



Inertia Dynamometer Brake Corner and Friction Material Fade Envelope Test

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This test procedure is used to assess the fade performance of the foundation brakes during high-energy and high temperature conditions encountered during testing on the race track or during Auto-Motor und Sport (AMS) fade testing. This test is also applicable to police vehicle testing.

1.2 Applicability. This procedure is applicable to all passenger car and light truck front and rear disc corners used in vehicle applications that involve high-energy braking conditions (such as race track or AMS fade testing).

1.3 Remarks. This test generates a map of friction and fluid displacement behavior of a brake corner relative to braking speed, braking temperature, hydraulic pressure, and cumulative braking energy within a braking event. It is intended to supply data for modeling high-energy brake usage conditions that may invoke significant changes in friction and fluid displacement behavior within a braking event. It is a test of both friction material and brake corner hardware capability, as the results will be heavily influenced by the friction material fade properties, as well as, the caliper and rotor design.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14925

GMW14974

GMW14986

GMW15142

2.3 Additional References.

- CG190 Evaluation Report Template (ID)
- Global Document Management (GDM) System (<https://documents.gm.com/gdm3/component/main>) (ID)

(ID) = This information is limited to internal distribution within General Motors and shall not be accessed outside this company. Contact the GM Lead Engineer for further instructions.

3 Resources

3.1 Facilities. Milford Proving Ground (MPG) Brake Component Development (BCD) inertia brake dynamometer or equivalent test facility shall be used. The dynamometer should already be approved for the GMW14925 procedure through the Test Improvement Process (TIP). No specific TIP Certification is required for this procedure.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used, but must obtain an official GM TIP accreditation for GMW14925 prior to submitting test data to GM.

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3.2 Equipment.

3.2.1 An inertia brake dynamometer capable of performing torque control, pressure control, corrected pressure control, ramp, and modulated brake applies.

3.3 Test Vehicle/Test Piece. Production representative brake corner hardware shall be used to produce the tailstock assembly.

3.4 Test Time.

Calendar time: 1 day

Test hours: 6 hours to 8 hours

Coordination hours: 4 hours (includes part preparation and set up time)

3.5 Test Required Information. The following measurements shall be made and digitally recorded at 500 Hz.

3.5.1 Dynamometer speed (kilometers/hour).

3.5.2 Brake apply pressure (kilopascals).

3.5.3 Brake torque (Newton-meters).

3.5.4 Brake rotor temperature (degrees Celsius).

3.5.5 Fluid displacement (cubic millimeters).

Note: Use **compensated** fluid displacement data (see 7.1).

3.5.6 Fluid temperature at the caliper (degrees Celsius).

3.5.7 Cooling air temperature (degrees Celsius).

3.5.8 Cooling air humidity (% Relative Humidity (RH)).

3.5.9 The requester needs to provide the Gross Vehicle Weight (GVW) inertia computed per GMW15142, caliper piston(s) diameter(s), the tire/wheel rolling radius, and the effective radius of the brake corner.

3.6 Personnel/Skills. One (1) technician trained for the operation of an inertia brake dynamometer and to perform the duties described in Section 4 is required.

4 Procedure

4.1 Preparation.

4.1.1 Embedded rotor thermocouple shall be installed per GMW14974.

4.1.2 The assembled corner Lateral Run Out (LRO) shall not exceed 50 μm . The corner LRO shall be measured on the inboard face of the rotor at a radius 10 mm inside of the rotor outer diameter using a dial indicator. The measurement result should be recorded in the test information header or other record associated with the test. Note that this measurement is required for the initial setup, but also after the test is completed.

4.2 Conditions.

4.2.1 Environmental Conditions. Cooling air is provided to the brake. Cooling air temperature shall be between 10 °C and 30 °C. Cooling air humidity control is not required, but should be recorded as noted in 3.5.8.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.2.2.1 The dynamometer inertia shall be set as described in GMW15142 using GVW parameters.

4.3 Instructions. The test should be performed as described in Table 1. At the completion of the test and after the brake rotor has cooled back to room temperature, the assembled corner LRO should be measured and recorded, at the end of test. If the program bandwidth maximum speed for the test corner excludes any of the higher test speeds used in Table 1, then those test section speeds may be omitted. (For example, if the maximum speed for a given corner design is 270 km/h, the 300 km/h test speeds may be omitted from the test.)

4.3.1 Initial Brake Temperatures (IBT). An IBT is specified for all of the braking events within the fade sections. It is the intent of this test procedure that additional heating snubs shall be used to achieve the IBTs if necessary. For the non-fade envelope test sections, a different warm-up stop has been defined to obtain the required IBT. See 7.1 for both warm-up stop definitions.

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Table 1: Test Sequence and Instructions

Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
Start of Test (SOT) Rotor Assembled LRO Measurements	Not applicable	Not applicable	Not applicable	Not Applicable	Record the rotor LRO on the inboard brake plate at a position 10 mm inward of the rotor outer edge
SOT Brake Lining Measurements	Not applicable	Not applicable	Not applicable	Not Applicable	Record the pretest brake lining thickness and mass (GMW14986). Linings are drilled for measurement, but leave noise insulator (if applicable) intact.
Pretest Equipment Check					
Ramp applies	100	30	5	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G (9.8 m/s ²) deceleration limit (whichever occurs first).	Initial brake rotor temperature ≤ 90 °C
Modulated applies	100	30	3	0.5 Hz sinusoidal or ramp apply and release at 6200 kPa/s maximum. If ≤ two modulations achieved, reduce the maximum pressure to generate two to three (2 to 3) modulations.	Initial brake rotor temperature ≤ 90 °C
Green					
Cold ramp applies	100	30	3	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G deceleration limit (whichever occurs first).	Initial brake rotor temperature ≤ 40 °C
Warm ramp applies	100	30	5	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G deceleration limit (whichever occurs first).	Initial brake rotor temperature ≤ 90 °C
Modulated applies	100	30	3	0.5 Hz sinusoidal or ramp apply and release at 6200 kPa/s maximum. If ≤ two modulations achieved, reduce the maximum pressure to generate two to three (2 to 3) modulations.	Initial brake rotor temperature ≤ 90 °C
Accelerated Burnish	95 to 65	50	50	Corrected pressure control stop, 3500 kPa/s apply rate to a 0.31G deceleration rate. Snubs completed on a 0.32 km (0.20 mi) cycle distance.	Initial brake rotor temperature ≤ 400 °C
Cool down	10	70	Not applicable	Allow the brake rotor to cool to ≤ 50 °C.	
Burnished Section					
Cold ramp applies	100	30	3	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G deceleration limit (whichever occurs first).	Initial brake rotor temperature ≤ 40 °C

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
Warm ramp applies	100	30	5	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G deceleration limit (whichever occurs first).	Initial brake rotor temperature $\leq 90^{\circ}\text{C}$
Modulated applies	100	30	3	0.5 Hz sinusoidal or ramp apply and release at 6200 kPa/s maximum. If $\leq$ two modulations achieved, reduce the maximum pressure to generate two to three (2 to 3) modulations.	Initial brake rotor temperature $\leq 90^{\circ}\text{C}$
Apparent Piston Travel with Preconditioning					
Preconditioning	50	30	10	The Caliper piston if physically retracted (or automatically retracted using a vacuum retraction on the dynamometer) to create clearance between the piston and the inboard pad. Torque control stops are made at 3500 kPa/s apply rate to 0.20G average deceleration.	Initial brake rotor temperature $\leq 90^{\circ}\text{C}$
Apparent piston travel	100	30	2	Ramp applies are made at 5000 kPa/s apply rate to 13 000 kPa maximum pressure, or a 1.1G deceleration limit (whichever occurs first).	Initial brake rotor temperature $\leq 90^{\circ}\text{C}$
Fade Envelope Performance: Note: For the Fade Envelope Performance Stops, a maximum brake pressure of 18 000 kPa should be used.					
100 °C Section:					
Perform brake warm-up stops, if necessary to obtain IBT = 100 °C (see 7.1 for definition). Record data for all stops.					
Condition 1	100	25	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$
Condition 2	100	25	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$
Condition 3	100	25	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$
Condition 4	100	25	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$
Condition 5	150	37	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$
Condition 6	150	37	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature $100^{\circ}\text{C} (\pm 5^{\circ}\text{C})$

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
Condition 7	150	37	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 8	150	37	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 9	200	50	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 10	200	50	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 11	200	50	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 12	200	50	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 13	250	62	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 14	250	62	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 15	250	62	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 16	250	62	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 17	300	75	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 18	300	75	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 19	300	75	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)
Condition 20	300	75	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 100 °C (± 5 °C)

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
200 °C Section:					
Perform brake warm-up stops, if necessary to obtain IBT = 200°C (see 7.1 for definition). Record data for all stops.					
Condition 21	100	25	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 22	100	25	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 23	100	25	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 24	100	25	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 25	150	37	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 26	150	37	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 27	150	37	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 28	150	37	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 29	200	50	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 30	200	50	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 31	200	50	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 32	200	50	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 33	250	62	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
Condition 34	250	62	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 35	250	62	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 36	250	62	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 37	300	75	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 38	300	75	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 39	300	75	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
Condition 40	300	75	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 200 °C (± 5 °C)
300 °C Section:					
Perform brake warm-up stops, if necessary to obtain IBT = 300 °C (see 7.1 for definition) Record data for all stops.					
Condition 41	100	25	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 42	100	25	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 43	100	25	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 44	100	25	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 45	150	37	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 46	150	37	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
Condition 47	150	37	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 48	150	37	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 49	200	50	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 50	200	50	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 51	200	50	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 52	200	50	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 53	250	62	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 54	250	62	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 55	250	62	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 56	250	62	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 57	300	75	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 58	300	75	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 59	300	75	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)
Condition 60	300	75	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 300 °C (± 5 °C)

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Test Section Name	Braking Speed (km/h)	Cooling Air Speed (km/h)	Number of Stops/Snubs	Control and Level	Condition
400 °C Section:					
Perform brake warm-up stops, if necessary to obtain IBT = 400 °C (see 7.1 for definition). Record data for all stops.					
Condition 61	100	25	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 62	100	25	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 63	100	25	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 64	100	25	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 65	150	37	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 66	150	37	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 67	150	37	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 68	150	37	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 69	200	50	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 70	200	50	2	Deceleration control to 0.8G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 71	200	50	2	Deceleration control to 1.0G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 72	200	50	2	Deceleration control to 1.2G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)
Condition 73	250	62	2	Deceleration control to 0.6G target; 7500 kPa/s pressure ramp rate. Braking maintained until 0.5 km/h release speed.	Initial brake rotor temperature 400 °C (± 5 °C)

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