

PARTIAL
STURAA TEST
7 YEAR
200,000 MILE BUS
from
ARBOC MOBILITY, LLC
MODEL 2010 CNG HYBRID-SOM236

DECEMBER 2010

PTI-BT-R1009-P

PENNS^TATE



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EXECUTIVE SUMMARY

ARBOC Mobility, LLC. submitted a model 2010 CNG Hybrid-SOM236, CNG-powered 12 seat (including the driver) 23-foot bus built on a GM 4500 chassis, for a partial STURAA test in the 7yr/200,000 mile category. The Federal Transit Administration determined that the following tests would be performed; 1.2 Servicing, P.M., Repair & Maintenance, 2. Reliability, 4.1 Performance, 4.2 Brake Test, 5.7 Structural Durability, 6. Fuel Economy, 7.1 Interior Noise (conditions 1 & 2 only), 7.2 Exterior Noise and 8. Emissions. The odometer reading at the time of delivery was 741.0 miles. Testing started on July 9, 2010 and was completed on December 14, 2010. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on July 12, 2010 and was completed on November 24, 2010.

The interior of the bus is configured with seating for 12 passengers including the driver plus 2 wheelchair positions. Free floor space will accommodate 6 standing passengers resulting in a potential load of 18 persons plus 2 wheelchair positions. At 150 lbs per person, this load results in a measured gross vehicle weight of 14,030 lbs. **Note: at Gross Vehicle Load (GVL) the weight of the rear axle is 470lbs over the rear GAWR yet within the GVWR.** The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 14,030 lbs. The middle segment was performed at a seated load weight of 13,140 lbs and the final segment was performed at a curb weight of 10,540 lbs. Durability driving resulted in unscheduled maintenance and failures that involved a variety of subsystems. A description of failures and a complete and detailed listing of scheduled and unscheduled maintenance is provided in the Maintainability section of this report.

Effective January 1, 2010 the Federal Transit Administration determined that the total number of simulated passengers used for loading all test vehicles will be based on the full complement of seats and free-floor space available for standing passengers (150 lbs per passenger). The passenger loading used for dynamic testing will not be reduced in order to comply with Gross Axle Weight Ratings (GAWR's) or the Gross Vehicle Weight Ratings (GVWR's) declared by the manufacturer. Cases where the loading exceeds the GAWR and/or the GVWR will be noted accordingly. During the testing program, all test vehicles transported or operated over public roadways will be loaded to comply with the GAWR and GVWR specified by the manufacturer.

The Reliability section compiles failures that occurred during Structural Durability Testing. Breakdowns are classified according to subsystems. The data in this section are arranged so that those subsystems with more frequent problems are apparent. The problems are also listed by class as defined in Section 2. The test bus encountered no Class 1 or Class 2 failures. Of the 23 reported failures, 15 were Class 3 and 8 were Class 4.

The performance of the bus is illustrated by a speed vs. time plot. Acceleration and gradeability test data are provided in Section 4, Performance. The average time to obtain 50 mph was 13.95 seconds. The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 26.06' at 20 mph, 52.74' at 30 mph, 87.32' at 40 mph and 109.46' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 25.09'. There was no deviation from the test lane during the performance of the Stopping Distance phase. During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane but did experience pull to the left during both approaches to the Split Friction Road surface. The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results were 0.67 M/lb, 1.07 M/lb, and 1.74 M/lb respectively; with an overall average of 0.93 M/lb.

A series of Interior and Exterior Noise Tests was performed. These data are listed in Section 7.1 and 7.2 respectively. Emissions testing was also performed. These data are available in Section 8.