.9	80	41.4	25.7	120	24.8	15.4	160	0.0	0.0	200	67.7	42.1
1	0.0	0.0	41	24.5	15.2	81	42.0	26.1	121	19.5	12.1	161	0.0	0.0	201	70.0	43.5
2	0.0	0.0	42	24.9	15.5	82	43.0	26.7	122	14.2	8.8	162	0.0	0.0	202	72.6	45.1
3	0.0	0.0	43	25.7	16.0	83	44.2	27.5	123	8.8	5.5	163	0.0	0.0	203	74.0	46.0
4	0.0	0.0	44	27.5	17.1	84	46.0	28.6	124	3.5	2.2	164	5.3	3.3	204	75.3	46.8
5	0.0	0.0	45	30.7	19.1	85	47.1	29.3	125	0.0	0.0	165	10.6	6.6	205	76.4	47.5
6	0.0	0.0	46	33.9	21.1	86	47.9	29.8	126	0.0	0.0	166	15.9	9.9	206	76.4	47.5
7	0.0	0.0	47	36.5	22.7	87	48.4	30.1	127	0.0	0.0	167	21.2	13.2	207	76.1	47.3
8	0.0	0.0	48	36.8	22.9	88	48.9	30.4	128	0.0	0.0	168	26.5	16.5	208	75.9	47.2
9	0.0	0.0	49	36.5	22.7	89	49.4	30.7	129	0.0	0.0	169	31.9	19.8	209	75.6	47.0
10	0.0	0.0	50	36.4	22.6	90	49.4	30.7	130	0.0	0.0	170	35.7	22.2	210	75.6	47.0
11	0.0	0.0	51	34.3	21.3	91	49.1	30.5	131	0.0	0.0	171	39.1	24.3	211	75.6	47.0
12	0.0	0.0	52	30.6	19.0	92	48.9	30.4	132	0.0	0.0	172	41.5	25.8	212	75.6	47.0
13	0.0	0.0	53	27.5	17.1	93	48.8	30.3	133	0.0	0.0	173	42.5	26.4	213	75.6	47.0
14	0.0	0.0	54	25.4	15.8	94	48.9	30.4	134	0.0	0.0	174	41.4	25.7	214	75.9	47.2
15	0.0	0.0	55	25.4	15.8	95	49.6	30.8	135	0.0	0.0	175	40.4	25.1	215	76.3	47.4
16	0.0	0.0	56	28.5	17.7	96	48.9	30.4	136	0.0	0.0	176	39.7	24.7	216	77.1	47.9
17	0.0	0.0	57	31.9	19.8	97	48.1	29.9	137	0.0	0.0	177	40.2	25.0	217	78.0	48.5
18	0.0	0.0	58	34.8	21.6	98	47.5	29.5	138	0.0	0.0	178	40.5	25.2	218	79.0	49.1
19	0.0	0.0	59	37.3	23.2	99	47.9	29.8	139	0.0	0.0	179	40.9	25.4	219	79.6	49.5
20	0.0	0.0	60	38.9	24.2	100	48.8	30.3	140	0.0	0.0	180	41.5	25.8	220	80.5	50.0
21	4.8	3.0	61	39.6	24.6	101	49.4	30.7	141	0.0	0.0	181	43.8	27.2	221	81.4	50.6
22	9.5	5.9	62	40.1	24.9	102	49.7	30.9	142	0.0	0.0	182	42.6	26.5	222	82.1	51.0
23	13.8	8.6	63	40.2	25.0	103	49.9	31.0	143	0.0	0.0	183	38.6	24.0	223	82.9	51.5
24	18.5	11.5	64	39.6	24.6	104	49.7	30.9	144	0.0	0.0	184	36.5	22.7	224	84.0	52.2
25	23.0	14.3	65	39.4	24.5	105	48.9	30.4	145	0.0	0.0	185	31.2	19.4	225	85.6	53.2
26	27.2	16.9	66	39.7	24.7	106	47.9	29.8	146	0.0	0.0	186	28.5	17.7	226	87.0	54.1
27	27.8	17.3	67	39.9	24.8	107	48.1	29.9	147	0.0	0.0	187	27.7	17.2	227	87.9	54.6
28	29.1	18.1	68	39.7	24.7	108	48.6	30.2	148	0.0	0.0	188	29.1	18.1	228	88.3	54.9
29	33.3	20.7	69	39.6	24.6	109	49.4	30.7	149	0.0	0.0	189	29.9	18.6	229	88.5	55.0
30	34.9	21.7	70	39.6	24.6	110	50.2	31.2	150	0.0	0.0	190	32.2	20.0	230	88.3	54.9
31	36.0	22.4	71	40.4	25.1	111	51.2	31.8	151	0.0	0.0	191	35.7	22.2	231	87.9	54.6
32	36.2	22.5	72	41.2	25.6	112	51.8	32.2	152	0.0	0.0	192	39.4	24.5	232	87.9	54.6
33	35.6	22.1	73	41.4	25.7	113	52.1	32.4	153	0.0	0.0	193	43.9	27.3	233	88.2	54.8
34	34.6	21.5	74	40.9	25.4	114	51.8	32.2	154	0.0	0.0	194	49.1	30.5	234	88.7	55.1
35	33.6	20.9	75	40.1	24.9	115	51.0	31.7	155	0.0	0.0	195	53.9	33.5	235	89.3	55.5
36	32.8	20.4	76	40.2	25.0	116	46.0	28.6	156	0.0	0.0	196	58.2	36.2	236	89.6	55.7
37	31.9	19.8	77	40.9	25.4	117	40.7	25.3	157	0.0	0.0	197	60.0	37.3	237	90.3	56.1
38	27.4	17.0	78	41.8	26.0	118	35.4	22.0	158	0.0	0.0	198	63.2	39.3	238	90.6	56.3
39	24.0	14.9	79	41.8	26.0	119	30.1	18.7	159	0.0	0.0	199	65.2	40.5	239	91.1	56.6

TABLE 1—URBAN DRIVING SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
240	91.2	56.7	280	89.5	55.6	320	44.2	27.5	360	49.6	30.8	400	0.0	0.0	440	0.0	0.0
241	91.2	56.7	281	90.1	56.0	321	39.9	24.8	361	50.8	31.6	401	0.0	0.0	441	0.0	0.0
242	90.9	56.5	282	90.1	56.0	322	34.6	21.5	362	51.6	32.1	402	0.0	0.0	442	0.0	0.0
243	90.9	56.5	283	89.8	55.8	323	32.3	20.1	363	52.8	32.8	403	4.2	2.6	443	0.0	0.0
244	90.9	56.5	284	88.8	55.2	324	30.7	19.1	364	54.1	33.6	404	9.5	5.9	444	0.0	0.0
245	90.9	56.5	285	87.7	54.5	325	29.8	18.5	365	55.5	34.5	405	14.8	9.2	445	0.0	0.0
246	90.9	56.5	286	86.2	53.6	326	27.4	17.0	366	55.7	34.6	406	20.1	12.5	446	0.0	0.0
247	90.9	56.5	287	84.5	52.5	327	24.9	15.5	367	56.2	34.9	407	25.4	15.8	447	0.0	0.0
248	90.7	56.4	288	82.9	51.5	328	20.1	12.5	368	56.0	34.8	408	30.7	19.1	448	5.3	3.3
249	90.3	56.1	289	82.9	51.5	329	17.4	10.8	369	55.5	34.5	409	36.0	22.4	449	10.6	6.6
250	89.8	55.8	290	82.9	51.5	330	12.9	8.0	370	55.8	34.7	410	40.2	25.0	450	15.9	9.9
251	88.7	55.1	291	82.2	51.1	331	7.6	4.7	371	57.1	35.5	411	41.2	25.6	451	21.2	13.2
252	87.9	54.6	292	80.6	50.1	332	2.3	1.4	372	57.9	36.0	412	44.2	27.5	452	26.5	16.5
253	87.2	54.2	293	80.5	50.0	333	0.0	0.0	373	57.9	36.0	413	46.7	29.0	453	31.9	19.8
254	86.9	54.0	294	80.6	50.1	334	0.0	0.0	374	57.9	36.0	414	48.3	30.0	454	37.2	23.1
255	86.4	53.7	295	80.5	50.0	335	0.0	0.0	375	57.9	36.0	415	48.4	30.1	455	42.5	26.4
256	86.2	53.6	296	79.8	49.6	336	0.0	0.0	376	57.9	36.0	416	48.3	30.0	456	44.7	27.8
257	86.7	53.9	297	79.6	49.5	337	0.0	0.0	377	57.9	36.0	417	47.8	29.7	457	46.8	29.1
258	86.9	54.0	298	79.6	49.5	338	0.0	0.0	378	58.1	36.1	418	47.1	29.3	458	50.7	31.5
259	87.0	54.1	299	79.6	49.5	339	0.0	0.0	379	58.6	36.4	419	46.3	28.8	459	53.1	33.0
260	87.0	54.1	300	79.0	49.1	340	0.0	0.0	380	58.7	36.5	420	45.1	28.0	460	54.1	33.6
261	86.6	53.8	301	78.2	48.6	341	0.0	0.0	381	58.6	36.4	421	40.2	25.0	461	56.0	34.8
262	85.9	53.4	302	77.4	48.1	342	0.0	0.0	382	57.9	36.0	422	34.9	21.7	462	56.5	35.1
263	85.3	53.0	303	75.9	47.2	343	0.0	0.0	383	56.5	35.1	423	29.6	18.4	463	57.3	35.6
264	84.6	52.6	304	74.2	46.1	344	0.0	0.0	384	54.9	34.1	424	24.3	15.1	464	58.1	36.1
265	83.8	52.1	305	72.4	45.0	345	0.0	0.0	385	53.9	33.5	425	19.0	11.8	465	57.9	36.0
266	84.3	52.4	306	70.5	43.8	346	0.0	0.0	386	50.5	31.4	426	13.7	8.5	466	58.1	36.1
267	83.7	52.0	307	68.5	42.6	347	1.6	1.0	387	46.7	29.0	427	8.4	5.2	467	58.2	36.2
268	83.5	51.9	308	66.8	41.5	348	6.9	4.3	388	41.4	25.7	428	3.1	1.9	468	57.9	36.0
269	83.2	51.7	309	64.8	40.3	349	12.2	7.6	389	37.0	23.0	429	0.0	0.0	469	57.4	35.7
270	82.9	51.5	310	61.9	38.5	350	17.5	10.9	390	32.7	20.3	430	0.0	0.0	470	57.9	36.0
271	83.0	51.6	311	59.5	37.0	351	22.8	14.2	391	28.2	17.5	431	0.0	0.0	471	57.9	36.0
272	83.3	51.8	312	56.6	35.2	352	27.8	17.3	392	23.3	14.5	432	0.0	0.0	472	57.3	35.6
273	83.8	52.1	313	54.4	33.8	353	32.2	20.0	393	19.3	12.0	433	0.0	0.0	473	57.1	35.5
274	84.5	52.5	314	52.3	32.5	354	36.2	22.5	394	14.0	8.7	434	0.0	0.0	474	57.0	35.4
275	85.3	53.0	315	50.7	31.5	355	38.1	23.7	395	8.7	5.4	435	0.0	0.0	475	56.6	35.2
276	86.1	53.5	316	49.2	30.6	356	40.5	25.2	396	3.4	2.1	436	0.0	0.0	476	56.6	35.2
277	86.9	54.0	317	49.1	30.5	357	42.8	26.6	397	0.0	0.0	437	0.0	0.0	477	56.6	35.2
278	88.3	54.9	318	48.3	30.0	358	45.2	28.1	398	0.0	0.0	438	0.0	0.0	478	56.6	35.2
279	89.1	55.4	319	46.7	29.0	359	48.3	30.0	399	0.0	0.0	439	0.0	0.0	479	56.6	35.2

TABLE 1—URBAN DRIVING SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
480	56.6	35.2	520	25.7	16.0	560	0.0	0.0	600	34.8	21.6	640	0.0	0.0	680	0.0	0.0
481	56.3	35.0	521	28.5	17.7	561	0.0	0.0	601	35.4	22.0	641	0.0	0.0	681	0.0	0.0
482	56.5	35.1	522	30.6	19.0	562	0.0	0.0	602	36.0	22.4	642	0.0	0.0	682	0.0	0.0
483	56.6	35.2	523	32.3	20.1	563	0.0	0.0	603	36.2	22.5	643	0.0	0.0	683	0.0	0.0
484	57.1	35.5	524	33.8	21.0	564	0.0	0.0	604	36.2	22.5	644	0.0	0.0	684	0.0	0.0
485	56.6	35.2	525	35.4	22.0	565	0.0	0.0	605	36.2	22.5	645	0.0	0.0	685	0.0	0.0
486	56.3	35.0	526	37.0	23.0	566	0.0	0.0	606	36.5	22.7	646	3.2	2.0	686	0.0	0.0
487	56.3	35.0	527	38.3	23.8	567	0.0	0.0	607	38.1	23.7	647	7.2	4.5	687	0.0	0.0
488	56.3	35.0	528	39.4	24.5	568	0.0	0.0	608	40.4	25.1	648	12.6	7.8	688	0.0	0.0
489	56.0	34.8	529	40.1	24.9	569	5.3	3.3	609	41.8	26.0	649	16.4	10.2	689	0.0	0.0
490	55.7	34.6	530	40.2	25.0	570	10.6	6.6	610	42.6	26.5	650	20.1	12.5	690	0.0	0.0
491	55.5	34.5	531	40.2	25.0	571	15.9	9.9	611	43.4	27.0	651	22.5	14.0	691	0.0	0.0
492	53.9	33.5	532	40.2	25.0	572	20.9	13.0	612	42.0	26.1	652	24.6	15.3	692	0.0	0.0
493	51.5	32.0	533	40.2	25.0	573	23.5	14.6	613	36.7	22.8	653	28.2	17.5	693	0.0	0.0
494	48.4	30.1	534	40.2	25.0	574	25.7	16.0	614	31.4	19.5	654	31.5	19.6	694	2.3	1.4
495	45.1	28.0	535	40.2	25.0	575	27.4	17.0	615	26.1	16.2	655	33.8	21.0	695	5.3	3.3
496	41.0	25.5	536	41.2	25.6	576	27.4	17.0	616	20.8	12.9	656	35.7	22.2	696	7.1	4.4
497	36.2	22.5	537	41.5	25.8	577	27.4	17.0	617	15.4	9.6	657	37.5	23.3	697	10.5	6.5
498	31.9	19.8	538	41.8	26.0	578	28.2	17.5	618	10.1	6.3	658	39.4	24.5	698	14.8	9.2
499	26.5	16.5	539	41.2	25.6	579	28.5	17.7	619	4.8	3.0	659	40.7	25.3	699	18.2	11.3
500	21.2	13.2	540	40.5	25.2	580	28.5	17.7	620	0.0	0.0	660	41.2	25.6	700	21.7	13.5
501	16.6	10.3	541	40.2	25.0	581	28.2	17.5	621	0.0	0.0	661	41.8	26.0	701	23.5	14.6
502	11.6	7.2	542	40.2	25.0	582	27.4	17.0	622	0.0	0.0	662	42.0	26.1	702	26.4	16.4
503	6.4	4.0	543	40.2	25.0	583	27.2	16.9	623	0.0	0.0	663	42.2	26.2	703	26.9	16.7
504	1.6	1.0	544	39.3	24.4	584	26.7	16.6	624	0.0	0.0	664	42.2	26.2	704	26.5	16.5
505	0.0	0.0	545	37.2	23.1	585	27.4	17.0	625	0.0	0.0	665	42.5	26.4	705	26.5	16.5
506	0.0	0.0	546	31.9	19.8	586	27.5	17.1	626	0.0	0.0	666	42.6	26.5	706	29.3	18.2
507	0.0	0.0	547	26.5	16.5	587	27.4	17.0	627	0.0	0.0	667	42.6	26.5	707	30.9	19.2
508	0.0	0.0	548	21.2	13.2	588	26.7	16.6	628	0.0	0.0	668	41.8	26.0	708	32.3	20.1
509	0.0	0.0	549	15.9	9.9	589	26.5	16.5	629	0.0	0.0	669	41.0	25.5	709	34.6	21.5
510	0.0	0.0	550	10.6	6.6	590	26.5	16.5	630	0.0	0.0	670	38.0	23.6	710	36.2	22.5
511	1.9	1.2	551	5.3	3.3	591	26.7	16.6	631	0.0	0.0	671	34.4	21.4	711	36.2	22.5
512	5.6	3.5	552	0.0	0.0	592	27.4	17.0	632	0.0	0.0	672	29.8	18.5	712	35.6	22.1
513	8.8	5.5	553	0.0	0.0	593	28.3	17.6	633	0.0	0.0	673	26.4	16.4	713	36.5	22.7
514	10.5	6.5	554	0.0	0.0	594	29.8	18.5	634	0.0	0.0	674	23.3	14.5	714	37.5	23.3
515	13.7	8.5	555	0.0	0.0	595	30.9	19.2	635	0.0	0.0	675	18.7	11.6	715	37.8	23.5
516	15.4	9.6	556	0.0	0.0	596	32.5	20.2	636	0.0	0.0	676	14.0	8.7	716	36.2	22.5
517	16.9	10.5	557	0.0	0.0	597	33.8	21.0	637	0.0	0.0	677	9.3	5.8	717	34.8	21.6
518	19.1	11.9	558	0.0	0.0	598	33.9	21.1	638	0.0	0.0	678	5.6	3.5	718	33.0	20.5
519	22.5	14.0	559	0.0	0.0	599	34.1	21.2	639	0.0	0.0	679	3.2	2.0	719	29.0	18.0

TABLE 1—URBAN DRIVING SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
720	24.1	15.0	760	15.1	9.4	800	45.1	28.0	840	30.9	19.2	880	46.8	29.1	920	36.4	22.6
721	19.3	12.0	761	10.0	6.2	801	45.9	28.5	841	30.9	19.2	881	46.7	29.0	921	37.7	23.4
722	14.5	9.0	762	4.8	3.0	802	48.3	30.0	842	32.3	20.1	882	46.5	28.9	922	38.6	24.0
723	10.0	6.2	763	2.4	1.5	803	49.9	31.0	843	33.6	20.9	883	45.9	28.5	923	38.9	24.2
724	7.2	4.5	764	2.4	1.5	804	51.5	32.0	844	34.4	21.4	884	45.2	28.1	924	39.3	24.4
725	4.8	3.0	765	0.8	0.5	805	53.1	33.0	845	35.4	22.0	885	45.1	28.0	925	40.1	24.9
726	3.4	2.1	766	0.0	0.0	806	53.1	33.0	846	36.4	22.6	886	45.1	28.0	926	40.4	25.1
727	0.8	0.5	767	4.8	3.0	807	54.1	33.6	847	37.3	23.2	887	44.4	27.6	927	40.5	25.2
728	0.8	0.5	768	10.1	6.3	808	54.7	34.0	848	38.6	24.0	888	43.8	27.2	928	40.7	25.3
729	5.1	3.2	769	15.4	9.6	809	55.2	34.3	849	40.2	25.0	889	42.8	26.6	929	41.0	25.5
730	10.5	6.5	770	20.8	12.9	810	55.0	34.2	850	41.8	26.0	890	43.4	27.0	930	40.5	25.2
731	15.4	9.6	771	25.4	15.8	811	54.7	34.0	851	42.8	26.6	891	44.2	27.5	931	40.2	25.0
732	20.1	12.5	772	28.2	17.5	812	54.7	34.0	852	42.8	26.6	892	44.7	27.8	932	40.2	25.0
733	22.5	14.0	773	29.6	18.4	813	54.5	33.9	853	43.1	26.8	893	45.1	28.0	933	40.2	25.0
734	25.7	16.0	774	31.4	19.5	814	54.1	33.6	854	43.4	27.0	894	44.7	27.8	934	39.7	24.7
735	29.0	18.0	775	33.3	20.7	815	53.3	33.1	855	43.8	27.2	895	45.1	28.0	935	39.4	24.5
736	31.5	19.6	776	35.4	22.0	816	53.1	33.0	856	44.7	27.8	896	45.1	28.0	936	39.1	24.3
737	34.6	21.5	777	37.3	23.2	817	52.3	32.5	857	45.2	28.1	897	45.1	28.0	937	39.1	24.3
738	37.2	23.1	778	40.2	25.0	818	51.5	32.0	858	46.3	28.8	898	44.6	27.7	938	39.4	24.5
739	39.4	24.5	779	42.6	26.5	819	51.3	31.9	859	46.5	28.9	899	44.1	27.4	939	40.2	25.0
740	41.0	25.5	780	44.2	27.5	820	50.8	31.6	860	46.7	29.0	900	43.3	26.9	940	40.2	25.0
741	42.6	26.5	781	45.1	28.0	821	50.7	31.5	861	46.8	29.1	901	42.8	26.6	941	39.6	24.6
742	43.6	27.1	782	45.5	28.3	822	49.2	30.6	862	46.7	29.0	902	42.6	26.5	942	39.6	24.6
743	44.4	27.6	783	46.5	28.9	823	49.3	30.0	863	45.2	28.1	903	42.6	26.5	943	38.8	24.1
744	44.9	27.9	784	46.5	28.9	824	48.1	29.9	864	44.2	27.5	904	42.6	26.5	944	39.4	24.5
745	45.5	28.3	785	46.5	28.9	825	48.1	29.9	865	43.4	27.0	905	42.3	26.3	945	40.4	25.1
746	46.0	28.6	786	46.3	28.8	826	48.1	29.9	866	41.5	25.8	906	42.2	26.2	946	41.2	25.6
747	46.0	28.6	787	45.9	28.5	827	48.1	29.9	867	40.2	25.0	907	42.2	26.2	947	40.4	25.1
748	45.5	28.3	788	45.5	28.3	828	47.6	29.6	868	39.4	24.5	908	41.7	25.9	948	38.6	24.0
749	45.4	28.2	789	45.5	28.3	829	47.5	29.5	869	39.9	24.8	909	41.2	25.6	949	35.4	22.0
750	45.1	28.0	790	45.5	28.3	830	47.5	29.5	870	40.4	25.1	910	41.2	25.6	950	32.3	20.1
751	44.2	27.5	791	45.4	28.2	831	47.1	29.3	871	41.0	25.5	911	41.7	25.9	951	27.2	16.9
752	43.1	26.8	792	44.4	27.6	832	46.5	28.9	872	41.4	25.7	912	41.5	25.8	952	21.9	13.6
753	41.0	25.5	793	44.2	27.5	833	45.4	28.2	873	42.2	26.2	913	41.0	25.5	953	16.6	10.3
754	37.8	23.5	794	44.2	27.5	834	44.6	27.7	874	43.3	26.9	914	39.6	24.6	954	11.3	7.0
755	34.6	21.5	795	44.2	27.5	835	43.4	27.0	875	44.2	27.5	915	37.8	23.5	955	6.0	3.7
756	30.6	19.0	796	44.2	27.5	836	41.0	25.5	876	44.7	27.8	916	35.7	22.2	956	0.6	0.4
757	26.5	16.5	797	44.2	27.5	837	38.1	23.7	877	45.7	28.4	917	34.8	21.6	957	0.0	0.0
758	24.0	14.9	798	44.2	27.5	838	35.4	22.0	878	46.7	29.0	918	34.8	21.6	958	0.0	0.0
759	20.1	12.5	799	44.4	27.6	839	33.0	20.5	879	47.0	29.2	919	34.9	21.7	959	0.0	0.0

TABLE 1—URBAN DRIVING SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
960	3.2	2.0	1000	37.8	23.5	1040	0.0	0.0	1080	29.0	18.0	1120	38.3	23.8	1160	0.0	0.0
961	8.5	5.3	1001	38.6	24.0	1041	0.0	0.0	1081	24.1	15.0	1121	39.4	24.5	1161	0.0	0.0
962	13.8	8.6	1002	39.6	24.6	1042	0.0	0.0	1082	19.8	12.3	1122	40.2	25.0	1162	0.0	0.0
963	19.1	11.9	1003	39.9	24.8	1043	0.0	0.0	1083	17.9	11.1	1123	40.1	24.9	1163	0.0	0.0
964	24.5	15.2	1004	40.4	25.1	1044	0.0	0.0	1084	17.1	10.6	1124	39.9	24.8	1164	0.0	0.0
965	28.2	17.5	1005	41.0	25.5	1045	0.0	0.0	1085	16.1	10.0	1125	40.2	25.0	1165	0.0	0.0
966	29.9	18.6	1006	41.2	25.6	1046	0.0	0.0	1086	15.3	9.5	1126	40.9	25.4	1166	0.0	0.0
967	32.2	20.0	1007	41.0	25.5	1047	0.0	0.0	1087	14.6	9.1	1127	41.5	25.8	1167	0.0	0.0
968	33.9	21.1	1008	40.2	25.0	1048	0.0	0.0	1088	14.0	8.7	1128	41.8	26.0	1168	0.0	0.0
969	35.4	22.0	1009	38.8	24.1	1049	0.0	0.0	1089	13.8	8.6	1129	42.5	26.4	1169	3.4	2.1
970	37.0	23.0	1010	38.1	23.7	1050	0.0	0.0	1090	14.2	8.8	1130	42.8	26.6	1170	8.7	5.4
971	39.4	24.5	1011	37.3	23.2	1051	0.0	0.0	1091	14.5	9.0	1131	43.3	26.9	1171	14.0	8.7
972	42.3	26.3	1012	36.8	22.9	1052	0.0	0.0	1092	14.0	8.7	1132	43.4	27.0	1172	19.3	12.0
973	44.2	27.5	1013	36.2	22.5	1053	1.9	1.2	1093	13.8	8.6	1133	43.4	27.0	1173	24.6	15.3
974	45.2	28.1	1014	35.4	22.0	1054	6.4	4.0	1094	12.9	8.0	1134	43.4	27.0	1174	29.9	18.6
975	45.7	28.4	1015	34.8	21.6	1055	11.7	7.3	1095	11.3	7.0	1135	43.3	26.9	1175	33.9	21.1
976	45.9	28.5	1016	33.0	20.5	1056	17.1	10.6	1096	8.0	5.0	1136	43.1	26.8	1176	37.0	23.0
977	45.9	28.5	1017	28.2	17.5	1057	22.4	13.9	1097	6.8	4.2	1137	43.1	26.8	1177	37.8	23.5
978	45.9	28.5	1018	22.8	14.2	1058	27.4	17.0	1098	4.2	2.6	1138	42.6	26.5	1178	37.0	23.0
979	44.6	27.7	1019	17.5	10.9	1059	29.8	18.5	1099	1.6	1.0	1139	42.5	26.4	1179	36.2	22.5
980	44.2	27.5	1020	12.2	7.6	1060	32.2	20.0	1100	0.0	0.0	1140	41.8	26.0	1180	32.2	20.0
981	43.8	27.2	1021	6.9	4.3	1061	35.1	21.8	1101	0.2	0.1	1141	41.0	25.5	1181	26.9	16.7
982	43.1	26.8	1022	1.6	1.0	1062	37.0	23.0	1102	1.0	0.6	1142	39.6	24.6	1182	21.6	13.4
983	42.6	26.5	1023	0.0	0.0	1063	38.6	24.0	1103	2.6	1.6	1143	37.8	23.5	1183	16.3	10.1
984	41.8	26.0	1024	0.0	0.0	1064	39.9	24.8	1104	5.8	3.6	1144	34.6	21.5	1184	10.9	6.8
985	41.4	25.7	1025	0.0	0.0	1065	41.2	25.6	1105	11.1	6.9	1145	32.2	20.0	1185	5.6	3.5
986	40.5	25.2	1026	0.0	0.0	1066	42.6	26.5	1106	16.1	10.0	1146	28.2	17.5	1186	0.3	0.2
987	38.6	24.0	1027	0.0	0.0	1067	43.1	26.8	1107	20.6	12.8	1147	25.7	16.0	1187	0.0	0.0
988	35.4	22.0	1028	0.0	0.0	1068	44.1	27.4	1108	22.5	14.0	1148	22.5	14.0	1188	0.0	0.0
989	34.6	21.5	1029	0.0	0.0	1069	44.9	27.9	1109	23.3	14.5	1149	17.2	10.7	1189	0.0	0.0
990	34.6	21.5	1030	0.0	0.0	1070	45.5	28.3	1110	25.7	16.0	1150	11.9	7.4	1190	0.0	0.0
991	35.1	21.8	1031	0.0	0.0	1071	45.1	28.0	1111	29.1	18.1	1151	6.6	4.1	1191	0.0	0.0
992	36.2	22.5	1032	0.0	0.0	1072	44.2	27.5	1112	32.2	20.0	1152	1.3	0.8	1192	0.0	0.0
993	37.0	23.0	1033	0.0	0.0	1073	43.4	27.0	1113	33.8	21.0	1153	0.0	0.0	1193	0.0	0.0
994	36.7	22.8	1034	0.0	0.0	1074	43.4	27.0	1114	34.1	21.2	1154	0.0	0.0	1194	0.0	0.0
995	36.7	22.8	1035	0.0	0.0	1075	42.3	26.3	1115	34.3	21.3	1155	0.0	0.0	1195	0.0	0.0
996	37.0	23.0	1036	0.0	0.0	1076	39.4	24.5	1116	34.4	21.4	1156	0.0	0.0	1196	0.0	0.0
997	36.5	22.7	1037	0.0	0.0	1077	36.2	22.5	1117	34.9	21.7	1157	0.0	0.0	1197	0.3	0.2
998	36.5	22.7	1038	0.0	0.0	1078	34.6	21.5	1118	36.2	22.5	1158	0.0	0.0	1198	2.4	1.5
999	36.5	22.7	1039	0.0	0.0	1079	33.1	20.6	1119	37.0	23.0	1159	0.0	0.0	1199	5.6	3.5

TABLE 1—URBAN DRIVING SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
1200	10.5	6.5	1240	9.7	6.0	1280	39.4	24.5	1320	0.0	0.0	1360	26.5	16.5
1201	15.8	9.8	1241	6.4	4.0	1281	38.6	24.0	1321	0.0	0.0	1361	24.9	15.5
1202	19.3	12.0	1242	4.0	2.5	1282	37.8	23.5	1322	0.0	0.0	1362	22.5	14.0
1203	20.8	12.9	1243	1.1	0.7	1283	37.8	23.5	1323	0.0	0.0	1363	17.7	11.0
1204	20.9	13.0	1244	0.0	0.0	1284	37.8	23.5	1324	0.0	0.0	1364	12.9	8.0
1205	20.3	12.6	1245	0.0	0.0	1285	37.8	23.5	1325	0.0	0.0	1365	8.4	5.2
1206	20.6	12.8	1246	0.0	0.0	1286	37.8	23.5	1326	0.0	0.0	1366	4.0	2.5
1207	21.1	13.1	1247	0.0	0.0	1287	37.8	23.5	1327	0.0	0.0	1367	0.0	0.0
1208	21.1	13.1	1248	0.0	0.0	1288	38.6	24.0	1328	0.0	0.0	1368	0.0	0.0
1209	22.5	14.0	1249	0.0	0.0	1289	38.8	24.1	1329	0.0	0.0	1369	0.0	0.0
1210	24.9	15.5	1250	0.0	0.0	1290	39.4	24.5	1330	0.0	0.0	1370	0.0	0.0
1211	27.4	17.0	1251	0.0	0.0	1291	39.7	24.7	1331	0.0	0.0	1371	0.0	0.0
1212	29.9	18.6	1252	1.6	1.0	1292	40.2	25.0	1332	0.0	0.0	1372	0.0	0.0
1213	31.7	19.7	1253	1.6	1.0	1293	40.9	25.4	1333	0.0	0.0			
1214	33.8	21.0	1254	1.6	1.0	1294	41.2	25.6	1334	0.0	0.0			
1215	34.6	21.5	1255	1.6	1.0	1295	41.4	25.7	1335	0.0	0.0			
1216	35.1	21.8	1256	1.6	1.0	1296	41.8	26.0	1336	0.0	0.0			
1217	35.1	21.8	1257	2.6	1.6	1297	42.2	26.2	1337	0.0	0.0			
1218	34.6	21.5	1258	4.8	3.0	1298	43.4	27.0	1338	2.4	1.5			
1219	34.1	21.2	1259	6.4	4.0	1299	44.7	27.8	1339	7.7	4.8			
1220	34.6	21.5	1260	8.0	5.0	1300	45.5	28.3	1340	13.0	8.1			
1221	35.1	21.8	1261	10.1	6.3	1301	46.7	29.0	1341	18.3	11.4			
1222	35.4	22.0	1262	12.9	8.0	1302	46.8	29.1	1342	21.2	13.2			
1223	35.2	21.9	1263	16.1	10.0	1303	46.7	29.0	1343	24.3	15.1			
1224	34.9	21.7	1264	16.9	10.5	1304	45.1	28.0	1344	27.0	16.8			
1225	34.6	21.5	1265	15.3	9.5	1305	39.7	24.7	1345	29.4	18.3			
1226	34.6	21.5	1266	13.7	8.5	1306	34.4	21.4	1346	31.4	19.5			
1227	34.4	21.4	1267	12.2	7.6	1307	29.1	18.1	1347	32.7	20.3			
1228	32.3	20.1	1268	14.2	8.8	1308	23.8	14.8	1348	34.3	21.3			
1229	31.4	19.5	1269	17.7	11.0	1309	18.5	11.5	1349	35.2	21.9			
1230	30.9	19.2	1270	22.5	14.0	1310	13.2	8.2	1350	35.6	22.1			
1231	31.5	19.6	1271	27.4	17.0	1311	7.9	4.9	1351	36.0	22.4			
1232	31.9	19.8	1272	31.4	19.5	1312	2.6	1.6	1352	35.4	22.0			
1233	32.2	20.0	1273	33.8	21.0	1313	0.0	0.0	1353	34.8	21.6			
1234	31.4	19.5	1274	35.1	21.8	1314	0.0	0.0	1354	33.9	21.1			
1235	28.2	17.5	1275	35.7	22.2	1315	0.0	0.0	1355	33.0	20.5			
1236	24.9	15.5	1276	37.0	23.0	1316	0.0	0.0	1356	32.2	20.0			
1237	20.9	13.0	1277	38.0	23.6	1317	0.0	0.0	1357	31.5	19.6			
1238	16.1	10.0	1278	38.8	24.1	1318	0.0	0.0	1358	29.8	18.5			
1239	12.9	8.0	1279	39.4	24.5	1319	0.0	0.0	1359	28.2	17.5			

TABLE 2—HIGHWAY FUEL ECONOMY TEST SCHEDULE

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
0	0.0	0.0	40	59.4	36.9	80	75.5	46.9	120	77.4	48.1	160	75.3	46.8	200	69.8	43.4
1	0.0	0.0	41	59.5	37.0	81	75.5	46.9	121	76.7	47.7	161	75.5	46.9	201	69.5	43.2
2	0.0	0.0	42	59.5	37.0	82	75.6	47.0	122	76.3	47.4	162	75.6	47.0	202	69.5	43.2
3	3.2	2.0	43	59.5	37.0	83	75.8	47.1	123	76.1	47.3	163	75.8	47.1	203	69.3	43.1
4	7.9	4.9	44	59.5	37.0	84	75.8	47.1	124	76.4	47.5	164	76.6	47.6	204	69.2	43.0
5	13.0	8.1	45	59.5	37.0	85	75.9	47.2	125	76.9	47.8	165	77.1	47.9	205	69.2	43.0
6	18.2	11.3	46	59.5	37.0	86	75.8	47.1	126	77.1	47.9	166	77.2	48.0	206	69.3	43.1
7	23.3	14.5	47	59.7	37.1	87	75.6	47.0	127	77.2	48.0	167	77.2	48.0	207	69.8	43.4
8	27.8	17.3	48	60.0	37.3	88	75.5	46.9	128	77.1	47.9	168	77.1	47.9	208	70.6	43.9
9	31.5	19.6	49	60.8	37.8	89	74.8	46.5	129	77.1	47.9	169	76.9	47.8	209	70.8	44.0
10	35.1	21.8	50	62.1	38.6	90	74.5	46.3	130	77.1	47.9	170	76.1	47.3	210	70.0	43.5
11	38.6	24.0	51	63.2	39.3	91	74.3	46.2	131	77.2	48.0	171	75.1	46.7	211	68.5	42.6
12	41.5	25.8	52	64.4	40.0	92	74.5	46.3	132	77.2	48.0	172	74.3	46.2	212	66.8	41.5
13	43.6	27.1	53	65.5	40.7	93	74.8	46.5	133	77.2	48.0	173	73.9	45.9	213	65.5	40.7
14	45.1	28.0	54	66.6	41.4	94	75.5	46.9	134	77.1	47.9	174	73.5	45.7	214	64.4	40.0
15	46.7	29.0	55	67.9	42.2	95	75.8	47.1	135	76.1	47.3	175	73.2	45.5	215	64.4	40.0
16	48.3	30.0	56	69.0	42.9	96	76.3	47.4	136	74.0	46.0	176	73.0	45.4	216	64.8	40.3
17	49.4	30.7	57	70.0	43.5	97	76.7	47.7	137	69.7	43.3	177	72.9	45.3	217	66.0	41.0
18	50.7	31.5	58	70.8	44.0	98	77.2	48.0	138	66.3	41.2	178	72.4	45.0	218	67.6	42.0
19	51.8	32.2	59	71.3	44.3	99	77.6	48.2	139	63.6	39.5	179	70.8	44.0	219	68.7	42.7
20	52.9	32.9	60	71.6	44.5	100	78.0	48.5	140	63.1	39.2	180	69.3	43.1	220	69.3	43.1
21	53.9	33.5	61	72.1	44.8	101	78.5	48.8	141	62.8	39.0	181	67.9	42.2	221	69.5	43.2
22	54.9	34.1	62	72.2	44.9	102	79.0	49.1	142	62.8	39.0	182	66.8	41.5	222	69.8	43.4
23	55.7	34.6	63	72.4	45.0	103	79.2	49.2	143	62.9	39.1	183	66.8	41.5	223	70.6	43.9
24	56.2	34.9	64	72.6	45.1	104	79.0	49.1	144	63.6	39.5	184	67.7	42.1	224	71.3	44.3
25	56.5	35.1	65	73.0	45.4	105	79.0	49.1	145	64.5	40.1	185	69.0	42.9	225	71.9	44.7
26	57.4	35.7	66	73.5	45.7	106	78.8	49.0	146	66.0	41.0	186	70.0	43.5	226	72.6	45.1
27	57.8	35.9	67	74.0	46.0	107	78.8	49.0	147	67.6	42.0	187	70.6	43.9	227	73.0	45.4
28	57.6	35.8	68	74.5	46.3	108	79.0	49.1	148	69.4	43.1	188	70.2	43.6	228	73.7	45.8
29	56.8	35.3	69	74.8	46.5	109	79.2	49.2	149	70.3	43.7	189	69.7	43.3	229	74.8	46.5
30	56.2	34.9	70	75.3	46.8	110	79.3	49.3	150	71.0	44.1	190	69.2	43.0	230	75.5	46.9
31	55.5	34.5	71	75.5	46.9	111	79.5	49.4	151	71.3	44.3	191	69.3	43.1	231	75.9	47.2
32	55.7	34.6	72	75.6	47.0	112	79.6	49.5	152	71.4	44.4	192	69.8	43.4	232	76.3	47.4
33	56.0	34.8	73	75.8	47.1	113	79.6	49.5	153	71.8	44.6	193	70.6	43.9	233	76.1	47.3
34	56.5	35.1	74	75.9	47.2	114	79.6	49.5	154	71.9	44.7	194	71.3	44.3	234	76.1	47.3
35	57.5	35.7	75	76.1	47.3	115	79.5	49.4	155	72.2	44.9	195	71.8	44.6	235	75.9	47.2
36	58.1	36.1	76	75.9	47.2	116	79.0	49.1	156	72.7	45.2	196	72.2	44.9	236	75.9	47.2
37	58.2	36.2	77	75.8	47.1	117	78.7	48.9	157	73.5	45.7	197	72.1	44.8	237	75.9	47.2
38	58.7	36.5	78	75.6	47.0	118	78.2	48.6	158	73.9	45.9	198	71.4	44.4	238	75.8	47.1
39	59.1	36.7	79	75.5	46.9	119	77.9	48.4	159	74.5	46.3	199	70.6	43.9	239	75.6	47.0

TABLE 2—HIGHWAY FUEL ECONOMY TEST SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
240	75.6	47.0	280	71.1	44.2	320	74.8	46.5	360	92.4	57.4	400	91.9	57.1	440	93.2	57.9
241	75.5	46.9	281	70.0	43.5	321	75.3	46.8	361	92.0	57.2	401	92.5	57.5	441	93.2	57.9
242	75.3	46.8	282	68.9	42.8	322	75.8	47.1	362	91.9	57.1	402	93.0	57.8	442	93.2	57.9
243	75.5	46.9	283	67.6	42.0	323	76.7	47.7	363	91.7	57.0	403	93.3	58.0	443	93.2	57.9
244	75.6	47.0	284	64.5	40.1	324	77.7	48.3	364	91.7	57.0	404	93.3	58.0	444	93.2	57.9
245	75.9	47.2	285	62.1	38.6	325	78.8	49.0	365	91.6	56.9	405	93.3	58.0	445	93.3	58.0
246	76.4	47.5	286	60.3	37.5	326	80.0	49.7	366	91.6	56.9	406	93.3	58.0	446	93.5	58.1
247	77.1	47.9	287	57.6	35.8	327	80.9	50.3	367	91.6	56.9	407	93.3	58.0	447	93.5	58.1
248	77.2	48.0	288	55.8	34.7	328	82.1	51.0	368	91.7	57.0	408	93.3	58.0	448	93.6	58.2
249	77.2	48.0	289	54.7	34.0	329	83.2	51.7	369	91.7	57.0	409	93.2	57.9	449	93.6	58.2
250	77.2	48.0	290	53.6	33.3	330	84.3	52.4	370	91.7	57.0	410	93.0	57.8	450	93.6	58.2
251	77.2	48.0	291	52.3	32.5	331	85.4	53.1	571	91.7	57.0	411	92.8	57.7	451	93.5	58.1
252	77.2	48.0	292	51.0	31.7	332	86.6	53.8	372	91.7	57.0	412	92.8	57.7	452	93.3	58.0
253	77.4	48.1	293	49.2	30.6	333	87.7	54.5	373	91.7	57.0	413	93.0	57.8	453	93.3	58.0
254	77.6	48.2	294	47.6	29.6	334	88.8	55.2	374	91.7	57.0	414	93.2	57.9	454	93.3	58.0
255	77.6	48.2	295	46.3	28.8	335	89.8	55.8	375	91.7	57.0	415	93.3	58.0	455	93.3	58.0
256	77.4	48.1	296	45.7	28.4	336	90.7	56.4	376	91.7	57.0	416	93.5	58.1	456	93.3	58.0
257	78.2	48.6	297	46.0	28.6	337	91.6	56.9	377	91.6	56.9	417	94.0	58.4	457	93.3	58.0
258	78.7	48.9	298	47.5	29.5	338	91.7	57.0	378	91.4	56.8	418	94.8	58.9	458	93.2	57.9
259	79.0	49.1	299	50.5	31.4	339	91.9	57.1	379	90.9	56.5	419	95.1	59.1	459	93.2	57.9
260	79.0	49.1	300	53.7	33.4	340	92.2	57.3	380	90.4	56.2	420	95.6	59.4	460	93.3	58.0
261	79.0	49.1	301	57.3	35.6	341	92.7	57.6	381	90.1	56.0	421	96.2	59.8	461	93.5	58.1
262	79.0	49.1	302	60.3	37.5	342	93.0	57.8	382	90.1	56.0	422	96.4	59.9	462	93.5	58.1
263	79.0	49.1	303	62.9	39.1	343	93.3	58.0	383	90.1	56.0	423	96.4	59.9	463	93.6	58.2
264	78.8	49.0	304	64.7	40.2	344	93.5	58.1	384	90.3	56.1	424	96.2	59.8	464	93.8	58.3
265	78.7	48.9	305	66.1	41.1	345	94.0	58.4	385	90.7	56.4	425	95.9	59.6	465	93.8	58.3
266	77.6	48.2	306	67.3	41.8	346	94.4	58.7	386	91.2	56.7	426	95.6	59.4	466	93.8	58.3
267	76.7	47.7	307	68.2	42.4	347	94.6	58.8	387	91.6	56.9	427	95.3	59.2	467	93.6	58.2
268	76.4	47.5	308	68.9	42.8	348	94.8	58.9	388	91.9	57.1	428	95.1	59.1	468	93.5	58.1
269	75.9	47.2	309	69.7	43.3	349	94.9	59.0	389	92.2	57.3	429	94.9	59.0	469	93.3	58.0
270	75.1	46.7	310	70.5	43.8	350	94.9	59.0	390	92.4	57.4	430	94.8	58.9	470	93.0	57.8
271	74.3	46.2	311	71.3	44.3	351	94.8	58.9	391	92.4	57.4	431	94.4	58.7	471	92.5	57.5
272	74.0	46.0	312	71.9	44.7	352	94.6	58.8	392	92.0	57.2	432	94.3	58.6	472	91.9	57.1
273	73.7	45.8	313	72.4	45.0	353	94.3	58.6	393	91.7	57.0	433	94.1	58.5	473	91.7	57.0
274	73.4	45.6	314	72.7	45.2	354	94.0	58.4	394	91.6	56.9	434	94.0	58.4	474	91.1	56.6
275	73.0	45.4	315	73.0	45.4	355	93.6	58.2	395	91.1	56.6	435	94.0	58.4	475	90.3	56.1
276	72.7	45.2	316	73.2	45.5	356	93.5	58.1	396	90.6	56.3	436	93.8	58.3	476	90.1	56.0
277	72.4	45.0	317	73.7	45.8	357	93.3	58.0	397	90.3	56.1	437	93.6	58.2	477	89.8	55.8
278	71.9	44.7	318	74.0	46.0	358	93.2	57.9	398	90.7	56.4	438	93.5	58.1	478	89.3	55.5
279	71.6	44.5	319	74.2	46.1	359	92.7	57.6	399	91.2	56.7	439	93.3	58.0	479	88.8	55.2

TABLE 2—HIGHWAY FUEL ECONOMY TEST SCHEDULE (CONTINUED)

Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)	Time (s)	Speed (km/h)	Speed (mph)
480	88.7	55.1	520	88.2	54.8	560	87.0	54.1	600	77.7	48.3	640	74.8	46.5	680	81.3	50.5
481	88.5	55.0	521	88.3	54.9	561	86.6	53.8	601	77.2	48.0	641	74.3	46.2	681	80.6	50.1
482	88.3	54.9	522	88.5	55.0	562	85.9	53.4	602	77.1	47.9	642	74.0	46.0	682	80.1	49.8
483	88.3	54.9	523	88.7	55.1	563	85.8	53.3	603	76.9	47.8	643	74.0	46.0	683	80.0	49.7
484	88.3	54.9	524	88.8	55.2	564	85.4	53.1	604	76.7	47.7	644	74.5	46.3	684	79.8	49.6
485	88.3	54.9	525	88.8	55.2	565	85.1	52.9	605	77.1	47.9	645	75.3	46.8	685	79.6	49.5
486	88.3	54.9	526	89.0	55.3	566	84.6	52.6	606	77.7	48.3	646	76.4	47.5	686	79.6	49.5
487	88.3	54.9	527	89.1	55.4	567	84.3	52.4	607	78.8	49.0	647	77.6	48.2	687	80.0	49.7
488	88.5	55.0	528	89.3	55.5	568	84.0	52.2	608	79.0	49.1	648	78.5	48.8	688	80.5	50.0
489	88.5	55.0	529	89.5	55.6	569	83.8	52.1	609	78.8	49.0	649	79.6	49.5	689	80.8	50.2
490	88.5	55.0	530	89.6	55.7	570	83.7	52.0	610	78.7	48.9	650	80.8	50.2	690	81.4	50.6
491	88.5	55.0	531	89.8	55.8	571	83.7	52.0	611	77.2	48.0	651	81.6	50.7	691	82.2	51.1
492	88.5	55.0	532	89.9	55.9	572	83.7	52.0	612	75.8	47.1	652	82.2	51.1	692	83.0	51.6
493	88.5	55.0	533	90.1	56.0	573	83.7	52.0	613	74.3	46.2	653	83.2	51.7	693	83.5	51.9
494	88.7	55.1	534	90.1	56.0	574	83.8	52.1	614	74.2	46.1	654	84.0	52.2	694	83.7	52.0
495	88.7	55.1	535	90.1	56.0	575	83.7	52.0	615	74.2	46.1	655	84.5	52.5	695	83.8	52.1
496	88.5	55.0	536	90.1	56.0	576	83.7	52.0	616	74.3	46.2	656	83.8	52.1	696	84.3	52.4
497	88.3	54.9	537	90.1	56.0	577	83.5	51.9	617	75.5	46.9	657	83.0	51.6	697	85.1	52.9
498	88.3	54.9	538	90.1	56.0	578	83.0	51.6	618	76.9	47.8	658	82.2	51.1	698	85.8	53.3
499	88.2	54.8	539	90.1	56.0	579	82.7	51.4	619	78.8	49.0	659	82.1	51.0	699	86.4	53.7
500	88.0	54.7	540	90.1	56.0	580	82.2	51.1	620	80.0	49.7	660	82.1	51.0	700	87.2	54.2
501	87.9	54.6	541	90.1	56.0	581	81.6	50.7	621	81.4	50.6	661	82.2	51.1	701	87.7	54.5
502	87.5	54.4	542	90.1	56.0	582	80.9	50.3	622	82.9	51.5	662	82.7	51.4	702	88.2	54.8
503	87.4	54.3	543	90.1	56.0	583	80.1	49.8	623	84.0	52.2	663	83.2	51.7	703	88.5	55.0
504	87.4	54.3	544	90.1	56.0	584	79.3	49.3	624	84.8	52.7	664	83.7	52.0	704	89.3	55.5
505	87.2	54.2	545	90.1	56.0	585	78.4	48.7	625	85.3	53.0	665	84.0	52.2	705	89.9	55.9
506	87.0	54.1	546	90.1	56.0	586	77.6	48.2	626	86.2	53.6	666	84.5	52.5	706	90.3	56.1
507	87.0	54.1	547	89.9	55.9	587	77.4	48.1	627	86.9	54.0	667	85.0	52.8	707	90.6	56.3
508	87.0	54.1	548	89.9	55.9	588	77.2	48.0	628	87.0	54.1	668	84.8	52.7	708	90.7	56.4
509	86.9	54.0	549	89.9	55.9	589	77.2	48.0	629	87.5	54.4	669	84.6	52.6	709	90.9	56.5
510	86.9	54.0	550	89.8	55.8	590	77.4	48.1	630	88.0	54.7	670	84.2	52.3	710	91.2	56.7
511	86.9	54.0	551	89.5	55.6	591	77.9	48.4	631	88.7	55.1	671	84.2	52.3	711	91.6	56.9
512	86.9	54.0	552	89.1	55.4	592	78.7	48.9	632	89.1	55.4	672	84.3	52.4	712	91.7	57.0
513	86.9	54.0	553	88.8	55.2	593	78.8	49.0	633	89.1	55.4	673	84.5	52.5	713	92.2	57.3
514	86.9	54.0	554	88.7	55.1	594	79.0	49.1	634	88.5	55.0	674	84.8	52.7	714	92.8	57.7
515	86.9	54.0	555	88.5	55.0	595	79.0	49.1	635	87.7	54.5	675	84.8	52.7	715	93.6	58.2
516	86.9	54.0	556	88.3	54.9	596	78.8	49.0	636	86.2	53.6	676	84.3	52.4	716	94.6	58.8
517	87.0	54.1	557	87.9	54.6	597	78.8	49.0	637	84.5	52.5	677	83.8	52.1	717	95.1	59.1
518	87.2	54.2	558	87.5	54.4	598	78.7	48.9	638	80.8	50.2	678	83.2	51.7	718	95.3	59.2
519	87.7	54.5	559	87.2	54.2	599	78.2	48.6	639	77.6	48.2	679	82.2	51.1	719	95.1	59.1