

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with 49 CFR, Part 665

Altoona Bus Testing and Research Center Test Bus Procedure

5.5 STRUCTURAL STRENGTH AND DISTORTION TESTS – JACKING TEST

Pass/Fail
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**LTI BUS RESEARCH
AND TESTING CENTER**

ABBREVIATIONS

ABTC	Altoona Bus Test Center
A/C	Air Conditioner
ADB	Advance design bus
CBD	Central business district
CI	Compression ignition
CNG	Compressed natural gas
CW	Curb weight (bus weight including maximum fuel, oil, and coolant; but without passengers or driver)
dB(A)	Decibels with reference to 0.0002 microbar as measured on the “A” scale
DIR	Test director
DR	Bus driver
EPA	Environmental Protection Agency
FFS	Free floor space (floor area available to standees, excluding ingress/egress areas, area under seats, area occupied by feet of seated passengers, and the vestibule area)
FTA	Federal Transit Administration
GAWR	Gross axle weight rating
GL	Gross load (150 lb. for every designed passenger seating position, for the driver, and for each 1.5 sq. ft. of free floor space)
GVW	Gross vehicle weight (curb weight plus gross vehicle load)
GVWR	Gross vehicle weight rating
hr.	Hour
LNG	Liquefied natural gas
LTI	Larson Transportation Institute
mpg	Miles per gallon
mph	Miles per hour
NBM	New bus models
PSTT	Penn State Test Track
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
SCF	Standard cubic feet
SCFM	Standard cubic feet per minute
SCH	Test scheduler
SA	Staff Assistant
SI	Spark ignition
SLW	Seated load weight (curb weight plus 150 lb. for every designated passenger seating position and for the driver)
TD	Test driver
TM	Track manager
TP	Test personnel

5.5-I. TEST OBJECTIVE

The objective of this test is to determine the potential damage caused by a deflated tire, and to determine the feasibility of jacking the bus with a portable jack to a height sufficient to replace a deflated tire.

5.5-II. TEST DESCRIPTION

With the bus at curb weight, each tire at one corner of the bus is deflated to simulate a flat tire. A portable hydraulic floor jack is then positioned in a manner and location specified by the manufacturer. The jack is used to raise the bus to a height sufficient to provide approximately 3 inches clearance between the floor and an inflated tire. The deflated tire is then inflated to the tires specification and the jack is lowered. Any structural damage or permanent deformation is recorded on the Jacking Test Data Form. This procedure is repeated at each wheel location for each jacking point on the bus.

5.5-III. TEST ARTICLE

The test article is a transit bus with a minimum service life of 4, 5, 7, 10 or 12 years.

5.5-IV. TEST EQUIPMENT/FACILITIES/PERSONNEL

This test will be performed on the structural strength test surface at the ABTC. The following test equipment and personnel are required for this test:

1. A floor jack
2. Tire-valve core tool
3. Tire inflation gauge
4. Air compressor
5. Test personnel (TP)
6. Camera
7. Calibrated Thermometer
8. Calibrated Tape Measure

5.5-V. TEST DATA

The test data consists of the Jacking Test Data Form. All forms must be filled out using pen. Upon completion of this test, data shall be forwarded to the ABTC manager.

5.5-VI. TEST PREPARATION AND PROCEDURES

Detailed test preparation and procedures are listed in Procedure 5.5-1. This section also includes Jacking Test Data Form – 5.5.

DETAILED TEST PROCEDURES		TITLE: 5. Structural Integrity
Procedure 5.5-1	NOMENCLATURE: 5.5 Structural Strength and Distortion Tests – Jacking Test	
OPER STEP	ACTION BY	TEST PREPARATION AND PROCEDURE
1	TP	With bus at curb weight, position it on the structural strength test surface and apply the parking brake. WARNING: Use extreme caution when jacking or working around raised bus.
2	TP	Record bus number on the Jacking Test Data Form.
3	TP	Remove the tire-valve core and make sure the tire deflates completely. NOTE: The bead on the tire may break, but this is expected. NOTE: The tire-valve core may not be easily removed on some inner dual tires. Tire may be flattened without tire valve core removal.
4	TP	Check for potential damage due to the deflated tire and measure the vertical clearance at the jack point.
5	TP	Position jack under right front jacking pad as per manufacturer instructions.
6	TP	Jack the bus to a height sufficient to provide approximately 3 inches of clearance between the floor and an inflated tire.
7	TP	Reseal the tire (if applicable) and inflate the tire to the manufacturer’s specifications.
8	TP	Lower jack and remove.
9	TP	Record any difficulty in interfacing the jack with the bus, or in jacking the bus, on the Jacking Test Data Form. Photograph any restrictions. .
10	TP	Repeat steps 3 through 7 for left front tire.
11	TP	Repeat steps 3 through 7 for right outside rear tire.

DETAILED TEST PROCEDURES		TITLE: 5. Structural Integrity
Procedure 5.5-1	NOMENCLATURE: 5.5 Structural Strength and Distortion Tests – Jacking Test	
OPER STEP	ACTION BY	TEST PREPARATION AND PROCEDURE
12	TP	Repeat step 11 for left outside rear tire.
13	TP	Repeat step 12 for both left rear tires.
14	TP	If bus is equipped with an additional axle, repeat steps 11 through 12 as necessary.
15	TP	Upon completion of this test, data shall be forwarded to the ABTC manager.