

**HEAVY-DUTY ARTICULATED 500,000-MILE BUS
WITH A MINIMUM SERVICE LIFE OF
12 YEARS**

5. STRUCTURAL INTEGRITY

5.5 STRUCTURAL STRENGTH AND DISTORTION TESTS - JACKING TEST

APRIL 2006

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
mpg	- miles per gallon
mph	- miles per hour
NBM	- new bus models
PSBRTF	- Penn State Bus Research and Testing Facility
PTI	- Pennsylvania Transportation Institute
rpm	- revolutions per minute
SAE	- Society of Automotive Engineers
SCF	- standard cubic feet
SCFM	- standard cubic feet per minute
SCH	- test scheduler
SEC	- secretary
SI	- spark ignition
SLW	- seated load weight (curb weight plus 150 lb for every designed 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 damage caused by a deflated tire, and to determine the feasibility of jacking the bus with a portable hydraulic 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 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 for each jacking point on the bus.

5.5-III. TEST ARTICLE

The test article is a heavy-duty transit bus with a minimum service life of 12 years or 500,000 mi.

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).

5.5-V. TEST DATA

The test data consists of the Jacking Test Data Form. 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.
2	TP	Record bus number on the Jacking Test Data Form. Retrieve the work order for this test.
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. The tire should be sealed and inflated.
4	TP	Check for damage due to the deflated tire and measure the clearance at the jack point.
5	TP	Position jack under right front jacking pad as per manufacturer instructions. WARNING: Use extreme caution when jacking or working around raised bus.
6	TP	Jack the bus to a height sufficient to provide 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
10	TP	Date Form. Photograph any restrictions.
11	TP	Repeat steps 3 through 7 for left front tire.
12	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 (continued)****OPER
STEP****ACTION
BY****TEST PREPARATION AND PROCEDURE**

13

TP

Repeat step 11 for left outside rear tire.

14

TP

Repeat step 12 for both left rear tires.

15

TP

If bus is equipped with an additional axle, repeat steps 11 through 14 as necessary.

16

TP

File completed Jacking Test Data Form and Work Order Form.

REVISIONS

All revisions to this test procedure must be identified on this page. Briefly describe each revision in the space provided below.

Revision	Description	Date	Approval
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JACKING TEST DATA FORM

Bus Number:	Date:
Personnel:	Temperature (EF):

Record any permanent deformation or damage to bus as well as any difficulty encountered during jacking procedure.

Deflated Tire	Jacking Pad Clearance Body/Frame (in)	Jacking Pad Clearance Axle/Suspension (in)	Comments
Right front			
Left front			
Right rear--outside			
Right rear--both			
Left rear--outside			
Left rear--both			
Right middle or tag--outside			
Right middle or tag--both			
Left middle or tag--outside			
Left middle or tag--both			
Additional comments of any deformation or difficulty during jacking:			