



CONTRAN 777/93 Brake System Certification

1 Scope

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. Check brake system as to Brazil Conselho Nacional de Trânsito - National Transit (Road Transportation) Council (CONTRAN) 777/93 requirements, certifying vehicle to sell in Brazilian market.

1.2 Foreword. Not applicable.

1.3 Applicability. Passenger cars, mix type vehicles, and commercial vehicles, M1 category and N1 category, equipped with hydraulic brakes.

2 References

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

2.1 External Standards/Specifications.

ABNT NBR 10967/99 (MB-3160)

ABNT NBR 10969 (NB-1256)

ABNT NBR 10969 (NB-1254)

CONTRAN 777/93

2.2 GM Standards/Specifications.

None

2.3 Additional References

Global Document Management (GDM) System

3 Resources

3.1 Facilities. Straight-away track and 20% ramp.

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. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Decelerometer.

3.2.2 Data acquisition system.

3.2.3 Optical 5th wheel.

3.2.4 Circuit insulator valves; front and rear or diagonal.

3.2.5 Line pressure transducer.

3.2.6 Pedal force transducer.

3.2.7 Booster vacuum transducer.

3.3 Test Vehicle/Test Piece. The specific vehicle chosen for testing should be representative with respect to brake system, tire, suspension and mass distribution properties.

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3.4 Test Time.

Calendar time: 5 days with vehicle
Test hours: 40 hours vehicle build and testing
Coordination hours: 20 hours analysis, report

3.5 Test Required Information.

 Not applicable.

3.6 Personnel/Skills. An experienced brake technician and an experienced engineer are required for vehicle setup, testing and data analysis.

4 Procedure

4.1 Preparation.

- 4.1.1 Install new brake system.
- 4.1.2 Install thermocouples at brake pads and linings.
- 4.1.3 Adjust tire pressure to recommended level.
- 4.1.4 Check brake fluid level.
- 4.1.5 Inspect load sensitive valve, if vehicle fits one.
- 4.1.6 Obtain the curves for vacuum reservoir filling time.

4.2 Conditions.

4.2.1 Environmental Conditions. Tests must be performed on dry road.

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 During burnishing cycles the temperature difference between wheels of one same axle shall not exceed 30 °C.

4.2.2.2 The vehicle loading condition shall comply with field report specification.

4.3 Instructions.

4.3.1 Follow instructions as specified in field report per vehicle category (M1 and N1) shown in Appendix A, example test sheets Figures A1 thru A8.

4.3.2 The Type 0 tests shall be initiated at room temperature and a total of three (3) consecutive applications with initial friction material temperature below 100 °C.

4.3.3 Carry out 21 burnishing cycles, where one cycle corresponds to a sequence of seven brake applications at 80 to 0 km/h at 1.6 km intervals and deceleration in a 0.10, 0.20, up to 0.70G sequence.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Results of test should be compared to applicable requirements in technical specifications or regulation standards.

5.3 Test Documentation.

5.3.1 Indicate category of test vehicle and requirement in a report.

5.3.2 Complete a field report per vehicle category.

5.3.3 Publish an evaluation report in the GM Global Document Management (GDM) System.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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7 Notes

7.1 Glossary.

M1 Category: Vehicles for passenger transportation and mixed usage, that the Gross Vehicle Weight Rating (GVWR) does not exceed 3500 kg.

N1 Category: Commercial vehicles for cargo transportation, with at least 1000 kg load capacity and that the GVWR does not exceed 3500 kg.

7.2 Acronyms, Abbreviations, and Symbols.

ABNT	Brazilian Association of Technical Standards
CONTRAN	Conselho Nacional de Trânsito - National Transit (Road Transportation) Council
FL	Front Left
FR	Front Right
GDM	Global Document Management
GVWR	Gross Vehicle Weight Rating
RL	Rear Left
RR	Right Rear
V Max.	Maximum Velocity
#	Number

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15620

9 Release and Revisions

This standard was originated in June 2007. It was first approved by the Global Chassis Brakes Subsystem Leadership Team in July 2007. It was first published in October 2007.

Issue	Publication Date	Description (Organization)
1	OCT 2007	Initial publication.
2	JAN 2013	2012, 5-Yr Refresh. Reference names in the standard were corrected to match published documents names. Acronyms list was corrected/updated. (Chassis Brake GSSLT)
3	MAR 2013	Correction of force units in Appendix A. (Chassis Brake GSSLT)

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Appendix A

1. TYPE 0 TEST (DISCONNECTED ENGINE)

ABNT NBR 10967/99 (MB-3160), ITEM 3.6.3.2

PROCEDURE: 3 STOPS IN NEUTRAL, MAXIMUM. DECELERATION WITHOUT WHEEL LOCK.

SPEED: 80 to 0 km/h AND START TEMPERATURE < 100 °C.

1.1 UNLADEN

Number	STOP DISTANCE	PEDAL FORCE	DECELERATION
1			
2			
3			
REQUIREMENTS			
M1	< 50.6 m	< 50 kgf	> 59%G
N1	< 61.2 m	< 70 kgf	> 50.8%G

1.2 GVWR

Number	STOP DISTANCE	PEDAL FORCE	DECELERATION
1			
2			
3			
REQUIREMENTS			
M1	< 50.6 m	< 50 kgf	> 59%G
N1	< 61.2 m	< 70 kgf	> 50.8%G

1.3 BRAKING WITH A TRAILER

$$D_{gvw} + T = D_{gvw} * \frac{P_{gvw}}{P_{gvw} + P_t}$$

D_{gvw} = VEHICLE DECELERATION IN NEUTRAL, LADEN CONDITION**P_{gvw}** = VEHICLE WEIGHT LADEN**P_t** = TRAILER WEIGHT**T** = TRAILER

CATEGORY	THEORETICAL DECELERATION
M1	> 59%G
N1	> 50.8%G

Figure A1: Example Test Sheet for Type 0 Tests with Disconnected Engine

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