(d) Parking brake applications: 1 apply and 2 reapply if necessary.

e) Test surface gradient: 20% grade. (f) Drive the vehicle onto the grade

with the longitudinal axis of the vehicle in the direction of the slope of the grade.

(g) Stop the vehicle and hold it stationary by applying the service brake control and place the transmission in neutral

(h) With the service brake applied sufficiently to just keep the vehicle from rolling, apply the parking brake as specified in S7.12.2(i) or S7.12.2(j).

(i) The parking brake system is actuated by a single application not exceeding the limits specified in S7.12.2(b).

(j) In the case of a parking brake system that does not allow application of the specified force in a single application, a series of applications may be made to achieve the specified force.

(k) Following the application of the parking brakes, release all force on the service brake control and, if the vehicle remains stationary, start the measurement of time.

 If the vehicle does not remain stationary, reapplication of a force to the parking brake control at the level specified in S7.12.2(b) as appropriate for the vehicle being tested (without release of the ratcheting or other holding mechanism of the parking brake) is used up to two times to attain a stationary position.

(m) Verify the operation of the parking brake application indicator.

(n) Following observation of the vehicle in a stationary condition for the specified time in one direction, repeat the same test procedure with the vehicle orientation in the opposite direction on the same grade.

S7.12.3. Performance requirement. The parking brake system shall hold the vehicle stationary for 5 minutes in both a forward and reverse direction on the grade.

S7.13. Heating Snubs.

S7.13.1. General information. The purpose of the snubs is to heat up the brakes in preparation for the hot performance test which follows immediately.

S7.13.2. Vehicle conditions.

(a) Vehicle load: GVWR only.

(b) Transmission position: In gear.

S7.13.3. Test conditions and

procedures.

(a) IBT

(I) Establish an IBT before the first brake application (snub) of $\geq 55^{\circ}$ C $(131^{\circ}F), \ge 65^{\circ}C (149^{\circ}F).$

(2) IBT before subsequent snubs are

those occurring at the distance intervals. (b) Number of snubs: 15.

(c) Test speeds: The initial speed for each snub is 120 km/h (74.6 mph) or

80% of Vmax, whichever is slower. Each snub is terminated at one-half the initial speed.

(d) Deceleration rate:

(1) Maintain a constant deceleration rate of 3.0 m/s² (9.6 fps²).

(2) Attain the specified deceleration within one second and maintain it for the remainder of the snub.

(e) Pedal force: Adjust as necessary to maintain the specified constant deceleration rate.

(f) Time interval: Maintain an interval of 45 seconds between the start of brake applications (snubs).

(g) Accelerate as rapidly as possible to the initial test speed immediately after each snub.

(h) Immediately after the 15th snub, accelerate to 100 km/h (62.1 mph) and commence the hot performance test.

S7.14. Hot performance.

S7.14.1. General information. The hot performance test is conducted immediately after completion of the 15th heating snub.

S7.14.2. Vehicle conditions.

(a) Vehicle load: GVWR only.

(b) Transmission position: In neutral. S7.14.3. Test conditions and procedures.

(a) IBT: Temperature achieved at completion of heating snubs.

(b) Test speed: 100 km/h (62.1 mph). (c) Pedal force: (1) The first stop is done with a pedal force not greater than the average pedal force recorded during the shortest GVWR cold effectiveness stop

(2) The second stop is done with a pedal force not greater than 500 N (112.4 lbs)

(d) Wheel lockup: No lockup of any wheel for longer than 0.1 seconds allowed at speeds greater than 15 km/ h (9.3 mph).

(e) Number of runs: 2 stops.

(f) Immediately after the 15th heating snub, accelerate to 100 km/h (62.1 mph) and commence the first stop of the hot performance test.

(g) If the vehicle is incapable of attaining 100 km/h, it is tested at the same speed used for the GVWR cold effectiveness test.

(h) Immediately after completion of the first hot performance stop accelerate as rapidly as possible to the specified test speed and conduct the second hot performance stop.

(i) Immediately after completion of second hot performance stop, drive 1.5 km (0.98 mi) at 50 km/h (31.1 mph) before the first cooling stop.

S7.14.4. Performance requirements.

(a) For the first hot stop, the stopping distance must be less than or equal to a calculated distance which is based on 60 percent of the deceleration actually

achieved on the shortest GVWR cold effectiveness stop. The following equations shall be used in calculating the performance requirement:

$$d_{c} = \frac{0.0386V^{2}}{S_{c} - 0.10V}$$
$$S = 0.10V + \frac{0.0386V^{2}}{0.60(d_{c})}$$

- where d_c = the average deceleration actually achieved during the shortest cold effectiveness stop at GVWR (m/s^2) ,
- S_c = actual stopping distance measured on the shortest cold effectiveness stop at GVWR (m), and
- V = cold effectiveness test speed (km/h).(b) In addition to the requirement in

S7.14.4(a), the stopping distance for at least one of the two hot stops must be $S \le 89 \text{ m}$ (292 ft) from a test speed of 100 km/h (62.1 mph) or, for reduced test speed, $S \le 0.10V + 0.0079V^2$. The results of the second stop may not be used to meet the requirements of S7.14.4(a).

S7.15. Brake cooling stops.

S7.15.1. General information. The cooling stops are conducted immediately after completion of the hot performance test.

S7.15.2. Vehicle conditions.

- (a) Vehicle load: GVWR only.
- (b) Transmission position: In gear.
- S7.15.3. Test conditions and

procedures.

(a) IBT: Temperature achieved at completion of hot performance.

(b) Test speed: 50 km/h (31.1 mph).

(c) Pedal force: Adjust as necessary to maintain specified constant deceleration rate.

(d) Deceleration rate: Maintain a constant deceleration rate of 3.0 m/s² (9.9 fps²).

(e) Wheel lockup: No lockup of any wheel for longer than 0.1 seconds allowed at speeds greater than 15 km/h (9.3 mph).

(f) Number of runs: 4 stops. (g) Immediately after the hot performance stops drive 1.5 km (0.93 mi) at 50 km/h (31.1 mph) before the first cooling stop.

(h) For the first through the third cooling stops:

(1) After each stop, immediately accelerate at the maximum rate to 50 km/h (31.1 mph).

(2) Maintain that speed until beginning the next stop at a distance of 1.5 km (0.93 mi) from the beginning of the previous stop.

(i) For the fourth cooling stop:

(1) Immediately after the fourth stop, accelerate at the maximum rate to 100 km/h (62.1 mph).