

Contents

NOTICE OF INVITATION FOR BIDS.....	1
NB 1. Description of the Work to be Done.....	1
NB 2. Bid Due Date and Submittal Requirements.....	1
NB 3. Validity of Bids	1
NB 4. Pre-Bid Meeting Information	1
 SECTION 2: INSTRUCTIONS TO BIDDERS	 11
IP 1. Quantities.....	11
IP 2. Proposed Schedule for the Bid	11
IP 3. Obtaining Bid Documents	11
IP 4. Pre-Bid Meeting/Information for Bidders	11
IP 5. Questions, Clarifications and Omissions.....	11
IP 6. Addenda to IFB	12
IP 7. DBE Requirements for Transit Vehicle Manufacturers	12
IP 8. Conditions, Exceptions, Reservations or Understandings.....	12
IP 9. Protest Procedures	13
IP 9.1 Address	13
IP 9.2 Pre-Bid Protests	13
IP 9.3 Protests on the Recommended Award	13
IP 9.4 FTA Review.....	13
IP 10. Preparation of Bids	15
IP 10.1 Use of Bid Forms	15
IP 10.2 Bid Format Requirements	15
IP 10.3 Agency Treatment of Proprietary/Confidential Information	16
IP 10.4 Signing of Bid Forms.....	17
IP 10.5 Modification or Withdrawal of Bids.....	17
IP 10.6 Cost of Bid Development.....	17
IP 11. Bid Evaluation, Negotiation and Selection.....	17
IP 11.1 Confidentiality of Bids.....	18
IP 11.2 Duration of the Validity of Bids	18
IP 11.3 Evaluation Committee	18
IP 11.4 Bid Selection Process.....	18
IP 11.5 Evaluation Procedures	20
IP 11.6 Evaluations of Competitive Bids	20
IP 12. Response to Bids	22
IP 12.1 Single Bid Response	22
IP 12.2 Availability of Funds	22
IP 12.3 Agency Contract Approval Process	22
IP 12.4 Agency Rights.....	22
IP 12.5 Execution of Contract	22
IP 13. Conflicts of Interests and Gratuities	22
 SECTION 3: GENERAL CONDITIONS.....	 23
GC 1. Definitions	23

GC 2. Materials and Workmanship.....	24
GC 3. Conformance with Specifications and Drawings	24
GC 4. Inspection, Testing and Acceptance	24
GC 4.1 General.....	24
GC 4.2 Risk of Loss	25
GC 5. Title and Warranty of Title.....	25
GC 6. Intellectual Property Warranty	25
GC 7. Data Rights	25
GC 7.1 Proprietary Rights/Rights in Data.....	25
GC 7.2 Access to Onboard Operational Data.....	26
GC 8. Changes	26
GC 8.1 Contractor Changes.....	26
GC 8.2 Agency Changes	26
GC 9. Legal Clauses	26
GC 9.1 Indemnification.....	26
GC 9.2 Suspension of Work.....	28
GC 9.3 Excusable Delays/Force Majeure.....	28
GC 9.4 Termination.....	29
GC 9.5 Compliance with Laws and Regulations.....	31
GC 9.6 Changes of Law	31
GC 9.7 Governing Law and Choice of Forum	31
GC 9.8 Disputes	31
GC 9.9 Maintenance of Records; Access by Agency; Right to Audit Records	33
GC 9.10 Confidential Information	33
GC 9.11 Conflicts of Interest, Gratuities.....	34
GC 9.12 General Nondiscrimination Clause	34
GC 9.13 Amendment and Waiver	34
GC 9.14 Remedies not Exclusive.....	35
GC 9.15 Counterparts.....	35
GC 9.16 Severability	35
GC 9.17 Third-Party Beneficiaries.....	35
GC 9.18 Assignment of Contract	35
GC 9.19 Independent Parties.....	35
GC 9.20 Survival.....	35
SECTION 4: SPECIAL PROVISIONS	37
SP 1. Inspection, Tests and Repairs	37
SP 1.1 First Article Inspection – Production	37
SP 1.2 Post-Delivery Tests	37
SP 1.3 Repairs after Non-Acceptance	37
SP 1.4 Repair Performance.....	37
SP 2. Deliveries.....	38
SP 2.1 Bus Delivery	38
SP 2.2 Delivery Schedule	38
SP 2.3 Contract Deliverables.....	38

SP 3. Options and Option Pricing	41
SP 4. Assignability of Options.....	42
SP 5. Payment	42
SP 5.1 Payment Terms	42
SP 5.2 Payment of Taxes.....	43
SP 6. Service and Parts	43
SP 6.1 Contractor Service and Parts Support	43
SP 6.2 Documentation.....	43
SP 6.3 Parts Availability Guarantee	43
SP 7. Federal Motor Vehicle Safety Standards (FMVSS)	44
SP 8. Insurance.....	44

SECTION 5: FEDERAL REQUIREMENTS 45

FR 1. Access to Records	45
FR 1.1 Local Governments.....	45
FR 1.2 State Governments.....	45
FR 2. Federal Funding, Incorporation of FTA Terms and Federal Changes	45
FR 3. Federal Energy Conservation Requirements.....	46
FR 4. Civil Rights Requirements	46
FR 5. No Government Obligation to Third Parties	47
FR 6. Program Fraud and False or Fraudulent Statements or Related Acts.....	47
FR 7. Suspension and Debarment	47
FR 8. Disadvantaged Business Enterprise (DBE).....	48
FR 9. Clean Water Requirements	48
FR 10. Clean Air Requirements.....	48
FR 11. Compliance with Federal Lobbying Policy.....	49
FR 12. Buy America	49
FR 13. Testing of New Bus Models.....	49
FR 14. Pre-Award and Post-Delivery Audits.....	50
FR 15. Cargo Preference.....	50
FR 16. Fly America.....	50

SECTION 6: TECHNICAL SPECIFICATIONS 511

TS 1. Scope	511
TS 2. Definitions	511
TS 3. Referenced Publications	555
TS 4. Legal Requirements.....	555
TS 5. Overall Requirements.....	555
TS 5.1 Weight.....	555
TS 5.2 Capacity	565
TS 5.3 Service Life.....	565
TS 5.4 Maintenance and Inspection	56
TS 5.5 Interchangeability	57
TS 5.6 Training.....	577
TS 5.7 Operating Environment.....	577
TS 5.8 Noise	577

TS 5.9 Fire Safety	588
TS 5.10 Respect for the Environment	588
TS 6. Physical Size	59
TS 6.1 Underbody Clearance	600
TS 6.2 Ramp Clearances	600
TS 6.3 Ground Clearance	600
TS 7. Power Requirements	611
TS 7.1 Top Speed	611
TS 7.2 Gradability	611
TS 7.3 Acceleration	611
TS 7.4 Operating Range	622
TS 8. Fuel Economy	622
TS 9. Engine.....	622
TS 10. Cooling Systems.....	633
TS 10.1 Engine Cooling	633
TS 10.2 Charge Air Cooling.....	644
TS 10.3 Transmission Cooling.....	644
TS 11. Transmission (Conventional Powertrain).....	645
TS 12. Retarder	655
TS 13. Mounting	655
TS 13.1 Service	655
TS 14. Hydraulic Systems.....	666
TS 14.1 Fluid Lines	666
TS 14.2 Fittings and Clamps	667
TS 14.3 Charge Air Piping	677
TS 15. Radiator	677
TS 16. Oil and Hydraulic Lines	677
TS 17. Fuel.....	677
TS 17.1 Fuel Lines	677
TS 17.2 Design and Construction.....	688
TS 18. Emissions and Exhaust.....	688
TS 18.1 Exhaust Emissions	688
TS 18.2 Exhaust System.....	68
TS 18.3 Particulate Aftertreatment.....	69
TS 19. General	69
TS 19.1 Design.....	69
TS 20. Altoona Testing.....	69
TS 20.1 Structural Validation.....	700
TS 21. Distortion.....	700
TS 22. Resonance and Vibration.....	700
TS 22.1 Engine Compartment Bulkheads	700
TS 22.2 Crashworthiness.....	700
TS 23. Corrosion.....	711
TS 24. Towing	711
TS 25. Jacking.....	711
TS 26. Hoisting	711

TS 27. Floor	722
TS 27.1 Design	722
TS 27.2 Strength.....	722
TS 27.3 Construction.....	722
TS 28. Platforms	722
TS 28.1 Driver's Area	722
TS 28.2 Driver's Platform	722
TS 28.3 Farebox	733
TS 28.4 Rear Step Area to Rear Area.....	733
TS 29. Wheel Housing	744
TS 29.1 Design and Construction.....	744
TS 30. Suspension.....	744
TS 30.1 General Requirements.....	744
TS 30.2 Alignment	744
TS 30.3 Springs and Shock Absorbers	744
TS 31. Wheels and Tires	755
TS 31.1 Wheels	755
TS 31.2 Tires	766
TS 32. Steering.....	766
TS 32.1 Steering Axle	766
TS 32.2 Wheel	766
TS 33. Drive Axle.....	777
TS 33.1 Non-Drive Axle	777
TS 34. Turning Radius	777
TS 35. Brakes.....	777
TS 35.1 Service Brake.....	777
TS 35.2 Actuation.....	777
TS 35.3 Friction Material	788
TS 35.4 Hubs and Drums	788
TS 35.5 Parking/Emergency Brake	788
TS 36. Interlocks.....	788
TS 36.1 Passenger Door Interlocks	788
TS 37. Pneumatic System	79
TS 37.1 General.....	79
TS 37.2 Air Compressor.....	79
TS 37.3 Air Lines and Fittings	79
TS 37.4 Air Reservoirs	800
TS 37.5 Air System Dryer	800
TS 38. Overview	800
TS 38.1 Modular Design	811
TS 39. Environmental and Mounting Requirements.....	811
TS 39.1 Hardware Mounting.....	821
TS 40. General Electrical Requirements.....	822
TS 40.1 Batteries	82
TS 40.2 Grounds.....	843
TS 40.3 Low Voltage/Low Current Wiring and Terminals.....	844

TS 40.4 Electrical Components	855
TS 40.5 Electrical Compartments.....	855
TS 41. General Electronic Requirements.....	855
TS 41.1 Wiring and Terminals	865
TS 42. Multiplexing	866
TS 42.1 General.....	866
TS 42.2 System Configuration	877
TS 43. Data Communications	877
TS 43.1 General.....	877
TS 43.2 Drivetrain Level.....	877
TS 43.3 Multiplex Level.....	888
TS 43.4 Electronic Noise Control	89
TS 44. Driver's Area Controls	89
TS 44.1 General.....	89
TS 44.2 Glare	89
TS 44.3 Visors/Sun Shades	89
TS 44.4 Driver's Controls	89
TS 44.5 Normal Bus Operation Instrumentation and Controls	900
TS 44.6 Driver Foot Controls.....	944
TS 44.7 Driver Foot Switches	944
TS 45. Driver's Amenities	954
TS 45.1 Coat Hanger	954
TS 45.2 Storage Box	954
TS 46. Windshield Wipers and Washers	955
TS 46.1 Windshield Wipers	955
TS 46.2 Windshield Washers	955
TS 47. Driver's Seat.....	965
TS 47.1 Dimensions	96
TS 47.2 Seat Belt.....	977
TS 47.3 Seat Control Locations.....	98
TS 47.4 Seat Structure and Materials	98
TS 47.5 Pedestal	98
TS 47.6 Mirrors	98
TS 48. Windows.....	99
TS 48. General	99
TS 49. Windshield	99
TS 49.1 Glazing.....	99
TS 50. Driver's Side Window.....	99
TS 51. Side Windows	100
TS 51.1 Configuration.....	100
TS 51.2 Emergency Exit (Egress) Configuration.....	100
TS 51.3 Configuration.....	1000
TS 51.4 Materials	1000
TS 52. HVAC Capacity and Performance	101
TS 53. Controls and Temperature Uniformity	103
TS 54. Air Flow	1033
TS 54.1 Passenger Area.....	1033

TS 54.2 Driver's Area	104
TS 54.3 Controls for the Climate Control System (CCS)	104
TS 54.4 Driver's Compartment Requirements	104
TS 54.5 Driver's Cooling	105
TS 55. Air Filtration.....	105
TS 56. Roof Ventilators	105
TS 57. Maintainability	105
TS 58. Exterior Panels, Finishing, and Exterior Lighting	105
TS 58. Design.....	1055
TS 58.1 Materials	106
TS 59. Pedestrian Safety	106
TS 60. Repair and Replacement.....	106
TS 60.1 Side Body Panels	106
TS 61. Rain Gutters.....	106
TS 62. License Plate Provisions.....	1066
TS 63. Fender Skirts	1066
TS 63.1 Splash Aprons	107
TS 64. Service Compartments and Access Doors.....	107
TS 64.1 Access Doors	107
TS 64.2 Access Door Latch/Locks	107
TS 65. Bumpers	107
TS 65.1 Location	107
TS 65.2 Front Bumper.....	107
TS 65.3 Rear Bumper	108
TS 65.4 Bumper Material	108
TS 66. Finish and Color	108
TS 66.1 Appearance	108
TS 67. Decals, Numbering and Signing.....	109
TS 67.1 Passenger Information	11009
TS 68. Exterior Lighting	110
TS 68.1 Backup Light/Alarm	1100
TS 68.2 Doorway Lighting.....	1100
TS 68.3 Turn Signals.....	1100
TS 68.4 Headlights	1100
TS 68.5 Brake Lights.....	1111
TS 68.6 Service Area Lighting (Interior and Exterior)	111
TS 69. General Requirements	1111
TS 70. Interior Panels	1111
TS 70.1 Driver Area Barrier	1111
TS 70.2 Modesty Panels	112
TS 70.3 Front End	1122
TS 70.4 Rear Bulkhead	1122
TS 70.5 Headlining.....	113
TS 70.6 Fastening.....	1133
TS 70.7 Insulation	1133
TS 70.8 Floor Covering.....	1133
TS 70.9 Interior Lighting.....	1133

TS 70.10 Passenger	114
TS 70.11 Driver Area	1144
TS 70.12 Seating Areas	1144
TS 70.13 Vestibules/Doors.....	1144
TS 70.14 Ramp Lighting.....	1144
TS 71. Fare Collection	1144
TS 72. Interior Access Panels and Doors.....	115
TS 72.1 Floor Panels	115
TS 73. Passenger Seating.....	1155
TS 73.1 Arrangements and Seat Style.....	1155
TS 74. Passenger Assists.....	119
TS 74.1 Assists.....	119
TS 74.2 Front Doorway.....	11919
TS 74.3 Vestibule.....	11919
TS 74.4 Rear Doorway(s).....	120
TS 74.5 Overhead.....	120
TS 74.6 Longitudinal Seat Assists.....	120
TS 74.7 Wheel Housing Barriers/Assists	120
TS 75. Passenger Doors	1200
Materials and Construction.....	121
TS 75.1 Dimensions	122
TS 75.2 Door Glazing	122
TS 75.3 Door Projection.....	122
TS 75.4 Door Height Above Pavement.....	123
TS 75.5 Closing Force.....	123
TS 75.6 Actuators.....	123
TS 75.7 Emergency Operation	124
TS 75.8 Door Control.....	124
TS 75.9 Door Controller.....	124
TS 75.10 Door Open/Close	124
TS 76. Accessibility Provisions	124
TS 76.1 Loading Systems.....	124
TS 76.2 Wheelchair Accommodations.....	125
TS 76.3 Interior Circulation	125
TS 77. Destination Signs.....	125
TS 78. Passenger Information and Advertising	126
TS 78.1 Interior Displays	126
TS 78.2 Exterior Displays	126
TS 79. Passenger Stop Request/Exit Signal.....	126
TS 80. Communications.....	127
TS 80.1 Camera Surveillance System	127
TS 80.2 Public Address System	127
TS 80.2.1 Speakers	128
TS 80.2.2 Bike Rack	128
TS 80.2.3 Emergency Alarm.....	128

SECTION 7: WARRANTY REQUIREMENTS	129
WR 1. Basic Provisions	129
WR 1.1 Warranty Requirements	129
WR 1.2 Voiding of Warranty	131
WR 1.3 Exceptions and Additions to Warranty	131
WR 1.4 Fleet Defects	132
WR 2. Repair Procedures.....	132
WR 2.1 Repair Performance.....	132
WR 2.2 Repairs by the Contractor	132
WR 2.3 Repairs by the Agency	133
WR 2.4 Warranty after Replacement/Repairs	134
WR 2.5 Forms	134
WR 2.6 Return of Parts	134
WR 2.7 Timeframe.....	135
WR 2.8 Reimbursements.....	135
SECTION 8: QUALITY ASSURANCE	136
QA 1. Contractor's In-Plant Quality Assurance Requirements	136
QA 1.1 Quality Assurance Organization.....	136
QA 1.2 Quality Assurance Organization Functions	136
QA 2. Inspection	138
QA 2.1 Resident Inspectors.....	138
QA 3. Acceptance Tests.....	139
QA 3.1 Responsibility	139
QA 3.2 Pre-Delivery Tests	139
SECTION 9: FORMS AND CERTIFICATIONS	144
CER 1. Bidders Checklist	144
CER 2. Request for Pre-Offer Change or Approved Equal	145
CER 3. Acknowledgement of Addenda.....	146
CER 4. Contractor Service and Parts Support Data.....	147
CER 5. Form for Bid Deviation.....	148
CER 6. Pricing Schedule.....	149
CER 7. Pre-Award Evaluation Data Form.....	150
CER 8. Federal Certifications	151
CER 8.1 Buy America Certification.....	151
CER 8.2 Debarment and Suspension Certification for Prospective Contractor	152
CER 8.3 Debarment and Suspension Certification (Lower-Tier Covered Transaction)	153
CER 8.4 Non-Collusion Affidavit.....	154
CER 8.5 Lobbying Certification.....	155
CER 8.6 Certificate of Compliance with Bus Testing Requirement	156
CER 8.7 DBE Approval Certification	157
CER 8.8 Federal Motor Vehicle Safety Standards	158
CER 9. Other Certifications.....	159
CER 9.1 Bid Form.....	159
CER 9.2 Notice of Award	160
CER 10. Vehicle Questionnaire	161

SECTION 11: APPENDIXES..... 173
Appendix A: Evaluation Criteria.....173
Altoona Testing Sign off179
Performance Bond Form..... 17980
References..... 18181
Abbreviation and Acronyms 182

SECTION 2: INSTRUCTIONS TO BIDDERS

IP 1. Quantities

The Work under these Contract documents consists of the manufacture and delivery of a base order of three (3) thirty-five foot (35') low floor heavy duty buses. The buses will also come with One (1) extra rim and tire.

IP 2. Proposed Schedule for the Procurement

The following is the solicitation schedule for bidders:

- Solicitation date: December 11, 2017
- Pre-Bid Meeting/teleconference: February 6, 2018 10 AM
- Deadline for Bidder communications and requests for clarifications to the City of Spartanburg is February 20, 2018
- Deadline for Responses to issue addenda is March 13, 2018
- Bid Due Date: **April 10, 2018 3 PM**

IP 3. Obtaining Bid Documents

Bid documents may be obtained from Carl Wright, in person at 145 West Broad Street Spartanburg, S. C. 29304 or electronically at cwright@cityofspartanburg.org. Documents requested by mail will be packaged and sent postage paid. Documents requested by courier will be packaged and sent only at the Bidders' expense.

IP 4. Pre-Bid Meeting/Information for Bidders

A Pre-Bid Meeting will be held on February 6, 2018. The meeting will convene at 10 AM in the Property and Procurement Training Room Lower Level located at 145 West Broad Street Spartanburg, SC 29304. Bidders can also participate via conference call. The call-in number and instructions are as follows: You may join the pre-bid meeting via phone Conference. If you wish to join the pre-bid conference on February 6, 2018 please dial 1-877-544-8688. The Conference ID Number is Prospective Bidders are urged to make every effort to attend this meeting.

Prospective Bidders are requested to submit written questions to the Contracting Officer, identified above, in advance of the Pre-Bid Meeting. In addition, questions may be submitted up to the date specified in "Proposed Schedule for the Procurement." Responses will be shared with all prospective Bidders. Prospective Bidders are reminded that any changes to the IFB will be by written addenda only, and nothing stated at the Pre-Bid Meeting shall change or qualify in any way any of the provisions in the IFB and shall not be binding on the Agency.

IP 5. Questions, Clarifications and Omissions

All correspondence, communication and contact in regard to any aspect of this solicitation or offers shall be only with the Contracting Officer identified above. Unless otherwise instructed by the Contracting Officer, bidders and their representatives shall not make any contact with or communicate with any member of the Agency, or its employees and consultants, other than the designated Contracting Officer, in regard to any aspect of this solicitation or offers.

At any time during this procurement up to the time specified in “Proposed Schedule for the Procurement,” Bidders may request, in writing, a clarification or interpretation of any aspect, a change to any requirement of the IFB, or any addenda to the IFB. Requests may include suggested substitutes for specified items and for any brand names, which whenever used in this solicitation shall mean the brand name or approved equal. Such written requests shall be made to the Contracting Officer. The Bidder making the request shall be responsible for its proper delivery to the Agency as identified on the form Request for Pre-Offer Change or Approved Equal. Any request for a change to any requirement of the Contract documents must be fully supported with technical data, test results or other pertinent information showing evidence that the exception will result in a condition equal to or better than that required by the IFB, without a substantial increase in cost or time requirements.

All responses to Request for Pre-Offer Change or Approved Equal shall be provided to all bidders. Any response that is not confirmed by a written addendum shall not be official or binding on the Agency.

If it should appear to a prospective Bidder that the performance of the Work under the Contract, or any of the matters relating thereto, is not sufficiently described or explained in the IFB or Contract documents, or that any conflict or discrepancy exists between different parts of the Contract or with any federal, state, local or Agency law, ordinance, rule, regulation or other standard or requirement, then the Bidder shall submit a written request for clarification to the Agency within the time period specified above.

IP 6. Addenda to IFB

The Agency reserves the right to amend the IFB at any time in accordance with “Proposed Schedule for the Procurement.” Any amendments to the IFB shall be described in written addenda. Notification of or to the addenda also will be distributed to all such prospective Bidders officially known to have received the IFB. Failure of any prospective Bidder to receive the notification or addenda shall not relieve the Bidder from any obligation under the IFB therein. All addenda issued shall become part of the IFB. Prospective Bidders shall acknowledge the receipt of each individual addendum in their Bids on the form Acknowledgement of Addenda. Failure to acknowledge in the Bid receipt of addenda may at the Agency’s sole option disqualify the Bid.

If the Agency determines that the addenda may require significant changes in the preparation of Bids, the deadline for submitting the Bids may be postponed no less than ten (10) days from the date of issuance of addenda or by the number of days that the Agency determines will allow Bidders sufficient time to revise their Bids. Any new Due Date shall be included in the addenda.

IP 7. DBE Requirements for Transit Vehicle Manufacturers

Pursuant to Title 49, Code of Federal Regulations, Part 26.49, a Bidder, as a condition of being authorized to respond to this solicitation, must certify by completing the form DBE Approval Certification that it has on file with the Federal Transportation Administration (FTA) an approved or not disapproved annual disadvantaged business enterprise (DBE) subcontracting participation goal.

IP 8. Conditions, Exceptions, Reservations or Understandings

Bidders are cautioned to limit exceptions, conditions and limitations to the provisions of this IFB, as they may be determined to be so fundamental as to cause rejection of the Bid for not responding to the requirements of the IFB.

Any and all Deviations must be explicitly, fully and separately stated in the Bid by completing Form for Bid Deviation, setting forth at a minimum the specific reasons for each Deviation so that it can be fully considered and, if appropriate, evaluated by the Agency. All Deviations shall be evaluated in accordance with the appropriate evaluation criteria and procedures and may result in the Bidder receiving a less favorable evaluation than without the Deviation.

Form for Bid Deviation shall be included in the Technical package.

IP 9. Protest Procedures

All protests must be in writing, stating the name and address of protestor, a contact person, Contract number and title. Protests shall specify in detail the grounds of the protest and the facts supporting the protest.

IP 9.1 Address

All protests must be addressed as follows:

- Agency Contact: Carl Wright
- For special delivery or hand delivery: 145 West Broad St.
- For U.S. Mail: P.O. Box 5107 Spartanburg, SC 29304

Protests not properly addressed to the address shown above may not be considered by the Agency.

Copies of the Agency's protest procedures and the protest provisions of FTA Circular 4220.1F or its successor may be obtained from the above named contact. Bids will be opened and a Notice of Award will be issued by the Agency in accordance with the Agency's protest procedures and the protest provisions of FTA Circular 4220.1F or its successor.

IP 9.2 Pre-Bid Protests

Pre-Bid protests are protests based upon the content of the solicitation documents. Three copies of Pre-Bid protests must be received by the Agency's office no later than fifteen (15) calendar days prior to the Due Date. Protests will be considered and either denied or sustained in part or in whole, in writing, in a manner that provides verification of receipt, prior to the Due Date for Bids. A written decision specifying the grounds for sustaining all or part of or denying the protest will be transmitted to the protestor prior to the Due Date for Bids in a manner that provides verification of receipt prior to the Due Date for Bids. If the protest is sustained, the Bid Due Date may be postponed and an addendum issued to the solicitation documents or, at the sole discretion of the Agency, the solicitation may be canceled. If the protest is denied, Bids will be received and opened on the scheduled date unless a protest is filed with FTA. See "FTA Review," below.

IP 9.3 Protests on the Recommended Award

Procedure: The protest must be submitted in writing and shall include the following information:

- The name and address of the protestor;
- The name and telephone number of the protestor contact person;
- A complete statement of the grounds of the protest with documentation of the protest claim(s). This information must be submitted to the City of Spartanburg Attorney who will act as the contact point for all bid protests.

Upon receipt of a protest, the City of Spartanburg Manager will notify the protest committee and establish a time for a committee meeting. This committee shall evaluate the material provided by the protestor and shall prepare a written recommendation for the City Manager concerning the validity of the protest and, if appropriate, any corrective action to be taken.

Time for Filing: Any potential bidder believing that bid documents or drawings contain restrictive specifications or any other improprieties regarding the solicitation for bids may file a protest with City of Spartanburg, which shall be received by City of Spartanburg not later than ten (10) working days prior to, or after the bid opening, and shall contain all reasons for the protest. The committee will then respond to the protest within five (5) working days of the receipt of the protest, and the protestor will have five (5) working days to appeal City of Spartanburg's initial response. Once an appeal has been received, the committee will render its final decision in writing within ten (10) working days to the protestor.

In all cases, if protest deadlines are not met, City of Spartanburg will proceed with the normal bid and contract award procedure.

Review of Protest: City of Spartanburg shall establish a committee to review bid protest(s). This committee shall be appointed by the City Manager and shall include, but not be limited to the following:

- City of Spartanburg Manager
- City of Spartanburg Attorney
- Procurement Manager

The City Manager, at his/her discretion, may appoint other City of Spartanburg personnel or persons outside of the City of Spartanburg to this committee based on technical expertise, or special knowledge of the particular procurement activity.

Authority to Resolve Protested Awards – Actual Bidders-Contractors

1. Any actual bidder or contractor who is aggrieved in connection with the intended award or award of a contract shall protest to the City Manager in the manner stated under Subsection "2" of this section within ten (10) calendar days of the date of notification of award posted in accordance with this policy.
2. Protest Procedure: A protest shall be in writing, submitted to the City Manager, as stated above, and shall set forth the grounds of protest and relief requested with enough particularity to give notice of the issues to be decided.
3. Authority to Resolve Protest: The City Manager in coordination with, and under the advisement of the City Attorney, shall have authority, prior to the commencement of an action in court concerning the controversy, to settle and resolve a protest by an actual aggrieved bidder, offeror, or a contractor concerning the award of a contract.
4. Decision: If the protest is not resolved by mutual agreement, the City Manager in coordination with the City Attorney shall issue a decision in writing within ten (10) days after receipt of the protest. The decision shall state the reasons for the action taken.

5. Notice of Decision: A copy of the decision under Subsection “4” of this section shall be mailed or otherwise furnished immediately to the protestant and any other intervening party.

IP 9.4 FTA Review

After such administrative remedies have been exhausted, an interested party may file a protest with the Federal Transit Administration of the U.S. Department of Transportation pursuant to the procedures provided in the FTA C 4220.1F or its successor. FTA review is limited to the alleged failure of the Agency to have written protest procedures, the alleged failure of the Agency to follow those procedures, the alleged failure of the Agency to review a protest or the alleged violation of federal law or regulation.

IP 10. Preparation of Bids

IP 10.1 Use of Bid Forms

Bidders are advised that the forms contained in this IFB are required to be used for submission of a Bid.

IP 10.2 Bid Format Requirements

Bids shall be submitted in four separately sealed packages identified below. Each package shall be marked as specified below and shall contain all of the Bid documents for which the package is required to be marked and shall include no other documents. These same requirements shall apply to any best and final offers (BAFOs) that may be requested.

Package 1: Technical Bid Requirements

1. Letter of Transmittal
2. Technical Bid
3. Acknowledgement of Addenda
4. Contractor Service and Parts Support Data
5. Form for Bid Deviation (without price data)
6. Vehicle Questionnaire
7. References and Non-Priced Information
8. Engineering organization chart, engineering change control procedure, field modification process
9. Manufacturing facilities plant layout, other contracts, staffing
10. Production and delivery schedule and other Contract commitments for the duration of this Contract
11. Management Plan

Package 2: Price Bid Requirements

Each Price Bid shall be on the prescribed Bid form(s) and shall be for the entire Contract, including all Bid items.

1. Letter of Transmittal
2. Pricing Schedule, (including but not limited to such pricing elements as option buses, spare parts package, manuals, training, special tools and test equipment)

The Bidder is required to complete and execute the Agency’s Pricing Schedule, contained as part of the Bid documents, and provide the same in the Price Bid. The Contractor shall be liable for payment of all local taxes applicable to the complete bus as delivered and should add these amounts to the Bid price.

Package 3: Qualification Package Requirements

3. Pre-Award Evaluation Data Form
4. Letter for insurance, indicating the Contractor's ability to obtain the insurance coverage in accordance with the IFB requirements
5. Letter from a surety for a Performance Guarantee, if required, indicating the Contractor's ability to obtain financial guarantees in accordance with the IFB requirements.
6. Form for Bid Deviation, if applicable (without price data)
7. Bid Form
8. All federal certifications: Buy America Certification, Debarment and Suspension Certification for Prospective Contractor, Debarment and Suspension Certification (Lower-Tier Covered Transaction), Non-Collusion Affidavit, Lobbying Certification, Certificate of Compliance with Bus Testing Requirement, DBE Approval Certification, and Federal Motor Vehicle Safety Standards.

Package 4: Proprietary/Confidential Information Package Requirements

The Bidder is directed to collect and submit any information it deems to be proprietary or confidential in nature in a separate marked and sealed package. If there is no confidential information, then the Bidder should include a statement to that effect. Subject package shall be submitted in accordance with the terms and conditions governing the submittal of bidders Bid to this IFB. Blanket-type identification by designating whole pages or sections as containing proprietary information, trade secrets or confidential commercial and financial information will not ensure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

The Bidder is advised that the Agency is public and as such may be subject to certain state and/or local Public Records Act provisions regarding the release of information concerning this IFB. If a request is received by the Agency for the release of Bidders propriety/confidential information, subject request will be referred to the Bidder for review and consideration. If Bidder chooses to declare the information proprietary/confidential and withhold it from release, it shall defend and hold harmless the Agency from any legal action arising from such a declaration.

IP 10.3 Agency Treatment of Proprietary/Confidential Information

Access to government records is governed by the State of South Carolina Except as otherwise required to be disclosed by applicable laws, the Agency will be exempt from disclosure proprietary information identified in Package 4.

Upon a request for records from a third party regarding this Bid, the Agency will notify the Bidder in writing. The Bidder must respond within ten (10) business days with the identification of any and all "proprietary, trade secret, or confidential commercial or financial" information. Failure to respond within the allowed period shall be deemed an approval to release. The Bidder shall indemnify the Agency's defense costs associated with its refusal to produce such identified information; otherwise, the requested information may be released.

The Agency shall employ sound business practices no less diligent than those used for the Agency's own confidential information to protect the confidence of all licensed technology, software, documentation, drawings, schematics, manuals, data and other information and material provided by Bidders and the Contractor pursuant to the Contract that contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the City of Spartanburg against disclosure of such information and material to third parties, except as permitted by the Contract. The Contractor shall be

responsible for ensuring that confidential commercial or financial information, trade secrets or proprietary information — with such determinations to be made by the Agency in its sole discretion — bears appropriate notices relating to its confidential character.

IP 10.4 Signing of Bid Forms

Bids shall include firm name (and, in the event that the Bidder is a joint venture, the names of the individual firms comprising the joint venture); business address; and the name, title and business address of the responsible individual(s) with their telephone, facsimile (fax) numbers and email address who may be contacted during the Bid evaluation period for scheduling oral presentations and for receiving notices from the Agency. The Bidder shall submit with their Bid a copy of the joint venture agreement.

Bids shall be signed by those individual(s) authorized to bind the Bidder. The Bidder shall submit evidence of the official's authority to act for and bind the Bidder in all matters relating to the Bid. (In the event the Bidder is a joint venture or consortium, a representative of each of the members of the joint venture or consortium shall execute the Bid. Each joint venture or consortium member is jointly and severally liable for the joint venture or consortium.)

IP 10.5 Modification or Withdrawal of Bids

A modification of a Bid already received will be accepted by the Agency only if the modification is received prior to the Bid Due Date, is specifically requested by the Agency, or is made with a requested BAFO. All modifications shall be made in writing and executed and submitted in the same form and manner as the original Bid.

A Bidder may withdraw a Bid already received prior to the Bid Due Date by submitting to the Agency, in the same manner as the original Bid, a written request for withdrawal executed by the Bidders authorized representative. After the Bid Due Date, a Bid may be withdrawn only if the Agency fails to award the Contract within the Bid validity period prescribed in "Duration of the Validity of Bids," or any agreed-upon extension thereof. The withdrawal of a Bid does not prejudice the right of a Bidder to submit another Bid within the time set for receipt of Bids.

IP 10.6 Cost of Bid Development

This IFB does not commit the Agency to enter into a Contract, to pay any costs incurred in the preparation or presentation of a Bid, nor to procure or contract for the equipment.

IP 11. Bid Evaluation, Negotiation and Selection

Bids will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described below. The approach and procedures are those that are applicable to a competitive negotiated procurement whereby Bids are evaluated to determine which Bids are within a Competitive Range. Discussions and negotiations may then be carried out with Bidders within the Competitive Range, after which BAFOs may be requested.

However, the Agency may select a Bid for award without any discussions or negotiations or request for any BAFOs. Subject to the Agency's right to reject any or all Bids, the Bidder whose Bid is found to be most advantageous to the Agency will be selected, based upon consideration of the criteria of "Bid Selection Process," below.

IP 11.1 Confidentiality of Bids

Bids will be publicly opened. All Bids and evaluations will be kept strictly confidential throughout the evaluation, negotiation and selection process, except as otherwise required by applicable law. Only the members of the Selection Committee and Evaluation Team and other Agency officials, employees and agents having a legitimate interest will be provided access to the Bids and evaluation results during this period.

IP 11.2 Duration of the Validity of Bids

Bids and subsequent offers shall be valid for the period stated in “Section 1: Notice of Request for Bids.” The Agency may request Bidders to extend the period of time specified herein by written agreement between the Agency and the Bidder(s) concerned.

IP 11.3 Evaluation Committee

An Evaluation Committee will be established. The Evaluation Committee will carry out the detailed evaluations, including establishing the Competitive Range, carrying out negotiations and making the selection of the Bidder, if any, that may be awarded the Contract.

The Evaluation Committee may report its recommendations and findings to the appropriate Agency individual or body responsible for awarding the Contract.

IP 11.4 Bid Selection Process

The following describes the process by which Bids will be evaluated and a selection made for a potential award. Any such selection of a Bid shall be made by consideration of only the criteria set forth below.

“Qualification Requirements” specifies the requirements for determining responsible Bidders, all of which must be met by a Bidder to be found qualified. Final determination of a Bidders qualification will be made based upon all information received during the evaluation process and as a condition for award.

“Bid Evaluation Criteria” contains all the evaluation criteria, and their relative order of importance, by which a Bid from a qualified Bidder will be considered for selection. An award, if made, will be to a responsible Bidder for a Bid that is found to be in the Agency’s best interests, based on price and other evaluation criteria considered. The procedures to be followed for these evaluations are provided in “Evaluation Procedures,” below.

Qualification Requirements

The following are the requirements for qualifying responsible bidders. All of these requirements should be met; therefore, they are not listed by any particular order of importance. Any Bid that the Evaluation Committee finds not to meet these requirements, and cannot be made to meet these requirements, may be determined by the Evaluation Committee not to be responsible and the Bid rejected. The requirements are as follows:

9. Sufficient financial strength, resources and capability to finance the Work to be performed and to complete the Contract in a satisfactory manner, as measured by the following:
 - Bidders financial statements prepared in accordance with generally accepted accounting principles of the jurisdiction in which the Bidder is located, and audited by an independent certified public accountant; or a statement from the Bidder regarding how financial information may be reviewed by the Agency.

- Bidders ability to secure financial guarantees, if required, as evidenced by a letter of commitment from an underwriter, surety or other guarantor confirming that the Bidder can provide the required guarantee.
 - Bidders ability to obtain required insurance with coverage values that meet minimum requirements evidenced by a letter from an underwriter confirming that the Bidder can be insured for the required amount.
10. Evidence that the human and physical resources are sufficient to perform the Contract as specified and to ensure delivery of all equipment within the time specified in the Contract, to include the following:
- Engineering, management and service organizations with sufficient personnel and requisite disciplines, licenses, skills, experience and equipment to complete the Contract as required and to satisfy any engineering or service problems that may arise during the warranty period.
 - Adequate manufacturing facilities sufficient to produce and factory-test equipment on schedule.
 - A spare parts procurement and distribution system sufficient to support equipment maintenance without delays and a service organization with skills, experience and equipment sufficient to perform all warranty and on-site Work.
11. Evidence that Bidder is qualified in accordance with the provisions of “Section 8: Quality Assurance.”
12. Evidence of satisfactory performance and integrity on contracts in making deliveries on time, meeting specifications and warranty provisions, parts availability and steps Bidder took to resolve any judgments, liens, Fleet Defects history or warranty claims. Evidence shall be by client references.

Bid Evaluation Criteria

The following are the complete criteria, listed by their relative degree of importance, by which Bids from responsible Bidders will be evaluated and ranked for the purposes of determining any Competitive Range and to make any selection of a Bid for a potential award. Any exceptions, conditions, reservations or understandings explicitly, fully and separately stated on Form for Bid Deviation, which do not cause the Agency to consider a Bid to be outside the Competitive Range, will be evaluated according to the respective evaluation criteria and sub-criteria that they affect.

The criteria are listed by their relative order of importance. However, certain criteria may have sub-criteria identified that are listed by their relative order of importance within the criterion they comprise. Also, certain sub-criteria may have sub-criteria that are listed by their relative degree of importance within the specific sub-criterion they comprise.

- Technical
- Price
- Delivery
- Qualifications (resources, management, engineering, etc.)
- Other financial impacts

IP 11.5 Evaluation Procedures

Bids will be analyzed for conformance with the instructions and requirements of the IFB and Contract documents. Bids that do not comply with these instructions and do not include the required information may be rejected as insufficient or not be considered for the Competitive Range. The Agency reserves the right to request that a Bidder provide any missing information and make corrections. Bidders are advised that the detailed evaluation forms and procedures will follow the same Bid format and organization specified in "Preparation of Bids." Therefore, Bidders should pay close attention to and strictly follow all instructions. Submittal of a Bid will signify that the Bidder has accepted the whole of the Contract documents, except such conditions, exceptions, reservations or understandings explicitly, fully and separately stated on the forms and according to the instructions of Form for Bid Deviation. Any such conditions, exceptions, reservations or understandings that do not result in the rejection of the Bid are subject to evaluation under the criteria set forth in "Bid Selection Process."

Evaluations will be made in strict accordance with all of the evaluation criteria specified in "Bid Selection Process," above. The Agency will choose the Bid that it finds to be most advantageous to the Agency, based upon the evaluation criteria.

IP 11.6 Evaluations of Competitive Bids

13. **Detailed evaluation of Bids and determination of Competitive Range.** The Agency will carry out and document its evaluations in accordance with the criteria and procedures set forth in "Bid Selection Process." Any Bid deficiencies that may render a Bid unacceptable will be documented. The Agency will make specific note of questions, issues, concerns and areas requiring clarification by Bidders and to be discussed in any meetings with Bidders that the Agency finds to be within the Competitive Range.

Rankings of the Bids against the evaluation will then be made for determining which Bids are within the Competitive Range, or may reasonably be made to be within the Competitive Range.

14. **Qualification of responsible Bidders.** Bids will be evaluated to determine the responsibility of bidders. A final determination of a Bidders responsibility will be made upon the basis of initial information submitted in the Bid, any information submitted upon request by the Agency, information submitted in a BAFO and information resulting from Agency inquiry of Bidders references and its own knowledge of the Bidder.
15. **Bids not within the Competitive Range.** Bidders of any Bids that have been determined by the Agency as not in the Competitive Range, and that cannot be reasonably made to be within the Competitive Range, will be notified in accordance with the Agency's policies.
16. **Discussions with Bidders in the Competitive Range.** The Bidders whose Bids are found by the Agency to be within the Competitive Range, or that may be reasonably made to be within the Competitive Range, will be notified and any questions or requests for clarifications provided to them in writing. Each such Bidder may be invited for an interview and discussions with the Agency to discuss answers to written or oral questions, clarifications and any facet of its Bid.

In the event that a Bid that has been included in the Competitive Range contains conditions, exceptions, reservations or understandings to any Contract requirements as provided in Form for

Bid Deviation, said conditions, exceptions, reservations or understandings may be negotiated during these meetings. However, the Agency shall have the right to reject any and all such conditions and exceptions, and instruct the Bidder to amend its Bid and remove said conditions and exceptions; and any Bidder failing to do so may cause the Agency to find such Bid to be outside the Competitive Range.

No information, financial or otherwise, will be provided to any Bidder about any of the Bids from other Bidders, to the extent permitted by applicable law. Bidders will not be given a specific price or specific financial requirements they must meet to gain further consideration, except that proposed prices may be considered to be too high with respect to the marketplace or unacceptable. Bidders will not be told of their rankings among the other Bidders prior to Contract award.

17. **Factory and site visits.** The Agency reserves the right to conduct factory visits of the Bidders facilities and/or the facilities of major sub-suppliers included in the Bid.
18. **Best and final offers.** After all interviews have been completed, the Bidders in the Competitive Range may be afforded the opportunity to amend their Bids and make their BAFOs. The Request for BAFOs shall include the following:
 - Notice that discussions and negotiations are concluded.
 - A complete listing of the conditions, exceptions, reservations or understandings that have been approved.
 - A common date and time for submission of written BAFOs, allowing a reasonable opportunity for preparation of the written BAFOs.
 - Notice that if any modification to a BAFO is submitted, it must be received by the date and time specified for the receipt of BAFOs.
 - Notice to Bidders that do not submit a notice of withdrawal or a BAFO that their immediately previous Bid will be construed as their BAFO.

Any modification to the initial Bid made by a Bidder in its BAFO shall be identified in its BAFO. BAFOs will be evaluated by the Agency according to the same requirements and criteria as the initial Bids, ("Bid Selection Process"). The Agency will make appropriate adjustments to the initial scores for any sub-criteria and criteria that have been affected by any Bid modifications made by the BAFOs. These final scores and rankings within each criterion will again be arrayed by the Agency and considered according to the relative degrees of importance of the criteria defined in "Bid Selection Process."

The Agency will then choose the Bid that it finds to be most advantageous to the Agency, based upon the evaluation criteria. The results of the evaluations and the selection of a Bid for any award will be documented.

The Agency reserves the right to make an award to a Bidder whose Bid it judges to be most advantageous to the Agency based upon the evaluation criteria, without conducting any written or oral discussions with any Bidders or solicitation of any BAFOs.

19. **Debriefing.** Subsequent to the award, the unsuccessful Bidders will be notified and may request a debriefing. Bidders will be debriefed in accordance with Agency policies, including information regarding the shortcomings of their Bid.

IP 12. Response to Bids

IP 12.1 Single Bid Response

If only one Bid is received in response to this IFB and it is found by the Agency to be acceptable, a price or cost analysis, or both, possibly including an audit, may be performed by or for the Agency. The Bidder has agreed to such analysis by submitting a Bid in response to this IFB.

IP 12.2 Availability of Funds

Funding for this procurement will come from various grants. Local match will come from the City of Spartanburg General Fund.

IP 12.3 Agency Contract Approval Process

A sample contract shall be included in a separate sealed envelope marked "SAMPLE CONTRACT". The City of Spartanburg has established that the City Attorney shall review all contracts.

IP 12.4 Agency Rights

The Agency reserves the right to cancel the procurement in whole or in part, at its sole discretion, at any time before the Contract is fully executed and approved on behalf of the Agency.

The Agency reserves the right to reject any or all Bids, to undertake discussions with one or more Bidders, and to accept that Bid or modified Bid which, in its judgment, will be most advantageous to the Agency, considering price and other evaluation criteria. The Agency reserves the right to determine any specific Bid that is conditional or not prepared in accordance with the instructions and requirements of this IFB to be nonresponsive. The Agency reserves the right to waive any Defects, or minor informalities or irregularities in any Bid which do not materially affect the Bid or prejudice other Bidders.

If there is any evidence indicating that two or more bidders are in collusion to restrict competition or are otherwise engaged in anti-competitive practices, the Bids of all such Bidders shall be rejected, and such evidence may be a cause for disqualification of the participants in any future solicitations undertaken by the Agency.

The Agency may reject a Bid that includes unacceptable Deviations as provided in Form for Bid Deviation.

IP 12.5 Execution of Contract

The acceptance of a Bid for award, if made, shall be evidenced in writing by a notice of award of Contract delivered to the Bidder whose Bid is accepted. Upon notice of award of the Contract to a Bidder, the Bidder shall commence performance under the Contract by furnishing any required bonds, and by furnishing copies of the certificates of insurance required to be procured by the Contractor pursuant to the Contract documents within thirty (30) calendar days after the date of receipt of the notice of award. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under "Termination for Default" in Section 3.

IP 13. Conflicts of Interests and Gratuities

Bidders are prohibited from engaging in any practice that may be considered as a conflict of interests under existing Agency policies and/or state law, and to refrain from participating in any gifts, favors or other forms of compensation that may be viewed as a gratuity in accordance with existing policies and laws.

SECTION 3: GENERAL CONDITIONS

GC 1. Definitions

The following are definitions of special terms used in this document:

Agency: Spartanburg Area Regional Transit Agency (SPARTA)

Authorized Signer: The person who is executing this Contract on behalf of the Contractor and who is authorized to bind the Contractor.

Best And Final Offer (BAFO): The last Bid made by a Bidder. If a BAFO is not specifically requested by the Agency, or if the Bidder does not promptly respond to a request for BAFO, then the most recent, current Bid is the BAFO.

Class 1 Failure (physical safety): A failure that could lead directly to passenger or operator injury and represents a severe crash situation.

Class 2 Failure (road call): A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.

Competitive Range: The range of bids that are identified as the most highly rated, unless the range is further reduced for purposes of efficiency.

Contract: The Bid and its acceptance by the Agency as manifested by the Contract documents specified in "Section 10: Contract."

Contracting Officer: The person who is executing this Contract on behalf of the Agency and who has complete and final authority except as limited herein.

Contractor: The successful Bidder who is awarded a Contract for providing all buses and equipment described in the Contract documents.

Days: Unless otherwise stated, "days" shall mean calendar days.

Defect: Patent or latent malfunction or failure in manufacture, installation or design of any component or subsystem.

Deviation: Variance from a requirement or specification that does not alter the basis of a contract or adversely affects its performance.

Due Date: The date and time by which Bids must be received by the Agency as specified in "Section 1: Notice of Request for Bids."

Extended Warranty: A warranty available for purchase above the standard warranty.

Fatigue Failure (Corrosion Fatigue): The mechanical degradation of a material under the joint action of corrosion and cyclic loading.

Pass-Through Warranty: A warranty provided by the Contractor but administered directly with the component Supplier.

Bid: A promise, if accepted, to deliver equipment and services according to the underlying solicitation of the Agency documented using the prescribed form in the solicitation, including any Bid or BAFO.

Bidder: A legal entity that makes a Bid.

Related Defect: Damage inflicted on any component or subsystem as a direct result of a separate Defect.

Solicitation: Agency's request for bids.

Superior Warranty: A warranty still in effect after all contractually required warranties have expired. The remaining warranty is administered directly between the sub-Supplier and the Agency.

Supplier: Any manufacturer, company or Agency providing units, components or subassemblies for inclusion in the bus that are installed by the Contractor. Supplier items shall require qualification by type and acceptance tests in accordance with requirements defined in "Section 8: Quality Assurance."

Subcontractor: Any manufacturer, company or Agency providing units, components or subassemblies for inclusion in the bus that are installed by a Subcontractor. Subcontractor items shall require qualification by type and acceptance tests in accordance with requirements defined in "Section 8: Quality Assurance."

Work: Any and all labor, supervision, services, materials, machinery, equipment, tools, supplies and facilities called for by the Contract and necessary to the completion thereof.

GC 2. Materials and Workmanship

The Contractor shall be responsible for all materials and workmanship in the construction of the bus and all accessories used, whether the same are manufactured by the Contractor or purchased from a Supplier. This provision excludes any equipment leased or supplied by the Agency, except insofar as such equipment is damaged by the failure of a part or component for which the Contractor is responsible, or except insofar as the damage to such equipment is caused by the Contractor during the manufacture of the buses.

GC 3. Conformance with Specifications and Drawings

Materials furnished and Work performed by the Contractor shall conform to the requirements of the Technical Specifications and other Contract documents. Notwithstanding the provision of drawings, technical specifications or other data by the Agency, the Contractor shall have the responsibility of supplying all parts and details required to make the bus complete and ready for service even though such details may not be specifically mentioned in the drawings and specifications. Items that are installed by the Agency shall not be the responsibility of the Contractor unless they are included in this Contract.

GC 4. Inspection, Testing and Acceptance

GC 4.1 General

The pre-delivery tests and inspections shall be performed at the Contractor's plant; they shall be performed in accordance with the procedures defined in "Section 8: Quality Assurance"; and they may be witnessed by the inspector. When a bus passes these tests and inspections, the inspector shall authorize release of the bus.

Within fifteen (15) calendar days after arrival at the designated point of delivery, the bus shall undergo the Agency tests defined in “Post-Delivery Tests.” If the bus passes these tests or if the Agency does not notify the Contractor of non-acceptance within 15 calendar days after delivery, then acceptance of the bus by the Agency occurs on the 15th day after delivery. If the bus fails these tests, it shall not be accepted until the repair procedures defined in “Repairs After Nonacceptance” have been carried out and the bus retested until it passes. Acceptance occurs earlier if the Agency notifies the Contractor of early acceptance or places the bus in revenue service.

GC 4.2 Risk of Loss

The Agency shall assume risk of loss of the bus on delivery, as defined in “Bus Delivery.” Prior to this delivery, the Contractor shall have risk of loss of the bus, including any damages sustained during the delivery regardless of the status of title or any payments related to the bus. Drivers shall keep a maintenance log en route, and it shall be delivered to the Agency with the bus. If the bus is released back to the Contractor for any reason, the Contractor has the risk of loss upon such release.

GC 5. Title and Warranty of Title

Adequate documents for registering the bus in Spartanburg South Carolina shall be provided to the Agency not less than 10 business days before delivery to the Agency. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Agency free and clear of all encumbrances. The bus shall be titled to The City of Spartanburg.

GC 6. Intellectual Property Warranty

The Agency shall advise the Contractor of any impending patent suit related to this Contract against the Agency and provide all information available. The Contractor shall defend any suit or proceeding brought against the Agency based on a claim that any equipment, or any part thereof, furnished under this Contract constitutes an infringement of any patent, and the Contractor shall pay all damages and costs awarded therein, excluding incidental and consequential damages, against the Agency. In case said equipment, or any part thereof, is in such suit held to constitute infringement and use of said equipment or parts is enjoined, the Contractor shall, at its own expense and at its option, either procure for the Agency the right to continue using said equipment or part, or replace same with non-infringing equipment, or modify it so it becomes non-infringing.

The Contractor’s obligations under this section are discharged and the Agency shall hold the Contractor harmless with respect to the equipment or part if it was specified by the Agency and all requests for substitutes were rejected, and the Contractor advised the Agency under “Questions, Clarifications and Omissions” of a potential infringement, in which case the Contractor shall be held harmless.

GC 7. Data Rights

GC 7.1 Proprietary Rights/Rights in Data

The term “subject data” used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the Contract. It includes the proprietary rights of the following:

- Shop drawings and working drawings
- Technical data including manuals or instruction materials, computer or microprocessor software
- Patented materials, equipment, devices or processes
- License requirements

The Agency shall protect proprietary information provided by the Contractor to the fullest extent of the law. The Contractor shall grant a non-exclusive license to allow the Agency to utilize such information in order to maintain the vehicles. In the event that the Contractor no longer provides the information the Agency has the right to reverse engineer patented parts and software.

The Agency reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, the following subject data for its purposes: (1) any subject data required to be developed and first produced in the performance of the Contract and specifically paid for as such under the Contract, whether or not a copyright has been obtained; and (2) any rights of copyright to which the Contractor, Subcontractor or Supplier purchases ownership for the purpose of performance of the Contract and specifically paid for as such under the Contract. The Contractor agrees to include the requirements of this clause, modified as necessary to identify the affected parties, in each subcontract and supply order placed under the Contract.

GC 7.2 Access to Onboard Operational Data

The Agency grants to the Contractor the right to inspect, examine, download, and otherwise obtain any information or data available from components provided by the Contractor, including, but not limited to, any electronic control modules or other data-collection devices, to the extent necessary to enable Contractor to perform reliability maintenance analysis, corrective action and/or other engineering type Work for the bus. This right expressly excludes access to information or data collected on any equipment not provided and installed by the Contractor.

GC 8. Changes

GC 8.1 Contractor Changes

Any proposed change in this Contract shall be submitted to the Agency for its prior approval. Oral change orders are not permitted. No change in this Contract shall be made without the prior written approval of the Contracting Officer. The Contractor shall be liable for all costs resulting from, and/or for satisfactorily correcting, any specification change not properly ordered by written modification to the Contract and signed by the Contracting Officer.

GC 8.2 Agency Changes

The Agency may obtain changes to the Contract by notifying the Contractor in writing. As soon as reasonably possible but no later than thirty (30) calendar days after receipt of the written change order to modify the Contract, the Contractor shall submit to the Contracting Officer a detailed price and schedule Bid for the Work to be performed. This Bid shall be accepted or modified by negotiations between the Contractor and the Contracting Officer. At that time, a detailed modification shall be executed in writing by both parties. Disagreements that cannot be resolved within negotiations shall be resolved in accordance with "Disputes," below. Regardless of any disputes, the Contractor shall proceed with the Work ordered.

GC 9. Legal Clauses

GC 9.1 Indemnification

GC 9.1.1 The Contractor shall, to the extent permitted by law: (1) protect, indemnify and save the Agency and its officers, employees and agents, including consultants, harmless from and against any and all liabilities, damages, claims, demands, liens, encumbrances, judgments, awards, losses, costs, expenses and suits or actions or proceedings, including reasonable expenses, costs and attorneys' fees incurred by the Agency and its officers, employees and agents, including consultants, in the defense, settlement or satisfaction thereof, for

any injury, death, loss or damage to persons or property of any kind whatsoever, arising out of or resulting from the intentional misconduct or negligent acts, errors or omissions of the Contractor in the performance of the Contract, including intentional misconduct, negligent acts, errors or omissions of its officers, employees, servants, agents, Subcontractors and Suppliers; and (2) upon receipt of notice and if given authority, shall settle at its own expense or undertake at its own expense the defense of any such suit, action or proceeding, including appeals, against the Agency and its officers, employees and agents, including consultants, relating to such injury, death, loss or damage. Each party shall promptly notify the other in writing of the notice or assertion of such claim, demand, lien, encumbrance, judgment, award, suit, action or other proceeding hereunder. The Contractor shall have sole charge and direction of the defense of such suit, action or proceeding. The Agency shall not make any admission that might be materially prejudicial to the Contractor unless the Contractor has failed to take over the conduct of any negotiations or defense within a reasonable time after receipt of the notice and authority above provided. The Agency shall at the request of the Contractor furnish to the Contractor all reasonable assistance that may be necessary for the purpose of defending such suit, action or proceeding, and shall be repaid all reasonable costs incurred in doing so. The Agency shall have the right to be represented therein by advisory council of its own selection at its own expense.

GC 9.1.2 The obligations of the Contractor under the above paragraph shall not extend to circumstances where the injury, death or damages are caused solely by the negligent acts, errors or omissions of the Agency, its officers, employees, agents or consultants, including, without limitation, negligence in: (1) the preparation of the Contract documents, or (2) the giving of directions or instructions with respect to the requirements of the Contract by written order. The obligations of the Contractor shall not extend to circumstances where the injury, death or damages are caused, in whole or in part, by the negligence of any third-party operator, not including an assignee or Subcontractor of the Contractor, subject to the right of contribution. In case of joint or concurrent negligence of the parties giving rise to a claim or loss against either one or both, each shall have full rights of contribution from the other.

GC 9.2 Suspension of Work

GC 9.2.1. The Contractor shall comply immediately with any such written order and take all reasonable steps to minimize costs allocable to the Work covered by the suspension during the period of work stoppage. Contractor shall continue the Work that is not included in the suspension and shall continue such ancillary activities as are not suspended. The Contractor shall resume performance of the suspended Work upon expiration of the notice of suspension, or upon direction from the Agency.

GC 9.2.2. The Contractor shall be allowed an equitable adjustment in the Contract price (excluding profit) and/or an extension of the Contract time, to the extent that cost or delays are shown by the Contractor to be directly attributable to any suspension. However, no adjustment shall be made under this section for any suspension, delay or interruption due to the fault or negligence of the Contractor, or for which an equitable adjustment is provided for, or excluded under any other term or condition of the Contract. As soon as reasonably possible but no later than forty-five (45) calendar days, or any other period of time agreed to by the parties, after receipt of the written suspension of work notice, the Contractor shall submit to the Contracting Officer a detailed price and schedule Bid for the suspension, delay or interruption.

GC 9.3 Excusable Delays/Force Majeure

GC 9.3.1. If the Contractor is delayed at any time during the progress of the Work by the neglect or failure of the Agency or by a cause as described below, then the time for completion and/or affected delivery date(s) shall be extended by the Agency subject to the following cumulative conditions:

- a. The cause of the delay arises after the Notice of Award and neither was nor could have been anticipated by the Contractor by reasonable investigation before such award. Such cause may also include force majeure events such as any event or circumstance beyond the reasonable control of the Contractor, including but not limited to acts of God; earthquake, flood and any other natural disaster; civil disturbance, strikes and labor disputes; fires and explosions; war and other hostilities; embargo; or failure of third parties, including Suppliers or Subcontractors, to perform their obligations to the Contractor;
- b. The Contractor demonstrates that the completion of the Work and/or any affected deliveries will be actually and necessarily delayed;
- c. The Contractor has taken measures to avoid and/or mitigate the delay by the exercise of all reasonable precautions, efforts and measures, whether before or after the occurrence of the cause of delay; and
- d. The Contractor makes written request and provides other information to the Agency as described in GC 9.3.4 below.

A delay in meeting all of the conditions of this section shall be deemed an excusable delay. Any concurrent delay that does not constitute an excusable delay shall not be the sole basis for denying a request hereunder.

GC 9.3.2. None of the above shall relieve the Contractor of any liability for the payment of any liquidated damages owing from a failure to complete the Work by the time for completion that the Contractor is required to pay pursuant to "Liquidated Damages for Late Delivery of the Bus" for delays occurring prior to, or subsequent to the occurrence of an excusable delay.

GC 9.3.3. The Agency reserves the right to rescind or shorten any extension previously granted, if subsequently the Agency determines that any information provided by Contractor in support of a request for an extension of time was erroneous; provided, however, that such information or facts, if known, would have resulted in a denial of the request for an excusable delay. Notwithstanding the above, the Agency will not

rescind or shorten any extension previously granted if the Contractor acted in reliance upon the granting of such extension and such extension was based on information which, although later found to have been erroneous, was submitted in good faith by the Contractor.

GC 9.3.4. No extension or adjustment of time shall be granted unless: (1) written notice of the delay is filed with the Agency within fourteen (14) calendar days after the commencement of the delay and (2) a written application therefore, stating in reasonable detail the causes, the effect to date and the probable future effect on the performance of the Contractor under the Contract, and the portion or portions of the Work affected, is filed by the Contractor with the Agency within thirty (30) calendar days after the commencement of the delay. No such extension or adjustment shall be deemed a waiver of the rights of either party under this Contract. The Agency shall make its determination within thirty (30) calendar days after receipt of the application.

GC 9.4 Termination

GC 9.4.1. Termination for Convenience

The performance of Work under this Contract may be terminated by the Agency in accordance with this clause in whole, or from time to time in part, whenever the contracting officer shall determine that such termination is in the best interest of the Agency. Any such termination shall be effected by delivery to the Contractor of a notice of termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination becomes effective.

After receipt of a notice of termination, and except as otherwise directed by the Contracting Officer, the Contractor shall do the following:

- Stop Work under the Contract on the date and to the extent specified in the notice of termination.
- Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated.
- Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the notice of termination; assign to the Agency in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Agency shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.
- Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he or she may require, which approval or ratification shall be final for all the purposes of this clause.
- Transfer title to the Agency and deliver in the manner, at the times and to the extent, if any, directed by the Contracting Officer the fabricated or unfabricated parts, Work in process, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property which, if the Contract had been completed, would have been required to be furnished to the Agency.
- Use its best efforts to sell, in the manner, at the times, to the extent, and at the price(s) directed or authorized by the Contracting Officer, any property of the types referred to above, provided, however, that the Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at a price(s) approved by the Contracting Officer, and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Agency to the Contractor under this Contract or shall otherwise be

credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Contracting Officer may direct.

- Complete performance of such part of the Work as shall not have been terminated by the notice of termination.
- Take such action as may be necessary, or as the Contracting Officer may direct, for the protection or preservation of the property related to this Contract that is in the possession of the Contractor and in which the Agency has or may acquire an interest.

The Contractor shall be paid its costs, including Contract close-out costs, and profit on Work performed up to the time of termination. The Contractor shall promptly submit its termination claim to Agency to be paid the Contractor. Settlement of claims by the Contractor under this termination for convenience clause shall be in accordance with the provisions set forth in Part 49 of the Federal Acquisition Regulations (48 CFR 49) except that wherever the word "Government" appears, it shall be deleted and the word "Agency" shall be substituted in lieu thereof.

GC 9.4.2. Termination for Default

The Agency may, by written notice of default to the Contractor, terminate the whole or any part of this Contract if the Contractor fails to make delivery of the supplies or to perform the services within the time specified herein or any extension thereof; or if the Contractor fails to perform any of the other material provisions of the Contract, or so fails to make progress as to endanger performance of this Contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of ten (10) business days, or such longer period as the Contracting Officer may authorize in writing, after receipt of notice from the Contracting Officer specifying such failure.

If the Contract is terminated in whole or in part for default, the Agency may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated. The Contractor shall be liable to the Agency for any excess costs for such similar supplies or services, and shall continue the performance of this Contract to the extent not terminated under the provisions of this clause.

Except with respect to defaults of Subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the Contract arises out of a cause beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a Subcontractor, and if such default arises out of causes beyond the control of both the Contractor and Subcontractor, and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the Subcontractor were obtainable from other sources and in sufficient time to permit the Contractor to meet the required delivery schedule.

Payment for completed supplies delivered to and accepted by the Agency shall be at the Contract price. The Agency may withhold from amounts otherwise due the Contractor for such completed supplies such sum as the Contracting Officer determines to be necessary to protect the Agency against loss because of outstanding liens or claims of former lien holders.

If, after notice of termination of this Contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to termination for convenience of the Agency.

GC 9.5 Compliance with Laws and Regulations

Contractor shall at all times comply with all applicable laws, regulations, policies, procedures and directives (together, the “Law”), including without limitation, FTA regulations, policies, procedures and directives, including those listed directly or by reference in the agreement between the Agency and FTA that funds any part of this Contract, as they may be amended or promulgated from time to time during the term of this Contract. Contractor’s failure to so comply shall constitute a material breach of this Contract.

GC 9.6 Changes of Law

Changes of Law that have become effective after the Bid Due Date may result in price changes. If a price adjustment is indicated, either upward or downward, it shall be negotiated between the Agency and the Contractor and the final Contract price will be adjusted upwards or downwards to reflect such changes in Law. Such price adjustment may be audited, where required.

GC 9.7 Governing Law and Choice of Forum

This Contract shall be governed by the laws of South Carolina without regard to conflict of law rules. The Contractor consents to the jurisdiction of the identified State, County of Spartanburg.

GC 9.8 Disputes

Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under or related to this Contract that is not disposed of by agreement shall be decided in accordance with the following steps. However, by mutual agreement the matter may be taken immediately to any higher step in the dispute resolution process, or mutually agreed to alternative dispute resolution process (which may include structured negotiations, mediation or arbitration) or litigation. Pending final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the Contracting Officer’s or Chief Executive Officer’s decision, as the case may be.

1. **Notice of dispute.** All disputes shall be initiated through a written dispute notice submitted by either party to the other party within 10 (ten) calendar days of the determination of the dispute.
2. **Negotiation between contracting officers.** The parties shall attempt in good faith to resolve any dispute arising out of or relating to this Contract promptly by negotiation between executives who have authority to settle the controversy and who are at a higher level of management than the people with direct responsibility for administration of this Contract. Any party may give the other party written notice of any dispute not resolved in the normal course of business as provided in (1) above. Within 14 (fourteen) calendar days after delivery of the dispute notice, the receiving party shall submit to the other party a written response. The dispute notice and written response shall include: (a) a statement of the party’s position and a summary of the arguments supporting that position, (b) any evidence supporting the party’s position and (c) the name of the executive who will represent that party and of any others who will accompany the executive in negotiations. Within 28 (twenty-eight) calendar days after delivery of the dispute notice, the Contracting Officer of both parties shall meet at a mutually acceptable time and place, and thereafter as they reasonably deem necessary to attempt to resolve the dispute. All reasonable requests for information by one party to the other shall be honored.

If the matter has not been resolved by these people within 42 (forty-two) calendar days of the dispute notice, the dispute may be referred to more senior executives of both parties who have authority to settle the dispute and who shall likewise meet to attempt to resolve the dispute.

3. **Chief Executive Officer's decision.** Should the dispute not be resolved by negotiation between Contracting Officers, as provided in (2) above, the Agency's Contracting Officer from (2) above shall submit a written request for decision to the Agency's Chief Executive Officer (CEO) along with all documentation and minutes from the negotiation. The Chief Executive Officer shall issue a written decision within 14 (fourteen) days of receipt of a request.
 - A. For disputes involving \$50,000 or less, the decision of the CEO shall be administratively final and conclusive. For disputes involving \$50,000 or less, it is the intent of the parties that such administratively final and conclusive decision pursuant to either this paragraph or paragraph 4 shall only be overturned if determined by a court of competent jurisdiction to be fraudulent, arbitrary, capricious, unsupported by the evidence or so grossly erroneous as to imply bad faith. For disputes greater than \$50,000, the decision of the CEO shall be administratively final and conclusive unless, within thirty (30) days from the date of delivery of the written decision, the Contractor appeals the decision in writing to the Agency's Chief Executive Officer or designee who shall render a written decision within fourteen (14) days of delivery of such written appeal. Such decision by the Chief Executive Officer or his or her designee shall be administratively final and conclusive.
 - B. Within thirty (30) days of the issuance of any administratively final and conclusive decision under this paragraph, the Contractor shall notify the Agency in writing of the Contractor's agreement with the final decision. Failure to provide such written notice of agreement shall indicate an intent by the Contractor to litigate the claim.
 - C. Any dispute that is not resolved by the parties through the operation of the provisions of this paragraph, or any mutually agreed-upon alternative disputes resolution process pursuant to paragraph 4 may be submitted to any court in South Carolina.
 - D. Pending final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of its obligations under the Contract in accordance with the written directions of the Agency.
4. **Alternatives disputes resolution.** If agreed to by both parties, disputes may be resolved by a mutually agreed-to alternative dispute resolution process that may include structured negotiations different from (2) above, mediation or arbitration.
5. **Arbitration.** Disputes appealed to arbitration involving more than \$50,000 but less than \$250,000 shall be decided by a qualified and disinterested arbitrator, selected through the American Arbitration Association and mutually agreed to by both parties. The arbitrator shall conduct all proceedings in accordance with the rules of the American Arbitration Association, and shall consider the Contract, equity, the prevailing law and established commercial practices in rendering a decision.

Disputes appealed to arbitration involving \$250,000 or more shall be decided by three (3) qualified and disinterested arbitrators selected through the American Arbitration Association. One arbitrator shall be selected by each of the parties, and the two selected arbitrators shall select a third arbitrator within ten (10) calendar days of their selection. The arbitrators shall conduct all proceedings in accordance with the rules of the American Arbitration Association and shall consider the Contract, equity, the prevailing law and established commercial practice in rendering a decision.

The decision by the arbitrators shall be final and enforceable in any court having jurisdiction over the parties.

GC 9.9 Maintenance of Records; Access by Agency; Right to Audit Records

In accordance with 49 CFR § 18.36(i), 49 CFR § 19.48(d), and 49 USC § 5325(a), provided the Agency is the FTA recipient or a sub-grantee of the FTA recipient, the Contractor agrees to provide the Agency, FTA, the Comptroller General of the United States, the Secretary of the U.S. Department of Transportation, South Carolina or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor that are directly pertinent to or relate to this Contract (1) for the purpose of making audits, examinations, excerpts and transcriptions and (2) when conducting an audit and inspection.

1. In the event of a sole source Contract, single Bid, single responsive Bid, or competitive negotiated procurement, the Contractor shall maintain and the Contracting Officer, the U.S. Department of Transportation (if applicable) or the representatives thereof shall have the right to examine all books, records, documents and other cost and pricing data related to the Contract price, unless such pricing is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, or combinations thereof. Data related to the negotiation or performance of the Contract shall be made available for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data. The right of examination shall extend to all documents necessary for adequate evaluation of the cost or pricing data, along with the computations and projections used therein, including review of accounting principles and practices that reflect properly all direct and indirect costs anticipated for the performance of the Contract.
2. For Contract modifications or change orders the Contracting Officer, the U.S. Department of Transportation, if applicable, or their representatives shall have the right to examine all books, records, documents and other cost and pricing data related to a Contract modification, unless such pricing is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, or combinations thereof. Data related to the negotiation or performance of the Contract modification or change order shall be made available for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data. The right of examination shall extend to all documents necessary for adequate evaluation of the cost or pricing data, along with the computations and projections used therein, either before or after execution of the Contract modification or change order for the purpose of conducting a cost analysis. If an examination made after execution of the Contract modification or change order reveals inaccurate, incomplete or out-of-date data, the Contracting Officer may renegotiate the Contract modification or change order price adjustment, and the Agency shall be entitled to any reductions in the price that would result from the application of accurate, complete or up-to-date data.

The requirements of this section are in addition to other audit, inspection and record-keeping provisions specified elsewhere in the Contract documents.

GC 9.10 Confidential Information

Access to government records is governed by the State of South Carolina. Except as otherwise required by the City of Spartanburg, the Agency will be exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information submitted or disclosed during the Contract period. Any such proprietary information, trade secrets or confidential commercial and financial information that a Contractor believes should be exempted from disclosure shall be specifically identified and marked as such.

Blanket-type identification by designating whole pages or sections as containing proprietary information, trade secrets or confidential commercial and financial information will not ensure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

Upon a request for records from a third party regarding the Contract, the Agency will notify the Contractor in writing. The Contractor must respond within twenty (20) days with the identification of any and all “proprietary, trade secret or confidential commercial or financial” information, and the Contractor shall indemnify the Agency’s defense costs associated with its refusal to produce such identified information; otherwise, the requested information may be released.

The Agency shall employ sound business practices no less diligent than those used for the Agency’s own confidential information to protect the confidence of all licensed technology, software, documentation, drawings, schematics, manuals, data and other information and material provided by the Contractor pursuant to the Contract that contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the State of South Carolina against disclosure of such information and material to third parties except as permitted by the Contract. The Contractor shall be responsible for ensuring that confidential commercial or financial information, trade secrets or proprietary information, with such determinations to be made by the Agency in its sole discretion, bears appropriate notices relating to its confidential character.

During the performance of the Work under the Contract, it may be necessary for either party (the “Discloser”) to make confidential information available to the other party (the “Recipient”). The Recipient agrees to use all such information solely for the performance of the Work under the Contract and to hold all such information in confidence and not to disclose same to any third party without the prior written consent of the Discloser. Likewise, the Recipient agrees that all information developed in connection with the Work under the Contract shall be used solely for the performance of the Work under the Contract, and shall be held in confidence and not disclosed to any third party without the prior written consent of the Discloser.

This Confidentiality section shall survive the termination or expiration of the Contract.

GC 9.11 Conflicts of Interest, Gratuities

No member, officer, or employee of the Agency or of a local public body during his or her tenure, or one year thereafter, shall have any interest, direct or indirect, in this Contract or the proceeds thereof.

GC 9.12 General Nondiscrimination Clause

In connection with the performance of Work provided for under this Contract, the Contractor agrees that it will not, on the grounds of race, religious creed, color, national origin, ancestry, physical disability, medical condition, marital status, sex, sexual orientation or age, discriminate or permit discrimination against any person or group of people in any manner prohibited by federal, state or local laws.

GC 9.13 Amendment and Waiver

GC 9.13.1. Amendment

Any modification or amendment of any provisions of any of the Contract documents shall be effective only if in writing, signed by authorized representatives of both the Agency and Contractor, and specifically referencing this Contract.

GC 9.13.2. Waiver

In the event that either party elects to waive its remedies for any breach by the other party of any covenant, term or condition of this Contract, such waiver shall not limit the waiving party's remedies for any succeeding breach of that or of any other term, covenant or condition of this Contract.

GC 9.14 Remedies not Exclusive

The rights and remedies of the Agency provided herein shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

GC 9.15 Counterparts

This Contract may be executed in any number of counterparts. All such counterparts shall be deemed to constitute one and the same instrument, and each of said counterparts shall be deemed an original thereof.

GC 9.16 Severability

Whenever possible, each provision of the Contract shall be interpreted in a manner as to be effective and valid under applicable law. However, if any provision, or part of any provision, should be prohibited or invalid under applicable law, such provision, or part of such provision, shall be ineffective to the extent of such prohibition or invalidity without invalidating the remainder of such provision or the remaining provisions of the Contract.

GC 9.17 Third-Party Beneficiaries

No provisions of the Contract shall in any way inure to the benefit of any third party, including the public at large, so as to constitute such person a third-party beneficiary of the Contract or of any one or more of the terms and conditions of the Contract or otherwise give rise to any cause of action in any person not a party to the Contract, except as expressly provided elsewhere in the Contract.

GC 9.18 Assignment of Contract

Neither party will assign or subcontract its' rights or obligations under the Contract without prior written permission of the other party, and no such assignment or subcontract will be effective until approved in writing by the other party.

GC 9.19 Independent Parties

The Contractor is an independent contractor with respect to the performance of all Work hereunder, retaining control over the detail of its own operations, and the Contractor shall not be considered the agent, employee, partner, fiduciary or trustee of the Agency.

GC 9.20 Survival

The following sections shall survive the nominal expiration or discharge of other Contract obligations, and the Agency may obtain any remedy under law, Contract or equity to enforce the obligations of the Contractor that survive the manufacturing, warranty and final payment periods:

- "Intellectual Property Warranty"
- "Data Rights"
- "Indemnification"
- "Governing Law and Choice of Forum"

- “Disputes”
- “Confidential Information”
- “Parts Availability Guarantee”
- “Access to Records”
- “Training”

SECTION 4: SPECIAL PROVISIONS

SP 1. Inspection, Tests and Repairs

SP 1.1 First Article Inspection – Production

The purpose of a first article inspection is to confirm that any components, systems, subsystems, major assemblies, subassemblies, products, parts, apparatuses, articles and other materials comply with the Technical Specifications and other Contract documents.

Where required by the Contract documents or requested by the Agency, the Contractor shall cause first article inspections to be conducted. A first article inspection may include both a physical configuration inspection and a functional demonstration. First article inspections shall be conducted at the Contractor or Subcontractor's facility. The Contractor shall furnish to the Agency prior to each first article inspection a written inspection and demonstration plan for each item for review. The Agency's inspectors will attend each first article inspection unless the Agency provides a written waiver of its right to attend any such inspection. The results of each first article inspection shall be documented by the Contractor in a format deemed acceptable by the Agency, and all documents relating to the inspection shall be forwarded to the Agency.

SP 1.2 Post-Delivery Tests

The Agency will conduct acceptance tests on each delivered bus. These tests shall be completed within fifteen (15) days after bus delivery and shall be conducted in accordance with written test plans. The purpose of these tests is to identify Defects that have become apparent between the time of bus release and delivery to the Agency. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply criteria that are different from the criteria applied in an analogous pre-delivery test (if any).

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The Agency shall record details of all Defects on the appropriate test forms and shall notify the Contractor of acceptance or non-acceptance of each bus according to "Inspection, Testing and Acceptance" after completion of the tests. The Defects detected during these tests shall be repaired according to procedures defined in "Repairs after Non-Acceptance."

SP 1.3 Repairs after Non-Acceptance

The Contractor, or its designated representative, shall perform the repairs after non-acceptance. If the Contractor fails or refuses to begin the repairs within five (5) days, then the Work may be done by the Agency's personnel with reimbursement by the Contractor.

SP 1.4 Repair Performance

SP 1.4.1 Repairs by Contractor

After non-acceptance of the bus, the Contractor must begin Work within five (5) working days after receiving notification from the Agency of failure of acceptance tests. The Agency shall make the bus available to complete repairs timely with the Contractor repair schedule.

The Contractor shall provide, at its own expense, all spare parts, tools and space required to complete the repairs. At the Agency's option, the Contractor may be required to remove the bus from the Agency's property while repairs are being made. If the bus is removed from the Agency's property, repair procedures

must be diligently pursued by the Contractor's representatives, and the Contractor shall assume risk of loss while the bus is under its control.

SP 1.4.2 Repairs by the Agency

The Agency will not take responsibility to correct Defects, except to replace defective parts as instructed by the Contractor.

1. **Parts used.** If the Agency performs the repairs after non-acceptance of the bus, it shall correct or repair the Defect and any Related Defects using Contractor-specified parts available from its own stock or those supplied by the Contractor specifically for this repair. Reports of all repairs covered by this procedure shall be submitted by the Agency to the Contractor for reimbursement or replacement of parts monthly, or at a period to be mutually agreed upon. The Contractor shall provide forms for these reports.
2. **Contractor-supplied parts.** If the Contractor supplies parts for repairs being performed by the Agency after non-acceptance of the bus, these parts shall be shipped prepaid to the Agency.
3. **Return of defective components.** The Contractor may request that parts covered by this provision be returned to the manufacturing plant. The total costs for this action shall be paid by the Contractor.
4. **Reimbursement for labor.** The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at a straight time wage rate of \$46.00 per hour, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing of the bus, if such action was necessary. These wage and fringe benefits rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.
5. **Reimbursement for parts.** The Agency shall be reimbursed by the Contractor for defective parts that must be replaced to correct the Defect. The reimbursement shall include taxes where applicable and fifteen (15) percent handling costs.

SP 2. Deliveries

SP 2.1 Bus Delivery

Delivery of buses shall be determined by signed receipt of the Agency's designated agent(s), SPARTA 150 Airflow Dr. Spartanburg, SC 29306, at the following point(s) of delivery and may be preceded by a cursory inspection of the bus.

SP 2.2 Delivery Schedule

The Agency prefers that all buses shall be delivered, once completed, together and at the same time. Should this not be possible, Bidder shall keep the Agency informed of all bus delivery timelines which include but are not limited to, delays, stoppages, shortages, etc. Manufacturers forecasted delivery schedule after estimated time of project award shall be part of the evaluation process. Bidder shall submit an estimated production and delivery timeline with their bid submission for evaluation. Time is of the essence with this IFB. Hours of delivery shall be 8:00am to 5:00pm on the following days of the week: Monday through Friday.

SP 2.3 Contract Deliverables

Contract deliverables associated with this Contract are set forth in the table below, along with other pertinent information. Contract deliverables shall be submitted in accordance with Section 6: Technical Specifications. Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider

early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
1.	Bus Testing — Altoona Test Report	Review		Pre Production meeting	Hardcopy	3
2.	List of serialized units installed on each bus	Review		With each delivered bus	Electronic Media	1 per bus
3.	Copy of Manufacturers formal Quality Assurance Program	Review		Pre production meeting	Hardcopy	3
4.	QA manufacturing certificate	Review		Pre production meeting	Hardcopy	3
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		30 days following first pre-production meeting	Hardcopy	3 per major Supplier
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy	1 per bus
7.	Motor Vehicle Pollution Requirements Certificate	Review		With each bus	Hardcopy	1
8.	Engine Emissions Certificate — NOx levels	Review		Prior to completion of bus	Hardcopy	1
9.	Pre-production meeting minutes	Approval		30 days after meeting	Hardcopy	2 originals
10.	Driver's log and incident report	Review		With each bus delivery	Hardcopy	1 per bus
11.	Title documentation	Review		10 days prior to bus delivery	Hardcopy	1 per bus
12.	Performance bond	Review		30 days following execution of Contract	Hardcopy	1
13.	Insurance certificates	Approval		Before Work commences	Hardcopy	1
14.	Engineering support	Review		During pre-production meeting	Contracts	1
15.	Training instructor information	Approval		30 days prior to delivery of bus	Hardcopy/Electronic Media	1
16.	Training curriculum	Approval		30 days prior to delivery of bus	Electronic Media/ Hardcopy	3
17.	Teaching materials	Review		During classroom instruction	Hardcopy	3
18.	Professionally prepared mechanics' "Bus Orientation" training video	Review		30 days prior to first production bus	Electronic Media	2

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
19.	Final preventative maintenance manuals	Review		30 days prior to delivery	Hardcopy Electronic Media	2
20.	Final diagnostic procedures manuals	Review		30 days prior to delivery	Hardcopy Electronic Media	2
21.	Final parts manuals	Approval		30 days prior to delivery	Hardcopy Electronic Media	2 1
22.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after Agency written approval of OEM component repair list	Hardcopy Electronic Media	2 2
23.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after pre-production meeting	Hardcopy	2
24.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after pre-production meeting	Hardcopy	2
25.	Draft parts manuals. (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after pre-production meeting	Hardcopy	2
26.	List of OEM component repair manuals	Approval		90 days after pre-production meeting	Hardcopy	2
27.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		30 days prior to start of production	Hardcopy	2
28.	Final operators' manuals	Review		30 days following Agency approval of draft manual	Hardcopy	1 per bus
29.	Recommended spare parts list, including bill of materials	Review		60 days prior to shipment of first bus	Hardcopy	1
30.	Part number index	Approval		60 days prior to shipment of first bus	Hardcopy Spreadsheet	1 1
31.	Current price list	Review		90 days after Agency written approval of draft parts manual	Hardcopy	2

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
32.	In-process drawings	Review		30 days prior to production	Scale drawings	1
33.	Electrical and air schematics	Review		30 days prior to production	Hardcopy	1
34.	As-built drawings	Review		Within 60 days after final bus delivery	Hardcopy Electronic Media	2 1
35.	Material samples	Review		By conclusion of pre-production meetings		1
36.	Undercoating system program	Approval		pre-production meeting	Hardcopy	1
37.	Flooring certificate	Review		pre-production meeting	Certificate/copy of purchase order	1
38.	Interior features – fire-resistance certificates	Review		Pre-production meeting	Certificates	1
39.	Crashworthiness	Review		Pre-production meeting	Certificate	1
40.	Technical review of electronic functionality	Approval		Prior to production	Hardcopy	1
41.	Interior security camera layout	Approval		Prior to bus completion	Copies of interior views	1 each
42.	Technical review of powerplant			Prior to production		
43.	Powerplant certifications	Review		Prior to bus completion	Hardcopy	1 each
44.	Striping layout	Approval		Prior to production	Hardcopy	1
45.	Resolution of issues "subject to Agency approval"	Approval		Prior to production	Hardcopy	1

SP 3. Options and Option Pricing

The Contractor hereby grants the Agency and any transit provider in the state of South Carolina options ("Options") to purchase up to five (5) additional vehicles ("Option Vehicles"). The Options shall be valid for a period of five (5) years from the effective date of the Contract. There shall be no minimum order quantity for any permissible assignee. Subject to the Agency's right to order modifications, the Option Vehicles shall have the same specifications as the vehicles purchased under this Contract. The Agency may exercise the Options by written notice to the Contractor ("Notice of Exercise of Option") at any time on or before following the effective date of the Contract ("Option Date").

The price of the Option Vehicles shall be the unit price of the base order vehicles, ("Base Order Price") adjusted by multiplying the base order price by the following fraction:

$$\frac{\text{Latest Published Preliminary Index Number Prior to Notice of Exercise of Option}}{\text{Index Number on Effective Date of the Contract}}$$

The Index shall be the Producer Price Index for Truck and Bus Bodies, Series No. 1413, published by the United States Department of Labor Bureau of Labor Statistics, or if such Index is no longer in use, then such replacement that is most comparable to the Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties.

Within thirty (30) days after delivery of the Notice of Exercise of Option to the Contractor, the Contractor shall submit a proposed delivery schedule. Along with the proposed delivery schedule, the Contractor will provide the Agency with access to its production schedule for the purpose of the parties verifying available production capacity. The production schedule shall include a reasonable time for mobilization and for coordinating with other vehicle orders, and it shall be based upon a production rate at least equal to the production rate actually realized with respect to the base order vehicles. If the parties are unable to agree on a production schedule, the maximum term for the production of the Option Vehicles shall not exceed a total of three (3) months after the date of Notice to Proceed with Option Vehicle production. The Agency or any permissible assignee may issue a Notice to Proceed at any time after the Contractor submits its proposed delivery schedule. The Contractor shall not commence production of the Option Vehicles prior to issuance of the Notice to Proceed by the Agency or any permissible assignee of the Agency for the Option Vehicles incorporating the agreed production delivery schedule or the three (3)-month maximum term.

Except as otherwise specially provided in this Contract, all other terms of the Contract shall apply to the Option Vehicles.

SP 4. Assignability of Options

If the Agency does not exercise the option(s) as listed in "Options and Option Pricing," then the Agency reserves the right to assign the option(s) to other grantees of FTA funds within the state of South Carolina. All transit providers within the state of South Carolina may purchase off this contract with written permission from the contracting officer in accordance with FTA Circular 4220.1F or its successors.

SP 5. Payment

The Agency shall pay and the Contractor shall accept the amounts set forth in the price schedule as full compensation for all costs and expenses of completing the Work in accordance with the Contract, including but not limited to all labor, equipment and material required, overhead, expenses, storage and shipping, risks and obligations, taxes (as applicable), fees and profit, and any unforeseen costs.

SP 5.1 Payment Terms

Payment Upon Delivery

All payments shall be made as provided herein, less any additional amount withheld as provided below and less any amounts for liquidated damages in accordance with "Liquidated Damages for Late Delivery of the Bus."

The Agency shall make payments for buses at the unit prices itemized in the price schedule within thirty (30) calendar days after the delivery and acceptance of each bus and receipt of a proper invoice.

The Agency shall make a final payment for all withholding within thirty (30) calendar days of receipt of a final proper invoice and the following:

1. Delivery and acceptance of all Contract deliverables, including manuals and other documentation required by the Contract, excluding training.
2. Contractor provision of any certifications as required by law and/or regulations.
3. Completion of post-delivery audits required under the Contract.

The Contractor may charge interest for late payment if payment is delayed more than ten (10) days after the payment Due Date set forth above. Interest will be charged at a rate not to exceed the prime rate of interest published by The Wall Street Journal on the 10th day.

SP 5.2 Payment of Taxes

Unless otherwise provided in this Contract, the Contractor shall pay all federal, state and local taxes, and duties applicable to and assessable against any Work, goods, services, processes and operations incidental to or involved in the Contract, including but not limited to retail sales and use, transportation, export, import, business and special taxes. The Contractor is responsible for ascertaining and paying the taxes, not to exceed three hundred dollars (\$300) when due. The total Contract price shall include compensation for all taxes the Contractor is required to pay by laws in effect on the Bid Due Date. The Contractor will maintain auditable records, subject to the Agency reviews, confirming that tax payments are current at all times.

SP 6. Service and Parts

SP 6.1 Contractor Service and Parts Support

The Contractor shall state on the form Contractor Service and Parts Support Data the representatives responsible for assisting the Agency, as well as the location of the nearest distribution center, which shall furnish a complete supply of parts and components for the repair and maintenance of the buses to be supplied. The Contractor also shall state below, or by separate attachment, its policy on transportation charges for parts other than those covered by warranty.

SP 6.2 Documentation

The Contractor shall provide 3 current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or trouble-shooting guides and major component service manuals, 3 current parts manual(s), and 3 standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.

SP 6.3 Parts Availability Guarantee

The Contractor hereby guarantees to provide, within reasonable periods of time, the spare parts, software and all equipment necessary to maintain and repair the buses supplied under this Contract for a period of at least twelve (12) years after the date of acceptance. Parts shall be interchangeable with the original equipment and shall be manufactured in accordance with the quality assurance provisions of this Contract. Prices shall not exceed the Contractor's then-current published catalog prices.

Where the parts ordered by the Agency are not received within two working days of the agreed-upon time and date and a bus procured under this Contract is out of service due to the lack of said ordered parts, then the Contractor shall provide the Agency, within eight (8) hours of the Agency's verbal or written request, the original Suppliers' and/or manufacturers' parts numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by the Agency.

Where the Contractor fails to honor this parts guarantee or parts ordered by the Agency are not received within thirty (30) days of the agreed-upon delivery date, then the Contractor shall provide to Agency, within seven (7) days of the Agency's verbal or written request, the design and manufacturing documentation for those parts manufactured by the Contractor and the original Suppliers' and/or manufacturers' parts numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by the Agency. The Contractor's design and manufacturing documentation provided to the Agency shall be for its sole use in regard to the buses procured under this Contract and for no other purpose.

SP 7. Federal Motor Vehicle Safety Standards (FMVSS)

The Contractor shall submit one (1) manufacturer's FMVSS self-certification, Federal Motor Vehicles Safety Standards, that the vehicle complies with relevant FMVSS or two manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

SP 8. Insurance

The Contractor shall maintain in effect during the term of this Contract, including any warranty period, at its own expense, at least the following coverage and limits of insurance:

- Statutory Workers Compensation and Employers Liability insurance and/or qualified self-insurance program covering Supplier's employees while on Agency property.
- Commercial General Liability Insurance:
 - Bodily Injury and Property Damage, including Contractual Liability covering the indemnification contained herein, \$10,000,000 combined single limits per occurrence, \$10,000,000 aggregate, where applicable.
 - Product liability: \$5,000,000 per occurrence, for a period of five (5) years after acceptance of the last bus delivered under this Contract (Products Liability coverage may be effected through one or more excess liability policies).
- Automobile Liability Insurance: Bodily Injury and Property Damage, \$1,000,000 combined single limits per occurrence.

Contractor shall deliver to the Agency, within ten (10) days after receiving Notice of Award of this Contract, evidence of the above. Prior to the expiration of any insurance during the time required, the Supplier shall furnish evidence of renewal to the Agency's Contract Administrator.

SECTION 5: FEDERAL REQUIREMENTS

FR 1. Access to Records

The Contractor agrees to maintain all books, records, accounts and reports required under this Contract for a period of not less than three years after the date of termination or expiration of this Contract, except in the event of litigation or settlement of claims arising from the performance of this Contract, in which case Contractor agrees to maintain the same until the Agency, the FTA Administrator, the Comptroller General or any of their duly authorized representatives have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

The following access to records requirements apply to this Contract:

FR 1.1 Local Governments

In accordance with 49 CFR 18.36(i), the Contractor agrees to provide the Agency, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor that are directly pertinent to this Contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 CFR 633.17 to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 USC 5302(a)1, which is receiving federal financial assistance through the programs described at 49 USC 5307, 5309 or 5311.

FR 1.2 State Governments

In accordance with 49 CFR 633.17, the Contractor agrees to provide the Agency, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 USC 5302(a)1, which is receiving federal financial assistance through the programs described at 49 USC 5307, 5309 or 5311. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at \$100,000.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

FR 2. Federal Funding, Incorporation of FTA Terms and Federal Changes

The preceding provisions include, in part, certain standard terms and conditions required by the Department of Transportation, whether or not expressly set forth in the preceding Contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F or its successors are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this agreement. The Contractor shall not perform any act, fail to perform any act or refuse to comply with any City of Spartanburg or Agency requests that would cause the City of Spartanburg or Agency to be in violation of the FTA terms and conditions.

The Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between Agency and FTA, as they may be amended or promulgated from time to time during the term of this Contract. Contractor's failure to so comply shall constitute a material breach of this Contract.

FR 3. Federal Energy Conservation Requirements

The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

FR 4. Civil Rights Requirements

The following requirements apply to the underlying Contract:

1. **Nondiscrimination:** In accordance with Title VI of the Civil Rights Act, as amended, 42 USC § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 USC § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 USC § 12132, and Federal transit law at 49 USC § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.
2. **Equal Employment Opportunity:** The following equal employment opportunity requirements apply to the underlying Contract:
 - (a) **Race, Color, Creed, National Origin, Sex:** In accordance with Title VII of the Civil Rights Act, as amended, 42 USC § 2000e, and Federal transit laws at 49 USC § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor,” 41 CFR Parts 60 *et seq.*, (which implement Executive Order No. 11246, “Equal Employment Opportunity,” as amended by Executive Order No. 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” 42 USC § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
 - (b) **Age:** In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 USC §§ 623 and Federal transit law at 49 USC § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
 - (c) **Disabilities:** In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 USC § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, “Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act,” 29 CFR Part 1630,

pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

3. The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

FR 5. No Government Obligation to Third Parties

1. The Agency and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the Solicitation or award of the underlying Contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this Contract and shall not be subject to any obligations or liabilities to the Agency, Contractor, or any other party (whether or not a party to that Contract) pertaining to any matter resulting from the underlying Contract.
2. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the Subcontractor who will be subject to its provisions.

FR 6. Program Fraud and False or Fraudulent Statements or Related Acts

20. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 USC §§ 3801 *et seq.* and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying Contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying Contract or the FTA assisted project for which this Contract Work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.
21. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a Contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 USC § 5307, the Government reserves the right to impose the penalties of 18 USC § 1001 and 49 USC § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.
22. The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the Subcontractor who will be subject to the provisions.

FR 7. Suspension and Debarment

This Contract is a covered transaction for purposes of 49 CFR Part 29. As such, the Contractor is required to verify that none of the Contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

The Contractor is required to comply with 49 CFR 29, Subpart C, and must include the requirement to comply with 49 CFR 29, Subpart C, in any lower-tier covered transaction it enters into.

By signing and submitting its bid or Bids, the Bidder or Bidders certifies as follows:

The certification in this clause is a material representation of fact relied upon by the Agency. If it is later determined that the Bidder or Bidders knowingly rendered an erroneous certification, in addition to remedies available to the Agency, the federal government may pursue available remedies, including but not limited to suspension and/or debarment. The Bidder or Bidders agrees to comply with the requirements of 49 CFR 29, Subpart C, while this Bid is valid and throughout the period of any Contract that may arise from this Bid. The Bidder or Bidders further agrees to include a provision requiring such compliance in its lower tier covered transactions.

FR 8. Disadvantaged Business Enterprise (DBE)

This Contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.

The Contractor shall maintain compliance with “DBE Approval Certification” throughout the period of Contract performance.

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted Contract. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the Agency deems appropriate. Each subcontract the Contractor signs with a Subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

FR 9. Clean Water Requirements

23. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 USC 1251 *et seq.* The Contractor agrees to report each violation to the Agency and understands and agrees that the Agency will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.
24. The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

FR 10. Clean Air Requirements

25. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 USC §§ 7401 *et seq.* The Contractor agrees to report each violation to the Agency and understands and agrees that the Agency will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.
26. The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

FR 11. Compliance with Federal Lobbying Policy

Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 CFR Part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any Agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal Contract, grant or any other award covered by 31 USC 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-federal funds with respect to that federal Contract, grant or award covered by 31 USC 1352. Such disclosures are forwarded from tier to tier up to the recipient.

FR 12. Buy America

The Contractor agrees to comply with 49 USC 5323(j) and 49 CFR Part 661, which provide that federal funds may not be obligated unless steel, iron and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7. A general public interest waiver from the Buy America requirements applies to microprocessors, computers, microcomputers, software or other such devices, which are used solely for the purpose of processing or storing data. This general waiver does not extend to a product or device that merely contains a microprocessor or microcomputer and is not used solely for the purpose of processing or storing data.

Separate requirements for rolling stock are set out at 49 USC 5323(j)(2)(C) and 49 CFR 661.11. Rolling stock must be assembled in the United States and have a more than 65 percent for FY2018 and FY2019 and more than 70 percent for FY2020 and beyond.

A Bidder or Bidders must submit to the Agency the appropriate Buy America Certification with all offers on FTA-funded contracts, except those subject to a general waiver. Bids that are not accompanied by a properly completed Buy America certification are subject to the provisions of 49 CFR 661.13 and may be rejected as nonresponsive.

FR 13. Testing of New Bus Models

The Contractor agrees to comply with 49 USC A 5323(c) and FTA's implementing regulation at 49 CFR Part 665 and shall perform the following:

1. A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient at a point in the procurement process specified by the recipient, which will be prior to the recipient's final acceptance of the first vehicle.
2. A manufacturer who releases a report under Paragraph 1 above shall provide notice to the operator of the testing facility that the report is available to the public.
3. If the manufacturer represents that the vehicle was previously tested, the vehicle being sold should have the identical configuration and major components as the vehicle in the test report, which must be provided to the recipient prior to recipient's final acceptance of the first vehicle. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.

4. If the manufacturer represents that the vehicle is “grandfathered” (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle’s configuration and major components.

FR 14. Pre-Award and Post-Delivery Audits

The Contractor agrees to comply with 49 USC § 5323(l) and FTA’s implementing regulation at 49 CFR Part 663 and to submit the following certifications:

1. **Buy America requirements:** The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the recommended Bidder/Bidders certifies compliance with Buy America, it shall submit documentation that lists (1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and (2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.
2. **Solicitation specification requirements:** The Contractor shall submit evidence that it will be capable of meeting the bid specifications.
3. **Federal Motor Vehicle Safety Standards (FMVSS):** The Contractor shall submit (1) manufacturer’s FMVSS self-certification, Federal Motor Vehicle Safety Standards, that the vehicle complies with relevant FMVSS or (2) manufacturer’s certified statement that the contracted buses will not be subject to FMVSS regulations.

FR 15. Cargo Preference

The Contractor agrees to the following:

- To use privately owned U.S.-flag commercial vessels to ship at least fifty (50) percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners and tankers) involved, whenever shipping any equipment, material or commodities pursuant to the underlying Contract to the extent such vessels are available at fair and reasonable rates for U.S.-flag commercial vessels;
- To furnish within twenty (20) working days following the date of loading for shipments originating within the United States or within thirty (30) working days following the date of leading for shipments originating outside the United States, a legible copy of a rated, “on-board” commercial ocean bill of lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the Contractor in the case of a Subcontractor’s bill-of-lading.)
- To include these requirements in all subcontracts issued pursuant to this Contract when the subcontract may involve the transport of equipment, material or commodities by ocean vessel.

FR 16. Fly America

The Contractor agrees to comply with 49 USC 40118 (the “Fly America” Act) in accordance with the General Services Administration’s regulations at 41 CFR Part 301-10, which provide that recipients and sub recipients of federal funds and their contractors are required to use U.S. flag air carriers for U.S. government-financed international air travel and transportation of their personal effects or property, to the extent such service is

available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

SECTION 6: TECHNICAL SPECIFICATIONS

GENERAL

TS 1. Scope

Technical specifications define requirements for three (3) thirty-five (35) ft. low floor heavy-duty transit buses, which may be used for both suburban express service and general service on urban arterial streets. Buses shall have a minimum expected life of twelve (12) years or 500,000 miles, whichever comes first, and are intended for the widest possible spectrum of passengers, including children, adults, the elderly and people with disabilities.

TS 2. Definitions

Ambient Temperature. The temperature of the surrounding air. For testing purposes, ambient temperature must be between 16 °C (50 °F) and 38 °C (100 °F).

Analog Signals. A continuously variable signal that is solely dependent upon magnitude to express information content.

Audible Discrete Frequency: An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by 4 decibels (dB) or more.

Battery Compartment. Low-voltage energy storage, i.e. 12/24 VDC batteries.

Battery Management System (BMS). Monitors energy, as well as temperature, cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures.

Braking Resistor. Device that converts electrical energy into heat, typically used as a retarder to supplement or replace the regenerative braking.

Burst Pressure. The highest pressure reached in a container during a burst test.

Capacity (fuel container). The water volume of a container in gallons.

Cells. Individual components (i.e., battery or capacitor cells).

Code. A legal requirement.

Combination Gas Relief Device. A relief device that is activated by a combination of high pressures or high temperatures, acting either independently or together.

Container Appurtenances. Devices connected to container openings for safety, control or operating purposes.

Container Valve. A valve connected directly to a container outlet.

Curb Weight. Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or driver.

dBA. Decibels with reference to 0.0002 microbar as measured on the “A” scale.

DC to DC Converter. A module which converts a source of direct current (DC) from one voltage level to another.

Defueling. The process of removing fuel from a tank.

Defueling Port. Device which allows for vehicle defueling, or the point at which this occurs.

Destroyed. Physically made permanently unusable.

Discrete Signal. A signal that can take only pre-defined values, usually of a binary 0 or 1 nature where 0 is battery ground potential and 1 is a defined battery positive potential.

DPF. Diesel particulate filter.

Driver's Eye Range. The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.

Energy Density. The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).

Fusible Material. A metal, alloy or other material capable of being melted by heat.

Fire Resistant. Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-90.

Fireproof. Materials that will not burn or melt at temperatures less than 2000 °F.

Free Floor Space: Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas such as, the floor space “swept” by passenger doors during operation. Floor area of 1.5 sq ft shall be allocated for the feet of each seated passenger that protrudes into the standee area.

GAWR (Gross Axle Weight Rated). The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.

Gross Load. 150 lbs for every designed passenger seating position, for the driver, and for each 1.5 square feet of free floor space.

GVW (Gross Vehicle Weight). Curb weight plus gross load.

GVWR (Gross Vehicle Weight Rated): The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.

Hose: Flexible line.

Inverter. A module that converts DC to and from AC.

Labeled. Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Leakage. Release of contents through a Defect or crack. See *Rupture*.

Line: All tubes, flexible and hard, that carry fluids.

Liner. Inner gas-tight container or gas container to which the overwrap is applied.

Local Regulations. Regulations below the state level.

Low-Floor Bus. A bus that, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.

Low Voltage (LV). 50 volts or less (AC and DC).

Lower Explosive Limit. The lowest concentration of gas where, given an ignition source, combustion is possible.

Maximum Service Temperature. The maximum temperature to which a container/cylinder will be subjected in normal service.

Metallic Hose. A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.

Module. Assembly of individual components

Operating Pressure. The varying pressure developed in a container during service.

Physical Layer. The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.

Pipe: Nonflexible line.

Power. Work or energy divided by time

Power Density. Power divided by mass, volume or area.

Propulsion System. System that provides propulsion for the vehicle proportional to operator commands. Includes, as applicable, the HDS, energy storage system and the hybrid system controller.

Real-Time Clock (RTC). Computer clock that keeps track of the current time.

Retarder. Device used to augment or replace some of the functions of primary friction based braking systems of the bus.

Rupture. Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.

Seated Load. 150 lbs for every designed passenger seating position and for the driver.

SLW (Seated Load Weight). Curb weight plus seated load.

Serial Data Signals. A current loop based representation of ASCII or alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance.

Service Pressure. The settled pressure at a uniform gas temperature of 21 °C (70 °F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.

Settled Pressure. The gas pressure when a given settled temperature, usually 21 °C (70 °F), is reached.

Settled Temperature. The uniform gas temperature after any change in temperature caused by filling has dissipated.

Solid State Alternator. A module that converts high-voltage DC to low-voltage DC (typically 12/24 volt systems).

Sources of Ignition. Devices or equipment that because of their modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable compressed natural gas-air mixtures when introduced into such a mixture, or when such a mixture comes into contact with them

Special Tools. Tools not normally stocked by the Agency.

Specification. A particular or detailed statement, account, or listing of the various elements, materials, dimensions, etc. involved in the manufacturing and construction of a product.

Standard. A firm guideline from a consensus group.

Standards. Standards referenced in “Part 5: Technical Specifications” are the latest revisions unless otherwise stated.

Standee Line. A line marked across the bus aisle to designate the forward area that passengers may not occupy when the bus is moving.

State of Charge (SOC). Quantity of electric energy remaining in the battery relative to the maximum rated Amp hour (Ah) capacity of the battery expressed in percent. This is a dynamic measurement used for the energy storage system. A full SOC indicates that the energy storage system cannot accept further charging from the engine driven generator or the regenerative braking system.

Stress Loops. The “pig-tails” commonly used to absorb flexing in piping.

Structure. The structure shall be defined as the basic body, including floor deck material and installation, load bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Wheelchair. A mobility aid belonging to any class of three- or four-wheeled devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A “common wheelchair” is such a device that does not exceed 30 in. in width and 48 in. in length measured 2 in. above the ground, and does not weigh more than 600 lbs when occupied.

TS 3. Referenced Publications

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification.

TS 4. Legal Requirements

The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.

Buses shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at location of the Agency and the date of manufacture.

In the event of any conflict between the requirements of these specifications and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

TS 5. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors’ requirements and recommendations. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

TS 5.1 Weight

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance. Curb weight of the bus shall be minimized to the extent practical without compromising its integrity and durability, and shall not exceed 29,000 pounds.

TS 5.2 Capacity

The vehicle shall be designed to carry the gross vehicle weight, which shall not exceed the bus GVWR.

TS 5.3 Service Life

The minimum useful design life of the bus in transit service shall be at least twelve (12) years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year, including the 12th year.

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be, in accordance with the manufacturer's recommended preventative maintenance schedule (along with routine daily service performed during the fueling operations).

Test ports, as required, shall be provided for commonly checked functions on the bus, such as air intake, exhaust, hydraulic, pneumatic, charge-air and engine cooling systems.

The coach manufacturer shall give prime consideration to the routine problems of maintaining the vehicle. All coach components and systems, both mechanical and electrical, which will require periodic physical Work or inspection processes shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. It shall not be necessary to disassemble portions of the coach structure and/or equipment such as seats and flooring under seats in order to gain access to these areas. Each coach shall be designed to facilitate the disassembly, reassembly, servicing or maintenance, using tools and equipment that are normally available as standard commercial items.

Requirements for the use of unique specialized tools will be minimized. The body and structure of the coach shall be designed for ease of maintenance and repair. Individual panels or other equipment which may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

The successful bidder is to supply the following safety items with each coach provided under this contract:

- One (1) Five (5)-pound ABC fire extinguisher with gauge showing status of charge, mounted
- One (1) set of reflecting safety warning triangles, mounted
- Two (2) wheel chocks rubber
- One (1) spare tire and wheel mounted for each coach

Maintenance, Parts and Operating Manuals

The successful bidder is to supply the following manuals:

- Two sets of maintenance manuals providing maintenance and service instructions for each system of the coach including the engine, transmission, climate control system for each order of buses during the term of the contract.
- Two sets of electrical system schematics for each order of buses during the term of the contract.
- Two sets of air system schematics for each order of buss during the term of this contract.
- Two parts manuals for each order of buses during the term of the contract.
- One operator's manual for each bus ordered under this contract.

Manuals may be provided in compact disc (CD) format, however at least one printed and bound copy of each manual must be supplied, as well. The operator's manuals are excluded from this provision; all copies must be printed and bound.

Keys

For each bus supplied under this contract, the following keys must be supplied:

- Compartment access door key (5/16" square key)

Contractor shall provide a list of all other special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to the Pricing Schedule.

TS 5.5 Interchangeability

Unless otherwise agreed, all units and components procured under this Contract, whether provided by Suppliers or manufactured by the Contractor, shall be duplicates in design, manufacture and installation to ensure interchangeability among buses in each production run in this procurement. This interchangeability shall extend to the individual components as well as to their locations in the buses. These components shall include, but are not limited to, passenger window hardware, interior trim, lamps, lamp lenses and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable.

Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture and assembly for each bus in each production run in this Contract. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

In the event that the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the Agency and obtain the Agency's prior written approval, including any changing in pricing.

Agency shall review proposed product changes on a case-by-case basis and shall have the right to require extended warranties to ensure that product changes perform as least as well as the originally supplied products.

TS 5.6 Training

Training classes and associated cost are to be presented as options.

TS 5.7 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 10 °F to 115 °F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F or at altitudes above 3000 feet. Speed, gradability and acceleration performance requirements shall be met at, or corrected to, 77 °F, 29.31 in. Hg, dry air per SAE J1995.

TS 5.8 Noise

Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 80 dBA. The driver area shall not experience a noise level of more than 75 dBA.

An exception shall be made for the turntable area, which shall be considered a separate environment.

Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated 0 to 35 mph at curb weight. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65 dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Agency and SAE J366.

TS 5.9 Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, bulkheads and facilitation of passenger evacuation.

As may be available, materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, need not comply. In addition, smaller components and items, such as seat grab rails, switch knobs and small light lenses, shall be exempt from this requirement.

TS 5.10 Respect for the Environment

In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

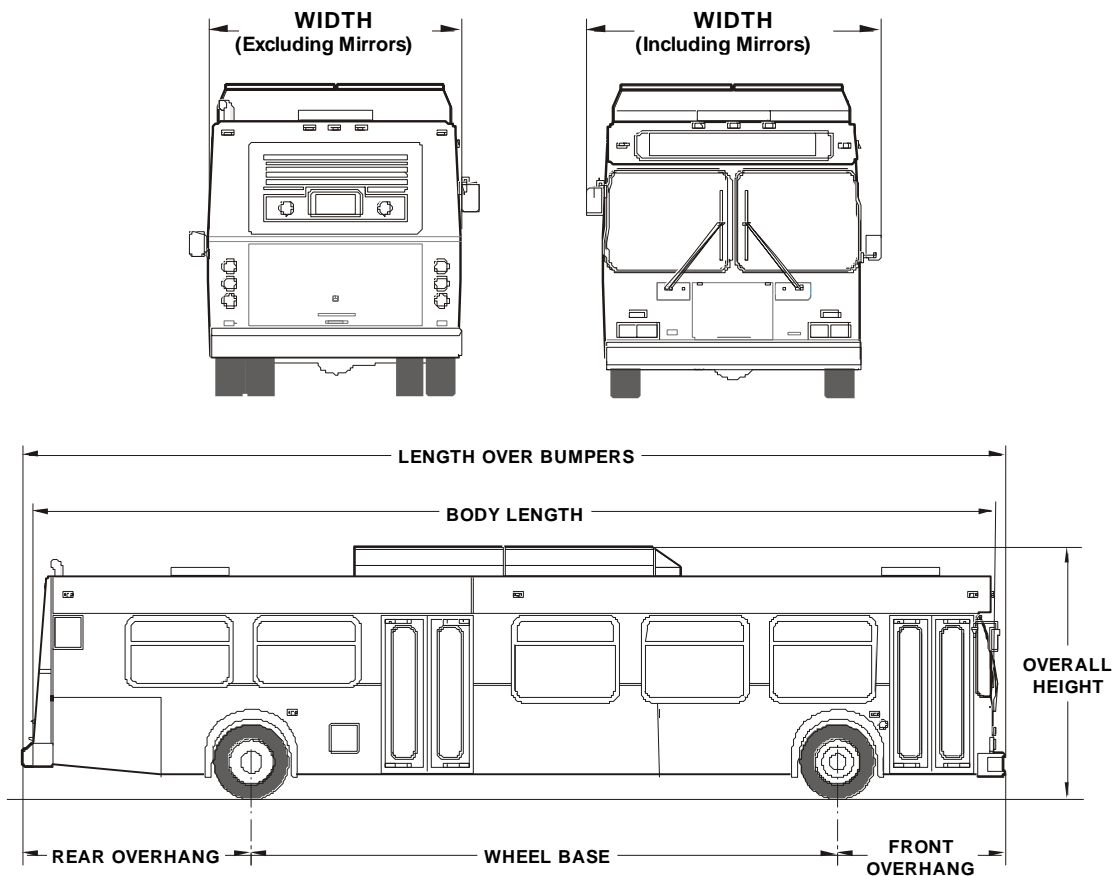
DIMENSIONS

TS 6. Physical Size

With exceptions such as exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames, cameras, object detection systems, bicycle racks, feelers and rub rails, the bus shall have the following overall dimensions as shown in Figure 1 at static conditions and design height.

FIGURE 1

Transit Bus Exterior Dimensions



For ease of use, the following tolerances will be allowable for each given bus.

Length, overall bumpers	36' maximum
Width, overall body	102" maximum
Height, overall @ GVWR	136" maximum
Wheelbase	230" maximum
Height, main floor @ GVWR	18" maximum
Height, first step (front door) @ GVWR	16" maximum, (kneeled 11" max.)
Height, first step (center door) @ GVWR	16" maximum, (kneeled 11" max.)
Height, interior	95" minimum, (76.5" rear riser)
Width, door panels, (front)	34" minimum
Width, door panels, (rear)	30" minimum

Height, door (front and rear) 75" minimum

TS 6.1 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as shown in Figure 2 and defined in SAE Standard J689, regardless of load up to the gross vehicle weight rating.

TS 6.2 Ramp Clearances

The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc and the initial point of structural interference forward of the front tire to the ground.

The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc and the initial point of structural interference rearward of the rear tire to the ground.

The breakover angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.

TABLE 2
 Breakover Angle

Angle	30- to 45-ft Bus
Approach	8.5 degrees (min.)
Front breakover	8 degrees (min.)
Rear breakover (articulated only)	n/a
Departure	8.7 degrees (min.)

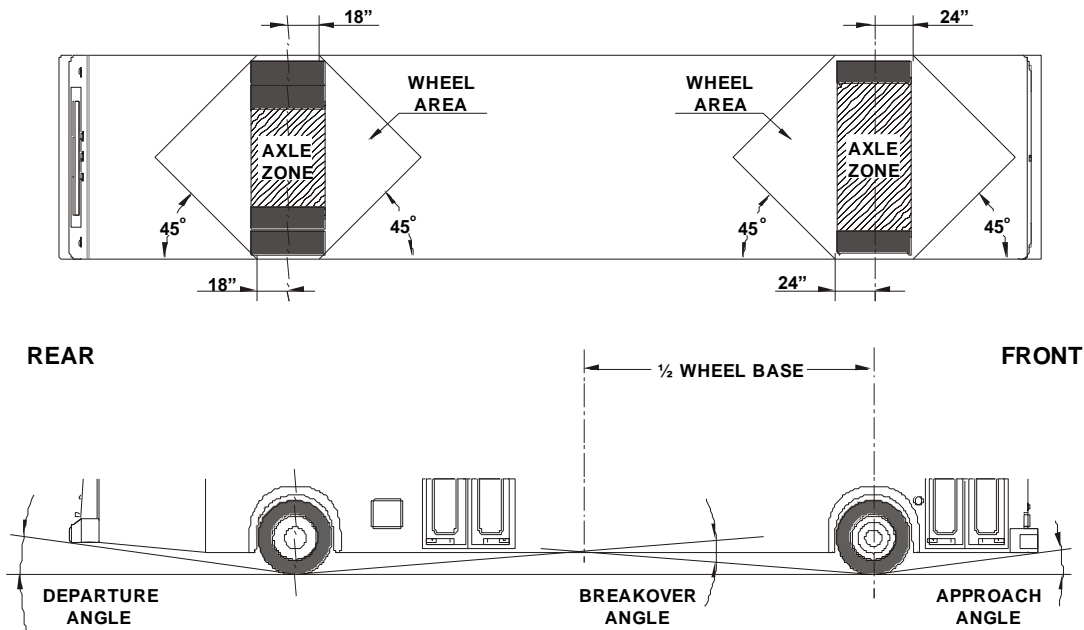
TS 6.3 Ground Clearance

Ground clearance shall be no less than 9 in., (8 in. at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 in.

Wheel area clearance shall be no less than 8 in. for parts fixed to the bus body and 6 in. for parts that move vertically with the axles.

FIGURE 2
 Transit Bus Minimum Road Clearance



VEHICLE PERFORMANCE

TS 7. Power Requirements

The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed, and gradability requirements, and operate all propulsion-driven accessories using actual road test results and computerized vehicle performance data.

TS 7.1 Top Speed

The bus shall be capable of achieving a top speed of 65 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed according to the recommendations by the tire manufacturer.

TS 7.2 Gradability

Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating.

The propulsion system and drivetrain shall enable the bus to achieve and maintain a speed of 40 mph on a 2½ percent ascending grade and 15 mph on a 10 percent ascending grade continuous.

TS 7.3 Acceleration

The acceleration shall meet the requirements below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

TABLE 3

Maximum Start Acceleration Times on a Level Surface¹

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

TS 7.4 Operating Range

The operating range of the coach shall be designed to meet the operating profile as stated in the “Design Operating Profile” section.

TS 7.4.1 Diesel

The operating range of the coach when run on the Altoona Test cycle shall be at least 350 mi (560 km) or 20 hrs with full fuel capacity.

TS 8. Fuel Economy

Test results from the Altoona fuel economy tests or other applicable test procedures shall be provided to the Agency. Results shall include vehicle configuration and test environment information. Fuel economy data shall be provided for each design operating profile. The design operating profile is assumed to be defined by the Altoona fuel duty cycle. The Agency will provide a percentage of each duty cycle that is representative of the Agency’s service.

POWERPLANT

TS 9. Engine

The power plant and drive train configuration proposed for this procurement shall provide adequate horsepower and torque to enable the bus to meet or exceed the acceleration, gradability, and acceleration rate of change required by this Section. The diesel engine shall be transit certified and designed to operate for at least 150,000 miles without major failure or significant deterioration. Components of the fuel injector and or control system shall be designed to operate for at least 150,000 miles without replacement or major service.

The heavy-duty diesel engine shall be a Cummins L9 or approved equal designed to provide sufficient power to meet the bus performance requirements of the Contract, and operate for not less than 300,000 miles without major failure or significant deterioration. The diesel engine shall be compliant with the current EPA Engine Certification emission standards for urban bus engines. The engine shall be equipped with an Electronic Control Microprocessor (ECM)-based engine control system compatible with multiplex wiring systems and either 12-volt or 24-volt electrical systems. The engine control system shall be capable of receiving electronic inputs from the engine and other vehicle systems. Communication between these electronic systems shall be made using the SAE J1939 Recommended Practice Communication Link. The engine’s electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of engine performance.

The engine shall have on-board diagnostic capabilities, be able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Trouble codes logged by the ECM shall be permanently retained in the ECM memory until removed with the proper service equipment. The system shall be equipped with two data link diagnostic reader connections protected against dirt and moisture with separate adjacent power ports for a laptop computer; one located in the engine compartment near the rear start- monitor box and the second located in the Operator's area. Data stored by this system shall be easily extractable via hardwire link and be capable of being transmitted via a wireless communications system. Conversely, the system shall be capable of similar modes of communications to upload various engine control settings inherent to the engine control system software architecture.

The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for continued operation, and automatically derate power and/or speed and initiate engine shutdown as needed. When the on board engine control unit or the fire suppression system detects a malfunction and the engine protection system is activated, the on-board diagnostic system shall trigger a visual and audible alarm to the Operator. Automatic shutdown shall occur within 10 seconds, only when parameters established for the following functions are exceeded:

- (1) Excessive Coolant Temperature
- (2) Excessive Exhaust Temperature
- (3) Excessive Engine Oil Pressure
- (4) Low Coolant level
- (5) Low Engine Oil level

Standard Requirements for a Fast Idle Device

The engine shall be equipped with an operator-controlled fast idle device. The fast idle control shall be a two-way switch mounted on the dash or side console and shall activate only with the transmission in neutral and the parking brake applied.

TS 10. Cooling Systems

The cooling systems shall be of sufficient size to maintain all engine and transmission fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible and in accordance with engine and transmission manufacturers' cooling system requirements. The cooling system fan controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall meet the requirements stated in the operating environment.

TS 10.1 Engine Cooling

A means of determining satisfactory engine coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than +/- 60 in. above the ground. Both shall be accessible through the same access door.

The radiator and charge air cooler shall be of durable, corrosion-resistant construction with non-removable radiator headers.

Screen in Front of Radiator

The radiator input shall be protected by an easily cleanable screen designed to collect large debris. Radiators with a fin density greater than 12 fins per in. or a louvered slit design shall not be used. No heat-producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator. The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration. The radiator and charge air cooler cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment.

Standard Requirement for Coolant Filtration

The engine cooling system shall be equipped with a properly sized water filter with a spin-on element and an automatic system for releasing supplemental coolant additives as needed to replenish and maintain protection properties. When replacing the water filter, only the water in the filter will be lost.

Standard Control and Drive Design

Control and drive of the radiator and charge air cooler fan(s) shall be the Contractor's standard design.

Standard Mounting Design

Mounting location of radiator and charge air cooler shall be the Contractor's standard design.

Cooling Fan Controls

The cooling fan shall be temperature controlled, allowing the engine to reach operating temperature quickly.

TS 10.2 Charge Air Cooling

The charge air cooling system also referred to as after-coolers or inter-coolers shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. The charge air radiator shall not be stacked ahead of or behind the engine radiator and shall be positioned as close to the engine as possible unless integrated with the radiator. Air ducting and fittings shall be protected against heat sources and shall be configured to minimize restrictions and maintain sealing integrity.

TS 10.3 Transmission Cooling

The transmission shall be cooled by a dedicated heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine cooling system should provide coolant bypass flow to the transmission cooling system with the engine thermostats closed.

TS 11. Transmission (Conventional Powertrain)

The transmission shall be a five-speed, electronically controlled automatic shift with torque converter, retarder with a rebuild-able torque converter. Agency desires an Allison B400R transmission or an approved equal. Gross input power, gross input torque and rated input speed shall be compatible with the engine. A mechanic, with optional assistance, shall be able to remove and replace the transmission assembly for service in less than

eight (8) total combined man-hours. The transmission shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications network. Electronic controls shall be compatible with either 12 or 24 volt power distribution, provide consistent shift quality, and compensate for changing conditions such as variations in vehicle weight and engine power. A brake pedal application of 6 psi shall be required by the operator to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against sever damage. A diagnostic reader device connector port, suitably protected against dirt and moisture, shall be provided in the operator's area. The on-board diagnostic system shall trigger a visual alarm to the operator when the electronic control unit detects a malfunction.

TS 12. Retarder

The transmission shall be equipped with an integral hydraulic retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake functions. Brake lights shall illuminate when the retarder is activated. The retarder shall be activated when the brake pedal is depressed.

The thermostatically controlled cooling fan shall be activated when the retarder is engaged and the coolant temperature exceeds the maximum limit established by the engine and transmission manufacturers.

TS 13. Mounting

All powerplant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure. Mounts shall control the movement of the powerplant so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the powerplant.

TS 13.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories and any other component requiring service or replacement shall be easily removable and independent of the engine and transmission removal. An engine oil pressure gauge and coolant temperature gauge shall be provided in the engine compartment. These gauges shall be easily read during service and mounted in an area where they shall not be damaged during minor or major repairs.

Engine oil and the radiator filler caps shall be hinged to the filler neck and closed with spring pressure or positive locks to prevent leakage. All fluid fill locations shall be properly labeled to help ensure that correct fluid is added. All fillers shall be easily accessible with standard funnels, pour spouts and automatic dispensing equipment. All lubricant sumps shall be fitted with magnetic-type drain plugs.

The engine and transmission shall be equipped with sufficient heavy-duty fuel and oil filters for efficient operation and to protect the engine and transmission between scheduled filter changes. All filters shall be easily accessible and the filter bases shall be plumbed to ensure correct reinstallation.

Engine Oil Pressure and Coolant Temperature Gauges

Engine oil pressure and coolant temperature gauges required in engine compartment.

Engine Air Cleaner

An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The location of the air intake system shall be designed to minimize the entry of dust and debris and to maximize the life of the air filter. The engine air duct shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into air filter.

TS 14. Hydraulic Systems

Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major coach systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation when applicable. A tamper-proof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system.

The hydraulic system shall operate within the allowable temperature range as specified by the lubricant manufacturer.

Hydraulic System Sensors

Sensors in the main hydraulic system, excluding those in the power steering system, shall indicate on the driver's on-board diagnostic panel conditions of low hydraulic fluid level.

TS 14.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, Fatigue Failures, degradation and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.

Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid.

All hoses, pipes, lines and fittings shall be specified and installed per the manufacturer's recommendations.

TS 14.2 Fittings and Clamps

All clamps shall maintain a constant tension at all times, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on.

Compression fittings shall be standardized to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed, even if the components are known to be interchangeable.

TS 14.3 Charge Air Piping

Charge air piping and fittings shall be designed to minimize air restrictions and leaks. Piping shall be as short as possible, and the number of bends shall be minimized. Bend radii shall be maximized to meet the pressure drop and temperature rise requirements of the engine manufacturer. The cross-section of all charge air piping shall not be less than the cross-section of the intake manifold inlet. Any changes in pipe diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Piping shall be routed away from heat sources as practicable and shielded as required to meet the temperature rise requirements of the engine manufacturer.

Charge air piping shall be constructed of stainless steel, aluminized steel or anodized aluminum, except between the air filter and turbocharger inlet, where piping may be constructed of fiberglass. Connections between all charge air piping sections shall be sealed with a short section of reinforced hose and secured with stainless steel constant tension clamps that provide a complete 360-degree seal.

TS 15. Radiator

Radiator piping shall be stainless steel or brass tubing, and if practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360-degree seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

TS 16. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on. Lines within the engine compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required.

Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

TS 17. Fuel

TS 17.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion or breakage due to strain or wear.

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected locations to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose and hose connections, where permitted, shall be made from materials resistant to corrosion and fuel and protected from fretting and high heat. Fuel hoses shall be accessible for ease of serviceability.

Fuel lines shall be capable of carrying the type of fuel specified by the Agency (i.e., up to B20 type fuel).

TS 17.2 Design and Construction

TS 17.2.1 Design and Construction, Diesel

Fuel Tank(s)

The fuel tank(s) shall be made of corrosion resistant stainless steel. The fuel tank shall be made of sufficiently heavy gauge 300 series or ASTM Spec. The fuel tank (s) shall have a minimum of 80 gallon capacity.

The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers.

The fuel tank(s) shall be equipped with an external, hex head, drain plug. It shall be at least a 3/8-inch size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing noise regardless of fill level. The baffles or fuel pickup location shall assure continuous full power operation on a 6 percent upgrade for 15 minutes starting with no more than 25 gallons of fuel over the unusable amount in the tank(s). The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 10 gallons of fuel over the unusable amount in the tank(s).

The materials used in mounting shall withstand the adverse effects of road salts, fuel oils, and accumulation of ice and snow for the life of the bus.

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to Federal Motor Carrier Safety Regulation shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with an undercoating material.

The fuel filler shall be located 7 to 32 feet behind the centerline of the front door on the curbside of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.

The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standards.

The fuel filler shall accommodate a standard diesel fuel nozzle. The nozzle shall automatically shut off when the tank is essentially full. An audible signal shall indicate when the tank is essentially full. The fuel filler cap shall be hinged.

TS 18. Emissions and Exhaust

TS 18.1 Exhaust Emissions

The engine and related systems shall meet all applicable emission and engine design guidelines and standards at the time of delivery.

TS 18.2 Exhaust System

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from discoloring or causing heat deformation to the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after-treatment compartment area. The exhaust outlet shall be designed

to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the after-treatment.

Diesel Exhaust Fluid Injection

If required by the engine manufacturer to meet NO_x level requirements specified by EPA, a DEF injection system will be provided. The DEF system will minimally include a tank, an injector, a pump, an ECM and a selective catalytic converter. The tanks shall be designed to store DEF in the operating environment described in the “Operating Environment” section. The DEF fluid lines shall be designed to prevent the DEF from freezing. The DEF injection system shall not be damaged from a cold soak at 10 °F.

TS 18.3 Particulate Aftertreatment

If required by the engine manufacturer to meet particulate level requirements specified by EPA, a particulate trap will be provided. The particulate trap shall regenerate itself automatically if it senses clogging. Regeneration cycles and conditions will be defined by the engine manufacturer.

STRUCTURE

TS 19. General

TS 19.1 Design

The bus shall have a clean, smooth, simple design, primarily derived from the bus performance requirements and passenger service criteria established in these specifications. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust, or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus. Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches, and doors shall be able to be sealed. Accumulation on any window of the bus of spray and splash generated by the bus’ wheels on a wet road shall be minimized.

TS 20. Altoona Testing

Prior to acceptance of first bus, the vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the Agency.

Altoona Test Report Provided to Agency Prior to Start of Bus Production

Prior to the start of any bus manufacturing or assembly processes, the structure of the proposed bus model shall have undergone appropriate structural testing and/or analysis, including the complete regimen of FTA required Altoona tests. Prior to assembly of the first bus, the OEM shall provide the Agency with a completed report of Altoona testing for the proposed bus model along with a plan of corrective action to address deficiencies, breakdowns and other issues identified during Altoona testing. The bus model tested shall match the bus model proposed for procurement, including structure, axles and drive-train. Base model and partial Altoona test reports are acceptable when the combination of these tests adequately represents the proposed bus model.

TS 20.1 Structural Validation

The structure of the bus shall have undergone appropriate structural testing and/or analysis. At minimum, appropriate structural testing and analysis shall include Altoona testing.

TS 21. Distortion

The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms or service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6 in. curb or in a 6 in. deep hole.

TS 22. Resonance and Vibration

All structure, body and panel-bending mode frequencies, including vertical, lateral and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible or sensible resonant vibrations during normal service.

TS 22.1 Engine Compartment Bulkheads

The passenger and engine compartment shall be separated by fire-resistant bulkheads. The engine compartment shall include areas where the engine and exhaust system are housed. This bulkhead shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, dated October 20, 1993. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-resistant. Any passageways for the climate control system air shall be separated from the engine compartment by fire-resistant material. Piping through the bulkhead shall have fire-resistant fittings sealed at the bulkhead. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. Engine access panels in the bulkhead shall be fabricated of fire-resistant material and secured with fire-resistant fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead.

TS 22.2 Crashworthiness

The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6 in. reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 25 mph impact by a 4000-pound automobile at any side, excluding doorways, along either side of the bus with no more than 3 in. of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 in. from ground level shall withstand a static load of 2000 lbs applied perpendicular to the bus by a pad no larger than 5 sq in. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

Chassis shall be stainless steel with side impact protection in the low floor area.

TS 23. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the Agency's use of proper cleaning and neutralizing agents.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion resistant and shall be protected from galvanic corrosion. Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over 1 percent.

All exposed surfaces and the interior surfaces of tubing and other enclosed members shall be corrosion resistant through application of a corrosion protection system.

TS 24. Towing

Towing devices shall be provided on each end of the bus. Towing devices should accommodate flat-bedding and flat-towing. Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20° of the longitudinal axis of the bus. The rear towing device(s) shall not provide a foothold for unauthorized riders. The front towing devices shall be permanently affixed to the frame and provide for the attachment of a rigid tow bar for flat towing of the bus, at curb weight. The rear towing devices shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of the bus. The method of attaching the tow bar or adapter shall require the specific approval of the Agency. Each towing device shall accommodate a crane hook with a 1-inch throat. A seven pin trailer light connection shall be provided at the front for connecting a towing light pack.

TS 25. Jacking

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. Jacking points located on the axle or suspension near the wheels shall permit easy and safe jacking with the flat tire or dual set on a 6 in. high run-up block not wider than a single tire. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Jacking points shall be painted safety yellow.

TS 26. Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post hoist system. Jacking plates, if used as hoisting pads, shall be designed to prevent the bus from falling off the hoist. Other pads or the bus structure shall support the bus on jack stands independent of the hoist.

TS 27. Floor

TS 27.1 Design

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than ¼ in. or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 degrees to allow for drainage.

The floor design shall consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height no more than 21 in. above the lower level, with equally spaced steps. An increase slope shall be allowed on the upper level, not to exceed 3.5 degrees off the horizontal.

TS 27.2 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor, and all floor fasteners shall be serviceable from one side only. Any adhesives, bolts or screws used to secure the floor to the structure shall last and remain effective throughout the life of the coach. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut, and all floor fasteners shall be secured and protected from corrosion for the service life of the bus.

The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 in. from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 lbs applied through the flat end of a ½ in. diameter rod, with 1/32-inch radius, without permanent visible deformation.

TS 27.3 Construction

The subfloor shall be 7 ply ¾ inch greenwood ACQ hardwood plywood flooring that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering, shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

TS 28. Platforms

TS 28.1 Driver's Area

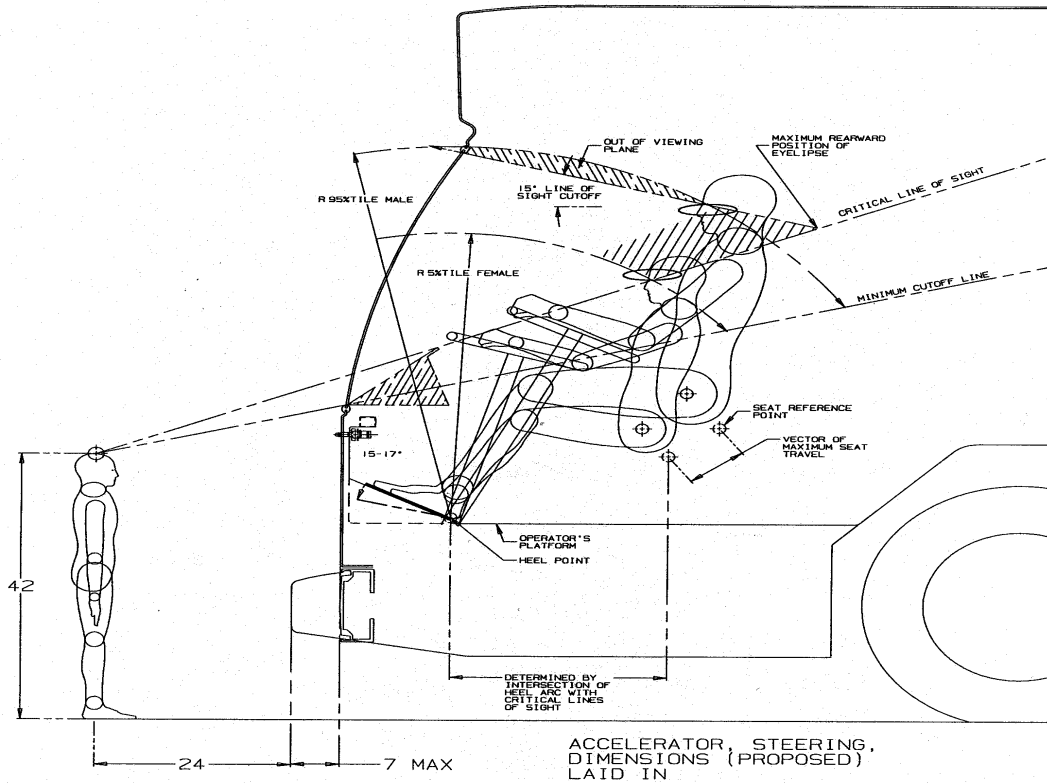
The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Trim shall be provided along top edges of platforms unless integral nosing is provided.

TS 28.2 Driver's Platform

The driver's platform shall be of a height such that, in a seated position, the driver can see an object located at an elevation of 42 in. above the road surface, 24 in. from the leading edge of the bumper. Notwithstanding this requirement, the platform height shall not position the driver such that the driver's vertical upward view is less than 15 degrees. A warning decal or sign shall be provided to alert the driver to the change in floor

level. Figure 3 illustrates a means by which the platform height can be determined, using the critical line of sight.

FIGURE 3
 Determining Platform Height



TS 28.3 Farebox

The Agency request a separate cost for a GFI Odyssey farebox to be listed in the pricing schedule as an option.

If the driver's platform is higher than 12 in., then the farebox is to be mounted on a platform of suitable height to provide accessibility for the driver without compromising passengers' access. Actual placement of farebox to be determined by the Agency.

TS 28.4 Rear Step Area to Rear Area

If the vehicle is of a bi-level floor design, a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 12 in. deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

TS 29. Wheel Housing

TS 29.1 Design and Construction

Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to preclude overheating when the bus is operating on the design operating profile. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material.

Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all noise requirements of this specification.

Design and construction of front wheel housings shall allow for the installation of a radio or electronic equipment storage compartment on the interior top surface, or its use as a luggage rack.

The finish of the front wheel housings shall be scratch-resistant and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 10 to 12 in. above floor shall be equipped with scuff-resistant coating or stainless steel trim.

Wheel housings, as installed and trimmed, shall withstand impacts of a 2 in. steel ball with at least 200 ft-lbs of energy without penetration.

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than 4 in. higher than the wheel well housing.

CHASSIS

TS 30. Suspension

TS 30.1 General Requirements

The front and rear suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Routine adjustments shall be easily accomplished by limiting the removal or disconnecting the components.

TS 30.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle.

TS 30.3 Springs and Shock Absorbers

TS 30.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of 2.75 in. jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 2.75 in. rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than ½ in. at any point from

the height required. The safe operation of a bus cannot be impacted by ride height up to 1 in. from design normal ride height.

TS 30.3.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Damping shall be sufficient to control coach motion to three cycles or less after hitting road perturbations. The shock absorber bushing shall be made of natural rubber that will last the life of the shock absorber. The damper shall incorporate a secondary hydraulic rebound stop.

TS 30.3.3 Lubrication

Standard Grease Fittings

All elements of steering, suspension and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534. These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun from a pit or with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. The lubricant specified shall be standard for all elements on the bus serviced by standard fittings and shall be required no less than every 6000 miles.

TS 30.3.4 Kneeling

A kneeling system shall lower the entrance(s) of the bus a minimum of 2.5 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver. The kneeling control shall provide the following functions:

- Downward control must be held to allow downward kneeling movement.
- Release of the control during downward movement must completely stop the lowering motion and hold the height of the bus at that position.
- Upward control actuation must allow the bus to return to normal floor height without the driver having to hold the control.

The brake and throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 in. per second at essentially a constant rate. After kneeling, the bus shall rise within 3 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.

An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, a minimum 2.5 in. diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.

TS 31. Wheels and Tires

TS 31.1 Wheels

All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. Front wheels and tires shall be balanced as an assembly per SAE J1986.

Wheels and rims shall be hub-piloted with powder coated steel (maximum 3.5 mil) and shall resist rim flange wear.

TS 31.2 Tires

Tires shall be 305/85/22.5 suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire Supplier's rating.

The tires shall be supplied by the Contractor.

TS 32. Steering

Hydraulically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. Engine driven hydraulic pump shall be provided for power steering.

TS 32.1 Steering Axle

The front axle shall be of an I-beam suspension design, non-driving, with a load rating sufficient for the bus loaded to GVWR and shall be equipped with grease type front wheel bearings and seals.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and, if needed, lubrication fittings easily accessible from a pit or hoist.

The steering geometry of the outside (frontlock) wheel shall be within 2 degrees of true Ackerman up to 50 percent lock measured at the inside (backlock) wheel. The steering geometry shall be within 3 degrees of true Ackerman for the remaining 100 percent lock measured at the inside (backlock) wheel.

TS 32.2 Wheel

TS 32.2.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure.

Under these conditions, the torque required to turn the steering wheel 10 degrees shall be no less than 5 ft-lbs and no more than 10 ft-lbs. Steering torque may increase to 70 ft-lbs when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort shall not exceed 55 lbs at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.

TS 32.2.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18-20 in.; the rim diameter shall be 7/8 in. to 1 1/4 in. and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

TS 32.2.3 Steering Column Tilt

The steering column shall have full tilt capability.

TS 32.2.4 Steering Wheel Telescopic Adjustment

The steering column shall have full telescopic adjustment.

TS 33. Drive Axle

The bus shall be driven by a heavy-duty Meritor or approved equal axle with a load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type. If a planetary gear design is employed, the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.

TS 33.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

TS 34. Turning Radius

TABLE 4
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius	Agency Requirement
35 ft	39 ft (TR0)	None

TS 35. Brakes

TS 35.1 Service Brake

Brakes shall be self-adjusting. Brake wear indicators (visible brake sensors) shall be provided on exposed push rods.

TS 35.2 Actuation

Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 70 lbs at a point 7 in. above the heel point of the pedal to achieve maximum braking. The heel point is the location of the

driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service.

The total braking effort shall be distributed between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. Manufacturer shall demonstrate compliance by providing a copy of a thermo dynamic brake balance test upon request.

TS 35.3 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. The complete brake lining wear indicator shall be clearly visible from the hoist or pit without removing backing plates.

TS 35.4 Hubs and Drums

Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze brake linings.

The bus shall be equipped with drum brakes on all axles.

TS 35.5 Parking/Emergency Brake

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121. An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. A Low air alarm sounds and a dash indicator light luminates when the air pressure drops below 60 psi. The parking brake valve button will pop out when air pressure drops below the requirements of FMVSS 121. The driver shall be able to manually depress and hold down the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the operator releases the emergency brake release valve, the brakes shall engage to hold the bus.

TS 36. Interlocks

TS 36.1 Passenger Door Interlocks

To prevent opening front and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the front/rear doors from being enabled or opened unless the bus speed is less than 2 mph.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a front/rear door enable or open position, or a rear door panel is opened more than 3 in. from the fully closed position (as measured at the leading edge of the door panel). The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6

percent grade, with the engine at idle and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle Master Run Switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in and unsecured condition, unless the door master switch has been actuated to intentionally release the interlocks.

Non-adjustable brake interlock regulator shall be provided.

An accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus whenever front doors are open.

TS 37. Pneumatic System

TS 37.1 General

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. New buses shall not leak down more than 5 psi over a 15-minute period of time as indicated on the dash gauge.

Provision shall be made to apply shop air to the bus air systems. A quick disconnect fitting shall be easily accessible and located in the engine compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered. The air system shall be protected by a pressure relief valve set at 150 psi and shall be equipped with a check valve and pressure relief valves to assure partial operation in case of line failures.

TS 37.2 Air Compressor

The engine-driven air compressor shall be sized to charge the air system from 40 psi to the governor cut-off pressure in less than 4 minutes while not exceeding the fast idle speed setting of the engine.

TS 37.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 °F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

- **Green:** Indicates primary brakes and supply.
- **Red:** Indicates secondary brakes.
- **Brown:** Indicates parking brake
- **Yellow:** Indicates compressor governor signal.
- **Black:** Indicates accessories.

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines

shall be supported at no more than 5-ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between powerplant and body-mounted equipment shall be flexible convoluted copper or stainless steel line, or may be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-ft intervals or less.

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be routed to prevent water traps to the extent possible. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

TS 37.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with flush type drain valves. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves that discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

TS 37.5 Air System Dryer

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer shall be located at the rear curbside of vehicle. The air dryer system shall include a replaceable desiccant bed, electrically heated drain, and activation device. A mechanic shall replace the desiccant in less than 15 minutes. SKF Turbo 2000 or approved equal.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 38. Overview

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle. (e.g., generator, voltage regulator, wiring, relays, and connectors).

Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

The data communication system consists of the bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both onboard the vehicle and off.

Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

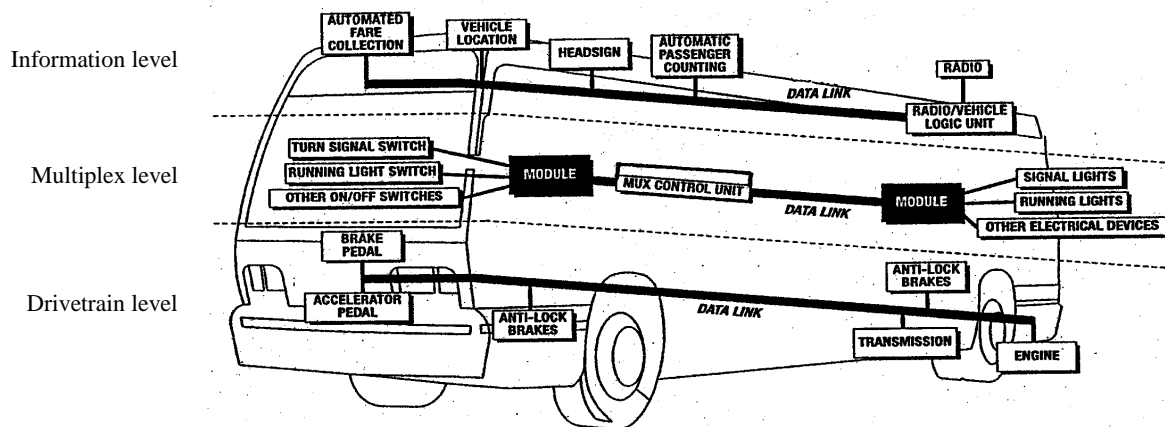
Data communications systems are divided into three levels to reflect the use of multiple data networks:

- **Drivetrain level:** Components related to the drivetrain including the propulsion system components (engine, transmission and hybrid units), and anti-lock braking system (ABS), which may include traction control.

- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fare boxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.
- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems; and gateway devices.

FIGURE 5

Data Communications Systems Levels



TS 38.1 Modular Design

Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.

Powerplant wiring shall be an independent wiring harness. Replacement of the engine compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 39. Environmental and Mounting Requirements

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile. As a recommendation, no vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).

The Agency shall follow recommendations from bus manufacturers and subsystem Suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

TS 39.1 Hardware Mounting

The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

All electrical/electronic hardware mounted on the exterior of the vehicle that is not designed to be installed in an exposed environment shall be mounted in a sealed enclosure.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of SAE J1455.

TS 40. General Electrical Requirements

TS 40.1.1 Low-Voltage Batteries (24V)

Batteries shall be easily accessible for inspection and serviceable only from outside the coach and shall be securely mounted on trays. Batteries shall be of premium construction. The Agency requires the use of two (2) Type 8D, deep-cycling, maintenance-free batteries. Each battery shall have a minimum of 1,300 cold-cranking amps. Positive and negative terminals shall have same sized studs, the battery terminals and cables shall be arranged to prevent incorrect installation. Battery terminals shall be located for access in less than 30 seconds with jumper cables. Each battery shall have a purchase date no more than 60 days from the date of release for shipment to the Agency.

The battery tray shall be stainless steel, shall pull out or swing out easily and properly support the batteries during servicing. The pull-out or swing-out requirement is not applicable if the batteries are properly supported in a compartment that allows inspection of indicator and replacement of batteries without lifting. A positive lock shall retain the battery tray in the open and closed positions. Battery cables shall be flexible and sufficiently long to reach the batteries in extended positions without stretching or pulling on any connection and shall not lie on top of the batteries. The battery terminals and cables shall be color-coded with red for the primary positive and black for negative.

Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127 – Type SGT, SGX or GXL and SAE Recommended Practice J541.

2100 strand 4/0 cable or greater recommended.

TS 40.1.2 Battery Compartment

The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose.

The vehicle shall be equipped with a 12VDC and 24VDC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the 12VDC and 24VDC quick disconnect switch(es).

The battery quick disconnect access door shall be identified with a decal. The decal size shall not be less than 3.5×5 in. (8.89×12.7 cm).

This access door shall not require any special locking devices to gain access to the switch, and it shall be accessible without removing or lifting the panel. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

TS 40.1.3 Master Battery Switch

A single master switch shall be provided near the battery compartment for the disconnecting of all battery positives (12V and 24V), except for safety devices such as the fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

Turning the master switch off with the powerplant operating shall shut off the engine and shall not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load.

The batteries shall be equipped with a single switch for disconnecting both 12V and 24V power.

TS 40.1.4 Low-Voltage Generation and Distribution

The low-voltage generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total low voltage generator load exceeding 70 percent of the low voltage generator nameplate rating.

Voltage monitoring and over-voltage output protection (recommended at 32V) shall be provided.

Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements with no greater than a 5 percent volt drop across the length of the cable.

TS 40.1.5 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid state devices sized to the requirements of the circuit. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. This requirement applies to in-line fuses supplied by either the Contractor or a Supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the Agency mechanic with visible indication of open circuits. The Agency shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits. Any manually resettable circuit breakers shall provide a visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 40.2 Grounds

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than four ground ring/spade terminal connections shall be made per ground stud. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis.

TS 40.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit.

Wiring shall be grouped, numbered and/or color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at all points where wiring enters electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion and mechanical damage. Where feasible, front to rear electrical harnesses should be installed above the window line of the vehicle.

All wiring harnesses over 5 ft long and containing at least five wires shall include 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to data links and communication cables. Wiring harness length shall allow end terminals to be replaced twice without pulling, stretching or replacing the wire. Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall either use different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or 1/16 in., whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires.

Ultra-sonic and T-splices may be used with 7 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be supported to prevent flexing.

All splicing shall be staggered in the harness so that no two splices are positioned in the same location within the harness.

Wiring located in the engine compartment shall be routed away from high-heat sources or shielded and/or insulated from temperatures exceeding the wiring and connector operating requirements.

The instrument panel and wiring shall be easily accessible for service from the driver's seat or top of the panel. The instrument panel shall be separately removable and replaceable without damaging the instrument panel or gauges. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

TS 40.4 Electrical Components

All electrical components, including switches, relays, flashers and circuit breakers, shall be heavy-duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment.

All electric motors shall be heavy-duty brushless type where practical, and have a continuous duty rating of no less than 40,000 hours (except cranking motors, washer pumps and wiper motors). All electric motors shall be easily accessible for servicing.

TS 40.5 Electrical Compartments

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion-resistant and sealed. The components and their functions in each electrical compartment shall be identified and their location permanently recorded on a drawing attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel and abrasion.

The front compartment shall be completely serviceable from the driver's seat, vestibule or from the outside. "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

TS 41. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

All electronic component Suppliers shall ensure that their equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32V DC on a 24V DC nominal voltage rating with a maximum of 50V DC) and reverse polarity conditions. If an electronic component is required to interface with other

components, it shall not require external pull-up and/or pull-down resistors. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible and labeled.

TS 41.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted.

TS 41.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding 4 in. Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common nodes of each I/O terminal.

TS 41.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

TS 41.1.3 Communications

The data network cabling shall be installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any purpose other than communication between the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24V-power line) shall meet the most stringent applicable wiring and terminal specifications.

TS 41.1.4 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

TS 42. Multiplexing

TS 42.1 General

The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for

troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0V, 12V, 24V), at each module location shall be designated as spares.

TS 42.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Either system shall consist of several modules connected to form a control network.

TS 42.2.1 I/O Signals

The input/output for the multiplex system may contain three types of electrical signals: discrete, analog or serial data.

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0-12V, 10-24V, etc.) or current signal (4-20 mA). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other on-board components.

TS 43. Data Communications

TS 43.1 General

All data communication networks shall be either in accordance with a nationally recognized interface standard, such as those published by SAE, IEEE or ISO, or shall be published to the Agency with the following minimum information:

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision levels of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.
- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

TS 43.2 Drivetrain Level

Drivetrain components, consisting of the engine, transmission, retarder, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols.

TS 43.2.1 Diagnostics, Fault Detection and Data Access

Drivetrain performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The drivetrain level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions and uninterrupted timing functions.

TS 43.2.2 Programmability (Software)

The drivetrain level components shall be programmable by the Agency with limitations as specified by the sub-system Supplier.

TS 43.3 Multiplex Level

TS 43.3.1 Data Access

At a minimum, information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible. A hardware gateway and/or wireless communications system are options requested by the Agency. The communication port(s) shall be located in the forward most panel closest to the main communication box.

TS 43.3.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of on-board visual/audible indicators.

In addition to the indicators, the system shall employ an advanced diagnostic and fault detection system, which shall be accessible via either a personal computer or a handheld unit. Either unit shall have the ability to check logic function. The diagnostic data can be incorporated into the information level network or the central data access system.

A mock-up board, where key components of the multiplexing system are replicated on a functional model, shall be provided as a tool for diagnostic, design verification and training purposes. If required, the mock-up board should be priced separately in the Pricing Schedule.

TS 43.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures:

- password protection
- limited distribution of the configuration software
- limited access to the programming tools required to change the software
- hardware protection that prevents undesired changes to the software

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all of the following:

- hardware component identification where labels are included on all multiplex hardware to identify components
- hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module
- software revision identification where all copies of the software in service displays the most recent revision number
- a method of determining which version of the software is currently in use in the multiplex system

Revision control labels shall be physically located near the programming port.

TS 43.4 Electronic Noise Control

Electrical and electronic sub-systems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception or violate regulations of the Federal Communications Commission.

Electrical and electronic sub-systems on the coaches shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of or onboard the buses, ac or dc power lines and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

TS 44. Driver's Area Controls

TS 44.1 General

In general when designing the driver's area, it is recommended that SAE J833, "Human Physical Dimensions," be used.

Switches and controls shall be divided into basic groups and assigned to specific areas, in conformance with SAE Recommended Practice J680, Revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach."

TS 44.2 Glare

The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be dark gray in color to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

TS 44.3 Visors/Sun Shades

Adjustable sun visor(s) shall be provided for the driver's windshield and the driver's side window. Visors shall be shaped to minimize light leakage between the visor and windshield pillars. Visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment, such as the radio handset or the destination control. Deployment of the visors shall not restrict vision of the rearview mirrors. Visor adjustments shall be made easily by hand with positive locking and releasing device.

Sun visor construction and materials shall be strong enough to resist breakage during adjustments. Visors may be transparent, but shall not allow a visible light transmittance in excess of 10 percent. Visors, when deployed, shall be effective in the driver's field of view at angles more than 5 degrees above the horizontal.

TS 44.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide for ease of operation. They shall be identifiable by shape, touch and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE Recommended Practice J2402, "Road Vehicles – Symbols For Controls, Indicators, and Tell Tales," where available and applicable. Color of switches and controls shall be dark with contrasting typography or symbols.

Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls and instruments shall be dust- and water-resistant.

TS 44.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The indicator panel shall be located within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear.

On-board displays visible to the operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Table 6 represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Consideration shall be provided for future additions of spare indicators as the capability of onboard diagnostic systems improves. Blank spaces shall contain LEDs.

TABLE 6
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Master run switch	Rotary, four-position detent	Side console	Master control for bus, off, day run, night run and clearance ID lights	
Engine start, front	Approved momentary switch	Side console	Activates engine starter motor	
Engine start, rear	Approved momentary switch	Engine compartment	Activates engine starter motor	
Engine run, rear	Three-position toggle switch	Engine compartment	Permits running engine from rear start, normal front run position and off	Amber light
Drive selector	Touch panel switch	Side console	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
Driver's ventilation	Rotary, three-position detent	Side console or Dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, three-position detent	Side console or Dash left wing	Permits defroster: fan off, low, medium or high	
Defroster temperature	Variable position	Side console or Dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	One-variable rotary position operating both wipers	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button	Dash left wing	Activates windshield washers	
Dash panel lights	Rotary rheostat or stepping switch	Side Console or Dash left wing	Provides adjustment for light intensity in night run position	
Interior lights	Three-position switch	Side console	Selects mode of passenger compartment lighting: off, on, normal	
Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
WC ramp/kneel enable	Two-position switch ¹	Side console or Dash right wing	Permits operation of ramp and kneel operations at each door remote panel	Amber light
Front door ramp/kneel enable	Two-position switch	Side console or Dash left wing	Permits ramp and kneel activation from front door area, key required ¹	Amber light
Front door ramp	Three-position momentary switch	Side console or Dash left wing	Permits deploy and stow of front ramp	Red light
Front kneel	Three-position momentary switch	Dash right wing	Permits kneeling activation and raise and normal at front door remote location	Amber or red dash indicator. Ext alarm and Amber light

TABLE 6
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Silent alarm	Recessed push button, NO and NC contacts momentary	Side console	enables destination sign emergency message	
Video system event switch	Momentary on/off momentary switch with plastic guard	Side console	Triggers event equipment, triggers event light on dash	
Left remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of left exterior mirror	
Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
Mirror heater	Switch or temperature activated	Side console	Permits heating of outside mirrors when required	
Passenger door control	two momentary push buttons	Side console, forward	Permits open/close control of front and rear passenger doors	Red light
Rear door override	Two-position switch in approved location	Side console, forward	Allows driver to override activation of rear door passenger tape switches	
Engine shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto engine shutdown	
Hazard flashers	Two-position switch	Side console or Dash left wing	Activates emergency flashers	Two green lights
Destination sign interface	Destination sign interface panel	Above driver	Facilitates driver interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and audible indicator
Low profile microphone	Low-profile discrete Mounting	Steering column	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
High beam	Detented push button	Left foot panel	Permits driver to toggle between low and high beam	Blue light
Parking brake	Pneumatic PPV	Side console or Dash left wing	Permits driver to apply and release parking brake	Red light
Park brake release	Pneumatic PPV	Vertical side of the side console or dash center	Permits driver to push and hold to release brakes	
Remote engine speed	Rotary rheostat	Engine compartment	Permits technician to raise and lower engine RPM from engine compartment	
Master door/ interlock	Multi-pole toggle, detented	Out of operator's reach	Permits driver override to disable door and brake/throttle interlock	Red light

TABLE 6
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Warning interlocks deactivated	Red indicator light	Out of operator's reach	Illuminates to warn driver that interlocks have been deactivated.	Red light
Retarder disable	Multi-pole switch detented	Behind panel by driver's left leg	Permits driver override to disable brake retardation/regeneration	Red light
Rear door passenger sensor disable	Multi-pole toggle, detented	In sign compartment or Driver's barrier compartment	Permits driver to override rear door passenger sensing system	
Indicator/ alarm test button	Momentary switch or programming ¹	Dash center panel	Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audibles
Speedometer	Speedometer, odometer, and diagnostic capability, 5-mile increments	Dash center panel	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Door ajar	Door not properly closed	Dash center	Indication of rear door not properly closed	Buzzer or alarm and red light
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
Methane detection function	Detection of system integrity	or Dash center	Detects system failure	No start condition, amber light
Methane detection	Indication of 20% LED emergency light (LEL)	or Dash center	Detects levels of methane	Flashing red at 20% LEL
Methane detection	Indication of 50% LEL	Dash center	Detects levels of methane	Solid red at 50% LEL
Engine coolant indicator	Low coolant indicator to be supplied as audible alert and visual	Within driver's sight	Detects low coolant condition	Buzzer and Amber light
Hot engine indicator	Coolant temperature indicator to be supplied as audible alert and visual	Within driver's sight	Detects hot engine condition and initiates time delay shutdown	Red light
Low engine oil pressure indicator	Engine oil pressure indicator to be supplied as audible alert and visual	Within driver's sight	Detects low engine oil pressure condition and initiates time-delayed shutdown	Red light
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light

TABLE 6
 Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
HVAC indicator	Detects system status	Dash center	Displays system failure	Amber or red light
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition and optionally detects battery high, low, imbalance, no charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Fuel tank level	Analog gauge, graduated based on fuel type	Dash center	Indication of fuel tank level/pressure	
DEF gauge	Level Indicator	Center dash	Displays level of DEF tank and indicates with warning light when low	Red light
Turntable	Interlock momentary switch	Side console	Momentarily release interlock brakes due to overangled condition	

TS 44.6 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material.

TS 44.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 degrees at the point of initiation of contact and extend downward to an angle of 10 to 18 degrees at full throttle.

The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield, and vertical H-point.

TS 44.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 in. long and 3 to 4 in. wide. Clearance around the pedal must allow for no interference precluding operation.

The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between 1 and 2 in. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 44.7 Driver Foot Switches

The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 degrees and a maximum of 37 degrees. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other signals, including high beam and public address system shall be in approved location.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The foot switches for the directionals shall be momentary type, while those for the PA system and the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

TS 45. Driver's Amenities

TS 45.1 Coat Hanger

A suitable hanger shall be installed in a convenient, approved location for the driver's coat.

TS 45.2 Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size is 2750 cubic in.

TS 46. Windshield Wipers and Washers

TS 46.1 Windshield Wipers

The bus shall be equipped with 2 electrically operated windshield wipers controlled by a single knob for each half of the windshield. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. Both wipers shall park along the center edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion-resistant.

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for each side of the windshield between approximately five (5) and twenty-five (25) cycles per minute.

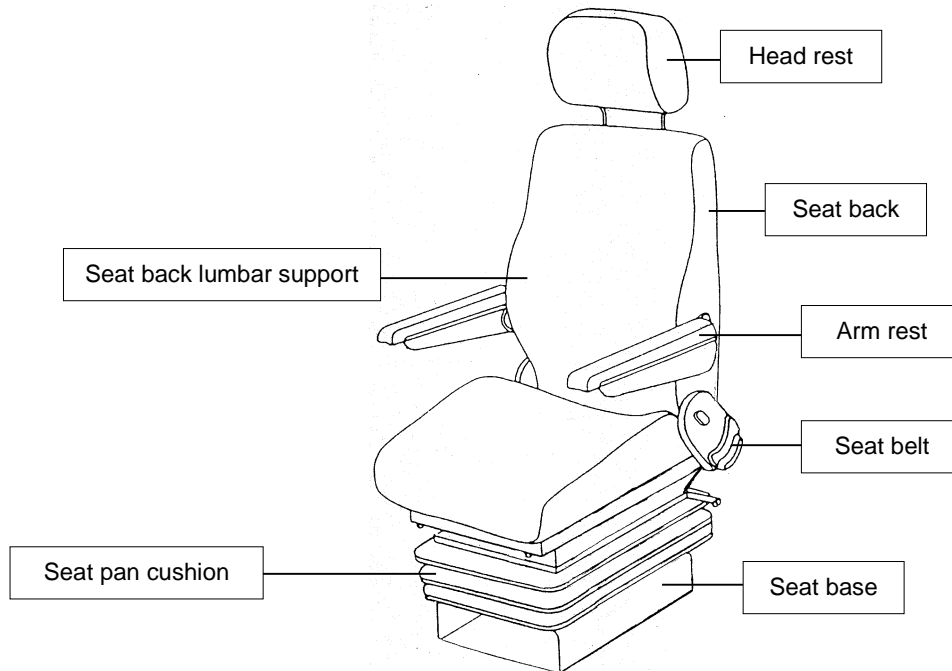
TS 46.2 Windshield Washers

The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling from outside of the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

TS 47. Driver's Seat

FIGURE 6
Driver's Seat



TS 47.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

TS 47.1.1 Seat Pan Cushion Length

Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no less than 16.5 in. at its minimum length and no more than 20.5 in. at its maximum length.

Seat Pan Cushion Height

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 in., with a minimum 6 in. vertical range of adjustment.

TS 47.1.2 Seat Pan Cushion Slope

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 degrees). The seat pan shall adjust in its slope from no less than plus 12 degrees (rearward "bucket seat" incline), to no less than minus 5 degrees (forward slope).

TS 47.1.3 Seat Base Fore/Aft Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 in.). The seat-base shall travel horizontally a minimum of 9 in. It shall adjust no closer to the heel point than 6 in.

TS 47.1.4 Seat Pan Cushion Width

Measurement is the horizontal distance across the seat cushion. The seat pan cushion shall be 17 to 21 in. across at the front edge of the seat cushion and 20 to 23 in. across at the side bolsters.

TS 47.1.5 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 lbs. The suspension shall be capable of dampening adjustment in both directions.

Rubber snubbers shall be provided to prevent metal-to-metal contact.

TS 47.1.6 Seat Back

Measurement is the distance between the outermost points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19 in. Seat back will include dual recliner gears on both sides of the seat.

TS 47.1.7 Seat Back Lumbar Support

Measurement is from the bottom of the seat back at its intersection with the seat pan to the top of the lumbar cushioning. The seat back shall provide adjustable depth lumbar back support with three individual operating lumbar cells within a minimum range of 7 to 11 in.

TS 47.1.8 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 degrees is the upright position and 90 degrees-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 105 degrees (reclined), with infinite adjustment in between.

TS 47.2 Seat Belt

The belt assembly should be an auto-locking retractor (ALR). All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt.

The seat and seat belt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

Seat belts shall be provided across the driver's lap and diagonally across the driver's chest. This belt shall be one piece and be orange in color.

Lap Belt Length

The lap belt assembly shall be 72 in. in length with an 8-in. extension

TS 47.3 Seat Control Locations

While seated, the driver shall be able to make seat adjustments by hand without complexity, excessive effort or being pinched. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.

TS 47.4 Seat Structure and Materials

Cushions shall be fully padded with at least 3 in. of materials in the seating areas at the bottom and back.

The cushion material shall be closed-cell polyurethane (FMVSS 302).

TS 47.5 Pedestal

The pedestal shall be stainless steel.

TS 47.6 Mirrors

TS 47.6.1 Exterior Mirrors

The bus shall be equipped with a corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.

Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield.

Spring loaded mirror heads auto return shall be installed.

Combination of flat and convex mirrors referred to as transit-specific shall be installed.

The curbside rearview mirror shall be mounted so that its lower edge is no less than 76 in. above the street surface.

The driver shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

The heaters shall be energized whenever the driver's heater and/or defroster is activated or activated independently.

The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

The street-side mirrors shall have heaters that energize whenever the driver's heater and/or defroster is activated, or can be activated independently.

TS 47.6.2 Interior Mirrors

Mirrors shall be provided for the driver to observe passengers throughout the bus without leaving the seat and without shoulder movement. The driver shall be able to observe passengers in the front/entrance and rear/exit areas, anywhere in the aisle, and in the rear seats. A round 12 inch in diameter mirror shall be placed to the top right of the driver as to observe down the isle.

WINDOWS

TS 48. General

A minimum of 8000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 49. Windshield

The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 14 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3½ ft high no more than 2 ft in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a 3-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded. The windshield shall be the 2 piece design.

TS 49.1 Glazing

The windshield glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673.

The upper portion of the windshield above the driver's field of view shall have a dark, shaded band with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D-1003.

TS 50. Driver's Side Window

The driver's side window shall be the sliding type, requiring only the rear half of sash to latch upon closing, and shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.

The driver's view, perpendicular through operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor. On the top fixed over bottom slider configuration, the top fixed area above 53 in. may have a maximum 5 percent light transmittance.

Hidden Frame (Flush “Euro-look”) Driver’s Side Window

- full slider
- non-egress

Quick Change Operator’s Side Window

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

TS 51. Side Windows

TS 51.1 Configuration

Side windows shall not be bonded in place, but shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.

TS 51.2 Emergency Exit (Egress) Configuration

Maximum Egress

Every window shall be capable of being made an egress window.

Standard Passenger Side Window Configurations

- hidden frame (flush “Euro-look”)
- openable windows with inward-opening transom panels.

Quick Change Passenger Side Windows

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

TS 51.3 Configuration

Fixed Side Windows

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)

Each operable side window shall incorporate an upper transom portion. The transom shall be between 25 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

TS 51.4 Materials

Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673.

Windows on the bus sides and in the rear door shall be tinted a neutral color, complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 27 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

HEATING, VENTILATING AND AIR CONDITIONING

TS 52. Capacity and Performance

The bus HVAC system shall be a rear bulkhead mounted Thermo King T-14 series system with Thermo King Intelligaire controls and an X426 or X430 compressor or approved equal. The controller shall be capable of accepting 12 V DC or 24 V DC signals from standard switches or Programmable Logic Control (PLC) outputs. The microprocessor-based controller shall provide continuous monitoring of the air conditioning system's critical pressures and temperatures, compressor clutch engagement, bus interior temperature and ambient air temperature. One set of diagnostic and programming tools are to be provided for this system.

An LED display panel shall be mounted on the air conditioning unit control panel located in the return air area to display bus interior temperature, ambient air temperature and thermostat set point temperature by pressing a keypad. The thermostat set point temperature is to be programmable by Agency maintenance staff to Agency high and low temperature setting limits.

Interior climate control operating modes are to be selected by a rotary switch located in the driver's console. The controller will then react to the digital inputs and will control the air conditioning system in the mode that has been selected. In the AUTO mode, the A/C system will operate in heat or cool as determined by the ambient temperature switch. The cool cycle of the AUTO mode can be pre-programmed to provide either cycling clutch or reheat as determined by Agency Transit maintenance personnel. The return air temperature for the AUTO mode may be programmed into the controller. When the rotary driver switch is placed in the COOL mode, the A/C system will operate on either cycling clutch or reheat as determined and programmed by Agency maintenance personnel. When the rotary driver switch is placed in the HEAT mode, the controller provides power to the evaporator/heater motor and the interior temperature of the bus is maintained by controlling power to the hot water coolant valve and hot water boost pump motor. With the rotary switch in the VENT mode, the controller provides power to the evaporator/heater motor only. An evaporator/heater blower speed switch is to be located on the driver's console to provide high and low speed air flow in the bus.

A/C stop light is located on the Intelligaire display panel. The red LED will activate anytime the controller monitoring system shuts the unit down because of a malfunction, out-of-limit condition or electrical failure. The controller monitors evaporator coil temperature and compressor discharge temperature. If either temperature approaches its limit, a yellow LED will light and the controller will cause the A/C system to take corrective action but will not shut the unit down unless the corrective action continues for a predetermined length of time.

The microprocessor-based controller provides diagnostics to monitor the A/C unit's critical operating parameters. The controller will activate a yellow LED on the driver display panel if an out-of-limit condition occurs. The code is automatically logged into the controller's memory and it will proceed to corrective action to the A/C system. If corrective action is not successful or the A/C unit does not return to normal operation within a specified period of time, the controller will shut down the A/C system and the red A/C stop LED will be activated on the driver's display unit. Logged alarm codes may be read and cleared from the diagnostic display panel located on the A/C unit.

Controller monitor function. When the air conditioning unit is on, the controller will continuously monitor temperatures of the bus return air, ambient air, refrigerant discharge gas and the evaporator coil. The controller verifies the operation of these sensors and will give an alarm if a sensor becomes non-operational. The controller also monitors refrigerant HPCO and LPCO pressure switches and measures critical temperature differentials of the A/C unit. If the A/C system's pressures or temperatures approach out-of-limit condition, the controller will take corrective action to protect A/C system components.

Controller diagnostic function. The diagnostic display allows the alarms to be read and cleared; however, cleared alarms remain in the controller memory and may be retrieved by maintenance personnel. The controller has an hour meter that records total A/C unit operating hours and compressor operating hours. An hour meter reading is logged whenever an alarm or shutdown occurs. The diagnostic function also provides a set up mode for pre-programming selected functions, tests for selected components and automatic sensor calibration.

The controller may be pre-programmed for interior temperature control range of 62° to 82° F. The air conditioning unit controller may be pre-programmed to operate in the COOL mode with clutch or reheat, HEAT mode, VENT mode and OFF. There is a unitized control panel consisting of reliable electromechanical relays, magnetic motor circuit breakers, bimetal control circuit breakers, and terminal board for ease of troubleshooting. The control panel is located in the evaporator/heater return air area and is not accessible to the driver or passengers.

The HVAC climate control system shall be capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.

With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within a range between 65 and 80 °F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10 to 95 °F and at any ambient relative humidity levels between 5 and 50 percent.

When the bus is operated in outside ambient temperatures of 95 to 115 °F, the interior temperature of the bus shall be permitted to rise 0.5° for each degree of exterior temperature in excess of 95 °F.

When bus is operated in outside ambient temperatures in the range of -10 to 10 °F, the interior temperature of the bus shall not fall below 55 °F while the bus is running on the design operating profile.

System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."

The recommended locations of temperature probes are only guidelines and may require slight modifications to address actual bus design. Care must be taken to avoid placement of sensing devices in the immediate path of an air duct outlet. In general, the locations are intended to accurately represent the interior passenger area.

Additional testing shall be performed as necessary to ensure compliance to performance requirements stated herein.

Capacity and Performance Requirements

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 to 90 °F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test, and the engine speed shall be limited to fast idle, which may be activated by a driver-controlled device. During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 in. from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," representing 4 p.m. on August 21, shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

The air conditioning system shall meet these performance requirements using R134a.

TS 53. Controls and Temperature Uniformity

The HVAC system excluding the driver's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. The system shall be compliant with J1939 Communication Protocol for receiving and broadcasting of data.

Hot engine coolant water shall be delivered to the HVAC system driver's defroster/heater and other heater cores by means of an auxiliary coolant pump, sized for the required flow, which is brushless and sealless having a minimum maintenance free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

The driver shall have full control over the defroster and driver's heater. The driver shall be able to adjust the temperature in the driver's area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and 6 to 72 in. above the floor, shall not vary by more than 5 °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than ± 5 °F from the front to the rear from the average temperature determined in accordance with APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System." Variations of greater than ± 5 °F will be allowed for limited, localized areas provided the majority of the measured temperatures fall within the specified requirement.

TS 54. Air Flow

TS 54.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic ft per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus, with air velocity not exceeding 100 ft per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

The air shall be composed of no less than 10 percent outside air.

TS 54.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J382, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 54.3 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- The heat/defrost system fan shall be controlled by a separate switch that has an "off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled, and shields shall be provided, if required. If the fans are approved by the Agency, an "on-off" switch shall be located to the right of or near the main defroster switch.
- A manually operated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, closed or open. The method of operating remote valves shall require the concurrence of the Agency project manager.

TS 54.4 Driver's Compartment Requirements

A heating and defroster system for the driver's area shall be provided and shall be controlled by the driver. The system shall meet the following requirements:

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver's side window, and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or the exterior through a control device and pass it through the heater core to the defroster system and over the driver's feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver's area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents or louvers shall be provided at the left of the driver's position to allow direction of air onto the side windows.

TS 54.5 Driver's Cooling

The Climate Control System shall be designed to maintain the driver's compartment temperatures within the range specified for the passenger compartment. The unit shall operate when the climate control switch is in the "Cool" position.

TS 55. Air Filtration

Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

Air filters shall be cleanable.

TS 56. Roof Ventilators

Two roof ventilators shall be provided in the roof of the bus, one approximately over or just forward of the front axle and the other approximately over the rear axle.

Each ventilator shall be easily opened and closed manually. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq in. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 in., or with all four edges raised simultaneously to a height of no less than 3½ in. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.

TS 57. Maintainability

Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor. Shut-off valves may be provided in lieu of self-sealing couplings. The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within 6 in. of floor level shall be constructed to resist damage and corrosion.

High and low refrigerant pressure analog gauges to be located in the return air area.

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 58. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 58.1 Materials

Body materials shall be selected and the body fabricated to reduce maintenance, extend durability and provide consistency of appearance throughout the service life of the bus. Detailing shall be kept simple, and add-on devices and trim shall be minimized and integrated into the basic design.

TS 59. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 in. of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.

Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 60. Repair and Replacement

TS 60.1 Side Body Panels

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.

Easily Replaceable Lower Side Body Panels

The lower section of the side body panels below the mid-rail shall be made of impact-resistant material and shall be easily and quickly replaceable.

TS 61. Rain Gutters

Rain gutters shall be provided to prevent water flowing from the roof onto the passenger doors and driver's side window. When the bus is decelerated, the gutters shall not drain onto the windshield, driver's side window or door boarding area. Cross-sections of the gutters shall be adequate for proper operation.

TS 62. License Plate Provisions

Provisions shall be made to mount standard-size U.S./Canada license plates per SAE J686 on the rear of the bus. These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes. The rear license plate provision shall be illuminated per SAE J587.

TS 63. Fender Skirts

Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.

TS 63.1 Splash Aprons

Splash apron behind both front wheels and rear wheels to reduce splashing is required.

TS 64. Service Compartments and Access Doors

TS 64.1 Access Doors

Conventional or pantograph hinged doors shall be used for the engine compartment. Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 64.2 Access Door Latch/Locks

Requirement for Latches on Access Doors

Access doors larger than 100 sq in. in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and fuel fill access doors. All such access doors that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16 in. square male tool to open or lock.

TS 65. Bumpers

TS 65.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 27 in., ± 2 in., above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

TS 65.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5 mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 in.

Integrated Design with Recessed Middle Portion

Bumper shall be an integrated design with the coach styling and be recessed in the middle portion to provide for mounting of a bike rack.

TS 65.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2 mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 ft wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 in. high, and at accelerations up to 2 mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs, at 4 mph parallel to or up to a 30-degree angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 in.

TS 65.4 Bumper Material

Bumper material shall be corrosion-resistant and withstand repeated impacts of the specified loads without sustaining damage. Visible surfaces shall be black. These bumper qualities shall be sustained throughout the service life of the bus.

TS 66. Finish and Color

TS 66.1 Appearance

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system Supplier prior to application of paint to assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be completely painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of visible dirt and the following other imperfections:

- blisters or bubbles appearing in the topcoat film
- chips, scratches, or gouges of the surface finish
- cracks in the paint film
- craters where paint failed to cover due to surface contamination
- overspray
- peeling
- runs or sags from excessive flow and failure to adhere uniformly to the surface
- chemical stains and water spots
- dry patch due to incorrect mixing of paint activators
- buffing swirls

All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals.

Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 ft-lbs. The

bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

Except for periodic cleaning, exterior surfaces of the bus shall be maintenance-free, permanently colored and not require refinish/repaint for the life of the vehicle. Paint scheme and colors will be consistent with other Agency buses.

TS 67. Decals, Numbering and Signing

Monograms, numbers and other special signing shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip- and peel-resistant. They may be painted signs, decals or pressure-sensitive appliques. All decals shall be installed per the decal Supplier recommendations. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part, Subpart B, 38.27.

The Offeror will supply and affix to the interior and exterior of the coach those decals regarding safety and operating procedures. Said decals will include, but not be limited to the following:

<u>DECAL</u>	<u>NUMBER</u>	<u>LOCATION</u>
a. No Smoking	2	Interior above the driver, Rear bulkhead
b. Watch Your Step	3	Front and rear stepwell
c. Fire Extinguisher	1	Front safety compartment.
d. Rear Door Oprtg Instructions	1	Above the rear exit door
e. No standing forwd Yellow Line	1	Above the driver
f. No eating or radio playing on bus	2	Above the driver Rear Bulkhead
g. Please reserve seats for E/H	2	Over forward seats
h. Please refrain from speaking to driver while bus in motion	1	Above the driver rear bulkhead
i. Bus Number		Exterior: (4") left side front above operator right side above front door rear center Interior: (4") front centered above windshield
j. Video surveillance	2	Interior above the driver, Rear bulkhead
k. Diesel fuel only	1	Inside fuel filler door
l. Emergency Exit Instructions	2	Decal – above inside of windows

- | | | | |
|----|--|---|--|
| m. | Emergency Exit | # | Metal Plate – riveted to window frame of each egress Window |
| n. | website:
www.cityofspartanburg.org/SPARTA | 2 | Near the top of the bus on both sides above the front entry door and above the driver's window |

TS 67.1 Passenger Information

ADA priority seating signs as required and defined by 49 CFR, Part 38.27 shall be provided to identify the seats designated for passengers with disabilities.

Requirements for a public information system in accordance with 49 CFR, Part 38.35 shall be provided.

TS 68. Exterior Lighting

Exterior lighting and reflectors shall comply, as applicable, with Part 393, Subpart B of the FMCSA and FMVSS 108.

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Commercially available LED-type lamps shall be utilized at all exterior lamp locations except headlights. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer. Front marker (clearance) lights along with lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts.

All LED lamps shall be standard installation of the OEM. The entire assembly shall be specifically coated to protect the light from chemical and abrasion degradation.

Size of LED lamps used for tail, brake and turn signal lamps shall be standard installation of OEM.

TS 68.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

TS 68.2 Doorway Lighting

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open.

TS 68.3 Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

TS 68.4 Headlights

Headlamps shall be designed for replacement without removing the headlamp bezel.

Headlamps shall incorporate a daytime running light feature.

Headlamps shall be LED low beam and halogen high beam.

TS 68.5 Brake Lights

Brake lights shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

TS 68.6 Service Area Lighting (Interior and Exterior)

LED lamps shall be provided in the engine and all other compartments where service may be required to generally illuminate the area for night emergency repairs or adjustments. These service areas shall include, but not be limited to, the engine compartment, the communication box, junction/apparatus panels and passenger door operator compartments. Lighting shall be adequate to light the space of the service areas to levels needed to complete typical emergency repairs and adjustments. The service area lamps shall be suitable for the environment in which they are mounted.

Engine compartment lamps shall be controlled by a switch mounted near the rear start controls. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies. Power to the service area lighting shall be programmable. Power shall latch on with activation of the switch and shall be automatically discontinued (timed out) after 30 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the on position after repairs are made.

INTERIOR PANELS AND FINISHES

TS 69. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability and tactile qualities. Materials shall be strong enough to resist everyday abuse and be vandalism and corrosion resistant. Trim and attachment details shall be kept simple and unobtrusive. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 in. below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the coach is parked on a level surface. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

TS 70. Interior Panels

Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

Interior panel required to meet FMVSS 302.

TS 70.1 Driver Area Barrier

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to

prevent passenger from reaching the driver by standing behind the driver's seat. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough in conjunction with entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. Dark or black panels are preferred behind the driver's head. The panel should be isolated for noise control and attached with rubber grommets.

Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

The bus shall also have a driver enclosure with door. The color shall match the interior of the bus.

TS 70.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to 1 and 1½ in. above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways shall provide no less than a 2½ in. clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passengers assist are not provided by other means.

The modesty panel and its mounting shall withstand a static force of 250 lbs applied to a 4 × 4 in. area in the center of the panel without permanent visible deformation.

TS 70.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material. Composite dash panels shall be reinforced as necessary, vandal-resistant and replaceable. All colored, painted and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of equipment.

TS 70.4 Rear Bulkhead

The rear bulkhead and rear interior surfaces shall be material suitable for exterior skin; painted and finished to exterior quality; or paneled with melamine-type material, composite, scratch-resistant plastic or carpeting and trimmed with stainless steel, aluminum or composite.

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this

area shall be louvered to reduce airflow noise and to reduce the probability of trash or litter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy-duty and designed to minimize damage and limit unauthorized access.

TS 70.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable material. Headlining shall be supported to prevent buckling, drumming or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment that is mounted above the ceiling shall be on hinges for ease of service but retained to prevent inadvertent opening.

TS 70.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper-resistant.

TS 70.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. Any insulation material used inside the engine compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.

The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

FMVSS 302

Insulation shall meet the requirements of FMVSS 302.

TS 70.8 Floor Covering

The floor covering shall be Altro non-skid flooring that remains effective in all weather conditions and complies with all ADA requirements. The floor covering, as well as transitions of flooring material to the main floor and to the entry and exit areas, shall be smooth and present no tripping hazards. The standee line shall be at least two inches wide and shall extend across the bus aisle. This line shall be the same color as the outboard edge of the entrance/exit areas. The color and pattern shall be consistent throughout the floor covering.

TS 70.9 Interior Lighting

The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct. All interior lights shall be LED.

The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively “mask” the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.

TS 70.10 Passenger

All interior lighting shall be turned off whenever the transmission selector is in reverse and the engine run switch is in the “on” position.

When the master switch is in the “run” or “night/run” mode, the first light module on each side of the coach shall automatically extinguish or dim when the front door is in the closed position and illuminate when the door is opened. This shall be accomplished through the use of a ballast specifically designed for this type application.

TS 70.11 Driver Area

The driver’s area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a level of 5 to 10 foot-candles.

TS 70.12 Seating Areas

The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 sq ft plane at an angle of 45 degrees from horizontal, centered 33 in. above the floor and 24 in. in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles.

TS 70.13 Vestibules/Doors

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of 4 foot-candles with the front doors open and a minimum of 2 foot-candles with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the “lights” positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 70.14 Ramp Lighting

Exterior and interior ramp lighting shall comply with CFR Part 49, Sections 19.29 and 19.31.

TS 71. Fare Collection

Space and structural provisions shall be made for installation of currently available fare collection devices and shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The fare box shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not — either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route destination signs — restrict the driver’s field of view per SAE Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The fare box location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the fare box shall be readable on a daily basis. The floor under the fare box shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the fare box.

As an option the Agency requests a GFI Odyssey Farbox to be added to the pricing schedule.

TS 72. Interior Access Panels and Doors

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way. Panels shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

Access doors shall be secured with hand screws or latches. All fasteners that retain access panels shall be captive in the cover.

TS 72.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the Agency to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

PASSENGER ACCOMMODATIONS

TS 73. Passenger Seating

TS 73.1 Arrangements and Seat Style

Passenger Seating

The Agency desires American Seating Metropolitan Transit Seat Style or approved equal. The exact colors shall be chosen from the manufacturer's standard color selections.

Arrangements and Seat Style

Passenger seats shall be arranged in a transverse, forward facing configuration, except at the wheel housings where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms.

Passenger seating capacity with this arrangement shall be no less than 34 passengers not including the operator, with the specified seating arrangement. The passenger seats shall be equipped with vandal-resistant non-padded inserts throughout the bus. All applicable seat dimensions specified below shall be measured.

Hip-to-knee room measured from the front of one seat back horizontally across the highest part of the seat to the seat or panel immediately in front, shall be no less than 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 26 inches. Foot room, measured from the floor forward from a point vertically below the front of the seat, shall be no less than 14 inches. Seats immediately behind the wheel housings and modesty panels may have foot room reduced, provided the wheelhouse is shaped so that it may be used as a footrest or the design of the modesty panel effective allows for foot room.

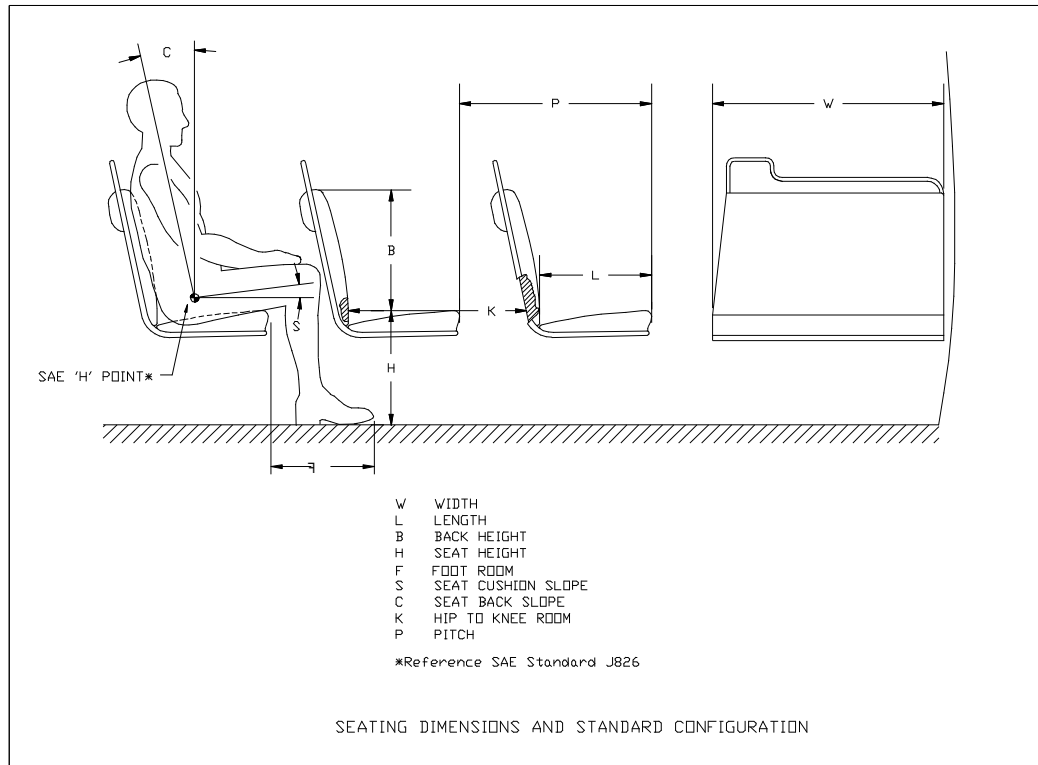
Thickness of the transverse seat backs shall be minimized at the bottom to increase passenger knee room and passenger capacity. The area between the longitudinal seat backs and the attachment to the bus sidewalls shall be designed to prevent debris accumulation. The aisle between the seats shall be no less than 22 inches wide

at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 inches at standing passenger hip height. Raised platforms for passenger seats shall not be allowed without the Agency approval. Each bidder shall submit a copy of the proposed seat layout consistent with these specifications showing hip-to-knee and foot room dimensions, stanchion layout and wheelchair maneuverability prior to bid for the Agency review and approval. Bidders shall also indicate on this layout, the free floor space available to standees.

Dimensions

Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to the figure above):

- The width, W, of the seat shall be 35"
- The length, L, shall be 17" \pm 1"
- The seat back height, B, shall be a minimum of 15"
- The seat height, H, shall be 17" \pm 1". For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under-floor components, a cushion height of up to 18" \pm 2" will be allowed. This shall also be allowed for limited transverses seats, but only with the prior approval of the Agency.
- The foot room, F, shall be not less than 14 inches when measured from a point vertically below the front of the seat cushion except as noted above.
- The seat cushion slope, S, shall be between 5° and 11°
- The seat back slope shall be between 8° and 17°
- The hip-to-knee room, K, shall be not less than 26 inches at all seat positions except as noted above
- The pitch, P, is shown as reference only



Structure and Design

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized to increase wheelchair maneuvering room and is completely free of obstructions to facilitate cleaning.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 inches of the aisle shall be at least 10 inches above the floor. Folding seats used in wheelchair securement areas, as well as transverse seats mounted in locations at which cantilevered installation is precluded by design and/or structure, need not be cantilevered. Non-cantilevered seats must be identified in the Seating Chart.

The underside of the seat and the sidewall shall be configured to prevent debris accumulation; and the transition from the seat underside to the bus sidewall to the floor cove radius shall be smooth. All transverse objects, including seat backs, modesty panels, and longitudinal seats, in front of forward facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from 1 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at $.05 \pm .015$ seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the back during this 10g deceleration shall not exceed 2 inches, measured at the aisle side of the seat frame at height H. Seat backs shall not deflect more than 14", measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat cushion in each seating position with less than ¼ inch permanent deformation in the seat or its mountings. The seat as-

sembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than ¼ inch permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36 inch pendulum and shall strike the seatback 10,000 times each from distances of 6, 8, 10 and 12 inches. Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10 and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3 ½ inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than 7/8 inch in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handholds shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4 inches long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th percentile male passenger. The handhold shall also be useable by 5th percentile females, as well as larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seatback handhold immediately forward of transverse seats shall be padded and/or constructed of energy-absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female to a 95th percentile male. The seat back handhold may be deleted from seats that do not have another transverse seat directly behind. Armrests shall not be included in the design of transverse seats.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 1 ½ to 3 ½ inches of the end of the seat.

Seat back handholds shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than ¼ inch permanent deformation. Seat back handholds shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than ¼ inch permanent deformation and without visible deterioration.

At the Agency request, a test report shall be provided by the Contractor, fully documenting the compliance with all requirements defined above. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformations of the seat assembly. The report shall include a statement of compliance with the requirements of this section of the Technical Specifications.

Construction and Materials

Seats shall be constructed with materials that comply with the physical test. Selected materials shall minimize damage from vandalism and reduce cleaning time. The seats shall be attached to the frame with tamperproof fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be aluminum or stainless steel. The seat and pads shall be contoured for individuality, lateral support, and maximum comfort, and shall fit the framework to reduce exposed edges.

Seating and interior trim shall have features to improve passenger comfort. Seats and pads shall be securely attached and shall be detachable by means of a simple release mechanism. To the extent practicable, seat pads

shall be interchangeable throughout the bus. Materials shall have a high resistance to tearing, flexing and wetting.

The minimum radius of any part of the seat back, handhold, or modesty panel in the head or chest impact zone shall be a nominal ¼ inch. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas in accordance with the Knee Impact and Head Impact. Complete seat assemblies shall be interchangeable to the extent practicable.

TS 74. Passenger Assists

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of seat back assist or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and the other without losing support. All handholds and stanchions at front doorway and at interior steps for bi-level designs shall be powder-coated in a high-contrast yellow color. The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be:

Powder-coated yellow.

TS 74.1 Assists

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ in. or shall provide an equivalent gripping surface with no corner radii less than ¼ in. All passenger assists shall permit a full hand grip with no less than 1½ in. of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings. Assists shall withstand a force of 300 lbs applied over a 12-in. lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

TS 74.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA-compliant assists. Assists shall be as far outward as practicable, but shall be located no farther inboard than 6 in. from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.

TS 74.3 Vestibule

The aisle side of the driver's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend

to within 36 in. of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. The assist shall be no less than 36 in. above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel.

TS 74.4 Rear Doorway(s)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1½ in. or providing an equivalent gripping surface with no corner radii less than ¼ in., and shall provide at least 1½ in. of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 in. from the outside edge of the rear doorway step.

TS 74.5 Overhead

Except forward of the standee line and at the rear door, a continuous, full grip, overhead assist shall be provided. This assist shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 in. above the floor.

TS 74.6 Longitudinal Seat Assists

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 in. apart or functionally continuous for a 5th percentile female passenger.

TS 74.7 Wheel Housing Barriers/Assists

Unless passenger seating is provided on top of wheel housing, passenger assists shall be mounted around the exposed sides of the wheel housings (and propulsion compartments if applicable), which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housing.

TS 75. Passenger Doors

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TABLE 7
Door Locations and Styles

Front Door	
Location	Slide Glide
Forward of the front wheels and under direct observation of the driver.	
Rear Doors(s)	
Location	Slide Guide
Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.	

The doors shall be air-powered and shall operate per specification at air pressures between 90 and 130 psi. There will be a switch to release air pressure on the door to the inside of the vehicle and to the right of the interior of the doors.

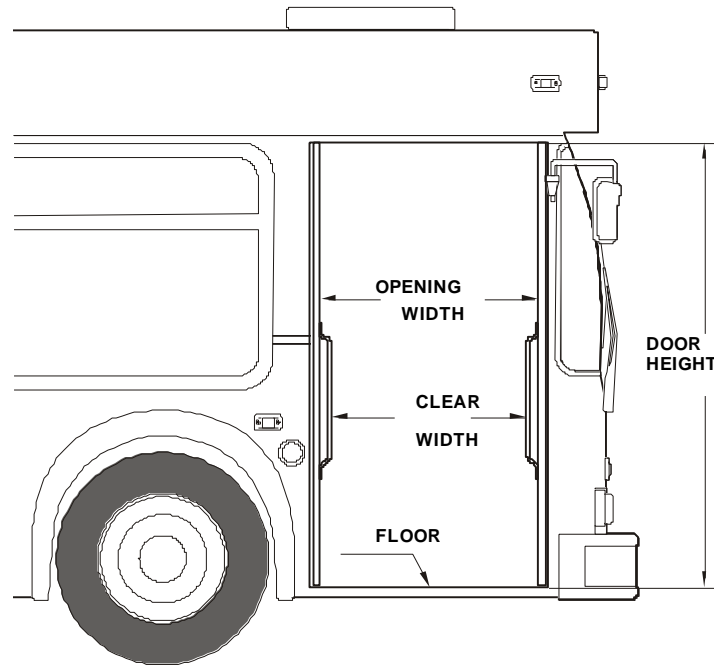
Materials and Construction

Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be corrosion-resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture, noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

The closing edge of each door panel shall have no less than 2 in. of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least 4 in. apart. The combined weather seal and window glazing elements of the front door shall not exceed 10 degrees of binocular obstruction of the driver's view through the closed door.

TS 75.1 Dimensions

FIGURE 8
Transit Bus Minimum Door Opening



When open, the doors shall leave an opening no less than 75.3 in. in height.

Front door clear width shall be a minimum of 31¾ in. with the doors fully opened.

Rear door opening clear width shall be a minimum of 24 in. with the doors fully opened.

TS 75.2 Door Glazing

The both front and rear doors shall be full length one piece window and shall be constructed with rubber zip-type glazing.

The both door panel glazing material shall have a nominal ¼ in. thick laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

TS 75.3 Door Projection

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 13 in. during the opening or closing cycles or when doors are fully opened

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

TS 75.4 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an 8-in.-high curb on a street sloping toward the curb so that the street side wheels are 5 in. higher than the right side wheels.

TS 75.5 Closing Force

Closing door edge speed shall not exceed 12 in. per second, and opening door speed shall not exceed 19 in. per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Power-close rear doors shall be equipped with an obstruction sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-lb force on 1 sq in. of that obstruction.

Whether or not the obstruction sensing system is present or functional, it shall be possible to withdraw a 1½ in. diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 lbs.

TS 75.6 Actuators

Doors shall open or close completely in not more than 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable. If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in the air system and to muffle sound.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear door actuator(s) shall be under the complete control of the vehicle operator and shall open and close in response to the position of the driver's door control.

A switch located within reach of the seated operator shall, when actuated, restore rear door function to complete operator control, as described in the "Default."

Doors that employ a "swing" or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the driver's door control is moved to an "Exit Door Enable" position and the vehicle is moving at a speed of less than 2 mph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 lbs to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, actuators or complex mechanism.

TS 75.7 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 lbs after actuating an unlocking device. The unlocking device shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the doorway area. The unlocking device shall be easily reset by the operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "Emergency Exits" shall meet the requirements of FMVSS 217.

TS 75.8 Door Control

The door control shall be located in the operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile feedback to indicate commanded door position and resist inadvertent door actuation.

Door control will be located on street side.

TS 75.9 Door Controller

Doors shall be operated by push-button controls, conveniently located and operable within the driver's reach. The push buttons shall be labeled. There shall be a separate set of push button controls for the front and rear door(s), as needed.

TS 75.10 Door Open/Close

Operation of, and power to, the passenger doors shall be completely controlled by the operator.

A control or valve in the operator's compartment shall shut off the power to, and/or dump the power from, the front door mechanism to permit manual operation of the front door with the bus shut down. A master door switch, which is not within reach of the seated operator, when set in the "off" position shall close the rear/center doors, deactivate the door control system, release the interlocks, and permit only manual operation of the rear/center doors.

TS 76. Accessibility Provisions

Space and body structural provisions shall be provided at the front door of the bus to accommodate a wheelchair loading system.

TS 76.1 Loading Systems

The loading system shall be a Lift u LU-18 ramp.

An automatically-controlled, power-operated ramp system compliant to requirements defined in 49 CFR, Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely and comfortably, both forward and rearward directions, for a passenger in a wheelchair from a level street or curb. The wheelchair loading system shall be located at the front door. The ramp shall be of a simple hinged, flip-out type design.

When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be presented and any resulting gaps shall be minimized. The controls shall be simple to operate with no com-

plex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the driver. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The wheelchair loading system shall not present a hazard, nor inconvenience any passenger. The loading system shall be inhibited from folding when a passenger is on the ramp/platform. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The platform shall be designed so protect the ramp from damage and persons on the sidewalk from injury during extension/retraction or raising/lowering phases of operation. The loading platform shall be covered with a replaceable or renewable, non-skid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading. Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 pounds of force. The ramp assembly components shall be replaceable within 30 minutes by a mechanic.

TS 76.2 Wheelchair Accommodations

Two locations, longitudinal A.D.A. fold up seats, as close to the wheelchair loading system as practical, shall provide parking space and securement system compliant with A.D.A. requirements for a passenger in a wheelchair. These locations shall be on the street side of the bus.

Additional equipment, including passenger restraint seat belts, shoulder harnesses and wheelchair securement devices shall be provided for each wheelchair passenger. The securement tie down system shall be the American Seating Advanced Restraint Module or approved equal.

TS 76.3 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 20 in. shall be maintained. As a guide, no width dimension should be less than 34 in. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180-degree turns are expected, space should be clear in a full 60-in.-diameter circle. A vertical clearance of 12 in. above the floor surface should be provided on the outside of turning areas for wheelchair footrest.

SIGNAGE AND COMMUNICATION

TS 77. Destination Signs

A TwinVision, 100% amber L.E.D. display, electronic destination sign, or approved equal, shall be provided and mounted in the upper windshield area and the first curbside window. The control console is mounted overhead in easy reach of the driver.

The front destination sign shall be accessible from the back and bottom of the sign box to facilitate cleaning of the sign and the sign window. A piano hinge shall be incorporated in the bottom panel and back door panels of the sign box to accomplish this task.

One set of programming software and USB flash unit are to be supplied for the contract.

The destination sign shall be integrated with a talking bus feature.

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself.
- Access shall be provided to allow cleaning of inside compartment window and unit glazing.
- Front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide.

The destination sign shall be twin vision and be integrated with a talking bus feature.

TS 78. Passenger Information and Advertising

TS 78.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

Advertising media 11 in. high and 0.09 in. thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.

TS 78.2 Exterior Displays

Provisions shall be made to integrate advertising into the exterior design of the bus. Advertising media, frames or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, vehicle fittings, or in any other manner restrict the operation or serviceability of the bus. Manufacturer will provide pricing as an option for advertising panels.

TS 79. Passenger Stop Request/Exit Signal

Pull Cord Passenger Signal

A passenger "stop requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37 shall be provided. The system shall consist of a heavy-duty pull cable, chime and interior sign message. The pull cable shall be located the full length of the bus on the sidewalls at the level where the transom is located. If no transom window is required, the height of the pull cable shall approximate this transom level and shall be no greater than 63 in. as measured from the floor surface. It shall be easily accessible to all passengers, seated or standing. Pull cable(s) shall activate one or more solid state or magnetic proximity switches. At each wheelchair passenger position and at priority seating positions, additional provisions shall be included to allow a passenger in a mobility aid to easily activate the "stop requested" signal.

An auxiliary passenger "stop requested" signal shall be installed at the rear door to provide passengers standing in the rear door/exit area convenient means of activating the signal system. The signal shall be a heavy-duty push button type located in the rear door vicinity. Button shall be clearly identified as "passenger signal."

A single "stop requested" chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

Exit signals located in the wheelchair passenger area shall be no higher than 4 feet above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.

Passenger signal system shall be arranged with push button switches accessible by each seated passenger and on stanchions and at rear door locations for standees.

TS 80. Communications

TS 80.1 Camera Surveillance System

As an option price a Seon video surveillance system TX 8. Camera placement is to be consistent with what the Agency already has in place.

TS 80.2 Public Address System

The bus is to integrate a Digital Recorders DR700 Talking Bus® stop announcement system or approved equal shall be installed on each vehicle. The system shall meet or exceed all ADA requirements found in 49CFR Parts 37.167 and 38.35 and shall provide different, simultaneous audio announcements to riders on-board and waiting curbside. The system shall also provide a control capability for integrating present and future electronics on the bus. In order to maximize the system's useful life and to ensure ease of integration with third party electronics on transit vehicles, the system shall provide a robust, open software and hardware architecture. The system shall comply with SAE J1708 vehicle communications protocol. The system shall have the capability of hardware and software extension to include new or additional features. The system shall also incorporate ease of programming and updates of all operating information.

The DR700 Talking Bus, or approved equal, stop announcement system shall be capable of providing a single log-on for other in-vehicle electronics systems (e.g.; destination/ header signs systems, fare collection systems, 2-way radio systems, etc.). The operating protocol to accomplish system integration shall be SAE J1708 or DRSIP. The system shall include an easy-to-use means of specifying whether log-on and/or passwords are required, and what vehicle operator ID's and passwords are acceptable for each sub-system.

The system shall allow the operator to select the route and shall display the route and the next stop to be announced on the operator control unit. The operator shall have the ability to scroll forward or backward within the selected route's list of announcements. Internal announcements are intended for on-board riders and shall play in response to signals received by an on-board Automatic Message Trigger (AMT) which includes a Global Positioning System (GPS) receiver. External announcements shall play automatically when the door is opened for a stop.

The system shall also provide the ability to define and play up to 99 special announcements and 200 announcements which play at pre-defined times of day, depending upon the amount of memory available. The system shall provide the ability to play external announcements on a repeating "loop" at regular time intervals until canceled by the operator.

The system shall provide an easy-to-use means of updating the programmed database in the in-vehicle stop announcement system's vehicle logic unit.

The DR700, or approved equal, stop announcement system shall have dual channel audio capable of playing simultaneous internal and external announcements. Vendor shall provide all database programming and route mapping services necessary for the system to be fully functional.

The system shall include a noise-sensing device, an Automatic Gain Control (AGC) Microphone, for each audio channel and shall automatically and independently adjust each channel's audio volume as appropriate in response to ambient noise detected. Volume adjustment shall be made independently on each audio channel.

TS 80.2.1 Speakers

Eight (8) interior loudspeakers shall be provided, semi-flush mounted, on alternate sides of the bus passenger compartment, installed with proper phasing. Total impedance seen at the input connecting end shall be 8 Ohms. Mounting shall be accomplished with riv-nuts and machine screws.

The speaker cable shall terminate at the instrument panel area on the curb side with a minimum of 3 feet of extra speaker cable. An end connector shall be supplied so a lead can be connected from the radio control head in order to make announcements directly from the transit control center to passengers through the PA system.

TS 80.2.2 Bike Rack

The bus will be equipped with a Sportworks brand bike rack or approved equal. The bike rack shall be capable of accommodating two bicycles at one time.

TS 80.2.3 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view and shall integrate with the destination sign to flash “emergency call police” on the destination sign. This emergency sign will only be seen from the outside of the bus and not show on the driver’s control unit for the destination sign.

SECTION 7: WARRANTY REQUIREMENTS

WR 1. Basic Provisions

WR 1.1 Warranty Requirements

WR 1.1.1 Contractor Warranty

Warranties in this document are in addition to any statutory remedies or warranties imposed on the Contractor. Consistent with this requirement, the Contractor warrants and guarantees to the original Agency each complete bus and specific subsystems and components as follows. Performance requirements based on design criteria shall not be deemed a warranty item.

WR 1.1.2 Complete Bus

The complete bus, propulsion system, components, major subsystems and body and chassis structure are warranted to be free from Defects and Related Defects for two years or 100,000 miles, whichever comes first, beginning on the date of revenue service but not longer than 15 days after acceptance under “Inspection, Testing and Acceptance.” The warranty is based on regular operation of the bus under the operating conditions prevailing in the Agency’s locale.

WR 1.1.3 Body and Chassis Structure

Body, body structure, structural elements of the suspension and engine cradle are warranted to be free from Defects and Related Defects for three years or 150,000 miles, whichever comes first.

Primary load-carrying members of the bus structure, including structural elements of the suspension, are warranted against corrosion failure and/or Fatigue Failure sufficient to cause a Class 1 or Class 2 Failure for a period of 12 years or 500,000 miles, whichever comes first.

WR 1.1.4 Propulsion System

Propulsion system components, specifically the engine, transmission or drive motors, generator, drive and non-drive axles shall be warranted to be free from Defects and Related Defects for the standard two years or 100,000 miles, whichever comes first. An Extended Warranty to a maximum of five years or 300,000 miles, whichever comes first, may be purchased at an additional cost. The propulsion system manufacturer’s standard warranty, delineating items excluded from the Extended Warranty, submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Bid Deviation.

WR 1.1.5 Emission Control System (ECS)

The Contractor warrants the emission control system for five years or 100,000 miles, whichever comes first. The ECS shall include, but is not limited to, the following components:

- complete exhaust system, including catalytic converter (if required)
- after-treatment device
- components identified as emission control devices

WR 1.1.6 Subsystems

Other subsystems shall be warranted to be free from Defects and Related Defects for two years or 100,000 miles, whichever comes first. Other subsystems are listed below:

- **Brake system:** Foundation brake components, including advancing mechanisms, as supplied with the axles, excluding friction surfaces.
- **Destination signs:** All destination sign equipment for the front, side and rear signs, power modules and operator control.
- **Heating, ventilating:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **AC unit and compressor:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **Door systems:** Door operating actuators and linkages.
- **Air compressor**
- **Air dryer**
- **Wheelchair lift and ramp system:** Lift and/or ramp parts and mechanical only
- **Starter**
- **Alternator:** Alternator only. Does not include the drive system.
- **Charge air cooler:** Charge air cooler including core, tanks and including related surrounding framework and fittings.
- **Hydraulic systems:** Including radiator fan drive and power steering as applicable.
- **Engine cooling systems:** Radiator including core, tanks and related framework, including surge tank.
- **Transmission cooler**
- **Passenger seating excluding upholstery**
- **Fuel storage and delivery system**
- **Surveillance system including cameras and video recorders**

WR 1.1.7 Serial Numbers

Upon delivery of each bus, the Contractor shall provide a complete electronic list of serialized units installed on each bus to facilitate warranty tracking. The list shall include, but is not limited to:

- engine
- transmission
- alternator
- starter
- A/C compressor and condenser/evaporator unit
- drive axle
- power steering unit
- fuel cylinders (if applicable)
- air compressor
- wheelchair ramp (if applicable)

The Contractor shall provide updated serial numbers resulting from warranty campaigns. The format of the list shall be approved by the Agency prior to delivery of the first production bus.

WR 1.1.8 Extension of Warranty

If, during the warranty period, repairs or modifications on any bus are made necessary by defective design, materials or workmanship but are not completed due to lack of material or inability to provide the proper

repair for thirty (30) calendar days, the applicable warranty period shall be extended by the number of days equal to the delay period.

WR 1.2 Voiding of Warranty

The warranty shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident or repairs not conducted in accordance with the Contractor-provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty also shall be void if the Agency fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and if that omission caused the part or component failure. The Agency shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

WR 1.3 Exceptions and Additions to Warranty

The warranty shall not apply to the following items:

- scheduled maintenance items
- normal wear-out items
- items furnished by the Agency

Should the Agency require the use of a specific product and has rejected the Contractor's request for an alternate product, then the standard Supplier warranty for that product shall be the only warranty provided to the Agency. This product will not be eligible under "Fleet Defects," below.

The Contractor shall not be required to provide warranty information for any warranty that is less than or equal to the warranty periods listed.

WR 1.3.1 Pass-Through Warranty

Should the Contractor elect to not administer warranty claims on certain components and wish to transfer this responsibility to the sub-Suppliers, or to others, the Contractor shall request this waiver.

Contractor shall state in writing that the Agency's warranty reimbursements will not be impacted. The Contractor also shall state in writing any exceptions and reimbursement including all costs incurred in transport of vehicles and/or components. At any time during the warranty period, the Contractor may request approval from the Agency to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by the Agency. Otherwise, the Contractor shall be solely responsible for the administration of the warranty as specified. Warranty administration by others does not eliminate the warranty liability and responsibility of the Contractor.

WR 1.3.2 Superior Warranty

The Contractor shall pass on to the Agency any warranty offered by a component Supplier that is superior to that required herein. The Contractor shall provide a list to the Agency noting the conditions and limitations of the Superior Warranty not later than the start of production. The Superior Warranty shall not be administered by the Contractor.

WR 1.4 Fleet Defects

WR 1.4.1 Occurrence and Remedy

A Fleet Defect is defined as cumulative failures of twenty-five (25) percent of the same components in the same or similar application in a minimum fleet size of twelve (12) or more buses where such items are covered by warranty. A Fleet Defect shall apply only to the base warranty period in sections entitled “Complete Bus,” “Propulsion System” and “Major Subsystems.” When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected.

For the purpose of Fleet Defects, each option order shall be treated as a separate bus fleet. In addition, should there be a change in a major component within either the base order or an option order, the buses containing the new major component shall become a separate bus fleet for the purposes of Fleet Defects.

The Contractor shall correct a Fleet Defect under the warranty provisions defined in “Repair Procedures.” After correcting the Defect, the Agency and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all of the buses in the fleet via a mutually agreed-to arrangement. The Contractor shall update, as necessary, technical support information (parts, service and operator’s manuals) due to changes resulting from warranty repairs. The Agency may immediately declare a Defect in design resulting in a safety hazard to be a Fleet Defect. The Contractor shall be responsible to furnish, install and replace all defective units.

WR 1.4.2 Exceptions to Fleet Defect Provisions

The Fleet Defect warranty provisions shall not apply to Agency-supplied items, such as radios, fare collection equipment, communication systems and tires. In addition, Fleet Defects shall not apply to interior and exterior finishes, hoses, fittings and fabric.

WR 2. Repair Procedures

WR 2.1 Repair Performance

The Contractor is responsible for all warranty-covered repair Work. To the extent practicable, the Agency will allow the Contractor or its designated representative to perform such Work. At its discretion, the Agency may perform such Work if it determines it needs to do so based on transit service or other requirements. Such Work shall be reimbursed by the Contractor.

WR 2.2 Repairs by the Contractor

If the Agency detects a Defect within the warranty periods defined in this section, it shall, within thirty (30) days, notify the Contractor’s designated representative. The Contractor or its designated representative shall, if requested, begin Work on warranty-covered repairs within five calendar days after receiving notification of a Defect from the Agency. The Agency shall make the bus available to complete repairs timely with the Contractor’s repair schedule.

The Contractor shall provide at its own expense all spare parts, tools and space required to complete repairs. At the Agency’s option, the Contractor may be required to remove the bus from the Agency’s property while

repairs are being affected. If the bus is removed from the Agency's property, repair procedures must be diligently pursued by the Contractor's representative.

WR 2.3 Repairs by the Agency

WR 2.3.1 Parts Used

If the Agency performs the warranty-covered repairs, it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, the Agency may use Contractor-specified parts available from its own stock if deemed in its best interests.

WR 2.3.2 Contractor-Supplied Parts

The Agency may require that the Contractor supply parts for warranty-covered repairs being performed by the Agency. Those parts may be remanufactured but shall have the same form, fit and function, and warranty. The parts shall be shipped prepaid to the Agency from any source selected by the Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to an Agency handling charge.

WR 2.3.3 Defective Component Return

The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The freight costs for this action shall be paid by the Contractor. Materials should be returned in accordance with the procedures outlined in "Warranty Processing Procedures."

WR 2.3.4 Failure Analysis

The Contractor shall, upon specific request of the Agency, provide a failure analysis of Fleet Defect or safety-related parts, or major components, removed from buses under the terms of the warranty that could affect fleet operation. Such reports shall be delivered within 60 days of the receipt of failed parts.

WR 2.3.5 Reimbursement for Labor and Other Related Costs

The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at a straight time wage rate of \$46.00 per hour, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing the bus if such action was necessary and if the bus was in the normal service area. These wage and fringe benefit rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.

WR 2.3.6 Reimbursement for Parts

The Agency shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price at the time of repair and shall include taxes where applicable, plus fifteen (15) percent handling costs. Handling costs shall not be paid if part is supplied by Contractor and shipped to Agency.

WR 2.3.7 Reimbursement Requirements

The Contractor shall respond to the warranty claim with an accept/reject decision including necessary failure analysis no later than sixty (60) days after the Agency submits the claim and defective part(s), when requested. Reimbursement for all accepted claims shall occur no later than sixty (60) days from the date of acceptance of a valid claim. The Agency may dispute rejected claims or claims for which the Contractor did not reimburse the full amount. The parties agree to review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. The parties also

agree to review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

WR 2.4 Warranty after Replacement/Repairs

If any component, unit or subsystem is repaired, rebuilt or replaced by the Contractor or by the Agency with the concurrence of the Contractor, the component, unit or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if the Contractor-provided or authorized parts are not used for the repair, unless the Contractor has failed to respond within five days, in accordance with “Repairs by the Contractor.”

If an item is declared to be a Fleet Defect, the warranty stops with the declaration of the Fleet Defect. Once the Fleet Defect is corrected, the item(s) shall have three (3) months or remaining time and/or miles of the original warranty, whichever is greater. This remaining warranty period shall begin on the repair/replacement date for corrected items on each bus if the repairs are completed by the Contractor or on the date the Contractor provides all parts to the Agency.

WR 2.4.1 Warranty Processing Procedures

The following list represents requirements by the Contractor to the Agency for processing warranty claims. One failure per bus per claim is allowed.

- bus number and VIN
- total vehicle life mileage at time of repair
- date of failure/repair
- acceptance/in-service date
- Contractor part number and description
- component serial number
- description of failure
- all costs associated with each failure/repair (invoices may be required for third-party costs):
 - towing
 - road calls
 - labor
 - materials
 - parts
 - handling
 - troubleshooting time

WR 2.5 Forms

The Agency’s forms will be accepted by the Contractor if all of the above information is included. Electronic submittal may be used if available between the Contractor and Agency.

WR 2.6 Return of Parts

When returning defective parts to the Contractor, the Agency shall tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

WR 2.7 Timeframe

Each claim must be submitted no more than thirty (30) days from the date of failure and/or repair, whichever is later. All defective parts must be returned to the Contractor, when requested, no more than forty-five (45) days from date of repair.

WR 2.8 Reimbursements

Reimbursements are to be transmitted to the following address:

Transit Management of Spartanburg
P.O. Box 1607
Spartanburg, SC 29304

SECTION 8: QUALITY ASSURANCE

QA 1. Contractor's In-Plant Quality Assurance Requirements

QA 1.1 Quality Assurance Organization

QA 1.1.1 Organization Establishment

The Contractor shall establish and maintain an effective in-plant quality assurance organization. It shall be a specifically defined organization and should be directly responsible to the Contractor's top management.

QA 1.1.2 Control

The quality assurance organization shall exercise quality control over all phases of production, from initiation of design through manufacture and preparation for delivery. The organization shall also control the quality of supplied articles.

QA 1.1.3 Authority and Responsibility

The quality assurance organization shall have the authority and responsibility for reliability, quality control, inspection planning, establishment of the quality control system, and acceptance/rejection of materials and manufactured articles in the production of the transit buses.

QA 1.2 Quality Assurance Organization Functions

QA 1.2.1 Minimum Functions

The quality assurance organization shall include the following minimum functions:

- **Work instructions:** The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements.
- **Records maintenance:** The quality assurance organization shall maintain and use records and data essential to the effective operation of its program. These records and data shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.
- **Corrective action:** The quality assurance organization shall detect and promptly ensure correction of any conditions that may result in the production of defective transit buses. These conditions may occur in designs, purchases, manufacture, tests or operations that culminate in defective supplies, services, facilities, technical data or standards.

QA 1.2.2 Basic Standards and Facilities

The following standards and facilities shall be basic in the quality assurance process:

- **Configuration control:** The Contractor shall maintain drawings, assembly procedures, and other documentation that completely describe a qualified bus that meets all of the options and special requirements of this procurement. The quality assurance organization shall verify that each transit bus is manufactured in accordance with these controlled drawings, procedures, and documentation.
- **Measuring and testing facilities:** The Contractor shall provide and maintain the necessary gauges and other measuring and testing devices for use by the quality assurance organization to verify that the buses conform to all specification requirements. These devices shall be calibrated at established

periods against certified measurement standards that have known, valid relationships to national standards.

- **Production tooling as media of inspection:** When production jigs, fixtures, tooling masters, templates, patterns, and other devices are used as media of inspection, they shall be proved for accuracy at formally established intervals and adjusted, replaced, or repaired as required to maintain quality.
- **Equipment use by resident inspectors:** The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

QA 1.2.3 Maintenance of Control

The Contractor shall maintain quality control of purchases:

- **Supplier control:** The Contractor shall require that each Supplier maintains a quality control program for the services and supplies that it provides. The Contractor's quality assurance organization shall inspect and test materials provided by Suppliers for conformance to specification requirements. Materials that have been inspected, tested, and approved shall be identified as acceptable to the point of use in the manufacturing or assembly processes. Controls shall be established to prevent inadvertent use of nonconforming materials.
- **Purchasing data:** The Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.

QA 1.2.4 Manufacturing Control

- **Controlled conditions:** The Contractor shall ensure that all basic production operations, as well as all other processing and fabricating, are performed under controlled conditions. Establishment of these controlled conditions shall be based on the documented Work instructions, adequate production equipment and special working environments if necessary.
- **Completed items:** A system for final inspection and test of completed transit buses shall be provided by the quality assurance organization. It shall measure the overall quality of each completed bus.
- **Nonconforming materials:** The quality assurance organization shall monitor the Contractor's system for controlling nonconforming materials. The system shall include procedures for identification, segregation and disposition.
- **Statistical techniques:** Statistical analysis, tests and other quality control procedures may be used when appropriate in the quality assurance processes.
- **Inspection status:** A system shall be maintained by the quality assurance organization for identifying the inspection status of components and completed transit buses. Identification may include cards, tags or other normal quality control devices.

QA 1.2.5 Inspection System

The quality assurance organization shall establish, maintain and periodically audit a fully documented inspection system. The system shall prescribe inspection and test of materials, Work in process and completed articles. As a minimum, it shall include the following controls:

- **Inspection personnel:** Sufficient trained inspectors shall be used to ensure that all materials, components and assemblies are inspected for conformance with the qualified bus design.
- **Inspection records:** Acceptance, rework or rejection identification shall be attached to inspected articles. Articles that have been accepted as a result of approved materials review actions shall be

identified. Articles that have been reworked to specified drawing configurations shall not require special identification. Articles rejected as unsuitable or scrap shall be plainly marked and controlled to prevent installation on the bus. Articles that become obsolete as a result of engineering changes or other actions shall be controlled to prevent unauthorized assembly or installation. Unusable articles shall be isolated and then scrapped. Discrepancies noted by the Contractor or resident inspectors during assembly shall be entered by the inspection personnel on a record that accompanies the major component, subassembly, assembly, or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then the Agency shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.

- **Quality assurance audits:** The quality assurance organization shall establish and maintain a quality control audit program. Records of this program shall be subject to review by the Agency.

QA 2. Inspection

QA 2.1 Inspectors

QA 2.1.1 Inspector's Role

The Agency shall be represented at the Contractor's plant by an inspector, as required by FTA. Inspector(s) may be outside contractors. The Agency shall provide the identity of each inspector and shall also identify their level of authority in writing. The inspector will be chosen prior to bus production. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these inspectors in the plant shall not relieve the Contractor of its responsibility to meet all of the requirements of this procurement. The Agency shall designate an inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings," "Authority" and "Pre-Delivery Tests," below. Contractor and inspector relations shall be governed by the guidelines included as Attachment A to this "Section 8: Quality Assurance."

QA 2.1.2 Pre-Production Meetings

The inspector may participate in design review and pre-production meetings with the Agency. At these meetings, the configuration of the buses and the manufacturing processes shall be finalized, and all Contract documentation provided to the inspector.

No less than thirty (30) days prior to the beginning of bus manufacture, the inspector may meet with the Contractor's quality assurance manager and may conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The inspector may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.

QA 2.1.3 Authority

Records and data maintained by the quality assurance organization shall be available for review by the inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.

The Contractor's gauges and other measuring and testing devices shall be made available for use by the inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

Discrepancies noted by the inspector during assembly shall be entered by the Contractor's inspection personnel on a record that accompanies the major component, subassembly, assembly of bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, the Agency shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.

The inspector shall remain in the Contractor's plant for the duration of bus assembly Work under this Contract. Only the inspector shall be authorized to release the buses for delivery. The inspector shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the inspector shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, assembly procedures, material standards, parts lists, inspection processing and reports, and records of Defects.

QA 2.1.4 Compliance with Safety Requirements

At the time of the Pre-Production meeting, the Contractor shall provide all safety and other operational restrictions that govern the Contractor's facilities. These issues will be discussed and the parties will agree which rules/restrictions will govern the Agency's inspector(s) and any other Agency representatives during the course of the Contract.

QA 3. Acceptance Tests

QA 3.1 Responsibility

Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the Agency. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by the Agency after the buses have been delivered.

QA 3.2 Pre-Delivery Tests

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans approved by the Agency.

Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the required quality and have met the requirements in Section 6: Technical Specifications. The Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in that section if there is evidence that prior tests have been invalidated by the Contractor's change of Supplier or change in manufacturing process. Such demonstration shall be by actual test, or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with thirty (30) days notice so that they may be witnessed by the inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus. The underfloor equipment shall be available for inspection by the inspector, using a pit or bus hoist provided by the

Contractor. A hoist, scaffold or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. An executed copy of the authorization shall accompany the delivery of each bus.

QA 3.2.1 Visual and Measured Inspections

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing includes verification of overall dimension and weight requirements, that required components are included and are ready for operation, and that components and subsystems designed to operate with the bus in a static condition do function as designed.

QA 3.2.2 Total Bus Operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of fifteen (15) miles during the road tests. If requested, computerized diagnostic printouts showing the performance of each bus shall be produced and provided to the Agency. Observed Defects shall be recorded on the test forms. The bus shall be retested when Defects are corrected and adjustments are made. This process shall continue until Defects or required adjustments are no longer detected.

Two lists are included to reflect the expectations of both the transit system and the vehicle manufacturer.

Pre-Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none"> 1. Contract/transit system inspectors must be given all Contract documentation before beginning the inspection process. 2. The bus manufacturer's inspection process should be reviewed at pre-production audit meeting. Inspectors should be present and understand the difference among various manufacturing processes. At least one key customer and manufacturer representative who will follow the entire procurement from start to finish should be present. 3. When change orders are required, they need to be made as early in the process as possible. If change orders have an impact on the delivery schedule, consideration should be given to a delivery schedule revision. 4. Transit system inspection forms should be provided to manufacturers prior to the build so that the manufacturers will know what items the customer believes are critical. The inspection forms should be provided to the manufacturer after completion so that the Defects to be corrected can be identified. 5. If the transit system requires sole-source components, it should obtain assistance for the first installation of new components. 6. The transit system should have a decision maker at the pre-production audit meeting. 7. The transit system should make every effort to inform manufacturers of what they want. Hidden agenda items buried in the Contract to not promote the cooperative environment desired. 8. The parties should agree on what necessitates a line shutdown before the build begins. 	<ol style="list-style-type: none"> 1. Manufacturers should have a formal, approved quality assurance (QA) program and must adhere to the program. Any changes in the approved program must be resubmitted to the transit system for approval. 2. At the pre-production audit meeting with the transit system: <ul style="list-style-type: none"> • Representatives from contracts, engineering, quality and production should be represented. • Manufacturers should ensure good communication among their departments regarding Contract requirements. • A formal sales release must be ready for review at the meeting, and a final sales release must be ready before production. • Manufacturers should not use the meeting to sell parts. • Manufacturers should supply test information and other documents required to meet expectations. 3. Manufacturers should have application and installation approvals from Suppliers whenever possible. On installations of new major components, the sub-Supplier must be present at initial production. 4. Manufacturers should read and understand the specification prior to bid. Specification clarifications should be made during the approved equals process. Ask the appropriate questions at pre-bid meetings. 5. The manufacturer's service representative should be involved with the pre-production audit meeting and initial production, and/or at final acceptance. 6. Prior to build, the manufacturer should be able to provide the transit system a complete Bill of Materials for the buses to be built.

Process During Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none"> 1. One person should be the inspector from start to finish. The primary inspector should be included in the design review process and pre-production meetings. The rotation of personnel with different expectations and standards causes difficulties. The first or second bus should stay at the manufacturer's location as a quality standard and be delivered last. 2. An adequate number of experienced inspectors should be available to prevent production line movement delays. 3. Inspectors should be available to support the manufacturing effort Monday through Friday, consistent with the manufacturer's production personnel hours. 4. Inspection should be conducted in a cooperative, professional manner. The inspector must <i>want</i> to solve problems. 5. Only one person should be able to make stop ship calls, and the reason for the stop ship <i>must</i> be immediately available. The stop ship should be in writing. 6. Problems identified should be brought to the attention of the manufacturer at the stage when they occur rather than at a future stage or when the vehicle is complete. 	<ol style="list-style-type: none"> 1. The inspector should have access to a complete set of engineering drawings and documents for the bus being built. Engineering or manufacturing changes must be formally documented and included in documents provided to transit systems. 2. Manufacturers should maintain the build schedule if possible. Changes in the build schedule and requests for overtime and weekend Work must be communicated as early as possible. 3. Buses that are not ready or complete should not be presented for final inspection. 4. Manufacturers should have a formal internal/external communications process and feedback for inspection problems and resolutions. Manufacturers should provide early resolution of problems identified by inspectors. QA procedures must be revised to reflect problem corrections. 5. The attitude of manufacturers and QA personnel is important; remember who the customer is. However, there must be mutual respect. 6. The transit system is not responsible for redesigning the bus, correcting problems or providing manufacturing quality. It audits only. Manufacturers should not need a learning period to determine acceptable quality standards. 7. Buses should be identical and interchangeable within an order unless provided by the transit system. 8. Inspection Work should be spread evenly during the workday to the extent possible.

Post-Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none"> 1. To ensure prompt payment, the transit system should increase the rate of the final acceptance process. 2. The on-property final acceptance inspection should be primarily for shipping damage and Defects that occur during shipment. It should not be a complete vehicle inspection with criteria different from those used at the plant. 	<ol style="list-style-type: none"> 1. Defects noted at the property final inspection should be repaired in a timely and acceptable manner.

Invitation for Bid
April 10, 2018 3PM
(BUS) 17180410-1

SECTION 9: FORMS AND CERTIFICATIONS

CER 1. Bidders Checklist

IFB# 17180410-1 3 Low Floor 35' Heavy Duty Buses

Package 1: Technical Bid

- ☐ 1. Letter of Transmittal
- ☐ 2. Technical Bid
- ☐ 3. Acknowledgement of Addenda
- ☐ 4. Form for Bid Deviation
- ☐ 5. Vehicle Questionnaire
- ☐ 6. References and non-priced information (if provided by Bidder)
- ☐ 7. Engineering organization chart, engineering change control procedure, field modification process
- ☐ 8. Manufacturing facility plant layout, other contracts, staffing
- ☐ 9. Production schedule and other Contract commitments for the duration of this Contract.
- ☐ 10. Quality Assurance Program

Package 2: Price Bid

- ☐ 1. Letter of Transmittal
- ☐ 2. Pricing Schedule (including option buses, spare parts package, engineering, manuals, training, special tools and test equipment)

Package 3: Qualifications Package

- ☐ 1. Pre-Award Evaluation Data Form
- ☐ 2. A copy of the three (3) most recent audited financial statements or a statement from the Bidder regarding how financial information may be reviewed by the Agency
- ☐ 3. Letter for insurance
- ☐ 4. Letter for performance bond (if applicable)
- ☐ 5. Letter of commitment for parental financial guarantee (if applicable)
- ☐ 6. Bid Form

Package 4: Proprietary/Confidential Information Package¹

- ☐ 1. Proprietary/Confidential Information

1. There may be items in the first three packages that are included in Package 4 because they are considered to be proprietary/confidential information. When this occurs, the Bidder must note that fact in Packages 1 through 3.

CER 3. Acknowledgement of Addenda

Failure to acknowledge receipt of all addenda may cause the Bid to be considered nonresponsive to the Solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Bid.

The undersigned acknowledges receipt of the following addenda to the documents:

Addendum No.: Dated:

Addendum No.: Dated:

Addendum No.: Dated:

Addendum No.: Dated:

Bidder:

Name:

Title:

Phone:

Street address:

City, state, ZIP:

Authorized signature

Date

CER 4. Contractor Service and Parts Support Data

Location of nearest Technical Service Representative to Agency

Name:

Address:

Telephone:

Describe technical services readily available from said representative:

Location of nearest Parts Distribution Center to Agency:

Name:

Address:

Telephone:

Describe the extent of parts available at said center:

Policy for delivery of parts and components to be purchased for service and maintenance:

Regular method of shipment:

Cost to Agency:

CER 5. Form for Bid Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Bid according to “Conditions, Exceptions, Reservations or Understandings.” One copy without any price/cost information is to be placed in the Technical Bid as specified in “Technical Bid Requirements,” and a separate copy with any price/cost information placed in the Price Bid as specified in “Price Bid Requirements.”

Spartanburg Area Regional Transit Agency
3 Low Floor 35’ Heavy Duty Diesel Buses

Deviation No.:	Contractor:	IFB section:	Page:
Complete description of Deviation:			
Rationale (pros and cons):			

CER 6. Pricing Schedule

Spartanburg Area Regional Transit Agency
3 Low Floor 35' Heavy Duty Buses

	All prices are to be in United States dollars	
	Unit Price	Extension
3 Low Floor 35' Heavy Duty Diesel buses		
Manuals	Lump Sum	
Training	Lump Sum	
Spare tires & rims		
Special tools		
Seon Camera System		
Bike Rack		
Option for five (5) camera system scenario		
Option pricing for exterior advertising panels		
Sales tax (if applicable)		
Delivery charges		
TOTAL PROPOSED PRICE		
ADA equipment (included in above unit prices)		

This form is to be completed and included in the Price Package.

CER 7. Pre-Award Evaluation Data Form

Spartanburg Area Regional Transit Agency
 17180410-1 3 Low Floor 35' Heavy Duty Diesel Buses

<p>1. Name of firm:</p> <p>2. Address:</p> <p>3. <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation <input type="checkbox"/> Joint Venture</p> <p>4. Date organized: State in which incorporated:</p> <p>5. Names of officers or partners:</p> <p style="margin-left: 20px;">a. b. c. d. e.</p> <p>6. How long has your firm been in business under its present name?</p>
<p>7. Attach as SCHEDULE ONE a list of similar current contracts that demonstrates your available capacity, including the quantity and type of bus, name of contracting party, percentage completed and expected completion date.</p> <p>8. Attach as SCHEDULE TWO a list of at least three similar contracts that demonstrates your technical proficiency, each with the name of the contracting party and number and the type of buses completed within the last five years.</p> <p>9. Have you been terminated or defaulted, in the past five years, on any Contract you were awarded? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, then attach as SCHEDULE THREE the full particulars regarding each occurrence.</p> <p>10. Attach as SCHEDULE FOUR Bidders last three (3) financial statements prepared in accordance with generally accepted accounting principles of the jurisdiction in which the Bidder is located, and audited by an independent certified public accountant; or a statement from the Bidder regarding how financial information may be reviewed by the Agency [This may require execution of an acceptable non-disclosure agreement between the Agency and the Bidder.]</p> <p>11. Attach as SCHEDULE FIVE a list of all principal Subcontractors and the percentage and character of Work (Contract amount) that each will perform on this Contract.</p> <p>12. If the Contractor or Subcontractor is a joint venture, submit PRE-AWARD EVALUATION DATA forms for each member of the joint venture.</p>
<p>The above information is confidential and will not be divulged to any unauthorized personnel.</p>
<p>The undersigned certifies to the accuracy of all information:</p> <p>Name and title:</p> <p>Company:</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 60%;"> <p>_____</p> <p>Authorized signature</p> </div> <div style="width: 35%;"> <p>_____</p> <p>Date</p> </div> </div>

CER 8. Federal Certifications

CER 8.1 Buy America Certification

This form is to be submitted with an offer exceeding the small purchase threshold for federal assistance programs, currently set at \$100,000.

Certificate of Compliance

The Bidder hereby certifies that it will comply with the requirements of 49 USC Section 5323(j), and the regulations of 49 CFR 661.11:

Name and title:

Company:

Authorized signature

Date

Certificate of Non-Compliance

The Bidder hereby certifies that it cannot comply with the requirements of 49 USC Section 5323(j) but may qualify for an exception to the requirements consistent with 49 USC Sections 5323(j)(2), as amended, and regulations in 49 CFR 661.7.

Name and title:

Company:

Authorized signature

Date

CER 8.2 Debarment and Suspension Certification for Prospective Contractor

Primary covered transactions must be completed by Bidder for contract value over \$25,000.

Choose one alternative:

- ☐ The Bidder, _____, certifies to the best of its knowledge and belief that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;
2. Have not within a three-year period preceding this Bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction or Contract under a public transaction; violation of federal or state antitrust statutes or commission or embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in Paragraph 2 of this certification; and
4. Have not within a three-year period preceding this Bid had one or more public transactions (federal, state or local) terminated for cause or default.

OR

- ☐ The Bidder is unable to certify to all of the statements in this certification, and attaches its explanation to this certification. (In explanation, certify to those statements that can be certified to and explain those that cannot.)

The Bidder certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that the provisions of Title 31 USC § Sections 3801 are applicable thereto.

Executed in _____.

Name:

Authorized signature

Date

CER 8.3Debarment and Suspension Certification (Lower-Tier Covered Transaction)

This form is to be submitted by each Subcontractor receiving an amount exceeding \$25,000.

The prospective lower-tier participant (Bidder) certifies, by submission of this Bid, that neither it nor its "principals" as defined at 49 CFR § 29.105(p) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or Agency.

If the prospective Bidder is unable to certify to the statement above, it shall attach an explanation, and indicate that it has done so by placing an "X" in the following space: _____

THE BIDDER, _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND EXPLANATION, IF ANY. IN ADDITION, THE BIDDER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 *ET SEQ.* APPLY TO THIS CERTIFICATION AND EXPLANATION, IF ANY.

Name and title of the bidders authorized official:

Authorized signature

Date

CER 8.5 Lobbying Certification

This form is to be submitted with an offer exceeding \$100,000.

The Bidder certifies, to the best its knowledge and belief, that:

1. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of a federal department or agency, a member of the U.S. Congress, an officer or employee of the U.S. Congress, or an employee of a member of the U.S. Congress in connection with the awarding of any federal Contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification thereof.
2. If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal Contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction, as amended by "Government-wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96).
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants and contracts under grants, loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, USC § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

THE BIDDER, _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND DISCLOSURE, IF ANY. IN ADDITION, THE BIDDER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 ET SEQ. APPLY TO THIS CERTIFICATION AND DISCLOSURE, IF ANY.

Name of the bidder or Bidders authorized official: _____

Title: _____

Signature

Date

Per paragraph 2 of the included form Lobbying Certification, add Standard Form–LLL, "Disclosure Form to Report Lobbying," if applicable.

CER 8.6 Certificate of Compliance with Bus Testing Requirement

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. ____ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on _____ (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Bid. If the configuration or components are not identical, then the manufacturer shall provide with its Bid a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.
2. ____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Bid the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.
3. ____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

The undersigned understands that misrepresenting the testing status of a vehicle acquired with federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regulation on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29.

Company name:

Name and title of the bidders authorized official:

Authorized signature

Date

CER 8.7 DBE Approval Certification

I hereby certify that the Bidder has complied with the requirements of 49 CFR 26, Participation by Disadvantaged Business Enterprises in DOT Programs, and that its goals have not been disapproved by the Federal Transit Administration.

Name and title of the bidders authorized official:

Authorized signature

Date

CER 8.8 Federal Motor Vehicle Safety Standards

The Bidder and (if selected) Contractor shall submit (1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or (2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

Company name:

Name of signer:

Title:

Authorized signature

Date

CER 9. Other Certifications

CER 9.1 Bid Form

Bidder shall complete the following form and include it in the price Bid.

BID

By execution below by a duly authorized representative(s) of the Bidder, the Bidder hereby offers to furnish equipment and services as specified in its Bid submitted to Spartanburg Area Regional Transit Agency in response to Invitation for Bid No. 17180410-1 in its entirety.

Bidder: _____

Street address: _____

City, state, ZIP: _____

Name and title of Authorized Signer(s): _____

Name and title of Authorized Signer(s): _____

Phone: _____

Authorized signature

Date

Authorized signature

Date

Invitation for Bid
April 10, 2018 3PM
(BUS) 17180410-1

CER 9.2Notice of Award

By execution below, Spartanburg Area Regional Transit Agency accepts Bid as indicated above.

Contracting officer: _____

Authorized signature

Date

CER 10. Vehicle Questionnaire

This form must be completed and included in the Technical Bid.

GENERAL COACH DATA SHEET: 35 Foot Low Floor Heavy Duty Diesel Bus

Bus Manufacturer: _____

Bus Model Number: _____

Basic Body Construction Type: _____

General Dimensions

Overall length	Over bumpers	<input type="text"/>	feet	<input type="text"/>	Inches
	Over body	<input type="text"/>	feet	<input type="text"/>	Inches
Overall width	Over body excluding mirrors and lights	<input type="text"/>	feet	<input type="text"/>	Inches
	Over body including mirrors	<input type="text"/>	feet	<input type="text"/>	Inches
	Over tires	<input type="text"/>	feet	<input type="text"/>	Inches
Overall height (maximum)		<input type="text"/>	feet	<input type="text"/>	Inches

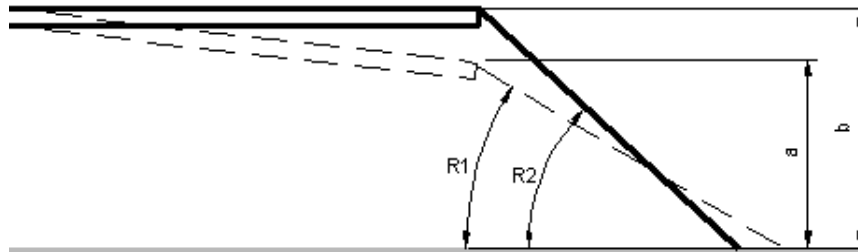
Angle of approach	<input type="text"/>	Degrees
Angle of departure	<input type="text"/>	Degrees
Breakover angle 1	<input type="text"/>	Degrees
Breakover angle 2	<input type="text"/>	Degrees

Doorway clear opening (at widest point) Inches

	Width with grab handles	Width without grab handles	Height
Front door	<input type="text"/> Inches	<input type="text"/> Inches	<input type="text"/> Inches
Center door (1)	<input type="text"/> Inches	<input type="text"/> Inches	<input type="text"/> Inches
Center door (2)	<input type="text"/> Inches	<input type="text"/> Inches	<input type="text"/> Inches
Rear door	<input type="text"/> Inches	<input type="text"/> Inches	<input type="text"/> Inches

Front axle floor height above ground (centerline of bus)	<input type="text"/>	Inches
Center axle floor height above ground (centerline of bus)	<input type="text"/>	Inches

Rear axle floor height above ground (centerline of bus) Inches
 Step height from ground (measured at center of doorway) Inches



	Front doorway	Center doorway	Ramp angle	Rear doorway
Kneeled	<input type="text"/> inches (a)	<input type="text"/> inches (a)	<input type="text"/> degrees (R1)	<input type="text"/> inches (a)
Unkneeled	<input type="text"/> inches (b)	<input type="text"/> inches (b)	<input type="text"/> degrees (R2)	<input type="text"/> inches (b)

Interior head room (floor to ceiling at center of aisle)

First axle location Inches
 Rear axle location Inches
 Rear settee (in front of seat) Inches

Aisle width

Minimum width on floor between first axle wheel housings Inches
 Minimum width on floor between center axle (1) wheel housings Inches
 Minimum width on floor between center axle (2) wheel housings Inches
 Minimum width on floor between rear axle wheel housings Inches

Minimum ground clearance

Outside axles zones Inches
 Inside axles zones Inches

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper) feet inches
 Inside Body Turning Radius innermost point, TR4 (including bumper) feet inches

Wheel base

First axle to center/rear axle Inches
 Center axle to rear axle Inches

Overhang, centerline of axle over bumper

Front Inches
 Rear Inches

Floor

Maximum interior floor slope (from horizontal) Degrees

Capacity

Total number of passenger sittings

Passenger seating manufacturer/model number

Total number of standing passengers (1 per 1.5 sq. ft.)

Minimum hip to knee space Inches

Maximum hip to knee space Inches

Restraint system type and model number

Bus weight

	Curb weight		Curb weight plus seated load*		GVWR	
Front axle	<input type="text"/>	Lbs	<input type="text"/>	Lbs	<input type="text"/>	Lbs
Rear axle	<input type="text"/>	Lbs	<input type="text"/>	Lbs	<input type="text"/>	Lbs
Total	<input type="text"/>	Lbs	<input type="text"/>	Lbs	<input type="text"/>	Lbs

* Including operator and passengers at 150 lbs per person

Steering Axles

Manufacturer	<input type="text"/>
Type and weight rating	<input type="text"/>
Model number	<input type="text"/>

Drive axle (☐ Center ☐ Rear)

Manufacturer	
Type and weight rating	
Model number	

Drive axle ratio

Differential ratio	
Hub reduction ratio (if used)	
Final axle ratio (if hub reduction is used)	

Brake system

Make/type of fundamental system	
Front axle brake chamber model	
Rear axle brake chamber model	
Front axle slack adjuster	
Manufacturer	
Model number	
Rear axle slack adjuster	
Manufacturer	
Model number	
Front axle brake drum/rotor	
Manufacturer	
Rear axle brake drum/rotor	
Manufacturer	

Air compressor

Manufacturer		
Type		
Model number		
Rated capacity		Cfm
Capacity at idle		Cfm
Maximum warranted speed		Rpm
Idle speed		Rmp
Drive type		
Governor cut-in pressure		Psi
Governor cut-out pressure		Psi

Air Reservoir Capacity

Manufacturer

Supply reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total
Primary reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total
Secondary reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total
Parking reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total
Accessory reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total
Other reservoir number and size	<input type="text"/>	/	<input type="text"/>	cubic inches total

Cooling System

	Radiator	Charge air cooler
Manufacturer	<input type="text"/>	<input type="text"/>
Type	<input type="text"/>	<input type="text"/>
Model number	<input type="text"/>	<input type="text"/>
Number of tubes	<input type="text"/>	<input type="text"/>
Fins per inch	<input type="text"/>	<input type="text"/>
Fin thickness (inches)	<input type="text"/>	<input type="text"/>
Fin construction	<input type="text"/>	<input type="text"/>

Total cooling system capacity (gallons)

Gallons

Radiator fan manufacturer

Fan speed/control type (mech/elect/hyb)

Surge tank capacity

Gallons

Surge tank material

Overheat alarm temperature

degrees F

Shutdown temperature settings

degrees F

Electrical

Primary interior lighting system

Manufacturer	
Type	
Model number	

Alternator

Manufacturer		
Type		
Model number		
Output at idle		Amps

Voltage regulator

Manufacturer	
Model number	

Voltage equalizer

Manufacturer	
Model number	

Auxiliary inverter (120/240)

Manufacturer	
Model number	
Inverter technology	
Output voltage(s)	

Starter motor

Manufacturer	
Voltage	
Model number	

Energy storage

Batteries – low voltage

Manufacturer	
Type	
Model number	
Cold cranking amps	

Batteries/energy storage – high voltage

Manufacturer	
Type	
Model number	
Energy density	
Specific power	
Operating temperature range	
Cooling/heating system	

Ultra-capacitor

Manufacturer	
Model number	

Ultra-capacitor ratings: Provide data sheet for energy efficiency, estimated calendar life, cycle life, voltage (each capacitor and each module), working and peak power, and weight

Engine

Manufacturer	
Model number/version	
Horsepower/torque rating	

Fire Suppression/Methane Detection System

Manufacturer			
Model number			
Number of detectors	<input type="text"/>	Fire	<input type="text"/>
Type of detector	<input type="checkbox"/> Thermal <input type="checkbox"/> Optical		
Battery backup	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Bumpers

Manufacturer	
Type	

Fuel and Exhaust System

Fuel type	
Operating range and route profile	

Fuel tanks (liquid fuels)

Manufacturer			
Capacity (total and usable)	<input type="text"/>	Gallons	/
	<input type="text"/>	Gallons	

Construction material	
Quantity and location of tanks	

Fuel tanks (gaseous fuels)

Manufacturer					
Capacity (total and usable)		SCF	/		SCF
Construction material					
Quantity and location of tanks					

Exhaust system

Diesel particulate filter manufacturer	
Describe DPF electronic interface	
Muffler manufacturer (if applicable)	

Air Suspension

	Front	Middle	Rear
Air spring manufacturer			
Air spring quantity per axle			
Shock absorber manufacturer			
Shock absorber quantity per axle			

Steering

Pump manufacturer		
Pump model number		
Steering gear manufacturer		
Steering gear model number		
Steering gear type		
Steering wheel diameter		Inches
Maximum effort at steering wheel*		

* Unloaded stationary coach on dry asphalt pavement

☐ **Transmission** / ☐ **Hybrid drive system** (check one)

Manufacturer	
Type	
Model number	
Number of forward speeds	
Traction motor horsepower rating	
Type ventilation/cooling	

Propshaft

Manufacturer	
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Wheels

Manufacturer	
Type	
Size	
Mounting type	
Bolt circle diameter	
Protective coating	

Tires

Manufacturer	
Type	
Size	
Load range/air pressure	

Door System

Door panels	Manufacturer	Type
Front door		
Rear door		

Actuating mechanism (air, electric, spring, other)

Manufacturer	
Front door	
Rear door	

Heating and Ventilating Equipment

Heating system capacity		Btu
Air conditioning system capacity		Btu
Ventilating capacity		CFM per passenger
Manufacturer and model		
Refrigerant type		

Driving heater

Manufacturer	
Type	
Model number	
Capacity	

Auxiliary heater

Manufacturer	
Type	
Model number	
Capacity	

Floor heaters

Manufacturer	
Type/number	
Model number	
Capacity	

Passenger Loading System

Manufacturer	
Type (hydraulic, electric or both)	
Model number	
Capacity (lbs.)	

Dimensions

Width of ramp		Inches
Length of ramp		Inches

Cycle times

Normal idle

Fast idle

Stowed to ground		Seconds		Seconds
Ground to stow		Seconds		Seconds

Electronics

Video system manufacturer	
Video system model number	
Number of cameras	
Multiplex system manufacturer	
Multiplex system model number	
Automatic passenger counter system manufacturer	
Automatic passenger counter system model number	
Destination sign manufacturer	
Destination sign model number	
AVL/AVM system manufacturer	
AVL/AVM system model number	
Passenger information system manufacturer	
Passenger information system model number	
Signal prioritization system manufacturer	
Signal prioritization system model number	

Coach Body Fittings

Passenger windows manufacturer	
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Exterior/interior mirrors

Size	
Manufacturer	
Model number	
Manufacturer part numbers	

Bicycle racks

Manufacturer	
Model number	

Paint system

Manufacturer	
Type	

Operator control layout diagram:

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APPENDIX A: EVALUATION CRITERIA

Evaluation of Bids and selection process

A. Evaluation/Selection Committee

An Evaluation/Selection Committee (Committee), which may include Agency staff, consortium members, and possibly one or more outside experts, will review and screen the Bids submitted according to the pre-established criteria as set forth below.

B. Pre-Bid Meeting (maximum of 5 points)

Attendance at the Pre-Bid Meeting on February 6, 2018

C. Technical Evaluation Criteria (maximum of 80 points)

Bids will be evaluated using the following principal selection criteria:

1. **Product design and performance (0-30 points):** The information provided by the Bidder in its technical submittal relating to the buses to be provided will be utilized to evaluate the Bid in relation to this factor. Vehicle construction and system design, as well as documented reliability, may be used in this evaluation, as well as other design and performance elements of the components that comprise those systems. At a minimum, test results, safety and maintenance factors, and cost of normal operation for the bus design and system components proposed, may be considered in determining a final value for this factor.
2. **Bidders reputation and performance (0-30 points):** The Committee will consider the capability and reputation of the Bidder as presented in the Bid or as is determined by review of information available from references or other resources. The evaluation may look at the Bidders overall organizational and financial capabilities and consider key components such as organizational reporting structure, quality control, quality assurance, research and development, technical, training and parts support, response time, product capabilities, ability to furnish multiple bus configurations, bonding capacity, and financial history, as well as other considerations, in reaching a final point determination. The committee may also look at judgments, liens, Fleet Defect history, warranty claims and the steps that the manufacturer took to resolve these concerns in assessing the overall reputation of the manufacturer.
1. **Delivery schedule (0-20 points):** The Committee will review the proposed delivery schedule for the Agency's minimum purchase of coaches. Delivery schedules that fulfill the delivery requirements, with evidence that the schedule can be accomplished, may receive higher points for this category.

D. Cost Bid Evaluation (maximum of 20 points)

As described below, the proposed cost as submitted by the Bidder on the Agency's form will be assigned a maximum of 20 points. The Contractor is *required* to use the Agency's form, without alteration, for submittal of its cost Bid. *Please DO NOT use your own forms.*

The cost will be evaluated in the following manner:

1. Cost Bid Criteria (0-20 points)

- a. The lowest average Cost Bid will receive 20 points. Every other Bid previously found to be in the Competitive Range will be given points proportionately in relation to the lowest price. This point total will be calculated by dividing the lowest price by the total price of the Bid being evaluated

and the result multiplied by the maximum weight for price (20 points) to arrive at a Cost Bid score.

Example: $\text{Lowest Proposed Price} / \text{Bidders Proposed Price} \times 20 = \text{Bid Score}$

The application of the above formula will result in a uniform assignment of points relative to the criterion of price.

E. Evaluation Methodology

The maximum number of points achievable in each of the aforementioned areas is as follows:

- **Attendance at Pre-Bid Meeting:** 0-5 points
- **Product design and performance:** 0-30 points
- **Manufacturer's reputation and performance:** 0-30 points
- **Delivery schedule:** 0-20 points
- **Cost bid:** 0-20 points

TOTAL POSSIBLE POINTS: 105

EVALUATION PROCESS

Following receipt of the Bids, the Bids will be evaluated for compliance with the following minimum requirements. Those Bids that do not evidence compliance may not be considered beyond the preliminary review.

Minimum Requirements

- The Bidder must be an existing vehicle manufacturer with an existing manufacturing facility.
- The Bid must be for a high-capacity vehicle with a nominal length not to exceed 35 feet.
- The vehicle must be constructed from composite material.
- The proposed vehicle must have a minimum of 30 seats.

Bids found to be compliant with the minimum qualifications will then be evaluated to determine those Bids that represent technically acceptable offers.

Each Bid will be rated according to the following ratings:

Rating	Definition
Exceptional	Exceeds evaluation standard in a way beneficial to Agency, and has no significant weaknesses. Innovative, comprehensive and complete in all details. Low-risk. Complies with all primary program objectives for the procurement.
Acceptable	Meets evaluation standards, and any weaknesses are readily correctable. Limited risk. Complies with many of the primary program objectives for the procurement.
Marginal	Fails to meet evaluation standard; however, any significant deficiencies are correctable. Lacks essential information to support Bid. Moderate risk. Complies with only one or two of the program objectives for the procurement.
Unacceptable	Fails to meet evaluation standard, and the deficiency is uncorrectable. Bid would have to undergo a major revision to become acceptable. Demonstrated lack of understanding of Agency's requirements or omissions of major areas. Unacceptable risk. Complies with none or one of the program objectives for the procurement.

Performance risk is the evaluation of each Bidders present and past work to assess confidence in the Bidders ability to perform against a proposed Contract. The following definitions are used when assessing performance risk:

Rating	Definition
High	Significant doubt exists, based on the Bidders performance record, that the Bidder can perform the proposed effort.
Moderate	Some doubt exists, based on the Bidders performance record, that the Bidder can perform the proposed effort.
Low	Little doubt exists, based on the Bidders performance record, that the Bidder can perform the proposed effort.
Not applicable	No significant performance record is identifiable.

The Agency may require clarifications or oral interviews with Bidders. Discussions may also be held with Bidders to determine acceptability of proposed Deviations and/or to address deficiencies and weaknesses of the Bid. See "Agency Rights" for additional information.

After completion of the evaluations, the Agency shall request pricing from those firms that have submitted technically acceptable Bids. The firms will be given approximately one week to submit pricing. The received pricing will then be reviewed. The Agency does not anticipate negotiation of price offers. The award will be made to the Bidder that possesses the appropriate facility, as well as the managerial, financial and technical capabilities necessary to fulfill the requirements of the Contract, and whose Bid conforms to Solicitation requirements and is judged by an integrated assessment of the evaluation criteria to be most advantageous to the Agency, when price and other factors are considered.

For the purposes of this procurement, all evaluation factors other than price, when combined, are significantly more important than the cost/price area in this acquisition. Therefore, the Agency may select other than the

lowest-priced technically acceptable Bid if it is determined that the additional technical merit offered is worth the additional cost in relation to other Bids received. For evaluation purposes, if Bids become more technically equivalent, then price becomes relatively more important.

The Agency is more concerned with obtaining superior technical features than with making an award at the lowest overall price to the Agency. However, the Agency will not make an award at a significantly higher overall cost to the Agency to achieve slightly superior technical features.

The Agency reserves the right to reject any or all Bids, to waive informalities or irregularities to the extent permitted by law in any Bid received, and to be the sole judge of the merits of the respective Bid received.

Evaluation Criteria

The award will be based upon the factors listed below in addition to price and may not necessarily be made to the lowest-price Bidder. Factors are ranked in order of importance, with the most important factor listed first.

- Minimum vehicle performance requirements
- Vehicle structure
- Advanced design provisions
- Proposed technical Deviations
- Manufacturing process
- Qualifications of the Bidder
- Past performance and current commitments
- Maintainability
- Proposed operating cost and reliability
- Emissions
- System safety provisions
- Technical support
- Project management
- Deviations from Contract terms and conditions

The primary sub-criteria under each factor are the following:

- **Performance requirements:**
 - Vehicle performance
 - Reduced Exterior sound levels
 - Minimum range requirements
 - Compliance with General Performance requirements
- **Vehicle structure:**
 - Previous service experience of the vehicle, if applicable
 - Current and/or planned durability testing, including existing test results
 - Physical dimensions
 - Interior layout, including compliance with ADA requirements
 - Layout of the operator's compartment, including the operator's field of view
 - Available ergonomic information
 - Functional enhancements, including integration of electronic controls and minimizing the number of gauges and switches
- **Advanced design provisions:** This addresses the design characteristics, including how the design complies with the program's design objectives.

- **Proposed technical deviations:** This addresses the effect and acceptability of proposed technical deviations, including proposed benefits to the Agency and Deviations that will result in cost reductions.
- **Manufacturing process:** This addresses the proposed manufacturing process, including a detailed description of the proposed facilities where the Work would be done.
- **Proposed quality assurance program**
- **Qualifications of the Bidder:**
 - Organization chart showing the organization proposed for this Contract
 - History of the Bidder, including information about manufacturing capabilities
 - Experience in producing composite structure vehicles
 - Maintenance and warranty experience, including a qualified staff to provide the necessary services
 - Bidders ISO certification(s) or equivalent
- **Bidders facilities to be used for significant portions of the Work, including Subcontractors' facilities:**
 - Location of the facility and whether the facility is owned or leased
 - Work to be performed at the facility
 - Capacity and resources available at the facility for fulfilment of this Contract
 - Length of time the facility has been in operation to do the kind of Work proposed to be performed at the facility.
- **Past performance and current commitments:**
 - Reference list
 - Bidders Work under way, or for which the Bidder is committed
- **Maintainability:**
 - Maintainability of the proposed powerplant
 - Maintainability of proposed component parts
 - Maintenance requirements
 - Skills needed to perform maintenance Work
 - Required special equipment, tools or maintenance facility requirements that must be implemented to maintain the vehicles
 - Proposed diagnostic equipment needed to maintain the vehicles
 - Proposed "built-in" diagnostic equipment, if offered
 - Reasonableness of proposed scheduled maintenance requirements
 - Proposed spare parts package required to support the schedule maintenance and replacement of major components
- **Proposed operating costs and reliability:**
 - Expected reliability and service life of major proposed components
- **Projected emissions of the vehicle**
- **System safety provisions:**
 - Proposed safety features
 - Knowledge of state codes and regulations affecting vehicles
 - Vehicle code changes required for the vehicle to legally operate in the state, if any
- **Technical support:**
 - Identification of proposed parts and service center
 - Service center staffing and qualifications
 - Availability of electronic maintenance documentation and comprehensive plan for providing technical updates for the life of the proposed vehicles

- Proposed availability of spare parts, including methodology for storing parts locally and for expediting needed parts
- Proposed training plans and instruction program
- Proposed diagnostic equipment required to maintain the vehicles
- Provision of advanced features such as wireless self-diagnostics and/or database management.
- **Project management:**
 - Proposed general project schedule and plan to ensure schedule compliance or to expedite the delivery schedule
 - Experience of the proposed project management team, including the experience of key personnel.
 - Experience of technical personnel supporting each area of technical expertise as required by the Contract specifications, including test and system integration personnel
 - Experience of the proposed key contact for the project, including the level of authority that this individual will have to make decisions that are “binding” on the Bidder
 - Plan for the coordination of major Suppliers and Subcontractors, if any
 - Major component Suppliers and the products to be provided by each for this Contract
 - The interface relationships between engineering, manufacturing, program control, quality control and test departments
 - Proposed critical path schedule for the production of the pilot vehicle and remaining vehicles as well as the methodology for controlling the schedule
- **Proposed Deviations from nontechnical terms and conditions:**
 - Rationale for the proposed Deviation
 - Benefit and/or risk to Agency if the request is granted

Certifications

The certifications will be reviewed for proper execution and responsiveness.

Type of Contract to be Awarded

The Agency intends to award a fixed-price Contract per unit for three (3) vehicles. The services of the Contractor will be based on the scope of Work as outlined in “Section 1” Description of Work.”

Period for Acceptance

The Bid shall be valid for ninety (90) calendar days from the date stipulated in the IFB for receipt of Bids. If this offer is accepted within that time period, the Bidder agrees to furnish all services and items as stipulated in the IFB and in any accompanying amendments.

ALTOONA TESTING REPORT

The manufacturer represents that the vehicle was previously tested at the Federal Transit Administration's (FTA) Altoona Bus Research and Testing Center, located in Pennsylvania, and the vehicle being sold should have the identical configuration and major components as the vehicle in the test report, which must be provided at the time of bid submission. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.

The manufacturer also agrees that the vehicle being proposed has successfully passed the requirements for a 12 year/500,000 mile vehicle.

The manufacturer will also agree to supply the Agency with a complete copy of the Altoona Test report for the vehicle being proposed which meet the specifications contained in the IFB.

Date _____

Signature _____

Company Name _____

Title: _____

FAITHFUL PERFORMANCE BOND

Spartanburg Area Regional Transit Agency (SPARTA)

CONTRACT NO. 17180410-1

3 Low Floor 35' Heavy Duty Buses

PERFORMANCE BOND

WHEREAS SPARTA has awarded to _____ (“Principal”), Contract No. 17180410-1, Up To 3 Low Floor 35' Heavy Duty Buses AND **WHEREAS** Principal is required under the terms of the Contract to furnish a Bond for the faithful performance of the Contract;

NOW, THEREFORE, we _____, as Principal, and _____, (“Surety”), as Surety, are held and firmly bound unto _____ in the sum of \$ _____, in lawful money of the United States of America, for payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severably, firmly by these presents. In case suit is brought upon this Bond, Surety shall pay reasonable attorneys’ fees to _____ in an amount to be fixed by the court. In no event shall the surety be liable under this Bond for an amount greater than the aggregate penal sum designated in this paragraph.

The condition of this obligation is such that, if the hereby-bonded Principal or its heirs, executors, administrators, successors, assigns, or Subcontractors shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions and agreements in the Contract and any alteration thereof, made as therein provided, all within the time and in the manner therein-designated and in all respects according to their true intent and meaning, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

Further, Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or modification of the Contract, or of the Goods to be furnished thereunder, shall in any way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension of time, alteration, or modification of the Contract or of the Goods and Technical Services to be performed thereunder.

IN WITNESS WHEREOF, three identical counterparts of this instrument, each of which shall for all purposes be deemed an original hereof, have been duly executed by Principal and Surety named herein, on the ____ day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

(“Principal”)

(“Surety”)

References

SAE #	Title	Date Published
J10	Methods of Test for Paints - Part J10: Determination of Deposition Efficiency of Coating Powders	Sep 15, 1998
J211	Instrumentation for Impact Test—Part 2: Photographic Instrumentation	May 1, 2001
J287	Driver Hand Control Reach	Feb 1, 2007
J366	Exterior Sound Level for Heavy Trucks and Buses	Feb 1, 1987
J382	Windshield Defrosting Systems Performance Requirements - Trucks, Buses, and Multipurpose Vehicles.	Jan 1, 1994
J534	Lubrication Fittings	May 1, 2008
J537	Storage Batteries	Sep 1, 2000
J541	Voltage Drop for Starting Motor Circuits	Oct 1, 1996
J587	License Plate Illumination Devices (Rear Registration Plate Illumination Devices)	Sep 1, 2003
J593	Backup Lamps (Reversing Lamps)	Sep 1, 2005
J673	Automotive Safety Glasses	Oct 1, 2005
J680	Location and Operation of Instruments and Controls in Motor Truck Cabs, Recommended Practice	Sep 1, 1988
J686	Motor Vehicle License Plates	Oct 1, 1999
J689	Curbstone Clearance, Approach, Departure, and Ramp Breakover Angles—Passenger Car and Light Truck	Aug 1, 2009
J833	Human Physical Dimensions	May 1, 2003
J844	Nonmetallic Air Brake System Tubing	Nov 1, 2004
J941	Motor Vehicle Drivers' Eye Locations	Mar 1, 2010
J994	Alarm—Backup—Electric Laboratory Performance Testing	Mar 1, 2009
J1050	Describing and Measuring the Driver's Field of View	Jan 1, 2003
J1113	Electromagnetic Compatibility Component Test Procedure Part 42, Conducted Transient Emissions	Oct 1, 2006
J1127	Low Voltage Battery Cable	Mar 1, 2010
J1128	Low Voltage Primary Cable	Dec 1, 2005
J1149	Metallic Air Brake System Tubing and Pipe	Aug 1, 2007
J1292	Automobile and Motor Coach Wiring	Jan 1, 2008
J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications	Jun 1, 2006
J1587	Joint SAE/TMC Electronic Data Interchange between Microcomputer Systems in Heavy-Duty Vehicle Applications, Recommended Practice	Jan 1, 1996
J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications	Oct 1, 2008
J1986	Balance Weight and Rim Flange Design Specifications, Test Procedures, and Performance Recommendations	Jan 1, 2006
J1939	Data Link Layer	Dec 1, 2006
J1995	Engine Power Test Code - Spark Ignition and Compression Ignition - Gross Power Rating, Standard;	Jun 1, 1990
J2402	Road Vehicles—Symbols for Controls, Indicators, and Tell-tales	Jan 1, 2010
J2711	Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles	Sept 1, 2002

Abbreviation and Acronyms

A/C	air conditioning
ABS	anti-lock braking system
AC	alternating current
ACQ	alkaline copper quaternary
ADA	Americans with Disabilities Act
Ah	amp hour
ALR	auto-locking retractor
APA	The Engineered Wood Association, formerly the American Plywood Association
APC	automatic passenger counter
APTA	American Public Transportation Association
ASTM	ASTM International, formerly the American Society for Testing and Materials
ATC	automatic traction control
AVL	automatic vehicle location
AWG	American Wire Gauge
BAFO	Best and Final Offer
BMS	Battery Management System
BRT	bus rapid transit
CARB	California Air Resources Board
CCS	climate control system
CCTV	closed-circuit television
cfm	cubic feet per minute
CGA	Compressed Gas Association
CNG	compressed natural gas
dB	decibel
DBE	disadvantaged business enterprise
DC	direct current
DDU	driver display unit
DEF	diesel exhaust fluid
DOT	Department of Transportation
DPF	diesel particulate filter
ECM	Engine Control and Monitoring
ECS	emission control system
ELR	emergency locking retractor
EMI	electromagnetic interference
EPA	Environmental Protection Agency
ESS	energy storage system
FEA	Finite Element Analysis
FEMA	failure mode effects analysis
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
FMVSS	Federal Motor Vehicle Safety Standards
FTA	Federal Transit Administration
GAWR	gross axle weight rated
GPS	global positioning system
GVW	gross vehicle weight
GVWR	gross vehicle weight rated
H-point	hip-point

HDS	hybrid drive system
HMI	human-machine interface
HSC	hybrid system controller
HV	high voltage
HVAC	heating, ventilation and air conditioning
I/O	input/output
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Standards Organization
LEL	LED emergency light
LV	low voltage
mA	milliampere
MDT	mobile data terminal
MPa	mega-Pascal
NC	normally closed
NFPA	National Fire Protection Association
NGV	natural gas vehicle
NO_x	nitrogen oxide
NO	normally open
NTP	notice to proceed
OEM	original equipment manufacturer
OSI	Open Systems Interconnect
PA	public address
PMO	project management oversight
PPU	primary propulsion unit
PPU	prime power unit
PPV	price per vehicle
PRD	pressure relief device
psi	pounds per square inch
RF	radio frequency
RFI	radio frequency interference
RTC	real-time clock
SAE	SAE International, formerly the Society of Automotive Engineers
scf	standard cubic feet
SLW	seated load weight
SOC	state of charge
UL	Underwriters Laboratories
UNECE	United Nations Economic Commission for Europe
VDC	volts of direct current
Wh	watt-hours
VIN	vehicle information number