Standard
Bus Procurement Guidelines
July 8, 1997

Dear Transportation Professional:

This document, the product of a cooperative effort by APTA and the FTA, will provide long range benefits to the entire industry. The recommended Terms and Conditions represents Phase I of the Standard Bus Procurement Guidelines (SBPG). It is the result of hundreds of hours of effort by the APTA SBPG Steering Committee comprised of transit systems and suppliers. We believe that the SBPG Steering Committee has done an excellent job in preparing a document that will provide substantial benefits to the transit industry.

The SBPG represent a new understanding and clarity in the relationships between bus buyer and seller. The recommended Terms and Conditions will be universally understood. Any disagreements should be minimized by adhering as closely as possible to the recommendations. The provisions are designed to benefit both operators and manufacturers in many ways.

Negotiated procurement, which has had only limited use in our industry, should be endorsed by state and local authorities and can help assure the best purchasing conditions for all parties concerned. The standardized warranty periods provided in the SPBG represent potential relief for transit operating budgets. The provisions for advance payments and progress payments utilize innovative use of our limited available funds. Adherence to the SBPG will reduce many unnecessary expenses of buying and selling buses by standardizing documents and procedures throughout the industry.

While beginning your bus procurement with SPBG will bring a significant benefit to your system and to the industry, your procurement documents are ultimately your own. You should closely review the Guidelines to ensure adherence to state and local law, and to make sure the provisions are appropriate to your project.

The Phase II - Technical Specification Baseline Heavy Duty Transit bus is currently under development. A plan is being developed to regularly review and revise these guidelines so that they become living documents. Additional phases of this project are being considered to include optional features, alternate and future designs.

Peter M. Cipolla
Co-Chair - APTA Procurement Steering Committee

Bernard J. Ford
Co-Chair - APTA Procurement Steering Committee
Mr. Jack R. Gilstrap  
Executive Vice President  
American Public Transit Association  
1201 New York Avenue, N W  
Washington, D.C. 20005  

Dear Mr. Gilstrap,

I take this opportunity on the eve of publication of the American Public Transit Association (APTA) Standard Bus Procurement Guidelines, Phase I document, to congratulate APTA and particularly the members of its Procurement Steering Committee who have worked so diligently to bring this effort to fruition.

Publication of these industry guidelines marks a historic transfer of responsibility from the Federal Government to the state, local, and private sectors of the transit industry. Symbolic of the changing roles of the Federal Government and those it serves under President Clinton's reinvention efforts, publication of the guidelines confirms and reinforces our confidence that issues confronting the mass transit industry can and will be addressed by the industry itself, without need for Federal regulation.

In support of these industry efforts, I want to assure all APTA members and associate members that any FTA-funded procurement undertaken in conformance with the Phase I guidelines will be deemed to comply with FTA's third party procurement guidelines with respect to the areas addressed.

Recognizing that the intent of the APTA/FTA Cooperative Agreement, under which this effort is funded, is to create living documents that will evolve as necessary to meet the needs of the mass transit industry into the 21st Century, I also assure you of our continued commitment of support for this effort through Phase II and beyond.

Sincerely,

Gordon J. Linton
# STANDARD BUS PROCUREMENT GUIDELINES
## COMMERCIAL TERMS AND CONDITIONS
### STEERING COMMITTEE

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<tr>
<td>Peter M. Cipolla</td>
<td>Santa Clara Valley Transportation Authority</td>
<td>Chairperson</td>
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<td>Susan J. Hafner</td>
<td>Riverside Transit Agency</td>
<td>Co-Chair</td>
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<tr>
<td>Clark K. Ahrens</td>
<td>Cummins Engine Company, Inc.</td>
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<td>Richard J. Bacigalupo</td>
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<td>Robert I. Brownstein</td>
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<td>Annemarie Chenoweth</td>
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<td>Craig O. Cole</td>
<td>Topeka Metropolitan Transit Authority</td>
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<td>Wayner P. Crowder</td>
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<td>Ann M. Geter</td>
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<td>Cheryl Johns</td>
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<td>Patrick Scully/</td>
<td>Detroit Diesel Corporation</td>
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<td>Dominick A. Vermet</td>
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<td>Robin C. Stevens</td>
<td>MTA New York City Transit</td>
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<td>James Zingale</td>
<td>Greater Cleveland Regional Transit Authority</td>
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### FEDERAL TRANSIT ADMINISTRATION ADVISORS

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<td>Donald R. Durkee</td>
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<td>Senior Engineer</td>
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<td>Lucy Jackson</td>
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<tr>
<td>Bart Mancini</td>
<td>General Engineer</td>
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### AMERICAN PUBLIC TRANSIT ASSOCIATION

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<td>Jerry Trotter</td>
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### CONSULTANTS

KPMG Peat Marwick LLP

in association with

Booz • Allen & Hamilton, Inc.

Lea + Elliott, Inc.
PREFACE

Purpose

The Standard Bus Procurement Guidelines (SBPG) are a model for solicitation of offers and contracts for the supply of transit buses. They are intended to be a starting point for a transit agency assembling a solicitation of offers and to assist in a cost-effective procurement. While the guidelines provide many options to the agency and the agency must, at a bare minimum, modify the guidelines to comply with state law, adherence to the guidelines will facilitate competitive offers from manufacturers, who are familiar with the guideline terms and conditions. In addition to the reliability of using a standard procurement tool, and the efficiency of manufacturers’ response to the solicitation, adherence to the guidelines will promote understanding and reduce the likelihood of disputes. In these ways, the SBPG are intended to promote the financial health of the bus manufacturing industry and the overall cost-effectiveness of urban bus transportation.

History

The SBPG are intended to supersede the Baseline Advanced Design Transit Coach Specification or “White Book,” which was developed 20 years earlier for the Federal Transit Administration (FTA). Published in April 1977, it was intended for use by FTA grantees to facilitate normal transit bus purchases and to establish production of Advanced Design Buses (ADBs) through the use of a standard, complete bus procurement package. The White Book was periodically updated by addendum for several years after original publication. In the late 1970s, FTA made the White Book a requirement for all federally-supported advanced design transit bus procurements. The requirement was lifted in the 1980s. Although the White Book was not formally updated for many years, a large number of transit authorities continued to use it for current bus procurements.

In November 1993, the Executive Committee of the American Public Transit Association (APTA) established a Procurement Steering Committee, comprised of senior representatives of both transit operators and suppliers. At its initial meeting on January 13, 1994, the Steering Committee (attached) concluded that a comprehensive revision of both the procurement guidelines and the technical specifications contained in the White Book should be undertaken. FTA supported the project enthusiastically with a grant that funded the first edition of the SBPG and with technical assistance during development. The Steering Committee met in seven long, plenary conferences to reach consensus on a new document. Analysis and drafting between conferences was performed by KPMG Peat Marwick LLP in association with Booz Allen Hamilton, Inc. and Lea + Elliott, Inc. Parts 1 (two alternative versions), 2, 3, and 4, consisting of the solicitation, general contractual provisions, quality assurance provisions, and warranty provisions were completed on May 1, 1996.

Upon the completion of the new parts 1, 2, 3, and 4, constituting the commercial terms and conditions of the SBPG, Federal Transit Administrator Gordon Linton issued a letter of support and endorsement, a copy of which immediately follows this preface.
Organization

The SBPG are organized in 5 parts. The first part is presented in two alternative versions for use in competitive negotiations (Request for Proposals) or sealed bidding (Invitation for Bids), respectively. The remaining four parts can be used in either method of procurement, with options to be designated based on the method of procurement. The sections of the document are:

1. Request for Proposals, Offer, and Award (to be used in competitive negotiation)
2. Solicitation, Offer, and Award (to be used for sealed bids)
5. Warranty Provisions
6. Technical Specifications (under development)

Part 1 contains the instructions to the manufacturers and other information relating to the procurement process. It also contains standard forms to be submitted by the offerors, including an offer (proposal or bid) form, which is section 1.2, and an award form to be used by the procuring agency (section 1.3). An appendix to the first version of Part 1, “Request for Proposals, Offer, and Award,” contains an illustrative evaluation process to be used in evaluating competing proposals.

Part 2 begins with definitions which apply throughout the SBPG and contains general commercial terms including contract modification and dispute resolution, delivery and product support, payment, bonding and other risk provisions, and policy provisions consisting primarily of those issues that must be addressed in a contract as a condition of the use of Federal funds for the contract. An appendix to Part 2 contains guidelines on setting the rate of liquidated damages, which is to be inserted in Part 2 as part of the solicitation of offers.

Part 3 contains quality assurance provisions, including the planned incorporation of ISO/QS 9000 standards as of January 1, 1999. Testing provisions that reflect the technical specifications are to be inserted at the end of Part 3. The New Bus Manufacturing Inspection Guidelines are incorporated in an appendix to Part 3.

Part 4 contains warranty provisions.

Standard technical specifications, which will comprise Part 5 are under development.

How To Use

While the SBPG provides a standard starting point, transit bus procurements should differ from each other not only in the number and use of buses purchased, but with delivery and other terms that serve the specific transit operation. Furthermore, each procuring agency must thoroughly review the SBPG to make modifications and additions required by local law or particular purposes of the agency. The SBPG will be available in hard copy, and in electronic form. The electronic versions can be obtained by mail, or may be down-loaded from the APTA World Wide Web site. The steps required to use the SBPG to issue a solicitation are:
1. Decide whether to use the first version of Part 1, Request for Proposals, or the second version, which is an invitation for bids, and enter the agency’s name, contracting officer’s contact data, and procurement schedule at the beginning of the section.

2. Supply a Pricing Schedule for suppliers to use, specifying the number of buses of each type required, quantities of spare parts, and any other items for which you want to receive separate prices (e.g., radios, fare boxes, tires, destination signs) at the end of Section 1.1.

3. Wherever the SBPG provide options in parallel columns of text, delete the unwanted columns, leaving the option you wish to specify.

4. Review, respond to (with insertions or choices), and remove all remaining italic text instructions.

5. Examine the document closely, and make any remaining changes required to meet your agency’s needs or current laws governing your agency.

**Solicitation and Contract Form**

After providing all the necessary information, making the appropriate selections, and otherwise modifying the document as necessary, either version of Part 1 of the SBPG (i.e., either the request for proposals or the invitation for bids) can be combined with Parts 2, 3, 4, and 5 to be issued as a solicitation of offers. When an offer (either a proposal or a bid) is received on the offer form in § 1.2, it is based on all the terms and conditions of the solicitation.

To use the SBPG as a contract form, the successful offer can be accepted using the notice of award attached to the offer; all other terms and conditions of the solicitation are incorporated by reference.
Alternatively, particularly in the case of long and prolific negotiations, parts 2, 3, 4, and 5 can be incorporated together with the results of the negotiations into a new contract form.

**User Information**

To facilitate some of these modifications and additions, italic text is used throughout the document for instructions or guidance to the procuring agency. Each procuring agency should replace all italic text with the appropriate data for its procurement or should mark out or remove the italic text if it is inappropriate. It is intended that no italic text remains in a solicitation of offers finally issued to manufacturers.

**Options**

Also the manual contains several standard options to address the most common differences among agencies and procurements. In addition to selecting the competitive negotiation or sealed bidding method of procurement, there are options for incorporating proposals into contract documents (§2.2.2), dispute resolution methods (§ 2.2.7), payment methods (§ 2.4), and a number of other variations in process and terms. These are presented in parallel columns in the text, so that the provisions that differ can be quickly identified and compared. The Procuring Agency should remove these columns (by marking out or masking in hard copy, or by deleting from an electronic copy) so that only one column remains in the solicitation issued to manufacturers. It is suggested that the letter designations of these options (a, b, or c) be retained in the solicitation as an aid to offerors in interpreting the solicitation.

Where an agency otherwise modifies the SBPG, it is suggested that the agency indicate with underlining added portions and with a caret character ( mẽ) the location of a deletion. These symbols together with a brief explanation will aid the offerors in identifying modifications from the SBPG. The date of the specific SBPG version used in the documents should be included.

**Interim Use**

If a procuring agency is using its own Part 5, Technical Specifications, the following links to the remainder of the SBPG should be made:

- “Guide for Inspection,” § 3.4, provides for inspection procedures or tests reflecting the technical specifications, and should be inserted;

- “Warranty Requirements,” § 4.1.1 provides specific warranty periods for specified systems in the bus; these systems should be clearly defined in the technical specifications;

- “Repair Procedures,” § 4.2, refers to rates of charge for Procuring Agency labor to be included in the Technical Specifications.

**Agency Responsibility**

The SBPG have been prepared by the Steering Committee to provide suggestions regarding bus purchases in general. Neither APTA, its consultants, nor any member of the committee has ascertained that these terms or specifications will achieve any specific result or are the most appropriate for any particular situation. The SBPG are based on the judgment of the Steering Committee and their assessment of the best procurement practices. The guidelines may not be responsive to varying legal and regulatory environments or varying dynamics of procurement.
contexts. Agencies are advised to have experts revise their solicitations and contracts to conform with state and local law as well as the best interests of the agency in a specific project. Each Procuring Agency should carefully review the SBPG and take full responsibility for any solicitation it issues whether all or part of the SBPG is included or not. Similarly, each supplier of buses or other equipment or services under such a contract must take responsibility for ensuring that the contract it enters into is appropriate to its situation.
(NOTE: All text shown in italics is either instruction to the Procuring Agency, information to be specified, guideline, or example; Procuring Agency should read, respond to, and remove all italicized text. Choices the Procuring Agency must make, i.e., standard options, are placed in parallel columns; the Procuring Agency should mark out or otherwise remove all but one column in each of these cases.)
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1 REQUEST FOR PROPOSALS, OFFER & AWARD

(Part 1 for competitive negotiated procurements: an alternative version of Part 1 for use in competitive bids follows this Part 1)
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1.1 REQUEST FOR PROPOSALS

1.1.1 SOLICITATION DATA

1.1.1.1 PROCURING AGENCY AND CONTRACTING OFFICER

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1.1.1.2 SCOPE

Procuring Agency requests proposals for the manufacture and delivery of transit buses/spare parts in accordance with the terms and conditions set forth below. The Contract shall be a firm-fixed price Contract.

1.1.1.3 SOLICITATION SCHEDULE

The following is the solicitation schedule for Offerors:

- Pre-proposal Conference: Sec. 1.1.2.1 (insert date and time)
- Offeror Communications and Requests: Sec. 1.1.2.2 due at least \((fifteen\text{ }days)\) before proposal due date
- Proposal Due Date: Sec. 1.1.3.1 (insert date and time)

1.1.2 PRE-PROPOSAL

1.1.2.1 PRE-PROPOSAL CONFERENCE

A pre-proposal conference will be held by the Procuring Agency at \((address)\) and at the time specified in “Solicitation Schedule” (Section 1.1.1.3).

Prospective Offerors are requested to submit written questions to the Contracting Officer in advance of the pre-proposal conference. Prospective Offerors are reminded that any changes to the RFP will
be by written addenda only and nothing stated at the pre-proposal conference shall change or qualify in any way any of the provisions in the RFP and shall not be binding on the Procuring Agency.

1.1.2.2 OFFEROR COMMUNICATIONS AND REQUESTS

All correspondence, communication and/or contact in regard to any aspect of this solicitation or offers shall be with the Contracting Officer identified in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) above, or his/her designated representative. Offerors and their representatives shall not make any contact with or communicate with any members of the Procuring Agency, or its employees and consultants, other than the Contracting Officer in regard to any aspect of this solicitation or offers.

At any time during this procurement up to the time specified in “Solicitation Schedule” (Section 1.1.1.3), Offerors may request, in writing, a clarification or interpretation of any aspect, or a change to any requirement of the RFP or any addenda to the RFP. 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 and may be transmitted by facsimile. The Offeror making the request shall be responsible for its proper delivery to the Procuring Agency per “Procuring Agency and Contracting Officer” (Section 1.1.1.1) on the form provided in “Request for Pre-Offer Change or Approved Equal” (Section 1.1.6.1). The Procuring Agency will not respond to oral requests except those made at the pre-proposal conference, which shall be tentative responses. Any oral response at a pre-proposal conference which is not confirmed by an addendum shall not be official or binding on the Procuring Agency. 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 evidencing that the exception will result in a condition equal to or better than that required by the RFP, without substantial increase in cost or time requirements. Any responses to such written requests shall be provided by the Procuring Agency in the form of addenda only. Only written responses provided as addenda shall be official and all other forms of communication with any officer, employee or agent of the Procuring Agency shall not be binding on the Procuring Agency.

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

1.1.2.3 ADDENDA TO RFP

The Procuring Agency reserves the right to amend the RFP at any time. Any amendments to or interpretations of the RFP shall be described in written addenda. The Procuring Agency shall provide copies of Addenda to all prospective Offerors officially known to have received the RFP. Prospective Offerors, or their agents, shall be responsible to collect the addendum at the address provided in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) above or receive same otherwise. Notification of or the addendum will also be mailed or delivered to all such prospective Offerors officially known to have received the RFP and to the address provided by each prospective Offeror. Failure of any prospective Offeror to receive the notification or addendum shall not relieve the Offeror from any obligation under its proposal as submitted or under the RFP, as clarified, interpreted or modified. All addenda issued shall become part of the RFP. Prospective Offerors shall
acknowledge the receipt of each individual addendum and all prior addenda in their proposals. Failure to acknowledge in their proposals receipt of addenda may at the Procuring Agency's sole option disqualify the proposal.

If the Procuring Agency determines that the addenda may require significant changes in the preparation of proposals, the deadline for submitting the proposals may be postponed by the number of days that the Procuring Agency determines will allow Offerors sufficient time to revise their proposals. Any new Due Date shall be included in the addenda.

1.1.2.4 CONDITIONS, EXCEPTIONS, RESERVATIONS OR UNDERSTANDINGS

Proposals stating conditions, exceptions, reservations or understandings (hereinafter “deviations”) relating to the RFP may be rejected. Offerors may submit an alternate proposal that states deviations so long as a basic proposal not containing deviations is submitted. Offerors may propose alternates either within one overall proposal or by submitting more than one proposal. Any alternate proposal shall include a price proposal in accordance with “Price Proposal Requirements” (Section 1.1.3.3).

Any and all deviations must be explicitly, fully and separately stated in the proposal by completing form(s) provided in “Form for Proposal Deviation” (Section 1.1.6.9), setting forth at a minimum the specific reasons for each deviation so that it can be fully considered and, if appropriate, evaluated by the Procuring Agency. All deviations not found by the Procuring Agency to be unacceptable shall be evaluated in accordance with the appropriate evaluation criteria and procedures, and may result in the Offeror receiving a less favorable evaluation than without the deviation.

1.1.3 INSTRUCTIONS TO OFFERORS

1.1.3.1 DUE DATE

Sealed proposals in original and (number) copies must be received at the address shown in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) until (date/time) for the provision of (number of buses, spare parts, options, etc.). All labor, equipment, and materials shall be furnished in strict accordance with the delivery schedule and conditions of the Contract Documents. Proposals and subsequent offers shall be valid for a period of (Procuring Agency to specify, not less than 90 and not more than 180 days) days.

1.1.3.2 TECHNICAL PROPOSAL REQUIREMENTS

(NOTE: Procuring Agency to develop and insert instructions to Offerors specifying the format and content of the technical proposal.)

1.1.3.2.1 Offeror Qualifications Statement

The Offeror shall state on the form provided in “Service and Parts Support” (Section 1.1.6.3) the representatives responsible for assisting the Procuring 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 Offeror shall also state below, or by separate attachment, its policy on transportation charges for parts other than those covered by warranty.

In addition, the Offeror shall provide the following information. (NOTE: Procuring Agency to specify the information necessary to evaluate against the qualifications requirements of Section 1.1.4.3.1.)
1.1.3.2.2 Technical Proposal
(Note: Procuring Agency to specify two types of information that Offerors shall include in the technical proposal: (1) the specific information needed to evaluate against the evaluation criteria of Section 1.1.4.3.2 and (2) the information that qualifies and quantifies the features of the bus offered that contractually commits the Offeror to deliver a specific bus design.)

1.1.3.2.3 Management Plan
(Note: Procuring Agency to specify the information required for any Management Plan required to be included in the proposal consistent with any specific management requirements and any evaluation criteria of Section 1.1.4.3.2.)

1.1.3.3 PRICE PROPOSAL REQUIREMENTS
(Note: Procuring Agency to specify the specific pricing data required and include the forms of Section 1.1.6 below on which prices are to be proposed.)

The Offeror is required to complete and execute the Pricing Schedule of Forms (Section 1.1.6.10) and provide same in the price proposal. 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 Offer price. The Procuring Agency shall furnish to all prospective Offerors a list of applicable state and local taxes imposed by the Procuring Agency’s state or local governments. The Procuring Agency shall be liable for any such state and local taxes applicable to the complete bus as delivered that are promulgated and become effective between the Due Date and the delivery date.

1.1.3.4 PROPOSAL PACKAGING REQUIREMENTS
Proposals shall be submitted in two (2) separately sealed packages. Each package shall be marked as specified below and shall contain all of the proposal documents for which the package is required to be marked and no other documents. These same requirements shall apply to any Best and Final Offers which may be requested.

PACKAGE NO. 1

TECHNICAL PROPOSAL

(Name of Procurement)

1. Letter of Transmittal
2. Technical Proposal
3. References and Non-priced Information (if provided by Offeror)

SUBMITTED BY:

(Offeror's name and address)

PACKAGE NO. 2

PRICE PROPOSAL

(Name of Procurement)
1. Price and Proposal
2. Pricing Schedule
3. Supporting Data

SUBMITTED BY:

(Offeror's name and address)

No cost, price or financial information of any kind shall be included in Package No. 1 or in any of the proposal documents that it will contain.

Proposal packages shall be addressed and delivered to the address specified in “Procuring Agency and Contracting Officer” (Section 1.1.1.1).

1.1.3.5 DBE CERTIFICATION
Pursuant to Title 49, Code of Federal Regulations, part 23.67, an Offeror, as a condition of being authorized to respond to this solicitation, must certify by completing “DBE APPROVAL CERTIFICATION” (Section 1.1.6.7), that it has on file with the Federal Transportation Administration (FTA) an approved or not disapproved annual Disadvantaged Business Enterprise (DBE) subcontracting participation goal.

1.1.3.6 MODIFICATION OR WITHDRAWAL OF PROPOSALS
A modification of a proposal already received will be accepted by the Procuring Agency only if the modification is received prior to the Proposal Due Date, or is specifically requested by the Procuring 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 proposal.

A Offeror may withdraw a proposal already received prior to the Proposal Due Date by submitting, in the same manner as the original proposal, to the Procuring Agency a written request for withdrawal executed by the Offeror’s authorized representative. After the proposal Due Date, a proposal may be withdrawn only if the Procuring Agency fails to award the Contract within the proposal validity period prescribed in “Due Date” (Section 1.1.3.1) or any agreed upon extension thereof. The withdrawal of a proposal does not prejudice the right of an offeror to submit another proposal within the time set for receipt of proposals.

This provision for modification and withdrawal of proposals may not be utilized by an Offeror as a means to submit a late proposal and, as such, will not alter the Procuring Agency’s right to reject a proposal.

1.1.4 PROPOSAL EVALUATION, NEGOTIATION AND SELECTION
Proposals will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described below. The approach and procedures are those which are applicable to a competitive negotiated procurement whereby proposals are evaluated to determine which proposals are within a competitive range. Discussions and negotiations may then be carried out with Offerors within the competitive range, after which Best and Final Offers (BAFOs) may be requested.
However, the Procuring Agency may select a proposal for award without any discussions or negotiations or request for any BAFO(s). Subject to the Procuring Agency's right to reject any or all proposals, the Offeror will be selected whose proposal is found to be most advantageous to the Procuring Agency, based upon consideration of the criteria of “Qualification Requirements” (Sections 1.1.4.3.1) and “Proposal Evaluation Criteria” (Section 1.1.4.3.2) below.
1.1.4.1 OPENING OF PROPOSALS
Proposals will not be publicly opened. All proposals and evaluations will be kept strictly confidential throughout the evaluation, negotiation and selection process. Only the members of the Selection Committee and Evaluation Team and other Procuring Agency officials, employees and agents having a legitimate interest will be provided access to the proposals and evaluation results during this period.

1.1.4.2 SELECTION COMMITTEE AND EVALUATION TEAM
(NOTE: Procuring Agency to specify how it will organize the evaluation and appropriately title this section. The following is provided as an example.)

A Selection Committee will be established. The Committee will make all decisions regarding the evaluations, determination of responsible Offerors and the competitive range, negotiations and the selection of the Offeror, if any, that may be awarded the Contract. The Selection Committee will be assisted by an Evaluation Team which will include officers, employees and agents of the Procuring Agency. The Evaluation Team will carry out the detailed evaluations and report all of its findings to the Selection Committee.

1.1.4.3 PROPOSAL SELECTION PROCESS
The following describes the process by which proposals will be evaluated and a selection made for a potential award. Any such selection of a proposal by a responsible Offeror shall be made by consideration of only the criteria of “Qualification Requirements” (Section 1.1.4.3.1) and “Proposal Evaluation Criteria” (Section 1.1.4.3.2) below. Section 1.1.4.3.1 specifies the requirements for determining responsible Offerors, all of which must be met by an Offeror to be found qualified. Final determination of an Offeror’s qualification will be made based upon all information received during the evaluation process and as a condition for award. Section 1.1.4.3.2 contains all of the evaluation criteria, and their relative order of importance, by which a proposal from a qualified Offeror will be considered for selection. An award, if made, will be to a responsible Offeror for a proposal which is found to be in the Procuring Agency’s best interest, price and other evaluation criteria considered.

The procedures to be followed for these evaluations are provided in “Evaluation Procedures” (Section 1.1.4.4) below.

1.1.4.3.1 Qualification Requirements
The following are the requirements for qualifying responsible Offerors. All of these requirements must be met; therefore, they are not listed by any particular order of importance. The Offeror of any proposal that the Selection Committee finds not to meet these requirements, and cannot be made to meet these requirements, may be determined by the Selection Committee not to be responsible and its proposal rejected. The requirements are as follows:

(NOTE: Requirements shown in italics are examples to serve as guidelines. The Procuring Agency is to choose and specify the appropriate requirements.)

I. Sufficient financial strength and resources and capability to finance the work to be performed and complete the Contract in a satisfactory manner as measured by:
A. Offeror's financial statements prepared in accordance with United States Generally Accepted Accounting Principles (GAAP) and audited by an independent certified public accountant authorized to practice in the jurisdiction of either the Procuring Agency or the Offeror. *(NOTE: Procuring Agency to determine any minimum requirements for equity, working capital, debt, etc. For example where it would be possible to establish some minimum numerical values for equity, debt to assets ratio, etc. as a screening mechanism, this should be done on an approximate basis to avoid having to rule out an otherwise viable Offeror which is just below a rigid minimum. Whatever measures are established should be consistent with what the financial strength needs are for the project. Here it is only important to determine if the Offeror will have sufficient financial strength to pay its bills on time, fund the cash flow, and meet obligations to subcontractors. The evaluation of financial strength should take into account the Offeror’s other contractual commitments)*

B. *(NOTE: If performance bonding is specified as an alternative to or together with other financial qualifications and assurances) Ability to secure required bond(s) as evidenced by a letter of commitment from an underwriter confirming that the Offeror can be bonded for the required amount.*

C. Willingness of any parent company to provide the required financial guaranty evidenced by a letter of commitment signed by an officer of the parent company having the authority to execute the parent company guaranty. *(NOTE: If the Offeror is a subsidiary(ies) of another company(ies) or is a joint venture, guaranties from the parents and/or corporate members of the joint venture should be required. Language can be stipulated by the Procuring Agency to assure that the guaranty is effective.)*

D. Ability to obtain required insurance with coverage values that meet minimum requirements evidenced by a letter from an underwriter confirming that the Offeror can be insured for the required amount.

II. Evidence that the human and physical resources are sufficient to perform the contract as specified and assure delivery of all equipment within the time specified in the Contract, to include:

A. Engineering, management and service organizations with sufficient personnel and requisite disciplines, licenses, skills, experience, and equipment to complete the Contract as required and satisfy any engineering or service problems that may arise during the warranty period.

B. Adequate manufacturing facilities sufficient to produce and factory-test equipment on schedule.

C. 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.

III. Evidence that Offeror is qualified in accordance with Part 3: Quality Assurance Provisions.

IV. Evidence of satisfactory performance and integrity on contracts in making deliveries on time, meeting specifications and warranty provisions, parts availability, and steps Offeror took to resolve any judgments, liens, fleet defects history, and warranty claims. Evidence shall be by client references.
1.1.4.3.2 Proposal Evaluation Criteria

The following are the complete criteria, listed by their relative degree of importance, by which proposals from responsible Offerors will be evaluated and ranked for the purposes of determining any competitive range and to make any selection of a proposal for a potential award. Any exceptions, conditions, reservations or understandings explicitly, fully and separately stated on the “Form for Proposal Deviation (Section 1.1.6.9) which do not cause the Procuring Agency to consider a proposal to be outside the competitive range, will be evaluated according to the respective evaluation criteria and/or sub-criteria which they affect.

The criteria are listed numerically by their relative order of importance. However, certain criteria may have sub-criteria that are listed by their relative order of importance within the specific 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.

(NOTE: Procuring Agency to define and insert the evaluation criteria. At the option of the Procuring Agency weights should be assigned to each criterion and sub-criterion and shown in the document. The criteria are to be listed by their order of importance in the evaluation. The following are suggested categories of criteria for Procuring Agency consideration, but not listed in suggested order of importance:

- Technical
- Qualifications and Resources
- Management
- Price
- Other Financial Impacts

Example evaluation criteria are presented in Appendix at the end of this Section 1.)

1.1.4.4 EVALUATION PROCEDURES

All aspects of the evaluations of the proposals and any discussions/negotiations, including documentation, correspondence and meetings, will be kept confidential during the evaluation and negotiation process.

Proposals will be analyzed for conformance with the instructions and requirements of the RFP and Contract documents. Proposals 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. Procuring Agency reserves the right to request an Offeror to provide any missing information and to make corrections. Offerors are advised that the detailed evaluation forms and procedures will follow the same proposal format and organization specified in “Instructions to Offerors” (Section 1.1.3). Therefore, Offerors shall pay close attention to and strictly follow all instructions. Submittal of a proposal will signify that the Offeror 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 Proposal Deviation” (Section 1.1.6.9). Any such conditions, exceptions, reservations or understandings which do not result in the rejection of the proposal are subject to evaluation under the criteria of “Proposal Evaluation Criteria” (Section 1.1.4.3.2).
Evaluations will be made in strict accordance with all of the evaluation criteria and procedures specified in “Proposal Selection Process” (Section 1.1.4.3) above. The Procuring Agency will select for any award the highest ranked proposal from a responsible Offeror, qualified under “Qualification Requirements” (Section 1.1.4.3.1) which does not render this procurement financially infeasible and is judged to be most advantageous to the Procuring Agency based on consideration of the evaluation “Proposal Evaluation Criteria” (Section 1.1.4.3.2).

1.1.4.4.1 Evaluations of Competitive Proposals

I. Qualification of Responsible Offerors. Proposals will be evaluated in accordance with requirements of “Qualification Requirements” (Section 1.1.4.3.1) to determine the responsibility of Offerors. Any proposals from Offerors whom the Procuring Agency finds not to be responsible and finds cannot be made to be responsible may not be considered for the competitive range. Final determination of an Offeror’s responsibility will be made upon the basis of initial information submitted in the proposal, any information submitted upon request by the Procuring Agency, information submitted in a BAFO and information resulting from Procuring Agency inquiry of Offeror’s references and its own knowledge of the Offeror.

II. Detailed Evaluation of Proposals and Determination of Competitive Range. Each proposal will be evaluated in accordance with the requirements and criteria specified in “Proposal Selection Process” (Section 1.1.4.3).

The following are the minimum requirements that must be met for a proposal to be considered for the competitive range. All of these requirements must be met; therefore, they are not listed by any particular order of importance. Any proposal that the Procuring Agency finds not to meet these requirements, and may not be made to meet these requirements, may be determined by the Procuring Agency to not be considered for the competitive range. The requirements are as follows:

A. Offeror is initially evaluated as responsible in accordance with the requirements of “Qualification Requirements” (Section 1.1.4.3.1), or that the Procuring Agency finds it is reasonable that said proposal can be modified to meet said requirements. Final determination of responsibility will be made with final evaluations.

B. Offeror has followed the instructions of the RFP and included sufficient detail information, such that the proposal can be evaluated. Any deficiencies in this regard must be determined by the Procuring Agency to be either a defect that the Procuring Agency will waive in accordance with “Acceptance/Rejection of Proposals” (Section 1.1.5.1) or that the proposal can be sufficiently modified to meet these requirements.

C. Proposal price would not render this procurement financially infeasible, or it is reasonable that such proposal price might be reduced to render the procurement financially feasible. The Procuring Agency will carry out and document its evaluations in accordance with the criteria and procedures of “Proposal Selection Process” (Section 1.1.4.3). Any extreme proposal deficiencies which may render a proposal unacceptable will be documented. The Procuring Agency will make specific note of questions, issues, concerns and areas requiring clarification by Offerors and to be discussed in any meetings with Offerors which the Procuring Agency finds to be within the competitive range.

Rankings and spreads of the proposals against the evaluation criteria will then be made by the
Procuring Agency as a means of judging the overall relative spread between proposals and of determining which proposals are within the competitive range, or may be reasonably made to be within the competitive range.

III. Proposals not within the Competitive Range. Offerors of any proposals that have been determined by the Procuring Agency as not in the competitive range, and cannot be reasonably made to be within the competitive range, will be notified in writing, including the shortcomings of their proposals.

IV. Discussions with Offerors in the Competitive Range. The Offerors whose proposals are found by the Procuring Agency to be within the competitive range, or may be reasonably made to be within the competitive range, will be notified and any questions and/or requests for clarifications provided to them in writing. Each such Offeror may be invited for a private interview(s) and discussions with the Procuring Agency to discuss answers to written or oral questions, clarifications, and any facet of its proposal.

In the event that a proposal, which has been included in the competitive range, contains conditions, exceptions, reservations or understandings to any Contract requirements as provided in “Form for Proposal Deviation” (Section 1.1.6.9), said conditions, exceptions, reservations or understandings may be negotiated during these meetings. However, the Procuring Agency shall have the right to reject any and all such conditions and/or exceptions, and instruct the Offeror to amend its proposal and remove said conditions and/or exceptions; and any Offeror failing to do so may cause the Procuring Agency to find such proposal to be outside the competitive range.

No information, financial or otherwise, will be provided to any Offeror about any of the proposals from other Offerors. Offerors 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. Offerors will not be told of their rankings among the other Offerors.

V. Factory and Site Visits. The Procuring Agency reserves the right to conduct factory visits to inspect the Offeror’s facilities and/or other transit systems which the Offeror has supplied the same or similar equipment.

VI. Best and Final Offers (BAFO). After all interviews have been completed, each of the Offerors in the competitive range will be afforded the opportunity to amend its proposal and make its BAFO. The request for BAFOs shall include:

A. Notice that discussions/negotiations are concluded;

B. Notice that this is the opportunity for submission of a BAFO;

C. A common date and time for submission of written BAFOs, allowing a reasonable opportunity for preparation of the written BAFOs;

D. 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 and is subject to the late submissions, modifications, and withdrawals of proposals provisions of the Request for Proposal;
E. Notice that if Offerors do not submit a BAFO or a notice of withdrawal and another BAFO, their immediate previous Offer will be construed as their BAFO.

Any modifications to the initial proposals made by an Offeror in its BAFO shall be identified in its BAFO. BAFOs will be evaluated by the Procuring Agency according to the same requirements and criteria as the initial proposals “Proposal Selection Process” (Section 1.1.4.3). The Procuring Agency will make appropriate adjustments to the initial scores for any sub-criteria and criteria which have been affected by any proposal modifications made by the BAFOs. These final scores and rankings within each criteria will again be arrayed by the Procuring Agency and considered according to the relative degrees of importance of the criteria defined in “Proposal Evaluation Criteria” (Section 1.1.4.3.2).

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

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

1.1.4.5 CONFIDENTIALITY OF PROPOSALS

NOTE: The following provision should be considered as a guideline for drafting a clause which is consistent with local laws.

Access to government records is governed by the (city state or local law). Except as otherwise required by the (city state or local law), the Procuring Agency will exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information submitted in the proposal. Any such proprietary information, trade secrets or confidential commercial and financial information which an Offeror 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 assure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

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<td>(If it is possible under the local law to separate the confidential information from the proposal)</td>
<td>The Offeror may (or shall) submit proprietary information, trade secrets or confidential commercial and financial information, which an Offeror believes should be exempted from disclosure, in a separate volume specifically identified and marked as such as an appendix to the proposal.</td>
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The following information is not required to be included in the Proposal, but the Offeror shall make it available for review by the Procuring Agency:
Upon a request for records from a third party regarding this proposal the Procuring Agency will notify in writing the party involved. The party involved must respond within twenty (20) calendar days with the identification of any and all “proprietary, trade secret, or confidential commercial or financial” information and the party involved shall indemnify the Procuring Agency’s defense costs associated with its refusal to produce such identified information; otherwise, the requested information may be released.

The Procuring Agency shall employ sound business practices no less diligent than those used for the Procuring 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 Offerors and the Contractor pursuant to the Contract which contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the (city state or local law) 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 Procuring Agency in its sole discretion, bears appropriate notices relating to its confidential character.

1.1.5 RESPONSE TO PROPOSALS

1.1.5.1 ACCEPTANCE/REJECTION OF PROPOSALS

The Procuring Agency reserves the right to reject any or all proposals for sound business reasons, to undertake discussions with one or more Offerors, and to accept that proposal or modified proposal which, in its judgment, will be most advantageous to the Procuring Agency, price and other evaluation criteria considered. The Procuring Agency reserves the right to consider any specific proposal which is conditional or not prepared in accordance with the instructions and requirements of this RFP to be noncompetitive. The Procuring Agency reserves the right to waive any defects, or minor informalities or irregularities in any proposal which do not materially affect the proposal or prejudice other Offerors.

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

The Procuring Agency may reject a proposal that includes unacceptable deviations as provided in “Conditions, Exceptions, Reservations or Understandings” (Section 1.1.2.4).

1.1.5.2 SINGLE PROPOSAL RESPONSE
If only one proposal is received in response to this RFP and it is found by the Procuring Agency to be acceptable, a detailed price/cost proposal may be requested of the single Offeror. A price or cost analysis, or both, possibly including an audit, may be performed by or for the Procuring Agency of the detailed price/cost proposal in order to determine if the price is fair and reasonable. The Offeror has agreed to such analysis by submitting a proposal in response to this RFP. A price analysis is an evaluation of a proposed price that does not involve an in-depth evaluation of all the separate cost elements and the profit factors that comprise an Offeror's price proposal. It should be recognized that a price analysis through comparison to other similar procurements must be based on an established or competitive price of the elements used in the comparison. The comparison must be made to a purchase of similar quantity, involving similar specifications and in a similar time frame. Where a difference exists, a detailed analysis must be made of this difference and costs attached thereto. Where it is impossible to obtain a valid price analysis, it may be necessary to conduct a cost analysis of the proposed price. A cost analysis is a more detailed evaluation of the cost elements in the Offeror's Offer to perform. It is conducted to form an opinion as to the degree to which the proposed costs represent what the Offeror's performance should cost. A cost analysis is generally conducted to determine whether the Offeror is applying sound management in proposing the application of resources to the contracted effort and whether costs are allowable, allocable and reasonable. Any such analyses and the results therefrom shall not obligate the Procuring Agency to accept such a single proposal; and the Procuring Agency may reject such proposal at its sole discretion.

1.1.5.3 CANCELLATION OF PROCUREMENT
The Procuring Agency reserves the right to cancel the procurement, for sound business reasons, at any time before the Contract is fully executed and approved on behalf of the Procuring Agency.

1.1.5.4 AVAILABILITY OF FUNDS
This procurement is subject to the availability of funding. (Procuring Agency to insert a description of the funding for this procurement, including any conditions upon which funding is dependent) The Procuring Agency's obligation hereunder is contingent upon the availability of appropriated funds from which payment for the Contract purposes can be made. No legal liability on the part of the Procuring Agency for any payment shall arise until funds are made available to the Contracting Officer for this Contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contracting Officer. Any award of Contract hereunder will be conditioned upon said availability of funds for the Contract.

1.1.5.5 PROTESTS
Any protests by an interested party regarding this procurement shall be made in accordance with (reference state or local law, ordinance and/or regulation). After such administrative remedies have been exhausted, an interested party may file a protest with the Federal Transit Administration (FTA) of the U.S. Department of Transportation pursuant to the procedures provided in FTA C 4220.1D. Alleged violations of certain federal requirements provide a separate complaint procedure. See, for example, Buy America Requirements, 49 CFR 661 (Section 661.15) and Participation by Disadvantaged Business Enterprise in Department of Transportation Programs, 49 CFR 23 (Section 23.73).

Failure to comply with the above protest procedures will render a protest untimely and/or inadequate and shall result in its rejection.
1.1.6 REQUIRED FORMS
1.1.6.1 REQUEST FOR PRE-OFFER CHANGE OR APPROVED EQUAL

*(procuring agency to insert RFP number)*

This form must be used for requested clarifications, changes, substitutes or approval of items equal to items specified with a brand name, and must be submitted as far in advance of the Due Date as specified in “Offeror Communications and Requests” (Section 1.1.2.2).

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Questions/Clarification or Approved Equal: ____________________________________________________________

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1.1.6.2 ACKNOWLEDGMENT OF ADDENDA

The following form shall be completed and included in the price proposal.

Failure to acknowledge receipt of all addenda may cause the proposal to be considered nonresponsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Offer.

ACKNOWLEDGMENT OF ADDENDA

The undersigned acknowledges receipt of the following addenda to the documents:

Addendum No. __________________, Dated __________
Addendum No. __________________, Dated __________
Addendum No. __________________, Dated __________
Addendum No. __________________, Dated __________

Offeror: ______________________________
Name

Street Address

City, State, Zip

Signature of Authorized Signer

Title

Phone
1.1.6.3 OFFEROR SERVICE AND PARTS SUPPORT DATA

| Location of nearest Technical Service Representative to Procuring Agency |
| Name |  |
| Address |  |
| Telephone |  |

Offeror to describe technical services readily available from said representative.

| Location of nearest Parts Distribution Center to Procuring Agency |
| Name |  |
| Address |  |
| Telephone |  |

Offeror shall 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 Procuring Agency |  |
1.1.6.4 BUY AMERICA CERTIFICATION

(To be submitted with a bid or 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 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:

Date: ________________________________________________________

Signature: ____________________________________________________

Company Name: _______________________________________________

Title: ________________________________________________________

Certificate of Non-Compliance

The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 C.F.R. 661.7.

Date: ________________________________________________________

Signature: ____________________________________________________

Company Name: _______________________________________________

Title: ________________________________________________________
1.1.6.5 DEBARMENT AND SUSPENSION CERTIFICATION (LOWER TIER COVERED TRANSACTION)

(To be submitted with a bid or Offer exceeding the small purchase threshold for Federal assistance programs, currently $100,000.)

The prospective lower tier participant (Offeror) certifies, by submission of this Offer, that neither it nor its “principals” as defined at 49 C.F.R. § 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 lower tier participant (Offeror) 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 ________.


_____________________________ Signature of the Bidder or Offeror’s Authorized Official

_____________________________ Name and Title of the Bidder or Offeror’s Authorized Official

___________________________ Date
1.1.6.6 LOBBYING CERTIFICATION

(To be submitted with a bid or Offer exceeding $100,000)

The Bidder or Offeror 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, U.S.C. § 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.


_____________________________ Signature of the Bidder or Offeror’s Authorized Official

_____________________________ Name and Title of the Bidder or Offeror’s Authorized Official

_____________________________ Date
1.1.6.7 DBE APPROVAL CERTIFICATION

I hereby certify that the Offeror has complied with the requirements of 49 CFR 23.67, Participation by Disadvantaged Business Enterprises in DOT Programs, and that its goals have not been disapproved by the Federal Transit Administration.

__________________________________ Signature of the Offeror’s Authorized Official

__________________________________ Name and Title of the Offeror’s Authorized Official

__________________________________ Date
1.1.6.8 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 U.S.C. § 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). 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 Offer. If the configuration or components are not identical, the manufacturer shall provide with its Offer a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.

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 Offer 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 Procuring 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.

Date: __________________________________

Signature: _______________________________

Company Name: _________________________

Title: _________________________________
1.1.6.9 FORM FOR PROPOSAL DEVIATION
(Procuring Agency to Insert RFP Number)

The following form shall be completed for each condition, exception, reservation or understanding (i.e., deviation) in the proposal according to “Conditions, Exceptions, Reservations and Understandings” (Section 1.1.2.4). One copy without any price/cost information is to be placed in the technical proposal as specified in “Technical Proposal Requirements” (Section 1.1.3.2) and a separate copy with any price/cost information placed in the price proposal as specified in “Price Proposal Requirements” (Section 1.1.3.3).

<table>
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<tr>
<th>Deviation #:</th>
<th>Offeror:</th>
</tr>
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<tbody>
<tr>
<td>Solicitation Ref:</td>
<td>Page:</td>
</tr>
<tr>
<td>Complete Description of Deviation</td>
<td>Section:</td>
</tr>
</tbody>
</table>

Rationale (Pros & Cons):
1.1.6.10 PRICING SCHEDULE

Procuring Agency to insert Pricing Schedule.
1.2 OFFER

(The following is an example Offer/Award form to be modified as appropriate by the Procuring Agency and included in the RFP.)

Offeror shall complete the following form and include same in the price proposal.

OFFER

By execution below Offeror hereby offers to furnish equipment and services as specified in (Procuring Agency insert name) Request for Proposals No. (Procuring Agency insert RFP Number) including the General Provisions (Section 2), Quality Assurance Provisions (Section 3), Warranty Provisions (Section 4) and Technical Specifications (Section 5), therein.

Offeror: ____________________________

Name

Street Address

City, State, Zip

Signature of Authorized Signer

Title

Phone

1.3 AWARD

NOTICE OF AWARD

By execution below, Procuring Agency accepts Offer as indicated above.

Contracting Officer: ____________________________

Signature

Date of Award: ____________________________
Two scoring methods, each including criteria and application of the criteria, are presented below. The first is a completely weighted method, in which all the criteria have a predetermined role and, given the unavoidably subjective assignment of pass/fail or numerical scores to specific criteria, results in a single, certain total score for each proposal. The second method, the narrative/trade-off method, provides more subjectivity in the assignment and combination of technical scores, and in the trade-offs between price and non-price criteria. An infinite number of variations and combinations of these methods could be developed.

I. Completely Weighted Formula Method

1.1.4.3.2 Illustrative Evaluation Criteria (Completely Weighted Formula Illustrative Method)

I. Affordability (pass or fail). The price proposals will be assessed for affordability. The Procuring Agency will not make an award for any proposal which proposes prices that would render the procurement infeasible.

II. Minimum Technical Requirements (pass or fail). Technical proposals shall meet the following minimum technical requirements for any consideration for selection and award. A proposal not meeting all of these requirements will be rejected.

(Note: Certain requirements of the specification can be selected as absolute requirements, such that where any one is not proposed to be met would be reason to reject a proposal. When doing so, the specific requirements must be identified by detailed references.)

Examples:

A. Passenger Capacity specified in ______.

B. Overall dimensions specified in ______.

C. Performance (speed, acceleration, braking, turning radius) specified in ______.

D. Emissions specified in ______.

E. Propulsion system requirements of ______.

F. Body structural and material requirements of ______.

G. Service proven technology

III. Unacceptable Exceptions, Conditions, Reservations and Understandings (pass or fail).

Exceptions, conditions, reservations or understandings that are explicitly, fully and separately stated on the required form of Section 1.1.6.9 “Form for Proposal Deviation” will be evaluated for their acceptability. Each of any exceptions and/or conditions made in a proposal will be evaluated and the Procuring Agency will determine their individual acceptability. An unacceptable exception, condition, reservation or understanding, if not withdrawn by the Offeror upon the request by the Procuring Agency, would be cause for the proposal to be rejected. For the purposes of determining
the competitive range a proposal containing unacceptable exceptions, conditions, reservations or understandings may be included on the basis that the proposal is capable of being made acceptable provided that the Offeror withdraw or modify the unacceptable exceptions, conditions, reservations or understandings. Any exceptions, conditions, reservations or understandings which do not cause the Procuring Agency to consider a proposal to be outside the competitive range, will be evaluated according to the respective evaluation criteria and/or sub-criteria which they affect.

IV. **Technical Proposal Scoring Criteria (weight = _______)** The transit bus offered in the technical proposal will be evaluated for the following factors which are listed in their relative order of importance:

A. **Engine** - Operating experience of previous users and test results of proposed engine and subsystems in transit service. The degree to which performance requirements of Part 3: Technical Specifications, for the engine are proposed to be met. The risk of development tasks (if any) will be assessed. (sub-weight = ______)

B. **Transmission** - Operating experience of previous users and test results of proposed transmission in transit service. The degree to which performance requirements of Part 3: Technical Specifications, for the transmission are proposed to be met. The risk of development tasks (if any) will be assessed. (sub-weight = ______)

C. **Major Subsystems** - Operating experience of previous users and test results of proposed major subsystems in transit service. The degree to which performance requirements of Part 3: Technical Specifications, for each major subsystem are proposed to be met. The risk of development tasks (if any) will be assessed. (sub-weight = ______)

D. **Quality Assurance** - Sufficiency of in-place Quality Assurance Program and procedures to meet requirements. (sub-weight = ______)

E. **Spare Parts Availability** - Degree to which the required availability of spare parts (Section 2.5.4) are proposed to be met or exceeded. (sub-weight = ______)

F. **Standard Warranty** - Degree to which the standard warranty of Part 5 is proposed to be met or exceeded. (sub-weight = ______)

G. **System Support** - Demonstrated ability to meet or exceed reliability and maintainability requirements; suitability of test equipment; quality of manuals; and effectiveness of training programs. (sub-weight = ______)

V. **Proposed Price (weight = _______).** The lowest proposal price (among all proposals) will be divided by the proposal price being scored, and the resulting quantity will be multiplied by the weight for the proposed price criterion. (NOTE: FTA competitive procurement requirements specify that to preserve the right to exercise options, they should be included in the evaluation).

VI. **Qualifications (weight = _______).** Degree to which Offeror exceeds the required qualifications of Section 1.1.4.3.1 above.

A. **Financial Strength and Resources** (sub-weight = ______)
B. **Human and Physical Resources** (sub-weight = ______)

C. **Record of Performance on Bus Contracts** (sub-weight = ______)

VII. **Other Financial Impacts** (weight = ______). This factor will consider the following financial impacts: maintenance costs resulting from parts reliability, parts standardization, warranties, timeframe for Contract performance and final delivery, and the extent to which the Procuring Agency can analyze cost and pricing data.

1.1.4.3.3 **Application of Evaluation Criteria.** (Completely Weighted Formula Illustrative Method)

(NOTE: This section may or may not be included, dependent upon the specific criteria that are included in Section 1.1.4.3.2.)

Proposals will be evaluated against the pass/fail Criteria Nos. 1, 2 and 3. Any proposal which meets all pass/fail criteria, or fails one or more of these criteria but is susceptible of being made to meet such failed criteria, will be considered within the competitive range. Otherwise, a proposal may not be considered to be within the competitive range.

Sub-criteria of Criteria Nos. 4 and 6 will be scored based on the reviewer’s determination of the degree of compliance with Contract requirements, potential risks and benefits, and strengths and weaknesses. The score is reduced in proportion to the extent of non-conformance, discrepancies, errors, omissions, and risks to the Procuring Agency. Scores will be assigned according to the following:

- **9 - 10** Exceptional. Fully compliant with Contract requirements and with desirable strengths or betterments; no errors, or risks, or weaknesses or omissions.
- **6 - 8** Good to Superior. Compliant with Contract requirements; some minor errors, or risks, or weaknesses or omissions.
- **4 - 5** Adequate. Minimally compliant with Contract requirements; errors, or risks, or weaknesses or omissions; possible to correct and make acceptable.
- **1 - 3** Poor to Deficient. Non-compliant with Contract requirements; errors, or risks, or weaknesses or omissions; difficult to correct and make acceptable.
- **0** Unacceptable. Totally deficient and not in compliance with Contract requirements; not correctable.

An estimate of the impact costs to the Procuring Agency will be made for the items listed in Criterion No. 7. Resultant scores for each sub-criterion will be weighed by the appropriate weight factors and a total score for each criterion determined. The scores of Criteria Nos. 4, 5 and 6 will then be weighed by the appropriate weight factors and a total score developed for the proposal. The following table illustrates the procedure.
Illustrative Scoring Format for Scoring Example No. 1

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Score</th>
<th>Weight</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subcriterion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. Technical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Engine</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>b. Transmission</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>c. Major Subsystems</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>d. Quality Assurance</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>e. Spare Parts Availability</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>f. Standard Warranty</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>g. System Support</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td><strong>Total Technical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. Proposed Price</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest Price Proposed</td>
<td>=</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Price of this Proposal</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6. Qualifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Financial Strength and Resources</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td>b. Human and Physical Resources</td>
<td>X</td>
<td>/10 =</td>
<td></td>
</tr>
<tr>
<td><strong>Total Qualifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7. Other Financial Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest Estimated Impact Cost</td>
<td>=</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Impact Cost of this Proposal</td>
<td>=</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL OF CRITERIA 4, 5, 6, AND 7**

II. Narrative / Trade-Off Method

1.1.4.3.2 Evaluation Criteria (Narrative / Trade-Off Illustrative Method)

1. **Unacceptable Exceptions, Conditions, Reservations and Understandings (pass or fail).**

   Exceptions, conditions, reservations or understandings that are explicitly, fully and separately stated on the required form of Section 1.1.6.9 “Form for Proposal Deviation” will be evaluated for their acceptability. Each of any exceptions and/or conditions made in a proposal will be evaluated and the Procuring Agency will determine their individual acceptability. An unacceptable exception, condition, reservation or understanding, if not withdrawn by the Offeror upon the request by the Procuring Agency, would be cause for the proposal to be rejected. For the purposes of determining the competitive range a proposal containing unacceptable exceptions, conditions, reservations or understandings may be included on the basis that the proposal is capable of being made acceptable.
provided that the Offeror withdraw or modify the unacceptable exceptions, conditions, reservations or understandings. Any exceptions, conditions, reservations or understandings which do not cause the Procuring Agency to consider a proposal to be outside the competitive range, will be evaluated according to the respective evaluation criteria and/or sub-criteria which they affect.

II. Other Pass/Fail Criteria - (NOTE: If the procuring agency wishes to impose any unalterable conditions on the proposals, these may be included as pass/fail criteria. Proposer criteria in addition to those specified in Section 1.1.4.3.1 “Qualification Requirements” (such as financial capability, proof of ability to provide performance bonds, or proven experience record) or essential technical criteria (such as propulsion system or approved equal, or structural requirements) may be either included in this category as pass/fail criteria, or evaluated under the following criteria with extremely low ranking for attributes that are unsatisfactory. The necessary input data should correspond to proposal requirements listed in Sections 1.1.3.2.2 “Technical Proposal” or 1.1.3.2.3 “Management Plan.”)

III. Technical Proposal - The transit bus and support offered in the technical proposal will be evaluated for the following factors which are listed in their relative order of importance:

A. Powertrain - Operating experience of previous users and test results of proposed engine, transmission, and subsystems in transit service. The degree to which performance requirements of Part 3: Technical Specifications and the needs of the Procuring Agency, for the engine and transmission are proposed to be met. The risk of development tasks (if any) will be assessed.

B. Structure, Suspension, and Body - Operating experience of previous users and test results of proposed structure, suspension (including braking systems and steering) and body in transit service. The degree to which performance requirements of Part 3: Technical Specifications and the needs of the Procuring Agency, for these systems are proposed to be met. The risk of development tasks (if any) will be assessed.

C. Other Major Subsystems - Operating experience of previous users and test results of proposed major subsystems in transit service. The degree to which performance requirements of Part 3: Technical Specifications and the needs of the Procuring Agency, for each major subsystem are proposed to be met. The risk of development tasks (if any) will be assessed.

D. Quality Assurance - Sufficiency of in-place Quality Assurance Program and procedures to meet requirements.

E. Spare Parts Availability - Degree to which the required availability of spare parts (Section 2.5.4) are proposed to be met or exceeded.

F. Standard Warranty - Degree to which the standard warranty of Part 5 is proposed to be met or exceeded.

G. System Support - Demonstrated ability to meet or exceed reliability and maintainability requirements; suitability of test equipment; quality of manuals; and effectiveness of training programs.
H. **Other Financial Impacts** - This factor will consider the following financial impacts: maintenance costs resulting from parts reliability, parts standardization, warranties, timeframe for Contract performance and final delivery, and the extent to which the Procuring Agency can analyze cost and pricing data.

I. **Qualifications** - Degree to which Offeror exceeds the required qualifications of Section 1.1.4.3.1 above.

   a) Human and Physical Resources.

   b) Financial Strength and Resources.

   c) Record of Performance on Bus Contracts.

(NOTE: The necessary input data should correspond to proposal requirements listed in Sections 1.1.3.2.2 “Technical Proposal” or 1.1.3.2.3 “Management Plan.”)

IV. **Proposed Price.** The price proposals will be evaluated and appropriate, uniform treatment of unit costs, ancillary products and services, escalators, exchange rates, deviations and options will reduce each proposal to a single price evaluation figure. (NOTE: FTA competitive procurement requirements specify that to preserve the right to exercise options, they should be included in the evaluation).

1.1.4.3.3 Application of Evaluation Criteria. (Narrative / Trade-Off Illustrative Method)

(NOTE: This section may or may not be included, dependent upon the specific criteria that are included in Section 1.1.4.3.2.)

1. Proposals will be evaluated against the pass/fail Criteria Nos. 1 and 2. Any proposal which meets all pass/fail criteria, or fails one or more of these criteria but is deemed susceptible of being made to meet such failed criteria, will be considered within the competitive range. Otherwise, a proposal may not be considered to be within the competitive range.

Sub-criteria of Criterion No. 3 will be evaluated based on the reviewer’s determination of the degree of compliance with Contract requirements, potential risks and benefits, and strengths and weaknesses. One of the following adjectival ratings should be used for each subcriterion:
Evaluators are to substantiate each rating with a brief narrative explaining their evaluation. The narrative will be specific in nature, addressing the strengths/weaknesses of the proposal in each area and provide a sound rationale for the conclusion reached. This becomes the basis for the evaluator’s overall rating and comparison to other proposals. To arrive at the overall technical rating, the evaluator will develop a summary statement.

Evaluators may utilize an informal weighting scheme as a tool (not to be considered the formal evaluation) to assist them in formulating their evaluation. This may be helpful to individual evaluators in terms of remaining focused on the relationship between criteria and facilitate the evaluation process.

2. The individual evaluators will rank each of the proposals reviewed in descending order and provide a supporting narrative, addressing the specific elements of the proposal that are the determining factors (consistent with step 1 findings) for their position within the ranking.

3. Committee members will review and discuss the individual findings and develop a consensus ranking consistent with the evaluation criteria. The committee ranking must also be supported by a narrative that provides the rationale (specific strengths and weaknesses) for their determination.

4. The rank ordered list of proposals will be arrayed in descending order together with the price evaluation figure for each proposal. As the list is reviewed in descending order, any increase in price as technical merit decreases will cause the elimination of the proposal from the list. If more than one proposal remains, the committee will review the trade-offs between descending technical merit and descending price. The committee will then make a decision regarding which of the proposals is the most advantageous to the Procuring Agency, price and other factors considered.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Significantly exceeds in all respects the minimum requirements; high probability of success; no significant weaknesses.</td>
</tr>
<tr>
<td>Very Good</td>
<td>Substantial response; meets in all aspects and in some cases exceeds, the critical requirements; no significant weaknesses.</td>
</tr>
<tr>
<td>Good</td>
<td>Generally meets minimum requirements; good probability of success; weaknesses can be readily corrected.</td>
</tr>
<tr>
<td>Marginal</td>
<td>Lack of essential information; low probability for success; significant weaknesses, but correctable.</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>Fails to meet minimum requirements; needs major revision to make it acceptable.</td>
</tr>
</tbody>
</table>
1 SOLICITATION, OFFER & AWARD

(Part 1 if Competitive Bidding is to be Followed: an alternative version of Part 1 for use in competitive negotiation precedes this Part 1)
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1.1 Solicitation

1.1.1 Solicitation Data

1.1.1.1 Procuring Agency and Contracting Officer

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<th>Invitation for Bids (IFB) No:</th>
<th></th>
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<tr>
<td>Date:</td>
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<td></td>
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<td>Telephone No.:</td>
<td></td>
</tr>
<tr>
<td>Fax No.:</td>
<td></td>
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</table>

1.1.2 Scope

Procuring Agency requests proposals for the manufacture and delivery of transit buses/spare parts in accordance with the terms and conditions set forth below. The Contract shall be a firm-fixed price Contract.

1.1.3 Solicitation Schedule

The following is the solicitation schedule for Offerors:

<table>
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<th>Sec. 1.1.2.2</th>
<th>due at least (fifteen days) before bid due date</th>
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<tr>
<td>Bid Due Date</td>
<td>Sec. 1.1.3.1</td>
<td>(insert date and time)</td>
</tr>
</tbody>
</table>

1.1.2 Pre-Bid

1.1.2.1 Bid Postponement and Addenda

The Procuring Agency reserves the right to revise or amend the specifications up to the time set for opening the bids. Such revisions and amendments, if any, shall be announced by addenda to this
solicitation. Copies of such addenda shall be furnished to all prospective Offerors. If the revisions and amendments require changes in quantities or prices bid, or both, the date set for opening bids may be postponed by such number of days as in the opinion of the Procuring Agency shall enable Offerors to revise their bids. In any case, bid opening shall be at least five working days after the last addendum, and the addenda shall include an announcement of the new date, if applicable, for opening bids.

1.1.2.2 OFFEROR COMMUNICATIONS AND REQUESTS

All correspondence, communication and/or contact in regard to any aspect of this solicitation or Offers shall be with the Contracting Officer identified in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) above, or his/her designated representative. Offerors and their representatives shall not make any contact with or communicate with any members of the Procuring Agency, or its employees and consultants, other than the Contracting Officer in regard to any aspect of this solicitation or Offers.

At any time during this procurement up to the time specified in “Solicitation Schedule” (Section 1.1.1.3), Offerors may request, in writing, a clarification or interpretation of any aspect, or a change to any requirement of the solicitation or any addenda to the solicitation. 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 and may be transmitted by facsimile. The Offeror making the request shall be responsible for its proper delivery to the Procuring Agency per “Procuring Agency and Contracting Officer” (Section 1.1.1.1) on the form provided in “Request for Change or Approved Equal” (Section 1.1.6.1). The Procuring Agency will not respond to oral requests except those made at any pre-bid conference, which shall be tentative responses. Any oral response at a pre-bid conference which is not confirmed by an addendum shall not be official or binding on the Procuring Agency. 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 evidencing that the exception will result in a condition equal to or better than that required by the RFP, without substantial increase in cost or time requirements. Any responses to such written requests shall be provided by the Procuring Agency in the form of addenda only. Only written responses provided as addenda shall be official and all other forms of communication with any officer, employee or agent of the Procuring Agency shall not be binding on the Procuring Agency.

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

1.1.2.3 BID WITHDRAWAL

After the bids are opened, bids may not be withdrawn during the period specified in “Due Date,” (Section 1.1.3.2). Prior to the date/time set for bid opening, however, bids may be modified or withdrawn by the Offeror’s authorized representative in person, or by written or facsimile notice. If bids are modified or withdrawn in person, the authorized representative shall make his identity known and shall sign a receipt for the bid. Written or facsimile notices shall be received in the office
designated in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) no later than the exact Due Date and time.

**1.1.3 BID REQUIREMENTS**

**1.1.3.1 BID PREPARATION**
Each Offer shall be made only on this Solicitation, Offer and Award form which shall be enclosed in a sealed envelope with the name and address of the Offeror clearly stated, and TRANSIT BUS OFFER marked on the outside. All blank spaces in the Offer must be filled in and no changes shall be made in the wording.

**1.1.3.2 DUE DATE**
Sealed bids in original and (number) copies will be received at the address shown in “Procuring Agency and Contracting Officer” (Section 1.1.1.1) until the time specified in “Solicitation Schedule,” (Section 1.1.1.3). Bids shall be valid for a period of (Procuring Agency to specify not less than 90 days and not more than 180 days).

**1.1.3.3 PRICING SCHEDULE**
*(NOTE: Procuring Agency to specify the specific pricing data required and include the forms of Section 1.1.6 below on which prices are to be proposed.)*

The Offeror is required to complete and execute the Pricing Schedule of Forms (Section 1.1.5.9), and provide same in the 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 Offer price. The Procuring Agency shall furnish to all prospective Offerors a list of applicable state and local taxes imposed by the Procuring Agency’s state or local governments. The Procuring Agency shall be liable for any such state and local taxes applicable to the complete bus as delivered that are promulgated and become effective between the Due Date and the delivery date.

**1.1.3.4 BID SECURITY**
*If bid security is required by local law or regulation, Procuring Agency to insert a conforming provision. If not, then consideration can be given to inclusion of the following option.*

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b) (Insert alternative bid security requirements)</th>
<th>(c) (Guideline option omitted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>As security for the Contract, each bid shall be accompanied by bid security in the form of a cashier’s check, letter of credit, or bond from a surety duly licensed to do business in the state of <em>(Procuring Agency’s state)</em>, furnished at the expense of the Offeror, in the amount of <em>(enter amount not to exceed 5 %)</em> percent of the total bid price of the Contract payable to the <em>(Procuring Agency)</em>.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(a)*
In the event that bid security is to be included then the following provision is to be included, unless there are overriding requirements provided by law or regulation.

Such bid security shall be held by (Procuring Agency) until the earlier of the end of the bid validity period, or award, or rejection of bids, after which said securities will be returned to the unsuccessful Offerors. However, if the bid validity period is requested by the (Procuring Agency) to be extended the bid securities from all Offerors not extending the validity period shall be returned and said bids shall not be valid. The bid securities from Offerors extending the bid validity period shall then be held only until the earlier of successful Offeror determination or expiration of the bid validity period, after which said securities will be returned to the unsuccessful Offerors. The bid security of the successful Offeror shall be held until the Contract is executed and the successful Offeror performs all other acts specified in “Production of Documents” (Section 2.7.3) within the required time period; otherwise, the bid security shall be forfeited to and retained by the (Procuring Agency) as liquidated damages for such failure of the successful Offeror.

1.1.3.5 DBE CERTIFICATION

Pursuant to Title 49, Code of Federal Regulations, part 23.67, a bidder, as a condition of being authorized to bid this procurement, must certify by completing “DBE APPROVAL CERTIFICATION” (Section 1.1.3.5), that it has on file with the Federal Transportation Administration (FTA) an approved or not disapproved annual Disadvantaged Business Enterprise (DBE) subcontracting participation goal.

1.1.4 1.1.4 BID OPENING AND RESPONSE

1.1.4.1 PUBLIC BID OPENING

Bids shall be publicly opened at the time set for opening in this solicitation. Their content, excluding documents marked proprietary, shall be made public for the information of Offerors and others interested, who may be present either in person or by representatives.

1.1.4.2 QUALIFICATIONS FOR AWARD

Award of this Contract shall be made to the Offeror quoting the lowest total, computed bid on buses, including delivery charges, as described on the pricing schedule in “Required Forms” (Section 1.1.5), provided the bid is responsive in all respects to these procurement requirements. The Offeror must have:

1. Offeror’s financial statements prepared in accordance with United States Generally Accepted Accounting Principles (GAAP) and audited by an independent certified public accountant authorized to practice in the jurisdiction of either the Procuring Agency or the Offeror. (NOTE:
Procuring Agency to determine any minimum requirements for equity, working capital, debt, etc. For example, where it would be possible to establish some minimum numerical values for equity, debt to assets ratio, etc., as a screening mechanism, this should be done on an approximate basis to avoid having to rule out an otherwise viable Offeror which is just below a rigid minimum. Whatever measures are established should be consistent with what the financial strength needs are for the project. Here it is only important to determine if the Offeror will have sufficient financial strength to pay its bills on time, fund the cash flow, and meet obligations to subcontractors. The evaluation of financial strength should take into account the Offeror's other contractual commitments.

2. Engineering, management and service organizations with sufficient personnel and requisite disciplines, licenses, skills, experience, and equipment to complete the Contract as required and satisfy any engineering or service problems that may arise during the warranty period.

3. Adequate manufacturing facilities sufficient to produce and factory-test equipment on schedule.

4. 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.


6. Evidence of satisfactory performance and integrity on contracts in making deliveries on time, meeting specifications and warranty provisions, parts availability, and steps Offeror took to resolve any judgments, liens, fleet defects history, and warranty claims. Evidence shall be by client reference.

The Procuring Agency shall have the right to conduct a pre-award survey of each Offeror.

1.1.4.3 SINGLE BID RESPONSE
If only one bid is received in response to the invitation for bids, a detailed cost proposal may be requested of the single Offeror. A cost/price analysis and evaluation and/or audit may be performed of the cost proposal in order to determine if the price is fair and reasonable.

1.1.4.4 AWARD PROCEDURE
Within _[Procuring Agency to insert number of days]_ calendar days after the bid opening, the Contracting Officer shall sign the Solicitation, Offer and Award form submitted by the successful Offeror and shall deliver the executed Contract documents specified in “Contract Documents” (Section 2.2.2) within _[Procuring Agency to insert number of days]_ calendar days after the signing. Delivery of Contract documents shall be determined by the Contractor’s signature on the return receipt request.

1.1.4.5 BID REJECTION
The Procuring Agency reserves the right to waive any minor bid informalities or irregularities received which do not go to the heart of the bid or prejudice other Offerors, or to reject, for good and compelling reasons, any and all bids submitted. Conditional bids, or those which take exception to the specifications, will be considered nonresponsive and will be rejected.
1.1.4.6 CONFIDENTIAL INFORMATION

NOTE: The following provision should be considered as a guideline for drafting a clause which is consistent with local laws.

Access to government records is governed by the (city state or local law). Except as otherwise required by the (city state or local law), the Procuring Agency will exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information submitted in the bid. Any such proprietary information, trade secrets or confidential commercial and financial information which an Offeror 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 assure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

(a) (If it is possible under the local law to separate the confidential information from the bid) - The Offeror may (or shall) submit proprietary information, trade secrets or confidential commercial and financial information, which an Offeror believes should be exempted from disclosure, in a separate volume specifically identified and marked as such as an appendix to the bid.

(b) (Guideline option omitted)

The following information is not required to be included in the Bid, but the Offeror shall make it available for review by the Procuring Agency:

(Procuring Agency to insert requirements)

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

The Procuring Agency shall employ sound business practices no less diligent than those used for the Procuring 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 Offerors and the Contractor pursuant to the Contract which contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the (city state or local law) 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 Procuring Agency in its sole discretion, bears appropriate notices relating to its confidential character.

1.1.4.7 PROTESTS
Any protests by an interested party regarding this procurement shall be made in accordance with (reference state or local law, ordinance and/or regulation).

After such administrative remedies have been exhausted, an interested party may file a protest with the Federal Transit Administration (FTA) of the U.S. Department of Transportation pursuant to the procedures provided in FTA C 4220.1D. Alleged violations of certain federal requirements provide a separate complaint procedure. See, for example, Buy America Requirements, 49 CFR 661 (Section 661.15) and Participation by Disadvantaged Business Enterprise in Department of Transportation Programs, 49 CFR 23 (Section 23.73).

Failure to comply with the above protest procedures will render a protest untimely and/or inadequate and shall result in its rejection.
1.1.5 REQUIRED FORMS
1.1.5.1 REQUEST FOR CHANGE OR APPROVED EQUAL

This form must be used for requested clarifications, changes, substitutes or approval of items equal to items specified with a brand name, and must be submitted as far in advance of the Due Date as specified in “Offeror Communications and Requests” (Section 1.1.2.2).

<table>
<thead>
<tr>
<th>Request #: _________________</th>
<th>Offeror:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solicitation Ref: _______ Page: ____________</td>
<td>Section: __________________</td>
</tr>
<tr>
<td>Questions/Clarification or Approved Equal: ___________________________</td>
<td></td>
</tr>
</tbody>
</table>

Procuring Agency: ____________________________
1.1.5.2 ACKNOWLEDGMENT OF ADDENDA
The following form shall be completed and included in the bid.

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 Offer.

ACKNOWLEDGMENT OF ADDENDA

The undersigned acknowledges receipt of the following addenda to the documents:

Addendum No. ____________________, Dated ________________
Addendum No. ____________________, Dated ________________
Addendum No. ____________________, Dated ________________
Addendum No. ____________________, Dated ________________

Offeror: ______________________________
Name

______________________________
Street Address

______________________________
City, State, Zip

______________________________
Signature of Authorized Signer

______________________________
Title

______________________________
Phone
### 1.1.5.3 OFFEROR SERVICE AND PARTS SUPPORT DATA

**Location of nearest Technical Service Representative to Procuring Agency**

- **Name**: 
- **Address**: 
- **Telephone**: 

Offeror to describe technical services readily available from said representative.

**Location of nearest Parts Distribution Center to Procuring Agency**

- **Name**: 
- **Address**: 
- **Telephone**: 

Offeror shall 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 Procuring Agency**: 
1.1.5.4 BUY AMERICA CERTIFICATION
(To be submitted with a bid or 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 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:

Date: ________________________________________________________
Signature: ____________________________________________________
Title: _________________________________________________________
Company Name: _______________________________________________

Certificate of Non-Compliance
The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 C.F.R. 661.7.

Date: ________________________________________________________
Signature: ____________________________________________________
Title: _________________________________________________________
Company Name: _______________________________________________
1.1.5.5 DEBARMENT AND SUSPENSION CERTIFICATION (LOWER TIER COVERED TRANSACTION)
(To be submitted with a bid or Offer exceeding the small purchase threshold for Federal assistance programs, currently $100,000.)

The prospective lower tier participant (Offeror) certifies, by submission of this Offer, that neither it nor its “principals” as defined at 49 C.F.R. § 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 lower tier participant (Offeror) 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 _________.


_____________________________ Signature of the Bidder or Offeror’s Authorized Official

_____________________________ Name and Title of the Bidder or Offeror’s Authorized Official

_____________________________ Date
1.1.5.6 LOBBYING CERTIFICATION  
(To be submitted with a bid or Offer exceeding $100,000)

The Bidder or Offeror 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 instructions (as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, et seq.))

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, U.S.C. § 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.


_____________________________  Signature of the Bidder or Offeror’s Authorized Official

_____________________________  Name and Title of the Bidder or Offeror’s Authorized Official

_____________________________  Date
1.1.5.7 DBE APPROVAL CERTIFICATION
I hereby certify that the Offeror has complied with the requirements of 49 CFR 23.67, Participation by Disadvantaged Business Enterprises in DOT Programs, and that our goals have not been disapproved by the Federal Transit Administration.

_________________________________ Signature of the Offeror’s Authorized Official

_________________________________ Name and Title of the Offeror’s Authorized Official

_________________________________ Date
1.1.5.8 CERTIFICATE OF COMPLIANCE WITH BUS TESTING REQUIREMENT

The undersigned certifies that the vehicles offered in this procurement comply and will, when delivered, comply with 49 U.S.C. § 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). 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 Offer. If the configuration or components are not identical, the manufacturer shall provide with its Offer a description of the change and the manufacturer’s basis for concluding that it is not a major change requiring additional testing.

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 Offer 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 Procuring 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.

Date: __________________________________

Signature: _____________________________

Company Name: _______________________

Title: _______________________________
1.1.5.9 PRICING SCHEDULE

Procuring Agency to insert Pricing Schedule.
1.2 OFFER

By execution below Offeror hereby offers to furnish equipment and services as specified in (Procuring Agency to insert its name) Invitation for Bids No. (Procuring Agency to insert IFB No.) including “General Provisions” (Section 2), “Quality Assurance Provisions” (Section 3), “Warranty Provisions” (Section 4) and “Technical Specifications” (Section 5) therein.

Offeror: ______________________________________________

Name

________________________________________________________________________

Street Address

________________________________________________________________________

City, State, Zip

________________________________________________________________________

Signature of Authorized Signer

________________________________________________________________________

Title

________________________________________________________________________

Phone

1.3 AWARD

By execution below Procuring Agency accepts Offer as indicated above.

Contracting Officer: ______________________________________________

Signature

Date of Award: ______________________________________________
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2.1 DEFINITIONS

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

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

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<th>(a) (for use in negotiated procurements)</th>
<th>(b) (for use in competitive bidding)</th>
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<td>Best and Final Offer (BAFO). The last Offer made by a proposer. If a BAFO is not specifically requested by the Procuring Agency, or if the proposer does not timely respond to a request for BAFO, the most recent, current Offer is the BAFO.</td>
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**Procuring Agency.** ______________________ (insert name) ______________________

**Contract.** The Offer and its acceptance by the Procuring Agency as manifested by the contract documents specified in "Contract Documents" (Section 2.2.2).

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

**Contractor.** The successful Offeror who is awarded a Contract for providing all buses and equipment described in the contract documents.

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

**Due Date.** The date and time by which Offers (proposals or bids) must be received by the Procuring Agency as specified in "Instructions to Offerors" (Section 1.1.3 of Procuring Agency's solicitation).

**Offer.** A promise, if accepted, to deliver equipment and services according to the underlying solicitation of the Procuring Agency documented using the prescribed form in the solicitation, including any bid or proposal or Best and Final Offer.

**Offeror.** A legal entity which makes an Offer, including a bidder or proposer.

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

| (a) Competitive Negotiation Solicitation. Procuring Agency's Request for Proposals |
|-----------------------------------------------|-----------------------------------------------|
| (b) Sealed Bids Solicitation. Procuring Agency's Invitation for Bids |
Supplier or Subcontractor. Any manufacturer, company, or agency providing units, components, or subassemblies for inclusion in the bus. Supplier items shall require qualification by type and acceptance tests in accordance with requirements defined in Part 3: Quality Assurance Provisions.

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.

2.2 CONTRACT AND MODIFICATIONS

2.2.1 CONTRACT AWARD AND EXECUTION

The acceptance of an Offer for award, if made, shall be evidenced by a notice of award of Contract in writing delivered in person or by registered mail to the Offeror whose Offer is accepted. No other act by the Procuring Agency shall evidence acceptance of an Offer. Such notice shall obligate said Offeror to commence performance under the Contract as specified in "Production of Documents" (Section 2.7.3).

2.2.2 CONTRACT DOCUMENTS

The Contract consists of the following:

In case of any conflict among these documents where the parties' intended resolution is not clear, the order of precedence shall be:

- Part 1 - Contractor's Best and Final Offer and Procuring Agency's Notice of Award
- Part 2 - General Contractual Provisions
- Part 3 - Quality Assurance Provisions
- Part 4 - Warranty Provisions
- Part 5 - Technical Specifications
- Addenda - As issued
- Contractor's Proposal including any modifications explicitly incorporated in Contractor's Best and Final Offer
2.2.3 MODIFICATIONS TO CONTRACT

2.2.3.1 CONTRACTOR CHANGES
Any proposed change in this Contract shall be submitted to the appropriate Procuring Agency for its prior approval.

2.2.3.2 WRITTEN CHANGE ORDERS
Oral change orders are not permitted. No change in this Contract shall be made unless the Contracting Officer gives prior written approval therefore. 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.

2.2.3.3 CHANGE ORDER PROCEDURE
As soon as reasonably possible but no later than 30 (thirty) 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 proposal for the work to be performed. This proposal 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 the Contract disputes clause. Regardless of any disputes, the Contractor shall proceed with the work ordered.

2.2.3.4 PRICE ADJUSTMENT FOR REGULATORY CHANGES
If price adjustment is indicated, either upward or downward, it shall be negotiated between the Procuring Agency and the Contractor for changes that are mandatory as a result of legislation or regulations that are promulgated and become effective after the Due Date. Such price adjustment may be audited, where required.

2.2.4 PARTIES AND CHANGES IN PARTIES

2.2.4.1 PARTIES
The parties to the contract are the Procuring Agency as defined in "Definitions", Section 2.1 and the Offeror as set out in the accepted Offer.

2.2.4.2 SUCESSION
The Contract will be binding on the parties, their successors, and assigns.
2.2.4.3 ASSIGNMENT AND SUBCONTRACTING

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.

2.2.5 SPECIFICATION AND OFFER OMISSIONS

Notwithstanding the provision of drawings, technical specifications, or other data by the Procuring 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. Fare collection equipment, communication equipment, and other items that are installed by the Procuring Agency shall not be the responsibility of the Contractor unless they are included in this Contract.

Any request, condition, exception, reservation, understanding or other deviation by Contractor not separately stated as required by "Instructions to Offerors" (Section 1.1.3 of Procuring Agency's solicitation) by completing the specified form(s) shall be invalid and shall not be binding on the Procuring Agency.

2.2.6 TERMINATION OF CONTRACT

2.2.6.1 TERMINATION FOR CONVENIENCE

The performance of work under this Contract may be terminated by the Procuring 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 Procuring 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: 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 Procuring 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 Procuring Agency shall have the right, in its discretion, to settle or pay and 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 may require, which approval or ratification shall be final for all the purposes of this clause; transfer title to the Procuring Agency and deliver in the manner, at the times, and to the extent, if any, directed by 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 Procuring 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 Procuring 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; and 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 which is in the possession of the Contractor and in which the Procuring 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 Procuring 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 "Procuring Agency" shall be substituted in lieu thereof.

2.2.6.2 TERMINATION FOR DEFAULT

The Procuring 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 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 10 (ten) days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.

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

If the Contract is terminated in whole or in part for default, the Procuring 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 Procuring 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 causes 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 in sufficient time to permit the Contractor to meet the required delivery schedule.

Payment for completed supplies delivered to and accepted by the Procuring Agency shall be at the Contract price. The Procuring 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 Procuring 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 Procurement Agency.

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

2.2.7 DISPUTES

NOTE: The following deals with disputes arising after Contract award and not during the procurement process. The latter are "protests" which should be dealt with under the procurement procedures.

Outlined below are example provisions and recommendations for drafting a disputes resolution clause to be included in the Contract. Included are stepped negotiations, submission for Procuring Agency executive decision and alternatives dispute resolution. However, by mutual agreement the matter may be taken immediately to any higher step in the resolution process, or mutually agreed to alternative dispute resolution process (which may include structured negotiations, mediation or arbitration), or litigation.

Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under or related to this Contract which 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) days of the determination of the dispute.
2. Negotiation Between Executives. 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 persons 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) 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 other person(s) who will accompany the executive in negotiations. Within 28 (twenty-eight) days after delivery of the dispute notice, the executives 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.

(a) If the matter has not been resolved by these persons within forty-two (42) 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.

(b) (Guideline option omitted)

3. Contracting Officer's or Chief Executive Officer's Decision. (a) Should the dispute not be resolved by negotiation between executives, as provided in (2) above, the Procuring Agency's executive representative from (2) above shall submit a written request for decision to the contracting officer along with all documentation and minutes from the negotiations. The Contracting 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 Contracting Officer 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 Contracting Officer shall be administratively final and conclusive unless, within 30 (thirty) days from the date of delivery of the written decision, the Contractor appeals the decision in writing to the Procuring Agency's chief executive officer or designee who shall render a written decision within 14 (fourteen) days of delivery of such written appeal. Such decision by the chief executive officer or his/her designee shall be administratively final and conclusive.

B. Within 30 (thirty) days of the issuance of any administratively final and conclusive decision under this paragraph 3, the Contractor shall notify the Procuring 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 which 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 the state of (Procuring Agency to insert its state).

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 Procuring Agency.

4. Alternatives Disputes Resolution. If agreed to by both parties disputes may be resolved by a mutually agreed to alternative dispute resolution process which may include structured negotiations different from (2) above, mediation or arbitration.

5. Arbitration. NOTE: If arbitration is not to be included this clause is to be deleted. The following is only an example arbitration clause that may be included, it is not intended as a recommendation but is provided for purposes of illustration.

Disputes appealed to arbitration involving over $50,000 but less than $250,000 shall be decided by one (1) 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 practice 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 (1) arbitrator shall be selected by each of the parties and the two selected arbitrators shall select a third arbitrator within 10 (ten) 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.

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

(b) The decision of the arbitrators shall not be binding and either party shall have the right to remedies provided by law.

2.2.8 COMMUNICATIONS

Communications in connection with this Contract shall be in writing and shall be delivered personally; or by facsimile; or by regular, registered, or certified mail addressed to the officer(s) or employee(s) of the Procuring Agency and of the Contractor designated to receive such communications. Telephone calls may be used to expedite communications but shall not be official communication unless confirmed in writing.

Communications shall be considered received at the time actually received by the addressee or designated agent.
2.3 DELIVERY AND TITLE

2.3.1 DELIVERIES

2.3.1.1 BUS DELIVERY PROCEDURE
Delivery of buses shall be determined by signed receipt of the Procuring Agency's designated agent(s) (name and address), at the following point of delivery and may be preceded by a cursory inspection of the bus.

(address)

2.3.1.2 DELIVERY SCHEDULE
The buses shall be delivered at a rate not to exceed (insert maximum) buses per week. Delivery shall be completed within (insert) weeks after delivery of the executed contract documents. Hours of delivery shall be (opening time) through (closing time) the following days of the week: (Procuring Agency to insert receiving periods).

2.3.1.3 PRE-DELIVERY TESTS AND INSPECTIONS
The pre-delivery tests and inspections shall be performed at or near the Contractor's plant; they shall be performed in accordance with the procedures defined in Part 3: Quality Assurance Provisions, and they may be witnessed by the resident inspector. When the bus passes these tests and inspections, the resident inspector shall authorize release of the bus.

2.3.1.4 ASSUMPTION OF RISK OF LOSS
The Procuring Agency shall assume risk of loss of the bus on delivery, as defined in "Bus Delivery Procedure" (Section 2.3.1.1), if delivered by common carrier or driveway, or on release to the Procuring Agency's drivers at the Contractor's plant. Prior to this delivery or release, the Contractor shall have risk of loss of the bus, including any damages sustained during the common carrier or driveway operation regardless of the status of title or any payments related to the bus. Drivers shall keep a maintenance log enroute and it shall be delivered to the Procuring Agency with the bus.

2.3.1.5 ACCEPTANCE OF BUS
Within 15 (fifteen) calendar days after arrival at the designated point of delivery, the bus shall undergo the Procuring Agency tests defined in Part 4: Quality Assurance Provisions. If the bus passes these tests or if the Procuring Agency does not notify Contractor of nonacceptance within 15 (fifteen) calendar days after delivery, acceptance of the bus by the Procuring Agency occurs on the fifteenth day after delivery. Acceptance may occur earlier if the Procuring Agency notifies the Contractor of early acceptance or places the bus in revenue service. If the bus fails these tests, it shall not be accepted until the repair procedures defined in "Repairs After Nonacceptance" (Section 2.3.2) have been carried out and the bus retested until it passes.
2.3.2 REPAIRS AFTER NONACCEPTANCE

The Contractor, or its designated representative shall perform the repairs after nonacceptance. If the Contractor fails or refuses to make the repairs within 5 (five) days, then the work may be done by the Procuring Agency's personnel with reimbursement by the Contractor.

2.3.2.1 REPAIRS BY CONTRACTOR

After nonacceptance of the bus, the Contractor must begin work within 5 (five) working days after receiving notification from the Procuring Agency of failure of acceptance tests. The Procuring 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 Procuring Agency's option, the Contractor may be required to remove the bus from the Procuring Agency's property while repairs are being effected. If the bus is removed from the Procuring 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.

2.3.2.2 REPAIRS BY PROCURING AGENCY

1. Parts Used. If the Procuring Agency performs the repairs after nonacceptance 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. Monthly, or at a period to be mutually agreed upon, reports of all repairs covered by this procedure shall be submitted by the Procuring Agency to the Contractor for reimbursement or replacement of parts. The Contractor shall provide forms for these reports.

2. Contractor Supplied Parts. If the Contractor supplies parts for repairs being performed by the Procuring Agency after nonacceptance of the bus, these parts shall be shipped prepaid to the Procuring Agency from any source selected by the Contractor within 10 (ten) working days after receipt of the request for said parts.

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 Procuring Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by multiplying the number of man-hours actually required to correct the defect by a per hour, 5M mechanic, straight wage rate, plus _ (insert same percentage as in Warranty Provisions, Part 3) ___ percent fringe benefits, plus the cost of towing in the bus if such action was necessary. These wage and fringe benefits rates shall not exceed the rates in effect in the Procuring Agency's service garage at the time the defect correction is made.

5. Reimbursement for Parts. The Procuring 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 _ (insert percentage) percent handling costs.
2.3.3 UNAVOIDABLE DELAYS

2.3.3.1 CONTRACTOR'S DELAY
If the Contractor is delayed at any time during the progress of the Work by the neglect or failure of the Procuring Agency or by a cause described below, then the time for completion and/or affected delivery date(s) shall be extended by the Procuring Agency subject to the following conditions:

1. 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;

2. The Contractor demonstrates that the completion of the Work and/or affected delivery(s) will be actually and necessarily delayed;

3. The effect of such cause cannot be avoided or mitigated by the exercise of all reasonable precautions, efforts and measures whether before or after the occurrence of the cause of delay; and

4. The Contractor makes written request and provides other information to the Procuring Agency as described in "Notification of Contractor Delay" (Section 2.3.3.2 below).

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

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" (Section 2.3.4) for delays occurring prior to, or subsequent to the occurrence of an excusable delay.

The Procuring Agency reserves the right to rescind or shorten any extension previously granted, if subsequently the Procuring 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 Procuring 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.

2.3.3.2 NOTIFICATION OF CONTRACTOR DELAY
Notwithstanding "Contractor's Delay" (Section 2.3.3.1), no extension or adjustment of time shall be granted unless (1) written notice of the delay is filed with the Procuring Agency within 14 (fourteen) calendar days after the commencement of the delay and (2) a written application therefor, 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 Procuring Agency within 30 (thirty) 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 Procuring Agency shall make its determination within 30 (thirty) (or insert time specified by regulation or law) calendar days after receipt of the application.

2.3.4 LIQUIDATED DAMAGES

It is mutually understood and agreed by and between the parties to the Contract that time is of the essence with respect to the completion of the Work and that in case of any failure on the part of the Contractor to complete the Work within the time specified in "Delivery Schedule" (Section 2.3.1.2), except for any excusable delays as provided in "Unavoidable Delays" (Section 2.3.3), or any extension thereof, the Procuring Agency will be damaged thereby. The amount of said damages, being difficult if not impossible of definite ascertainment and proof, it is hereby agreed that the amount of such damages due the Procuring Agency shall be fixed at $ (see Appendix for LD Calculation Guideline) per calendar day per bus not delivered in substantially as good condition as inspected by the Procuring Agency at the time released for shipment.

The Contractor hereby agrees to pay the aforesaid amounts as fixed, agreed and liquidated damages, and not by way of penalty, to the Procuring Agency and further authorizes the Procuring Agency to deduct the amount of the damages from money due the Contractor under the Contract, computed as aforesaid. If the monies due the Contractor are insufficient or no monies are due the Contractor, the Contractor shall pay the Procuring Agency the difference or the entire amount, whichever may be the case, within 30 (thirty) calendar days after receipt of a written demand by the Contracting Officer.

The payment of aforesaid fixed, agreed and liquidated damages shall be in lieu of any damages for any loss of profit, loss of revenue, loss of use, or for any other direct, indirect, special or consequential losses or damages of any kind whatsoever that may be suffered by the Procuring Agency arising at any time from the failure of the Contractor to fulfill the obligations referenced in this clause in a timely manner.

The Procuring Agency specifically reserves the right, without limitation of any other rights, to terminate the Contract in accordance with "Termination of Contract" (Section 2.2.6).

(a) May be considered by the Procuring Agency for inclusion if early delivery will create a savings to the Procuring Agency. Procuring Agency may wish to modify "Contractor's Delay" (Section 2.3.3.1) to determine delivery date for purposes of this incentive option) - In the event that the Contractor completes Work earlier than required by "Delivery Schedule" (Section 2.3.1.2), the Contractor shall be paid an incentive of $ (see Appendix for Incentive Calculation Guideline) per calendar day per bus that is delivered and accepted early. The total amount of such incentive payments shall not exceed (insert maximum percent) percent (__ %) of the total Contract amount.

(b) (Guideline option omitted)
2.3.5 TITLE

Adequate documents for registering the bus in (Procuring Agency to insert its jurisdiction) shall be provided to the Procuring Agency at least (number) working days before each bus is released to the common carrier driveaway or to the Procuring Agency's drivers. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Procuring Agency free and clear of all encumbrances.

2.4 PAYMENT

The Procuring 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 and material required, overhead, expenses, storage and shipping, risks and obligations, taxes (as applicable), fees and profit, and any unforeseen costs.

NOTE: The advanced payment option may be used to advance funds to the contractor whether payment is otherwise due on progress completed or on delivery (see options below).

| (a) (Guideline option omitted) | (b) ADVANCE PAYMENT OPTION (The following optional provision is a guideline for drafting any advance payment option that might be included.) The Procuring Agency shall pay to the Contractor twenty percent (20%) of the total amount of the price schedule within 30 (thirty) calendar days after the issuance of the notice of award and upon receipt of Contractor's invoice and provision by the Contractor the evidences of insurance required by "Insurance" (Section 2.7.1) and Performance Bond specified by "Performance Bond" (Section 2.7.2). The Advance Payment shall be refunded to the Procuring Agency as prorata credits against future invoices, whereas each prorata credit is calculated as the same percentage that the invoice amount (not discounted for any liquidated damages) is of the total amount of the price schedule, or, in the event that the Contract is terminated for any reason, as a direct payment. |
| NOTE: Three alternatives for payment are provided: (a) Payment Upon Delivery (b) Payment Upon Delivery with Retention, and (c) Progress Payments. The progress payment alternative is a model that the Procuring Agency may use as a guideline in drafting such payment provision. |

| (a) Delivery Payment | (b) Delivery Payment with Retention | (c) Progress Payments (Include the following provision if progress payments are to be made.) |
| All payments shall be made as provided herein, less any | All payments shall be made as provided herein, | NOTE: The following is a model clause that the Procuring Agency can use as a guideline in preparing any progress payment provision. If progress payments are to |
additional moneys withheld as provided below and less any amounts for liquidated damages in accordance with "Liquidated Damages" (Section 2.3.4).

less a withholding of two percent (2%) plus any additional moneys withheld as provided below and less any amounts for liquidated damages in accordance with "Liquidated Damages" (Section 2.3.4).

be included, security for the progress payments of Milestone No. 1 to the Contractor should be required of the Contractor through a Performance Bond. The bond amount should not be less than the Procuring Agency's financial exposure for cumulative payments for Milestone No. 1 and any advance payment.

The Procuring Agency shall make payments for buses at the unit prices itemized in the Price Schedule within 30 (thirty) calendar days after the delivery and acceptance of each bus and receipt of a proper invoice. In the event that the bus does not meet all requirements for acceptance the Procuring Agency may, at its exclusive option, "conditionally accept" the bus and place it into revenue service pending receipt of Contractor furnished materials and/or labor necessary to effectuate corrective action for acceptance. For any conditionally accepted bus the payment shall be reduced by an amount to be withheld, and paid upon corrective action by the contractor, equal to twice the estimated cost for parts and labor for the corrective action.

All payments shall be made as provided herein, less any moneys to be withheld as provided below and less any amounts for liquidated damages in accordance with "Liquidated Damages" (Section 2.3.4).

The Procuring Agency shall make progress payments to the Contractor for buses in accordance with the performance milestones set forth below.

Title to material included in any progress payment request shall pass to the Procuring Agency upon payment by the Procuring Agency. Said title shall be free of all encumbrances. However, such transfer of title shall not relieve the Contractor of its responsibility for the furnishing, installation, fabrication or inclusion of said materials as a deliverable element of buses procured in accordance with the requirements of the Contract.

The (suggested) performance milestones and payment limits shall be as follows:

1. The Procuring Agency shall make payments for buses at forty percent (40%) of the unit price(s) for each bus(es) itemized in the price schedule upon verification by the Procuring Agency’s Inspector that said bus(es) have had the front and rear axles installed in the manufacturing cycle at the Contractor’s plant and within 30 (thirty) calendar days of receipt of a proper invoice. Invoices submitted under this milestone shall include a listing of all major components and component serial numbers that shall be the same as in the final bus record.

The Procuring Agency shall make final payment for all withholding within 30 (thirty) 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. Rectification of any deficiencies found during the acceptance of buses.

3. Contractor provision of any certifications as required by law and/or regulations.

4. Completion of post delivery audits required under the Contract.

2. The Procuring Agency shall make payments for buses at **twenty percent (20%)** of the unit price(s) for each bus(es) itemized in the price schedule when the Procuring Agency’s Inspector has approved shipment of said bus(es) from the Contractor’s plant and within **30 (thirty)** calendar days of receipt of a proper invoice.

3. The Procuring Agency shall make payments for buses at **thirty-eight percent (38%)** of the unit price(s) for each bus(es) itemized in the price schedule upon the delivery and acceptance of each bus and within **30 (thirty)** calendar days of receipt of a proper invoice. In the event that the bus does not meet all requirements for acceptance the Procuring Agency may, at its exclusive option, “conditionally accept” the bus and place it into revenue service pending receipt of Contractor furnished materials and/or labor necessary to effectuate corrective action for acceptance. For any conditionally accepted bus the payment shall be reduced by an amount to be withheld, and paid upon corrective action by the contractor, equal to twice the estimated cost for parts and labor for the corrective action.

4. The Procuring Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule upon the delivery and acceptance of said spare parts and/or equipment and within **30 (thirty)** calendar days of receipt of a proper invoice. Title for spare parts and/or equipment shall transfer to the Procuring Agency upon payment. Said title shall be free of all encumbrances.

5. The Procuring Agency shall make a final payment of **two percent (2%)** of the total Contract price plus any moneys withheld, within **30 (thirty)** calendar days of receipt of a proper invoice and the following:
(Include the following provision if there is no applicable prompt payment law or regulation.) - The Procuring Agency shall pay to the Contractor interest daily on the balance of any payments due, as specified above, at the prime rate of interest published by the Wall Street Journal, beginning 30 (thirty) days after payments are due.

### 2.5  SERVICE AND PARTS

#### 2.5.1 TRAINING

*(The following is illustrative; the Procuring Agency should carefully specify its requirements)*

The Contractor shall have at least one qualified instructor who shall be available at the Procuring Agency's property for *(number of days per month)* calendar days between the hours of *(starting time)* and *(closing time)* per month for *(number)* months prior to, and *(number)* months after, acceptance of the first bus. Instructor(s) shall conduct schools and advise the personnel of the Procuring Agency on the proper operation and maintenance of the equipment. The Contractor shall also provide visual and other teaching aids for use by the Procuring Agency's own training staff.

#### 2.5.2 ENGINEER / SERVICE REPRESENTATIVES

The Contractor shall, at its own expense, have a competent engineering service representative(s) available on request to assist the Procuring Agency's staff in the solution of engineering or design
problems within the scope of the specifications that may arise during the warranty period. This does not relieve the Contractor of responsibilities under Part 4: Warranty Provisions.

2.5.3 DOCUMENTS

The Contractor shall provide (Procuring Agent to insert number and specify any additional documentation requirements) current maintenance manual(s), (number) current parts manual(s), and (number) standard operator's manual(s) as part of this Contract. The Contractor shall keep maintenance manuals available for a period of three years after the date of acceptance of the buses procured under this Contract. The Contractor shall also exert its best efforts to keep maintenance manuals, operator manuals, and keep parts books up-to-date for a period of 15 (fifteen) years. The supplied maintenance and operator's manuals shall incorporate all equipment ordered on the buses covered by this procurement.

2.5.4 PARTS AVAILABILITY GUARANTY

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 15 (fifteen) years after the date of acceptance. Parts shall be interchangeable with the original equipment and 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 Procuring Agency are not received within two working days of the agreed upon time/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 Procuring Agency, within eight hours of the Procuring 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 Procuring Agency.

Where the Contractor fails to honor this parts guaranty or parts ordered by the Procuring Agency are not received within 30 (thirty) days of the agreed upon delivery date, then the Contractor shall provide to Procuring Agency, within 7 (seven) days of the Procuring 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 Procuring Agency. Contractor's design and manufacturing documentation provided to the Procuring Agency shall be for its sole use in regard to the buses procured under this Contract and for no other purpose.

2.5.5 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 assure interchangeability among buses in this procurement. This interchangeability shall extend to the individual components as well as to their locations in the buses.
2.5.6 SURVIVABILITY

Contractor's obligations under this section 2.5 shall survive the nominal expiration or discharge of other Contract obligations and Procuring Agency may obtain any remedy under law, Contract or equity to enforce the obligations of contractor that survive the manufacturing, warranty, and final payment periods.

2.6 AUDIT AND INSPECTION OF RECORDS

NOTE: There are three different kinds of audit requirements: pre- and post-award reviews for compliance with Buy America, reviews to ensure specification compliance, and financial audits. Financial audits are necessary for reimbursable contracts, sole source, change orders and sometimes as the means to establish financial responsibility of an Offeror. The following will not deal with audits for compliance with Buy America or the Contract specification. Also, pre-award audits of financial responsibility should be treated as part of the procurement procedures. Bus procurements are generally never reimbursable Contracts; therefore, the following deals only with the Procuring Agency's audit rights in regard to sole source, single Offer and change orders.

In accordance with 49 C.F.R. § 18.36(i), 49 C.F.R. § 19.48(d), and 49 U.S.C. § 5325(a), provided the Procuring Agency is the FTA Recipient or a subgrantee of the FTA Recipient, the Contractor agrees to provide the Procuring Agency, FTA, the Comptroller General of the United States, the Secretary of the U.S. Department of Transportation, or any of their duly authorized representatives access to any books documents, papers, and records of the Contractor which 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.

A. In the event of a sole source Contract, or single Offer, single responsive Offer, 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.

B. 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 Procuring Agency shall be entitled to any reductions in the price that would result from the application of accurate, complete or up-to-date data.

(FTA does not require contractors to flow down these requirements to subcontractors.)

C. For any cost reimbursable work the Contractor shall maintain and the Contracting Officer, the U.S. Department of Transportation (if applicable), or their representatives shall have the right to examine books, records, documents, and other evidence, including review of accounting principles and practices that reflect properly all direct and indirect costs incurred as related to said cost reimbursable work.

1. The materials described in Paragraphs A, B and C above shall be available at the Contractor's office at all reasonable times for inspection, audit, and making excerpts and transcriptions until three years from the date of final payment under the Contract except that the materials described in Paragraph A above shall also be available prior to any award and materials relating to "Service and Parts" (Section 2.5). For records relating to appeals under "Disputes" (Section 2.2.7), "Audit and Inspection of Records" (this Section 2.6), litigation, or the settlement of claims arising out of the negotiation or the performance of contract modifications, records shall be kept available until such appeals, litigation, or claims have been disposed of.

2. The Contracting Officer and his/her representative and any other parties authorized under this clause shall employ sound business practices to protect the confidence of the data specified under this clause, for which the Contractor provides access, against disclosure of such information and material to third parties except as permitted by the Contract. The Contractor shall be responsible for ensuring that any confidential data bears appropriate notices relating to its confidential character.

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

2.7 RISK

2.7.1 INSURANCE

(Procuring Agency to insert insurance requirements of local law or policy)

2.7.2 PERFORMANCE BOND

The Contractor shall furnish at its own expense performance security in the form of a cashier's check, or letter of credit in a form approved by the Procuring Agency before offer submission, or a
performance bond, from a surety duly licensed to do business in the state of *(Procuring Agency to insert its state)* having a financial rating from A. M. Best Company of "A VIII" or better, in the amount of *(maximum of 25 % where there are no progress payments and payment is made upon delivery and acceptance; or in the case of progress payments set at the Procuring Agency's financial exposure for cumulative payments)* percent of the full amount of the Contract. The bond shall cover all of Contractor's obligations under the Contract except for the warranty and shall remain in force until said obligations have been fulfilled. The bond amount may be reduced as follows: (1) to 65 (sixty-five) percent of the original amount when 50 (fifty) percent of the required number of buses are delivered and accepted, (2) to 30 (thirty) percent of the original amount when 75 (seventy-five) percent of the required number of buses are delivered and accepted, and (3) to zero percent of the original amount when 100 (one hundred) percent of the required number of buses are delivered and accepted.

In the case that a surety shall become insolvent, its license is revoked or suspended, or in the case of a surety approved on the basis that it is listed as an approved federal surety, that such federal approval is revoked or suspended, the Contractor, within five days after notice by the Procuring Agency, shall substitute other and sufficient surety or sureties. If the Contractor fails to do so, such failure shall be an event of default. *(NOTE: In such event as described above the Procuring Agency may negotiate, in lieu of declaring the Contractor in default, deduct money for the risk or the purchase of a replacement bond.)*

2.7.3 PRODUCTION OF DOCUMENTS

Upon award of the Contract to an Offeror, such Offeror shall commence performance under the Contract by executing all Contract Guaranty Agreements provided with the Offer, 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 *(Procuring Agency to complete)* calendar days after the date of receipt of the notice of award or within such further time as the Procuring Agency may allow. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under "Termination for Default" (Section 2.2.5.2).

2.7.4 INDEMNIFICATION

The Contractor shall, to the extent permitted by law (1) protect, indemnify and save the Procuring 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 Procuring 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 negligent acts, errors or omissions of the Contractor, including 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 Procuring 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 any 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 Procuring Agency shall not make any
admission which 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 Procuring 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
Procuring Agency shall have the right to be represented therein by advisory counsel of its own
selection at its own expense.

The obligations of the Contractor under the above paragraph shall not extend to circumstances where
the injury, or death, or damages is caused solely by the negligent acts, errors or omissions of the
Procuring Agency, its officers, employees, agents or consultants, including 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, or death, or damages is 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 as provided in the next sentence below. In case of joint or
concurrent negligence of the parties hereto giving rise to a claim or loss against either one or both,
each shall have full rights of contribution from the other.

### 2.7.5 MATERIALS/ACCESSORIES RESPONSIBILITY

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
supplier. This provision excludes tires, fare boxes, radios, and any equipment leased or supplied by
the Procuring 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. Risk of damage to or
loss of the buses is the subject of "Assumption of Risk of Loss" (Section 2.3.1.4).

*(NOTE: Procuring Agency may wish to provide a procedure for claims by Contractor against the
Procuring Agency.)*

### 2.8 POLICIES FOR ALL TIERS

Contractor agrees to comply with the subsections of this Section 2.8 and to include these
requirements in all subcontracts of every tier.

### 2.8.1 NO OBLIGATION BY THE FEDERAL GOVERNMENT

The Procuring Agency and the 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 Procuring
2.8.2 PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTIONS:

1. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. §§3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Accordingly, by signing 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 also 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.

2. 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 awarded by FTA under the authority of 49 U.S.C. § 5301 et seq., the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5301 et seq. on the Contractor to the extent the Federal Government deems appropriate.

2.8.3 INCORPORATION OF FTA TERMS

"General Contract Provisions," (this Section 2), includes, in part, certain standard terms and conditions required by DOT, whether or not expressly set forth in the Contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1D, as amended, 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 Procuring Agency requests which would cause Procuring Agency to be in violation of the FTA terms and conditions.

2.8.4 CHANGES IN FEDERAL LAWS AND REGULATIONS

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 agreement between Procuring 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.
2.8.5 CARGO PREFERENCE

The Contractor agrees:

To utilize privately owned United States-flag commercial vessels to ship at least 50 (fifty) 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 this Contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

To furnish within 20 (twenty) working days following the date of loading for shipments originating within the United States, or within 30 (thirty) working days following the date of loading 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 Procuring Agency (through the Contractor in the case of a subcontractor's bill-of-lading.)

2.8.6 ENERGY CONSERVATION

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act. (42 U.S.C. 6321 et seq.)

2.8.7 RECYCLED PRODUCTS

The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

2.8.8 CIVIL RIGHTS

2.8.8.1 NONDISCRIMINATION

In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 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.

2.8.8.2 EQUAL EMPLOYMENT OPPORTUNITY

The following equal employment opportunity requirements apply to the underlying Contract:
1. **Race, Color, Creed, National Origin, Sex.** In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 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 C.F.R. 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 U.S.C. § 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;

2. **Age.** In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. §§ 623 and Federal transit law at 49 U.S.C. § 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.

3. **Disabilities.** In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 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 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

### 2.8.9 DISADVANTAGED BUSINESS ENTERPRISE

#### 2.8.9.1 POLICY

It is the policy of the Department of Transportation that Disadvantaged Business Enterprises (DBEs) as defined in 49 CFR Part 23 shall have the maximum opportunity to participate in the performance of Contracts financed in whole or in part with Federal Funds under this agreement. Consequently the DBE requirements of 49 CFR Part 23 apply to this agreement.

#### 2.8.9.2 DBE OBLIGATION

Contractor agrees to ensure that Disadvantaged Business Enterprises as defined in 49 CFR Part 23 have the maximum opportunity to participate in the performance of Contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard, all
recipients or contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 23 to ensure that Disadvantaged Business Enterprises have the maximum opportunity to compete for and perform contracts. Recipients and their contractors shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of DOT assisted contracts.

2.8.9.3 REMEDY

Failure of the Contractor to comply with this section or to include it in any subcontract of any tier will constitute a breach of Contract and, after notification of DOT, may result in termination of the Contract by the Procuring Agency or such remedy as the Procuring Agency deems appropriate.

2.8.10 PATENT INFRINGEMENT

The Procuring Agency shall advise the Contractor of any impending patent suit related to this Contract against the Procuring Agency and provide all information available. The Contractor shall defend any suit or proceeding brought against the Procuring 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 Procuring 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 Procuring Agency the right to continue using said equipment or part, or replace same with noninfringing equipment, or modify it so it becomes noninfringing.

Contractor's obligations under this section are discharged and Procuring Agency shall hold Contractor harmless with respect to the equipment or part if it was specified by the Procuring Agency and all requests for substitutes were rejected, and the Contractor advised the Procuring Agency under "Offeror Communications and Requests" (Section 1.1.2.2) of a potential infringement, in which case the Contractor shall be held harmless.

2.8.11 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. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to Contract administration.

The Procuring 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.

2.8.12 INTEREST OF MEMBERS OF, OR DELEGATES TO, CONGRESS

No member of, or delegate to, the Congress of the United States shall be admitted to any share or part of this Contract or to any benefit arising therefrom. (41 U.S.C. § 22.)

2.8.13 PROHIBITED INTEREST

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

2.9 POLICIES FOR SELECTED CONTRACTS

Contractor shall comply with the subsections of this Section 2.9 and to include these requirements, except "Contract Work Hours and Safety Standards Act" (Section 2.9.1), in all subcontracts exceeding $100,000 in value of every tier. Contractor will include "Contract Work Hours and Safety Standards Act" (Section 2.9.1) in all subcontracts exceeding $2,500 in value not including subcontracts for the purchase of supplies or materials or articles ordinarily available on the open market.

2.9.1 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

1. Overtime requirements. No contractor or subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such Work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and
subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

3. Withholding for unpaid wages and liquidated damages. The Procuring Agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section.

5. Payrolls and basic records. (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

2.9.2 CLEAN AIR

The Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor shall report each violation
to the Procuring Agency and understands and agrees that the Procuring Agency will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

### 2.9.3 CLEAN WATER

The Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 1251 et seq. The Contractor shall report each violation to the Procuring Agency and understands and agrees that the Procuring Agency will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

### 2.9.4 DEBARMENT AND SUSPENSION CERTIFICATION REQUIREMENTS.

1. By signing and submitting this bid or proposal, the prospective lower tier participant is providing the signed certification set out in "Debarment and Suspension Certification" (Section 1.1 of the Procuring Agency's solicitation).

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, Procuring Agency may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to Procuring Agency if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.


5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized in writing by Procuring Agency.

6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Debarment and Suspension Certification Requirements" and the certificate form, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9,
subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from the covered
transaction, unless it knows that the certification is erroneous. A participant may decide the
method and frequency by which it determines the eligibility of its principals. Each participant
may, but is not required to, check the Nonprocurement List issued by U.S. General Service
Administration.

8. Nothing contained in the foregoing shall be construed to require establishment of system of
records in order to render in good faith the certification required by this clause. The
knowledge and information of a participant is not required to exceed that which is normally
possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under Paragraph 5 of these instructions, if a participant in a
covered transaction knowingly enters into a lower tier covered transaction with a person who
is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible,
or voluntarily excluded from participation in this transaction, in addition to all remedies
available to the Federal Government, Procuring Agency may pursue available remedies
including suspension and/or debarment.

2.9.5 LOBBYING CERTIFICATION AND DISCLOSURE STATEMENTS

C.F.R. Part 20, the Contractor must have provided a certification to the Procuring Agency that the
Contractor has not and will not use Federal appropriated funds to pay any person or organization to
influence or attempt to influence an officer or employee of any Federal department or agency, a
member of Congress, officer or employee of Congress, or an employee of a member of Congress in
See "Lobbying Certification," in Section 1.1 of Procuring Agency's solicitation.

2.10 POLICIES FOR PRIME CONTRACT

2.10.1 PRE-AWARD AND POST-DELIVERY AUDIT REQUIREMENTS

2.10.1.1 CERTIFICATIONS REQUIRED
The Offeror and (if selected) Contractor agrees to comply with 49 U.S.C. § 5323(l) and FTA's
implementing regulation at 49 C.F.R. Part 663 and to submit the following certifications with its
Offer and (if selected) after acceptance of the last bus:

2.10.1.2 BUY AMERICA REQUIREMENTS
The Offeror and (if selected) Contractor shall complete and submit a declaration certifying either
compliance or noncompliance with Buy America. If the Offeror/Contractor certifies compliance with
Buy America, it shall submit documentation which 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.
2.10.1.3 SOLICITATION SPECIFICATION REQUIREMENTS
The Offeror and (if selected) Contractor shall submit evidence that it will be capable of meeting the bid specifications.

2.10.1.4 FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS)
The Offeror 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.

2.10.2 BUS TESTING
The Contractor agrees to comply with 49 U.S.C. § 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 Procuring Agency prior to the recipient's final acceptance of the first bus.

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 Procuring Agency prior to Procuring Agency'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.
APPENDIX A: GUIDELINES FOR CALCULATING LIQUIDATED DAMAGES AND ANY INCENTIVES

CALCULATION OF LIQUIDATED DAMAGES:

Prior to its solicitation, the Procuring Agency should document and file for the record its derivation of the amount of liquidated damage that is entered in Clause 2.13. The following identifies suggested areas for consideration, but not limited to, by which a Procuring Agency may be damaged if buses are not delivered as contracted.

For determining amounts for liquidated damages the following guidance is provided.

I. The liquidated damage amount must not be punitive but shall be based upon damages that the Procuring Agency would incur as a result of the delay.

II. The liquidated damage amount must be calculated on the basis of damages that the Procuring Agency would incur and substantiated by experience data.

III. A definition of days and any exempted days for delay should be included.

A. Cost to Retain Old Fleet
   If the purpose of the procurement is to replace older buses that are being retired there can be two areas of damage which are additive: (1) extra cost of maintenance and (2) cost of purchasing or renting some additional buses to meet fleet availability requirements.

1. Extra Cost of Maintenance. The difference in maintenance costs, old buses minus new ones, is a realistic damage, assuming that older buses will be continued in service for the duration and not replaced with alternative leased buses.

2. Cost to Obtain Additional Buses to Meet Fleet Availability. Reliability of the older buses is not expected to be as good as for new ones and they can be expected to be out of service for maintenance/repair for longer periods than new ones. Therefore, additional buses may be needed to assure that required service on routes is met.

B. Cost to Obtain Alternative Fleet
   The damage may be attributed to requirements to obtain alternative fleet for the duration of the delay. Such may be precipitated because a sales agreement on the old buses being replaced is expected to have been executed prior to the Contract delivery date for new buses or because the new buses are needed for new or expanded services.

1. Replace Old Buses Being Sold. This approach is an alternative to the cost of retaining the old fleet of (A) above. It is suggested that the liquidated damage be the lower of this alternative and that of (A).
2. **To Meet Requirements for New or Expanded Service.** Under this approach the liquidated damage would simply be the daily costs of the alternative fleet as calculated above.

C. **Increased Contract Administrative Costs**
Delays in delivery will increase the period that the Contract must be administered and possibly increase the effort or waste effort of either in-house staff or consultants for in-plant inspection and to assist taking delivery and acceptance.

1. **Increased Contract Period.** The amount of the damage can be calculated as the average daily cost of Contract administration, apart from any technical services.

2. **Increased Technical Services.** Technical services for in-plant inspection and to assist in taking delivery and acceptance will have been budgeted consistent with the Contract schedule. The extra budget for these services could be determined as a daily rate.

D. **Fines**
Damages may include fines for which a court has already imposed or can be expected to be imposed on the Procuring Authority not meeting required emission (noise or air quality) reductions or features mandated by Americans with Disabilities Act. Include this element only if the Procuring Agency can prove its vulnerability for such fines and a purpose of the procurement is to comply with such laws or ordinances.

E. **Fuel Consumption**
If the new buses are expected to consume less fuel per passenger capacity, then the difference in fuel consumption costs per day may be included.

**CALCULATION OF INCENTIVES FOR EARLY DELIVERY**

Any provision of incentive payments for early delivery should be made on the basis of savings which may be reasonably expected to accrue to the Procuring Agency. Prior to its solicitation, the Procuring Agency should document and file for the record its derivation of the amount of any incentive that would be entered in the Option provided in Clause 2.13. It is suggested that any savings be shared between the Contractor and the Procuring Agency, on some predetermined ratio basis, not exceeding an amount approximately that of the anticipated profit under the Contract. The following provides suggested areas in which a Procuring Agency may accrue savings for early delivery.

A. **Savings to Retire Old Fleet Early**
If the purpose of the procurement is to replace older buses that are being retired there can be savings in maintenance costs. The difference in maintenance costs, old buses minus new ones, could be a savings if the old fleet can be retired early.

B. **Decreased Contract Administrative Costs**
Early delivery can decrease the period that the Contract must be administered. The amount of savings can be calculated as the average daily cost of Contract administration, apart for any technical services.
C. **Fines**
   If the Procuring Agency is being fined or can be expected to be imposed for failure to meet court mandated emission standards or requirements of AMERICANS WITH DISABILITIES ACT, and early delivery reduces any such fines savings will accrue. This element should be included only if the Procuring Agency can prove its vulnerability for such fines and a purpose of the procurement is to comply with such laws or ordinances.

D. **Fuel Consumption**
   If the new buses are expected to consume less fuel per passenger capacity, then the difference in fuel consumption costs per day may be included as a savings if the old fleet can in fact be replaced by the early delivered fleet.
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3.1 CONTRACTOR'S IN-PLANT QUALITY ASSURANCE REQUIREMENTS

3.1.1 QUALITY ASSURANCE REQUIREMENTS

This entire Section 3.1, "Contractor's In-Plant Quality Assurance Requirements," beginning with Section 3.1.2, "Quality Assurance Organization," shall be effective until January 1, 1999, at which time it shall be replaced with the following:

3.1 QUALITY ASSURANCE REQUIREMENTS

The Contractor, the Contractor's manufacturing plant and organization shall be certified to the appropriate QS-9000/ISO 9000 series of standards.

3.1.2 QUALITY ASSURANCE ORGANIZATION

3.1.2.1 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.

3.1.2.2 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.

3.1.2.3 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.

3.1.3 QUALITY ASSURANCE ORGANIZATION FUNCTIONS

3.1.3.1 MINIMUM FUNCTIONS

The quality assurance organization shall include the following minimum functions.

3.1.3.2 WORK INSTRUCTIONS

The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements.
3.1.3.3 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 1 year after inspections and tests are completed.

3.1.3.4 CORRECTIVE ACTION

The quality assurance organization shall detect and promptly assure 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.

3.1.4 STANDARDS AND FACILITIES

3.1.4.1 BASIC STANDARDS AND FACILITIES

The following standards and facilities shall be basic in the quality assurance process.

3.1.4.2 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.

3.1.4.3 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.

3.1.4.4 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.

3.1.4.5 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.
3.1.5 CONTROL OF PURCHASES

3.1.5.1 MAINTENANCE OF CONTROL
The Contractor shall maintain quality control of purchases.

3.1.5.2 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.

3.1.5.3 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.

3.1.6 MANUFACTURING CONTROL

3.1.6.1 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.

3.1.6.2 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.

3.1.6.3 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.

3.1.6.4 STATISTICAL TECHNIQUES
Statistical analysis, tests, and other quality control procedures may be used when appropriate in the quality assurance processes.

3.1.6.5 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.

### 3.1.7 INSPECTION SYSTEM

#### 3.1.7.1 INSPECTION SYSTEM SCOPE
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.

#### 3.1.7.2 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.

#### 3.1.7.3 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, the Procuring Agency shall approve the modification, repair, or method of correction to the extent that the contract specifications are affected.

#### 3.1.7.4 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 Procuring Agency.
3.2 INSPECTIONS

3.2.1 INSPECTION STATIONS

Inspection stations shall be at the best locations to provide for the work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic, and other components and assemblies for compliance with the design requirements.

Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include underbody structure completion, body framing completion, body prior to paint preparation, water test before interior trim and insulation installation, engine installation completion, underbody dress-up and completion, bus prior to final paint touchup, bus prior to road test, and bus final road test completion.

3.2.2 RESIDENT INSPECTOR

3.2.2.1 RESIDENT INSPECTOR ROLE

The Procuring Agency shall be represented at the Contractor's plant by resident inspectors. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these resident inspectors in the plant shall not relieve the Contractor of its responsibility to meet all of the requirements of this procurement. The Procuring Agency shall designate a primary resident inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings" (Section 4.2.2.2); "Authority" (Section 4.2.2.3); and "Pre-Delivery Tests" (Section 4.3.2). Contractor and resident inspector relations shall be governed by the guidelines included as Attachment A to this Part 4. "Quality Assurance" Provisions.

3.2.2.2 PRE-PRODUCTION MEETINGS

The primary resident inspector shall participate in design review and pre-production meetings with the Procuring 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 30 (thirty) days prior to the beginning of bus manufacture, the primary resident inspector shall meet with the Contractor's quality assurance manager and shall conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The resident inspectors may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.

3.2.2.3 AUTHORITY

Records and data maintained by the quality assurance organization 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.
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.

Discrepancies noted by the resident inspector during assembly shall be entered by the Contractor's 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, the Procuring Agency shall approve the modification, repair, or method of correction to the extent that the contract specifications are affected.

The primary resident inspector shall remain in the Contractor's plant for the duration of bus assembly work under this contract. Only the primary resident inspector or designee shall be authorized to release the buses for delivery. The resident inspectors shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the resident inspectors 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.

3.2.2.4 SUPPORT PROVISIONS
The Contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside and interplant telephones, file cabinet, chairs, and clothing lockers sufficient to accommodate the resident staff.

3.3 ACCEPTANCE TESTS

3.3.1 RESPONSIBILITY

Fully-documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the Procuring Agency. These acceptance tests shall include pre-delivery inspections and testing by the Contractor, and inspections and testing by the Procuring Agency after the buses have been delivered.

3.3.2 PRE-DELIVERY TESTS

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Procuring 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 Procuring Agency.
Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the desired quality and have met the requirements in "Technical Specifications" (Part 5). The Procuring Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in "Technical Specifications" (Part 5), if there is evidence that prior tests have been invalidated by 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 30 (thirty) days notice so that they may be witnessed by the resident 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 resident inspectors, 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 primary resident 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.

3.3.2.1 INSPECTION - VISUAL AND MEASURED

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing is to verify overall dimensional and weight requirements, to verify that required components are included and are ready for operation, and to verify that components and subsystems that are designed to operate with the bus in a static condition do function as designed.

3.3.2.2 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 15 (fifteen) miles during the road tests. 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. Results shall be pass/fail for these bus operation tests.

3.3.3 POST-DELIVERY TESTS

The Procuring Agency may conduct acceptance tests on each delivered bus. These tests shall be completed within 15 (fifteen) 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 Procuring 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 nonacceptance. The Procuring Agency shall record details of all Defects on the appropriate test forms and shall notify the Contractor of acceptance, conditional acceptance, or nonacceptance of each bus within five days according to "Acceptance of Bus" (Section 2.3.1.5) after completion of the tests. The Defects detected during these tests shall be repaired according to procedures defined in "Contractual Provisions" (Part 2, "Repairs After Nonacceptance" (Section 2.3.2).

3.3.3.1 VISUAL INSPECTION
The post-delivery inspection is similar to the inspection at the Contractor's plant and shall be conducted with the bus in a static condition. Any visual delivery damage shall be identified and recorded during the visual inspection of each bus.

3.3.3.2 BUS OPERATION
Road tests will be used for total bus operation similar to those conducted at the Contractor's plant. In addition, the Procuring Agency may elect to perform chassis dynamometer tests. Operational deficiencies of each bus shall be identified and recorded.

3.4 GUIDE FOR INSPECTION

A list of tests corresponding to "Technical Specifications" (Part 5) will be inserted here.

ATTACHMENT A: NEW BUS MANUFACTURING INSPECTION GUIDELINES

This attachment was developed by the American Public Transit Association (APTA) Bus Equipment and Maintenance Committee and is intended as a Guideline for use by transit systems (Procuring Agency) and vehicle manufacturers (Contractors).

Two lists are included to reflect the expectations of both the transit system and the vehicle manufacturer.
## Pre-Building Phase

<table>
<thead>
<tr>
<th>Bus Manufacturers Expectations</th>
<th>Transit System Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contract/Transit system inspectors must be given all contract documentation before beginning inspection process.</td>
<td>1. Manufacturers should have a formal, approved Quality Assurance (QA) Program, and must adhere to the program! Program must identify senior QA person. QA program must be an integral part of the company’s ISO 9000 certification to be effective January 1, 1999. Any changes in approved program must be resubmitted to transit system for approval.</td>
</tr>
<tr>
<td>2. Bus manufacturers inspection process should be reviewed at preproduction audit meeting. Inspectors should be present and understand the difference between various manufacturers processes. At least one key customer and manufacturer representative should be present that will follow the entire procurement from start to finish.</td>
<td>2. Preproduction audit meeting with transit system.</td>
</tr>
<tr>
<td>3. When change orders are required, they need to be made as early in the process as possible. Six months before building starts, whenever possible. If change orders have an impact on delivery schedule, consideration should be given to a delivery schedule revision.</td>
<td>- Representatives from contracts, engineering, quality, and production should be represented.</td>
</tr>
<tr>
<td>4. Transit system inspection forms should be provided to manufacturers prior to the build so that the manufacturer will know the items the customer believes are critical. The inspection forums should be provided to the manufacturer after completion so that the defects to be corrected can be identified.</td>
<td>- Manufacturers should improve communication between own departments regarding contract requirements.</td>
</tr>
<tr>
<td>5. If transit system requires sole source components, transit system should obtain assistance for first installation of new components.</td>
<td>- Must have formal sales release to review at the meeting and provide final sales release prior to production.</td>
</tr>
<tr>
<td>6. Transit system should have a decision maker at the preproduction audit meeting.</td>
<td>- Manufacturers should not use meeting to sell parts.</td>
</tr>
<tr>
<td>7. Transit system should make every effort to inform manufacturers of what they want. Hidden agenda items buried in contract do not promote the cooperative environment desired.</td>
<td>- Manufacturers should supply test information and other documents required to meet expectations.</td>
</tr>
<tr>
<td>8. Agree on what constitutes a line shut down before build begins.</td>
<td>3. Manufacturers should have application and installation approvals from suppliers whenever possible.</td>
</tr>
</tbody>
</table>

- On installations of new major components, sub-supplier must be present at initial production.

4. Manufacturers should read and understand the specification prior to bid! Specification clarification should be made during the approved equals process. Ask questions at prebid meetings.

5. Manufacturers service representative should be involved with preproduction audit meeting and initial production and/or at final acceptance.

6. Prior to build—bus manufacturer should be able to provide to the transit system a complete Bill of Material for the bus to be built.
## Process During Building Phase

<table>
<thead>
<tr>
<th>Bus Manufacturers Expectations</th>
<th>Transit System Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need one person as primary inspector from start to finish of process. The primary inspector should be included in the design review process and preproduction meetings. Consistency is very important. First or second bus should stay at manufacturer's location as a quality standard and be delivered last. Rotation of personnel with different expectations/standards causes difficulties.</td>
<td>1. Resident 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.</td>
</tr>
<tr>
<td>2. Adequate number of experienced inspectors should be available to prevent production line movement delays.</td>
<td>2. Manufacturers should maintain build schedule if possible. Changes in build schedule and requests for overtime and weekend work must be communicated as early as possible.</td>
</tr>
<tr>
<td>3. Inspectors should be available to support the manufacturing effort Monday through Friday, consistent with the manufacturers production personnel hours.</td>
<td>3. Buses should not be presented for final buy-off (inspection) that are not ready or complete.</td>
</tr>
<tr>
<td>4. Inspections should be conducted in a cooperative, professional manner. Must want to solve problems.</td>
<td>4. Manufacturers should have formal internal/external communications process and feedback of inspection problems and resolutions. Manufacturers should provide early resolution of problems identified by inspectors. QA procedures must be revised to reflect problem correction.</td>
</tr>
<tr>
<td>5. Only one person should be able to make STOP SHIP calls and reason for the STOP SHIP must be immediately available. STOP SHIP must be in writing.</td>
<td>5. Attitude of manufacturers and QA personnel is important. Remember who the customer is. However, there must be mutual respect.</td>
</tr>
<tr>
<td>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.</td>
<td>6. Transit system is not responsible for redesigning the bus, correcting problems or manufacturer quality. They audit only. Should not need a learning period for manufacturers to determine acceptable quality standards.</td>
</tr>
<tr>
<td>7. Buses should be identical and interchangeable within an order unless approved by transit system.</td>
<td>8. Inspection work should be spread evenly during the workday to the extent possible.</td>
</tr>
</tbody>
</table>
## Post Building Phase

<table>
<thead>
<tr>
<th>Bus Manufacturers Expectations</th>
<th>Transit System Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increase the rate of the final acceptance process at the transit system after delivery to improve payment process.</td>
<td>1. Defects noted at property final inspection should be repaired in a timely and acceptable manner.</td>
</tr>
<tr>
<td>2. On property final acceptance inspection should be primarily for shipping damage and defects that occur during shipment. Complete vehicle inspection with criteria different from that used at the plant should not be done.</td>
<td></td>
</tr>
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4.1 BASIC PROVISIONS

4.1.1 WARRANTY REQUIREMENTS

4.1.1.1 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 Procuring Agency each complete bus, and specific subsystems and components as follows.

4.1.1.2 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 one year or 50,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus under "Acceptance of Bus" (2.3.1.5). The warranty is based on regular operation of the bus under the operating conditions prevailing in the Procuring Agency's locale.

4.1.1.3 BODY AND CHASSIS STRUCTURE
Body, body structure, and structural elements of the suspension are warranted to be free from Defects, Related Defects, and to maintain structural integrity 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 (twelve) years or 500,000 miles, whichever comes first.

4.1.1.4 PROPULSION SYSTEM
Propulsion system components, specifically the engine, transmission and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for five years or 300,000 miles, whichever comes first. Propulsion system manufacturer's standard warranty, delineating items excluded from this warranty, submitted in accordance with "Offeror Communications and Requests" (Section 1.1.2.2 of Procuring Agency's solicitation), is attached.

4.1.1.5 MAJOR SUBSYSTEMS
Major subsystems shall be warranted to be free from Defects and Related Defects, for three years or 150,000 miles, whichever comes first. Major subsystem manufacturers standard warranty, delineating items excluded from this warranty, submitted in accordance "Offeror Communications and Requests" (Section 1.1.2.2 of Procuring Agency's solicitation), is attached. Items included as Major Subsystems are listed below:

Brake system
Destination signs
Heating, Ventilating, and Air conditioning system
Door systems
Air compressor and dryer
Wheelchair lift and ramp system
Starter Alternator

4.1.1.6 EXTENSION OF WARRANTY
If, during the warranty period, repairs or modifications on any bus, made necessary by defective design, materials or workmanship are not completed due to lack of material or inability to provide the proper repair for 30 (thirty) calendar days, the applicable warranty period shall be extended by the number of days equal to the delay period.

4.1.2 VOIDING OF WARRANTY
The warranties 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 shall also be void if the Procuring Agency fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and that omission caused the part or component failure. Procuring Agency shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

4.1.3 EXCEPTIONS AND ADDITIONS TO WARRANTY
The warranties shall not apply to the following items scheduled maintenance items, normal wear-out items, and items furnished by the Procuring Agency, except insofar as such equipment may be damaged by the failure of a part or component for which the Contractor is responsible.

The warranties shall not apply to components and major subsystems specified by the Procuring Agency, and required by the Procuring Agency to be installed on the bus by the Contractor, if the following conditions apply: the Procuring Agency has rejected the Contractor's requests for approved equal under "Offeror Communications and Requests" (Section 1.1.2.2 of Procuring Agency's solicitation), and the component or major subsystem supplier declines to participate in this warranty; and the Contractor notifies the Procuring Agency in writing with, or before submitting, Contractor's original Offer. The Contractor shall pass on to the Procuring Agency any warranty, offered by a component supplier, that is superior to that required herein.

4.1.4 DETECTION OF DEFECTS
If the Procuring Agency detects a Defect within the warranty periods defined in "Warranty Requirements" (Section 4.1.1), it shall within 20 (twenty) working days, notify the Contractor's representative. Within five working days after receipt of notification, the Contractor's representative
shall either agree that the Defect is in fact covered by warranty, or reserve judgment until the subsystem or component is inspected by the Contractor's representative or is removed and examined at the Procuring Agency's property or at the Contractor's plant. At that time, the status of warranty coverage on the subsystem or component shall be mutually resolved between the Procuring Agency and the Contractor. Work shall commence to correct the Defect within 10 (ten) working days after receipt of notification and shall be conducted in accordance with "Repairs by Contractor" (Section 4.2.2).

4.1.5 SCOPE OF WARRANTY REPAIRS

When warranty repairs are required, the Procuring Agency and the Contractor's representative shall agree within five working days after notification on the most appropriate course for the repairs and the exact scope of the repairs to be performed under the warranty. If no agreement is obtained within the five-day period, the Procuring Agency reserves the right to commence the repairs in accordance with "Repairs by Procuring Agency" (Section 4.2.3).

4.1.6 FLEET DEFECTS

4.1.6.1 OCCURRENCE AND REMEDY

A fleet defect is defined as cumulative failures of any kind in the same components in the same or similar application where such items covered by the warranty and such failures occur in the warranty period in the specified proportion of the buses delivered under this contract. For deliveries of over 50 buses, the proportion shall be 20 (twenty) percent. For deliveries of 4 (four) to 49 (forty-nine) buses the proportion shall be 25 (twenty-five) percent.

The Contractor shall correct a fleet defect under the warranty provisions defined in "Repair Procedures" (Section 4.2). After correcting the Defect, the Procuring 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.

4.1.6.2 EXCEPTIONS TO FLEET DEFECT PROVISIONS

The fleet defect warranty provisions shall not apply to Procuring Agency-supplied items such as fareboxes, radio and fare collection equipment, communication systems, and tires.

Fleet defect warranty provisions shall not apply to components and major subsystems specified by the Procuring Agency and required by the Procuring Agency to be installed on the bus by the Contractor, if the following conditions apply: the Procuring Agency has rejected the Contractor's requests for approved equal under "Offeror Communications and Requests" (Section 1.1.2.2 of Procuring Agency's solicitation) and the component or major subsystem supplier declines to participate in this warranty; and the Contractor notifies the Procuring Agency in writing, or
before submitting, Contractor's original Offer. The Contractor shall pass on to the Procuring Agency any warranty, offered by a component supplier, that is superior to that required herein.

4.2 REPAIR PROCEDURES

4.2.1 REPAIR PERFORMANCE

The Contractor is responsible for all warranty-covered repair work. To the extent practicable, the Procuring Agency will allow the Contractor or its designated representative to perform such work. At its discretion, the Procuring 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.

4.2.2 REPAIRS BY CONTRACTOR

The Contractor or its designated representative shall begin work on warranty-covered repairs, within five calendar days after receiving notification of a Defect from the Procuring Agency. The Procuring 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 repairs. At the Procuring Agency's option, the Contractor may be required to remove the bus from the Procuring Agency's property while repairs are being effected. If the bus is removed from the Procuring Agency's property, repair procedures must be diligently pursued by the Contractor's representative.

4.2.3 REPAIRS BY PROCURING AGENCY

4.2.3.1 PARTS USED

If the Procuring 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 Procuring Agency may use Contractor-specified parts available from its own stock if deemed in its best interest. Monthly, or at a period to be mutually agreed upon, reports of all repairs covered by this warranty shall be submitted by the Procuring Agency to the Contractor for reimbursement or replacement of parts. The Contractor shall provide forms for these reports.

4.2.3.2 CONTRACTOR SUPPLIED PARTS

The Procuring Agency may require that the Contractor supply new parts for warranty-covered repairs being performed by the Procuring Agency. These parts shall be shipped prepaid to the Procuring Agency from any source selected by the Contractor within 10 (ten) working days of receipt of the request for said parts. Parts supplied by the Contractor shall be Original Equipment Supplier (OEM) equivalent or superior to that used in the bus original manufacture.
4.2.3.3 DEFECTIVE COMPONENTS RETURN
The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The total cost for this action shall be paid by the Contractor. Materials should be returned in accordance with Contractor's instructions.

4.2.3.4 FAILURE ANALYSIS
The Contractor shall, upon specific request of the Procuring 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 (sixty) days of the receipt of failed parts.

4.2.3.5 REIMBURSEMENT FOR LABOR
The Procuring Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by multiplying the number of man-hours actually required to correct the Defect by a per hour, 5M mechanic, straight wage rate, as defined in "Technical Specifications" (Section 5), plus (procuring agency to insert fringe benefit rate) percent fringe benefits and (procuring agency to insert overhead rate) percent overhead, plus the cost of towing in 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 Procuring Agency's service garage at the time the Defect correction is made.

4.2.3.6 REIMBURSEMENT FOR PARTS
The Procuring 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 and 15 (fifteen) percent handling costs.

4.2.3.7 REIMBURSEMENT REQUIREMENTS
The Contractor shall reimburse the Procuring Agency for warranty labor and/or parts within 60 (sixty) days of receipt of warranty claim.

4.2.4 WARRANTY AFTER REPLACEMENT/REPAIRS
If any component, unit, or subsystem is repaired, rebuilt or replaced by the Contractor, or by the Procuring 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 Contractor-provided or authorized parts are not used for the repair; unless the Contractor has failed to respond within five days, in accordance with "Scope of Warranty Repairs" (Section 4.1.5).

The warranty on items determined to be fleet defects as defined in Section 4.1.6.1 shall be extended for the time and/or miles of the original warranty remaining at the time the fleet defect was identified. This extended warranty shall begin on the repair/replacement date for corrected items on each bus.
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5.1 GENERAL

5.1.1 SCOPE

Part 5: Technical Specifications define requirements for a heavy duty transit bus which, by the selection of specifically identified alternative configurations, may be used for both suburban express service and general service on urban arterial streets. It is intended for the widest possible spectrum of passengers, including children, adults, the elderly, and persons with disabilities.

5.1.2 DEFINITIONS

The following are definitions of special terms used in Part 5.

1. **dBA.** Decibels with reference to 0.0002 microbar as measured on the "A" scale.

2. **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.

3. **Standee Line.** A line marked across the bus aisle in line with the operator's barrier to designate the forward area that passengers may not occupy when the bus is moving.

4. **Free Floor Space.** Floor area available to standees, excluding stepwells, area under seats, area occupied by feet of seated passengers, and the vestibule area forward of the standee line. Floor area of 1.5 square feet shall be allocated for the feet of each seated passenger.

5. **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 operator.

6. **Seated Load.** One hundred fifty pounds for every designed passenger seating position and for the operator.

7. **Gross Load.** One hundred fifty pounds for every designed passenger seating position, for the operator, and for each 1.5 square feet of free floor space.

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

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

10. **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 propose.
(11) **Heavy Heavy-Duty Diesel Engine (HHDD).** Heavy heavy-duty diesel engines have sleeved cylinder liners, are designed for multiple rebuilds, and a rated horsepower that generally exceeds 250.

(12) **Operator'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.

(13) **Fireproof.** Materials that will not burn or melt at temperatures less than 2,000°F.

(14) **Fire-Resistant.** Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-75.

(15) **Human Dimensions.** The human dimensions used in Part 5: Technical Specifications are defined in SAE Recommended Practice J833.

(16) **HIC (Head Injury Criteria).** The following equation presents the definition of head injury criteria:

\[
\left[ \frac{1}{t_1 - t_2} \int_{t_2}^{t_1} (a) dt \right]^{2.5} (t_2 - t_1)
\]

where:

\[ a \] = the resultant acceleration at the center of gravity of the head form expressed as a multiple of g, the acceleration of gravity.

\[ t_1 \text{ and } t_2 = \] any two points in time during the impact.

(17) **Baseline Configuration Bus.** The bus described by Part 5: Technical Specifications if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the Procuring Agency in attachments to Part 5: Technical Specifications.

(18) **Alternative.** An alternative specification condition to the standard configuration bus. The Procuring Agency may define alternatives to the standard configuration to satisfy local operating requirements. Alternatives for the standard configuration will be clearly identified.

(19) **Design Operating Profile.** The operating profile for design purposes shall consist of simulated transit type service. The duty cycle is described in the figure “Transit Coach Duty
Cycle.” The duty cycle consists of three phases to be repeated in sequence: a central business district (CBD) phase of 2 miles with 7 stops per mile and a top speed of 20 mph, an arterial route phase of 2 miles with 2 stops per mile and a top speed of 40 mph, and a commuter phase of 4 miles with 1 stop and a maximum speed of 55 mph and an idle phase.

The bus shall be loaded to SLW and shall average approximately 18 mph while operating on this duty cycle. Operation shall continue regardless of the ambient temperature or weather conditions. The passenger doors shall be opened and closed at each stop, and the bus shall be knelt at each stop during the CBD phase. The braking profile shall be:

- 16 percent of the stops at 3 ft/sec/sec
- 50 percent of the stops at 6 ft/sec/sec
- 26 percent of the stops at 9 ft/sec/sec
- 8 percent of the stops at 12 ft/sec/sec

These percentages of stops shall be evenly distributed over the three phases of the duty cycle. For scheduling purposes, the average deceleration rate is assumed.

(20) Class of Failures. Classes of failures are described below.
a. **Class 1: Physical Safety.** A failure that could lead directly to passenger or operator injury and represents a severe crash situation.

b. **Class 2: 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.

c. **Class 3: Bus Change.** A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point with a replacement bus.

d. **Class 4: Bad Order.** A failure that does not require removal of the bus from service during its assignments but does degrade bus operation. The failure shall be reported by operating personnel.

(21) **Maintenance Personnel Skill Levels.** Defined below are maintenance personnel skill levels used in Part 5: Technical Specifications.

a. 5M: Specialist Mechanic or Class A Mechanic Leader
b. 4M: Journeyman or Class A Mechanic
c. 3M: Service Mechanic or Class B Servicer
d. 2M: Mechanic Helper or Bus Servicer
e. 1M: Cleaner, Fueler, Oilier, Hostler, or Shifter

In attachments to Part 5: Technical Specifications, the Procuring Agency may relate the skill levels and ratings of mechanics in its operation to the above definitions.

(22) **Standards.** Standards referenced in Part 5: Technical Specifications are the latest revisions unless otherwise stated.

(23) **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 inches in width and 48 inches in length measured two inches above the ground, and does not weigh more than 600 pounds when occupied.

(24) **Structure.** The structure shall be defined as the basic body, including floor and panels, structural components, axle mounting provisions and suspension beams and attachment points.

### 5.1.3 ABBREVIATIONS

The following is a list of abbreviations used in Part 5: Technical Specifications.

(1) **ADA** Americans with Disabilities Act
5.1.4 LEGAL REQUIREMENTS

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

The bus shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at the date of manufacture.

In the event of any conflict between the requirements of this Specification and any applicable legal requirement, the legal requirement shall prevail.
5.1.5 OVERALL REQUIREMENTS

5.1.5.1 DIMENSIONS

5.1.5.1.1 Physical Size
With the exceptions of exterior mirrors, marker and signal lights, flexible portions of the bumpers, fender skirts, and rubrail, the bus shall have the following overall dimensions as shown in the figure “Transit Coach Exterior Dimensions.”

<table>
<thead>
<tr>
<th>Baseline: Use for 40-ft length bus.</th>
<th>Alternative: Use for 35-ft length bus. Also see Sections 5.1.5.2, 5.1.5.3, 5.4.5.1.1 and 5.4.7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Body Length: 40 feet, 0 inches (+0, -1 inch)</td>
<td>(1) Body Length: 35 feet, 0 inches (+0, -1 inch)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Baseline: Use for 102-inch width bus.</th>
<th>Alternative: Use for 96-inch width bus. Also see Sections 5.1.5.2, 5.4.5.1.1 and 5.4.7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Body Width: 102 inches (+0, -1 inch)</td>
<td>(2) Body Width: 96 inches (+0, -1 inch)</td>
</tr>
</tbody>
</table>

(3) Overall Height: 128 inches, maximum
5.1.5.1.2 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as shown in the figure “Transit Coach Minimum Road Clearance” and defined in SAE Standard J689, regardless of load up to the gross vehicle weight rating.

Ramp Clearances. Approach angle shall be no less than 8.5 degrees. Breakover angle shall be no less than 10 degrees. Departure angle shall be no less than 9 degrees.

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.
**Ground Clearance.** Ground clearance shall be no less than 10 inches, except within the axle zone and wheel area.

**Axle Clearance.** Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than revise with data from mfrs 5 ½ inches.

**Wheel Area Clearance.** Wheel area clearance, shall be no less than 8 inches for parts fixed to the bus body and 6-1/2 inches for parts that move vertically with the axles.

---

**5.1.5.1.3 Floor Height**

Height of the floor above the street shall be no more than 35 inches measured at the centerline of the front doorway and revise with data from mfrs 38 ½ inches measured at the centerline of the rear doorway. The floor may be inclined only along the longitudinal axis of the bus, and the incline shall be less than 1-1/2 degrees of the horizontal. All floor measurements shall be with the bus at the design height and on a level surface.
5.1.5.1.4 Step Dimensions

A maximum of three steps shall be required for passenger ingress and egress. The steps in each doorway shall be in a fixed location relative to the floor of the bus. At the front door, the first step up from street level shall not exceed 15 inches with the bus at the design height, and all step riser heights to bus floor level shall be the same height which shall be no more than 10 inches. At the rear door, the interior steps down from floor level shall not exceed 11-1/8 inches, and the final step to street level shall not exceed 16 inches with the bus at the design height.

5.1.5.1.5 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 inches. At the centerline of the window seats, headroom shall be no lower than the required top of the side window. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 inches, but it shall increase to the normal ceiling height at the front of the seat cushion. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his/her head, padding shall be provided on the overhead paneling.

5.1.5.2 WEIGHT

<table>
<thead>
<tr>
<th>Baseline: Use for baseline configuration.</th>
<th>Alternative: Use for alternative configurations as noted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb weight of the bus, as defined in Section 5.1.2 of these Specifications, shall not exceed 27,000 (Procuring Agency to insert weight considering specific configuration including bus width, seating style and configuration, and glazing material) pounds.</td>
<td>Curb weight of the bus, as defined in Section 5.1.2 of these Specifications, shall not exceed (Procuring Agency to calculate per following notes) pounds.</td>
</tr>
<tr>
<td>Note:</td>
<td></td>
</tr>
<tr>
<td>Subtract 650-1000 pounds for 35 ft length.</td>
<td></td>
</tr>
<tr>
<td>Subtract 100-500 pounds for 96 inch width.</td>
<td></td>
</tr>
<tr>
<td>Subtract [mfr. data] pounds for polycarbonate or acrylic window glazing materials.</td>
<td></td>
</tr>
<tr>
<td>Subtract [mfr. data] pounds for baseline or padded seating in perimeter configuration.</td>
<td></td>
</tr>
<tr>
<td>Add [mfr. data] pounds for cushioned seating in perimeter configuration.</td>
<td></td>
</tr>
<tr>
<td>Add [mfr. data] pounds for cushioned seating in baseline configuration.</td>
<td></td>
</tr>
</tbody>
</table>
5.1.5.3 CAPACITY

Baseline: Use for 40-ft length bus with baseline seats and baseline seating arrangement. Also see Section 5.4.7.5.4.5

Rated capacity of the bus shall be no less than 43 seated passengers, not including the operator, with the standard seating arrangement.

Alternative: Use for alternative configurations as noted. Also see Section 5.4.7.5.4.5

Rated capacity of the bus shall be no less than \( \text{(Procuring Agency to insert number of Seated Passengers for specified seating arrangement)} \) seated passengers, not including the operator, with the specified seating arrangement.

Note:

- Subtract \( \text{[mfr. data]} \) seats for 35 ft length with baseline or padded seating in baseline arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 35 ft length with baseline or padded seating in perimeter arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 35 ft length with cushioned seating in baseline arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 35 ft length with cushioned seating in perimeter arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 40 ft length with baseline or padded seating in perimeter arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 40 ft length with cushioned seating in baseline arrangement.

- Subtract \( \text{[mfr. data]} \) seats for 40 ft length with cushioned seating in perimeter arrangement.

5.1.5.4 SERVICE LIFE AND MAINTENANCE

5.1.5.4.1 Service Life
The bus shall be designed to operate in transit service for at least 12 years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year including the twelfth year.

5.1.5.4.2 Maintenance and Inspection

Scheduled maintenance or inspection tasks as specified by the Contractor shall require a skill level of 3M or less. Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Base upon the Design Operating Profile defined in Section 5.1.2, routine scheduled maintenance actions, such as filter replacement and adjustments, shall not be required at intervals of less than 6,000 miles, except for engine oil/filter change intervals for severe duty shown below and routine daily service performed during the fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of mileage for lower level tasks. The Contractor may require routine scheduled maintenance actions at shorter intervals when a more severe operating profile is anticipated.

APTA Comment: The table below added per committee agreement at Chicago meeting.

<table>
<thead>
<tr>
<th>Average Vehicle Speed</th>
<th>Oil/Filter Change Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH</td>
<td>Miles</td>
</tr>
<tr>
<td>10 and higher</td>
<td>6000</td>
</tr>
<tr>
<td>8 – 10</td>
<td>5000</td>
</tr>
<tr>
<td>6 – 8</td>
<td>4000</td>
</tr>
<tr>
<td>4 – 6</td>
<td>3000</td>
</tr>
<tr>
<td>2 - 4</td>
<td>1500</td>
</tr>
</tbody>
</table>

5.1.5.4.3 Accessibility

All systems or components subject to periodic maintenance or that are subject to periodic failures shall be readily accessible for service and inspection. To the extent practicable, removal or physical movement of components unrelated to the specific maintenance and/or repair tasks involved shall be unnecessary.

As a goal, relative accessibility of components, measured in time required to gain access, shall be inversely proportional to frequency of maintenance and repair of the components. Specific maintainability requirements are defined in other sections of Part 5: Technical Specifications.

5.1.5.4.4 Interchangeability

Components with identical functions shall be interchangeable to the extent practicable. These components shall include passenger window hardware, interior trim, lamps, lamp lenses, and seat assemblies. Components with nonidentical 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 this Contract.
5.1.5.5 OPERATING ENVIRONMENT

The bus shall achieve normal operation in ambient temperature ranges of -10 degrees to 115E F, at relative humidities between 5 percent and 100 percent, and at altitudes up to 7,500 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below -10E F, above 115E F, or at altitudes above 7,500 feet.

Special equipment or procedures may be employed to start the bus after being exposed for more than 4 hours to temperatures less than 30E F without the engine in operation. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85E F, 29.00 inches Hg, dry air. The interior climate control system shall perform in accordance with Section 5.4.8 of Part 5: Technical Specifications.

5.1.5.6 NOISE

5.1.5.6.1 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 83 dBA and the operator shall not experience a noise level of more than 75 dBA under the following test conditions. The bus shall be empty except for test personnel, not to exceed 4 persons, and the test equipment. All openings shall be closed and all accessories shall be operating during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement in an area free of large reflecting surfaces within 50 feet of the bus path. During the test, the ambient noise level in the test area shall be at least 10 dBA lower than the bus under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured.

5.1.5.6.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 83 dBA under full power acceleration when operated at or below 35 mph at curb weight and just prior to transmission upshift. 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 as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured. All noise readings shall be taken 50 feet from, and perpendicular to, the centerline of the bus with all accessories operating. Instrumentation, test sites, and other general requirements shall be
in accordance with SAE Standard J366. The pull away test shall begin with the front bumper even with the microphone. The curb idle test shall be conducted with the rear bumper even with the microphone.

In addition, the Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Procuring Agency.

5.1.5.7 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 and suppression systems, firewalls, and facilitation of passenger evacuation.

All materials used in the construction of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993.

Fire detection and suppression systems as required in Section 5.5.9 shall be provided in the engine compartment.

Firewalls shall be provided between the bus interior areas and the engine compartment. The engine compartment shall include the areas in which the engine, transmission, and exhaust system are housed. The firewalls shall satisfy the requirements defined in FTA Docket 90, dated October 20, 1993.

The requirements for passenger evacuation provisions related to doors, windows, and escape hatches are defined in Section 5.4 of Part 5: Technical Specifications.

5.1.5.8 ELDERLY AND DISABLED PASSENGERS

The contractor shall comply with all applicable Federal requirements defined in the Americans with Disabilities Act, 49 CFR Part 38, and all state and local regulations regarding mobility-impaired persons. Local regulations are defined as those below the state level.

5.2 PROPULSION SYSTEM

5.2.1 VEHICLE PERFORMANCE

5.2.1.1 Power Requirements

Propulsion system and drive train shall provide power to enable the bus to meet the defined acceleration, top speed, and gradability requirements, and operate all propulsion-driven accessories. Power requirements are based on heavy heavy-duty diesel (HHDD) engines certified for use in all 50 states using actual road test results or computerized vehicle performance data.

5.2.1.2 Top Speed
The bus shall be capable of a top speed of *(Procuring Agency to insert number, understanding that top speed requirements may affect other performance characteristics)* mph (for emergency and passing maneuvers) on a straight, level road at GVWR with all accessories operating.

### 5.2.1.3 Gradability

Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating. The power plant shall enable the bus to maintain a speed of 44 mph on a 2-1/2 percent grade and 7 mph on a 16 percent grade.

*APTA Comment: Speed on 2 ½ percent grade revised due to change from SLW to GVWR*

### 5.2.1.4 Acceleration

An average acceleration rate of *(obtain mfr data)* shall be achieved at GVWR between 0 and 15 mph.

APTA comment: Recommend that acceleration compliance should be “time to speed” rather than average acceleration rate. Table below revised based on data received from transit systems, bus mfgs. and engine mfgs.

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.

In addition, the times to reach the respective speeds in the following table from a stall start shall not exceed the times listed in the table.

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>TIME (SEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.00</td>
</tr>
<tr>
<td>10</td>
<td>2.25</td>
</tr>
<tr>
<td>15</td>
<td>4.50</td>
</tr>
<tr>
<td>20</td>
<td>6.94</td>
</tr>
<tr>
<td>30</td>
<td>14.10</td>
</tr>
<tr>
<td>40</td>
<td>25.25</td>
</tr>
<tr>
<td>50</td>
<td>41.65</td>
</tr>
<tr>
<td>60</td>
<td>69.00</td>
</tr>
</tbody>
</table>
5.2.1.5 Operating Range

The operating range of the coach run on the design operating profile shall be at least 350 miles with a full capacity of fuel.

5.2.2 DRIVETRAIN

5.2.2.1 Power Plant

5.2.2.1.1 Engine

The HHDD engine shall be designed to operate for not less than 300,000 miles without major failure or significant deterioration. Components of the fuel injector and/or control system shall be designed to operate for not less than 150,000 miles without replacement or major service. Mileage intervals are based on the design operating profile defined in Section 5.1.2.

The engine shall meet all requirements of Part 5: Technical Specifications when operating on Nos. 1 or 2 diesel fuel, as certified by the engine manufacturer and specified by the Procuring Agency. Durability of the engine and its components shall not be seriously reduced and the requirement of Section 5.2.2.5.1 shall be met by operation on either of the commercially available diesel fuels.

The engine shall be equipped with an electronically controlled management system, compatible with multiplex wiring systems and either 12- 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 have the capability of being programmed, allowing the Procuring Agency to optimize engine performance. Initial performance settings shall only be changed with authorization from the bus and engine manufacturers to keep engine warranties valid.

The engine shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in operator’s area and inside engine compartment. The on-board diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions. Conditions that require an operator alarm are identified in Section 5.4.6.1.6. The engine control system shall prevent high engine rpm operation before adequate lubrication is available to critical components.

The engine starter shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the engine when exposed to temperatures less than 30EC for a minimum of four hours without the engine in operation. All cold weather starting aids, engine heating devices and procedures shall be of the type recommended by the engine manufacturer and approved by the Procuring Agency. The requirements for specific cold weather starting aids are included in attachments to Part V: Technical Specifications.
### Standard Bus Procurement Guidelines

#### Technical Specifications

**Baseline: 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 toggle mounted on the dash or side console and the device shall activate only with the transmission in neutral and the parking brake applied. This device may be used to help meet the requirements of bus cool down in Section 5.4.8.

**Alternative: Automatically activated fast idle.**

The fast idle device shall be activated and regulated automatically by the engine control system.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>An auxiliary heater fired by diesel fuel shall be provided to supplement the heat supplied by the engine and shall have an output of no less than 104,000 BTUs per hour necessary to meet the performance criteria specified in 5.4.8.1. The heater shall be equipped with safety devices to prevent the following: overfueling, overheating due to loss of coolant or water pump failure, and operation during conditions of low battery voltage. The auxiliary heater shall be equipped with a self-priming fuel pump.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically derate power and/or speed as needed. The on-board diagnostic system, as described in Section 5.4.6.1.6, shall trigger a visual and audible alarm to the operator when the engine control unit detects a malfunction and the engine protection system is activated.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A control shall be available to the operator, allowing him/her to override the engine protection system if additional engine power is required to move the bus in emergency conditions.</td>
<td></td>
</tr>
</tbody>
</table>
### Baseline: No requirement for an automatic engine shutdown feature.

<table>
<thead>
<tr>
<th>Alternative: Automatic Engine Shutdown.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The engine control system shall shutdown the engine automatically when parameters established for critical functions are exceeded. The on-board diagnostic system, as described in Section 5.4.6.1.6, shall trigger a visual and audible alarm to the operator when the engine control unit detects a malfunction and the engine shutdown system is activated. Automatic shutdown shall only occur when parameters established for the functions checked below are exceeded:</td>
</tr>
<tr>
<td>- Coolant Level</td>
</tr>
<tr>
<td>- Coolant Temperature</td>
</tr>
<tr>
<td>- Oil Pressure</td>
</tr>
<tr>
<td>- Oil Temperature</td>
</tr>
<tr>
<td>- Intake Manifold Temperature</td>
</tr>
</tbody>
</table>

### Baseline: No requirement for an automatic engine shutdown override feature.

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<tr>
<th>Alternative: Automatic engine shutdown override.</th>
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<tr>
<td>A control shall be available to the operator, allowing him/her to allow override of the engine shutdown system if engine power is required to move the bus in emergency conditions. If both override alternatives are selected (i.e., Automatic Engine Protection and Automatic Engine Override), a single override control may be used.</td>
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## 5.2.2.1.2 Cooling Systems

Temperature of operating fluids and intake air shall be controlled by independent cooling system controls. 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 in new condition shall have an ambient capacity of at least 110°F with water as coolant and sea level operation, with the bus loaded to GVWR and with ambient temperatures up to 115°F.

### 5.2.2.1.2.1 Engine Cooling

The engine shall be cooled by a water-based, pressure type, cooling system that does not permit boiling or coolant loss during the operations described above. Engine thermostats shall be easily accessible for replacement. Shutoff valves shall allow filter replacement without coolant loss. Valves shall permit complete shutoff of lines for the heating and defroster units, and water booster pumps. All low points in the water-based cooling system shall be equipped with drain cocks. Air vent valves shall be fitted at high points in the cooling system unless it can be demonstrated that the system is self-purging.
A sight glass to determine satisfactory engine coolant level shall be provided and shall be accessible by opening one of the engine compartment's access doors. A spring-loaded, push button type valve to safely release pressure or vacuum in the cooling system shall be provided with both it and the water filler no more than 60 inches above the ground and both shall be accessible through the same access door.

The radiator, and charge air cooler if integrated, shall be of durable corrosion-resistant construction with bolted-on removable tanks. The radiator shall be designed so a 2M mechanic can gain access to a substantial portion of the side facing the engine for the purpose of cleaning the radiator in five minutes or less.

*(NOTE: Radiators with a fin density greater than 12 fins per inch, or louvered/slit design, are more susceptible to clogging and deteriorating cooling performance over time and shall not be used).*

Radiator piping shall meet the requirements of Section 5.2.2.2.4. 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 for not less than 300,000 miles without failure.

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<tr>
<td>The engine cooling system shall be equipped with a properly sized water filter with a spin-on element filter.</td>
<td>The water filter and its plumbing shall not be provided.</td>
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<tr>
<td>The cooling fan shall be temperature controlled, allowing the engine to reach operating temperature quickly. The temperature-controlled fan shall not be driven when the coolant temperature falls below the minimum level recommended by the engine manufacturer.</td>
<td>The cooling fan shall operate continuously with the engine.</td>
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**5.2.2.1.2.2 Charge Air Cooling**

The charge air cooling system, also referred to as aftercoolers or intercoolers, 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. To the extent possible, the charge air radiator shall not be stacked ahead 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.
5.2.2.1.2.3 Transmission Cooling

The transmission shall be cooled by a separate 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.

5.2.2.1.3 Transmission

The transmission shall be multiple speed, automatic shift with torque converter, retarder and electronic controls. Gross input power, gross input torque and rated input speed shall be compatible with the engine. A 3M mechanic, with optional assistance, shall be able to remove and replace the transmission assembly for service in less than 8 1/2 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 compatible with multiplex wiring systems, capable of receiving inputs from the throttle, shift selector, engine, and transmission. Communication between the transmission and other electronically controlled vehicle systems shall be made using the SAE J1939 Recommended Practice communication link. Electronic controls shall be compatible with either 12- or 24-volt systems, provide consistent shift quality, and compensate for changing conditions such as variations in vehicle weight and engine power. A brake pedal application of 15 to 20 psi shall be required by the operator to engage forward or reverse range from the neutral position.

The electronically controlled transmission shall have on-board diagnostic capabilities, able to monitor functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. 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 as described in Section 5.4.6.1.6. The transmission shall contain built-in protection software to guard against severe damage.

5.2.2.1.4 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 without exceeding jerk requirements as defined in section 5.2.2.1.5. A retarder control, which permits the retarder to be disabled during inclement weather or slippery road conditions, shall be available to the operator as described in Section 5.4.6.1.3. Brake lights shall illuminate when the retarder is activated

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<tr>
<td>The retarder shall be activated when the brake pedal is depressed.</td>
<td>The retarder shall be engaged up to a maximum of 50 percent when the throttle is completely released (e.g., zero throttle). The retarder shall only be allowed to exceed 50</td>
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5.2.2.1.5  **Jerk**

Jerk, the rate of change of acceleration measured at the centerline, floor level of the bus shall be minimized throughout the shifting of each transmission range and retarder application and shall be no greater than 0.3 g/sec. for a duration of a quarter-second or more. This requirement shall be achieved regardless of driver actions.

5.2.2.2  **Mounting**

The power plant shall be mounted in a compartment in the rear of the bus. All power plant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure as defined in section 5.4.1.5. Mounts shall control movement of the power plant so as not to affect performance of belt driven accessories or cause strain in piping and wiring connections to the power plant.

5.2.2.2.1  **Service**

The power plant shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the power plant. Two 3M mechanics shall be able to remove and replace the engine and transmission assembly in less than 8 total combined man-hours. 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. All fluid fill locations shall be properly labeled to help ensure correct fluid is added and all fillers shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant sumps shall be fitted with magnetic-type, external, hex head, 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. To the extent practicable, the filters shall be of the spin-on, disposable type or integral with the engine and transmission. All filters shall be easily accessible and the filter bases shall be plumbed to assure correct
reinstallation. Fuel and oil lines shall meet the requirements of Section 5.2.2.2.4. The engine shall be equipped with a fuel-priming pump or a check valve fitted in the fuel suction line to aid restarting after fuel filter changes.

### 5.2.2.2 Accessories

Engine-driven accessories shall be unit mounted for quick removal and repair. Accessory drive systems shall operate without unscheduled adjustment for not less than 50,000 miles on the design operating profile. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle operation and low route speed portion of the design operating profile. Belt guards shall be provided as required for safety and shall be sturdy in design and installation and readily removable.

### 5.2.2.3 Hydraulic Systems

Any accessory may be driven hydraulically. The hydraulic system shall demonstrate a mean time between repairs in excess of 50,000 miles. 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. All hydraulic lines shall meet the requirements of Section 5.2.2.2.4, and all elements of the hydraulic system shall meet the noise limits defined in Section 5.1.5.6. 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. All elements of the hydraulic system shall meet the accessibility loading requirements of Section 5.4.5.4.2.

| Baseline: No requirement for hydraulic system sensors. | Alternative: Hydraulic system sensors. Sensors in the hydraulic system, excluding those in the power steering system, shall indicate on the operator's on-board diagnostic panel conditions of low hydraulic fluid level. Specific systems for which low hydraulic fluid level sensors are required are included in attachments to Part 5: Technical Specifications. |

### 5.2.2.4 Fluid Lines, Fittings and Clamps, and Charge Air Pipework

All fluid lines and air pipework shall be individually and rigidly supported to prevent chafing damage, fatigue failures, and tension strain.

Radiator piping shall be stainless steel or brass tubing and, if practicable, rubber hoses shall be eliminated. Necessary hoses shall be premium, silicone rubber type that are impervious to all bus fluids. All hoses shall be as short as practicable. All hoses shall be secured with premium, stainless steel clamps that provide a complete 360E 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.

Fuel, oil, and hydraulic lines shall be compatible with the fluid they carry. The lines shall also be compatible with potentially damaging elements of the surrounding environment including heat and salt.
Lines shall be capable of withstanding maximum system pressures. Lines within the engine compartment shall be composed of steel tubing where practicable except in locations where flexible lines are specifically required by the Procuring Agency in attachments to Part 5: Technical Specifications.

Flexible fuel and oil lines shall be kept at a minimum and shall be as short as practicable. Flexible lines shall be routed or shielded so that failure of a line shall not allow fuel or oil to spray or drain onto any component operable above the autoignition temperature of the fluid. Flexible lines shall be Teflon hoses with braided stainless steel jackets except in applications where premium hoses are required and shall have standard SAE or JIC brass or steel, reusable factory crimped, swivel, end fittings. Flexible hoses and fluid lines shall not touch one another, or any part of the bus.

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.

The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standard J1149 Type 1 for copper tubing, SAE Standard J526 for welded steel tubing, or SAE Standard J844 for nylon tubing color coded orange.

Charge air pipework and fittings shall be designed to minimize air restrictions and leaks. Pipework shall be as short as possible and the number of bends minimized. Bend elbows shall have smooth contours with a bend radius to tube diameter ratio of no less than 2.0. The cross section of all charge air pipework shall not be less than the cross section of the intake manifold inlet. Any changes in pipework diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Pipework shall be routed away from exhaust manifolds and other heat sources, and insulated and shielded from these sources to protect inlet air from heat radiation.

Charge air pipework shall be seamless, constructed of either stainless steel or anodized aluminum. Pipework between the air filter and turbocharger inlet may be constructed of fiberglass. Connections between all charge air pipework sections shall be sealed with a short section of reinforced hose and stainless steel, constant tension clamps that provide a complete 360° seal.

5.2.2.3 Fuel System

5.2.2.3.1 Fuel Tank

The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers, but shall be capable of being removed and reinstalled by a 2M mechanic for cleaning or replacement in 2.5 hours or less. Fuel tank capacity shall be (125) gallons. The fuel tank shall be equipped with an external, hex head, brass drain plug. It shall be at least a 3/8-inch size and shall be located at the lowest point of the tank. The tank shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank without requiring its removal. The tank 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. The underside of the tank shall be protected from damage caused by road debris. 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.

5.2.2.3.2 Fuel Filler
The fuel filler shall be located 7 to 25 feet behind the centerline of the front door on the curbside of the bus. The hinged filler cap 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 the SAE Standards identified in Section 5.2.2.2.4.

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<tr>
<td>The filler shall accommodate a 1-1/2-inch diameter nozzle and fill rate of not less than 40 gallons per minute of foam-free fuel without spitting back or causing the nozzle to shut off before the tank is full. An audible signal shall indicate when the tank is essentially full.</td>
<td>The fuel filler shall accommodate a nozzle that forms a locked and sealed connection during the refueling process to eliminate spills. Fuel shall not be allowed to flow into the tank unless the nozzle has been properly coupled, locked and sealed to the filler. With the nozzle open, fuel shall enter the tank at a fill rate of not less than 40 gallons per minute of foam-free fuel without causing the nozzle to shut off before the tank is full. The nozzle shall automatically shut off when the tank is essentially full. Once disconnected, fuel shall not be allowed to flow through the nozzle at any time. Any pressure over 3 psi shall be relieved from the fuel tank automatically. An audible signal shall indicate when the tank is essentially full. The dry break system shall be compatible with the Procuring Agency’s system.</td>
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5.2.2.4 Final Drive

The bus shall be driven by a single heavy-duty axle at the rear with a load rating sufficient for the bus loaded to GVWR. Transfer of gear noise to the bus interior shall be minimized. The rear axle shall be designed to operate for not less than 300,000 miles on the design operating profile without repairs. The lubricant drain plug shall be magnetic type, external hex head. The drive shaft shall be guarded to prevent it striking the floor of the coach or the ground in the event of a tube or universal joint failure.

5.2.2.5 Emissions

5.2.2.5.1 Exhaust Emissions

The engine shall meet all applicable emission standards.

5.2.2.5.2 Exhaust Location
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 roof. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component. The exhaust outlet shall be designed to prevent rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the catalyst.

5.3 CHASSIS

5.3.1 SUSPENSION

5.3.1.1 GENERAL REQUIREMENTS

Both 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. Items such as one suspension bushing or air spring shall be replaceable by a 3M mechanic in 30 minutes or less. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Necessary adjustments shall be easily accomplished without removing or disconnecting the components.

5.3.1.2 SPRINGS AND SHOCK ABSORBERS

5.3.1.2.1 TRAVEL

The suspension system shall permit a minimum wheel travel of 3.5 inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 3 inches 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 + 1/2 inch at any point from the height required in Section 5.1.5.1.3.

5.3.1.2.2 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 3 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles of the service life of the bus. Each unit shall be replaceable by a 2M mechanic in less than 15 minutes. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber.

5.3.1.2.3 LUBRICATION

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 without flexible hose end from a pit or
with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. Lubricant specified shall be standard for all elements on the bus serviced by standard fittings.

5.3.1.2.4 KNEELING

A kneeling system shall lower the bus a minimum of 3 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the front door, by the driver using a three position, spring loaded to center switch. Downward direction will lower the bus. Release of switch at anytime will completely stop lowering motion and hold height of the bus at that position. Upward direction of the switch will allow the system to go to floor height without the driver having to hold the switch up.

Brake and Throttle interlock shall prevent movement when the bus is kneeled. The kneel control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate. After kneeling, the bus shall rise within 2 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 acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec measured on the front door step tread.

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, minimum 3" diameter, amber lens shall be provided that will blink when kneel feature activated and throughout operation. Kneeling shall not be operational while the wheelchair lift is deployed.

5.3.1.3 WHEELS AND TIRES

5.3.1.3.1 WHEELS

Wheels and rims shall be (procuring agency to specify hub or stud piloted, and whether with aluminum rims) and shall be integral formed steel drop center construction. 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.

5.3.1.3.2 TIRES

Tires shall be 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. (Procuring agency to describe arrangements for furnishing tires from lessor or supplier.)

5.3.2 STEERING

5.3.2.1 FRONT AXLE

The front axle shall be 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 lubrication fittings easily accessible from a pit or hoist.

5.3.2.2 STRENGTH

Fatigue life of all steering components shall exceed 1,000,000 miles. No element of the steering system shall sustain a Class I failure when one of the tires hits a curb or strikes a severe road hazard.

5.3.2.3 TURNING RADIUS

Outside body corner turning radius for a standard configuration 40-foot long bus shall not exceed 44 feet.

5.3.2.4 TURNING EFFORT

The steering wheel shall be no less than 19 inches in diameter and shall be shaped for firm grip with comfort for long periods of time. The steering wheel shall be removable with a standard or universal puller.

Hydraulically assisted power steering shall be provided. The steering gear shall be an integral type with flexible lines eliminated or the number and length minimized. Steering torque applied by the driver shall not exceed 10 foot-pounds with the front wheels straight ahead to turned 10 degrees. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. 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. Power steering failure shall not result in loss of steering control. With the bus in operation the steering effort shall not exceed 55 pounds 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.

5.3.3 BRAKES

5.3.3.1 SERVICE BRAKE

5.3.3.1.1 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 50 pounds at a point 7 inches above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver’s heel when foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. Microprocessor controlled ABS and traction control shall be provided. 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.
5.3.3.1.2  **FRICITION MATERIAL**

The entire service brake system, including friction material, shall have a minimum overhaul or replacement life of 30,000 miles with a brake retarder on operating profile. Brakes shall be self-adjusting throughout this period. Microprocessor controlled ABS and traction control shall be provided.

5.3.3.1.3  **HUBS AND DRUMS**

Wheel bearing seals shall run on replaceable wear surfaces. Wheel bearing and hub seals shall not leak or weep lubricant for 100,000 miles when running on the design operating profile.

5.3.3.2  **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. The parking brake valve button will pop out when air pressure drops below 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 in place.

5.3.4  **PNEUMATIC SYSTEM**

5.3.4.1  **GENERAL**

The bus air system shall operate all accessories and the braking system with reserve capacity. New buses shall not leak down more than 5 psi as indicated on the instrument panel mounted air gauges, within 15 minutes from the point of governor cut-off.

Provision shall be made to apply shop air to the bus air systems using a standard tire inflation type valve. A quick disconnect fitting specified in attachments to Part 5: Technical Specifications, 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 through the main engine air cleaner system. The air system shall be protected by a pressure relief valve set at 150 psi and shall be equipped with check valve and pressure protection valves to assure partial operation in case of line failures.

5.3.4.2  **AIR COMPRESSOR**

The engine-driven air compressor shall be sized to charge the air system from 40 psi to the governor cutoff pressure in less than 3 minutes while not exceeding the fast idle speed setting of the engine.
5.3.4.3 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 degrees F. 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 by looms 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-foot intervals. Nylon lines may be grouped and shall be continuously supported.

The compressor discharge line between power plant 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-foot intervals or less.

Air lines shall be cleaned and blown out before installation and shall be installed to minimize air leaks. All air lines shall be sloped toward a reservoir and routed to prevent water traps. Grommets shall protect the air lines at all points where they pass through understructure components.

5.3.4.4 AIR RESERVOIRS

All air reservoirs shall meet the requirements of FMVSS Standard 121-Section 5.1.2.1. and SAE Standard J10 and shall be equipped with 2 inch minimum clean-out plugs and guarded or 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 brass drain valves which discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

5.3.4.5 AIR SYSTEM DRYER

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system will include a replaceable desiccant bed, electrically heated drain, and activation device. A 2M/3M mechanic shall replace the desiccant in less than 15 minutes.
5.4 BODY

5.4.1 GENERAL

5.4.1.1 DESIGN

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria established by Part 5: Technical 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 still to prevent vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. 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.

5.4.1.2 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-inch reduction in any interior dimension. Windows shall remain in place and shall not open under such a load.

The bus shall withstand a 25-mpg impact by a 4,000-pound automobile at any point, excluding doorways, along either side of the bus with no more than 3 inches 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 the rubrail and their supporting structural members shall withstand a static load of 2,000 pounds applied perpendicular to the bus anywhere below the rubrail by a pad no larger than 5 inches square. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

5.4.1.3 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; add-on devices and trim, where necessary, shall be minimized and integrated into the basic design.

Baseline: No requirement for anti-graffiti/vandalism surface treatments.

Alternative: Additional requirements for anti-graffiti/vandalism surface treatments. Also see Sections 5.4.3 and 5.4.4.

The body material surfaces shall be treated to
5.4.1.4 CORROSION

The bus shall resist corrosion from atmospheric conditions and road salts. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, provided it is maintained by the Procuring Agency in accordance with the procedures specified in the Contractor’s service manual. All exposed surfaces and the interior surfaces of tubing and other enclosed members shall be corrosion resistant. 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 2-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.

5.4.1.5 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.

5.4.1.6 FIRE PROTECTION

The passenger and engine compartments shall be separated by a bulkhead(s) that shall, by incorporation of fireproof materials in its construction, be a firewall. This firewall 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 90, dated October 20, 1993. Only necessary openings shall be allowed in the firewall, and these shall be fireproofed. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the firewall with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the firewall. Engine access panels in the firewall shall be fabricated of fireproof material and secured with fireproof fasteners. These panels, their fasteners, and the firewall shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the firewall.

5.4.1.7 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 and service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6-inch curb or in a 6-inch deep hole.
5.4.2 STRUCTURE

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban duty cycle throughout its service life. The Design Operating Profile defined in Section 5.1.2 shall be considered for this purpose.

The Structure of the bus shall have undergone appropriate structural testing and analysis, including Altoona testing, to ensure adequacy of design for the urban transit service.

5.4.2.1 TOWING

Towing devices shall be provided on each end of the bus. Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. The rear towing device(s) shall not provide a toehold for unauthorized riders. The front towing devices shall allow attachment of a rigid tow bar and shall permit lifting and towing of the bus, at curb weight, by the towing devices and the tow bar until the front wheels are clear of the ground. The rear tow eyes shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency. The method of attaching the tow bar shall require the specific approval of the Procuring Agency prior to submittal of bids/proposals. Each towing device shall accommodate a crane hook with a 1-inch throat.

5.4.2.2 JACKING

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack 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 pads 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-inch-high run-up block not wider than a single tire. Jacking and changing any one tire shall be completed by a 2M mechanic helper in less than 30 minutes from the time the bus is approached. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

5.4.2.3 HOISTING

The bus axles or jacking plates shall accommodate the lifting pads of a 2-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.

5.4.2.4 FLOOR

5.4.2.4.1 Design

The floor shall be essentially a continuous flat plane, except at the stepwells and wheel housings. Where the floor meets the walls of the bus, the surface edges shall be blended with a circular section of radius not less than 1 inch, and a molding or cove shall prevent debris accumulation between the floor and wheel housings.
The floor shall be divided into sections that are replaceable by a 3M mechanic in less than 30 minutes for a section up to 5 feet long (excludes the removal/installation of seats and floor covering).

5.4.2.4.2 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement. Sheet metal screws shall not be used to retain the floor and all floor fasteners shall be serviceable from one side only. 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 inches from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. Floor and step treads, with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a 2-inch-diameter rod, with 1/32-inch radius, without permanent visible deformation.

5.4.2.4.3 Construction

The floor shall consist of the subfloor and the floor covering (See 5.4.4.5 Floor Covering). The floor, as assembled, including the sealer, attachments and covering shall be waterproof, nonhydroscopic, and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot) and impervious to wood destroying insects such as termites. Plywood, if used, shall be of a thickness calculated to support the design loads, manufactured with exterior glue of Group I Western species as defined in PS 1-95 (Voluntary Product Standard PS 1-95, Construction and Industrial Plywood) and of a grade that is manufactured with a solid face and back. Plywood shall be installed with the highest-grade veneer up and with all edges sealed. Preservative treated plywood shall utilize a chemical that contains no EPA listed hazardous compounds and have a moisture content at or below fifteen percent. Plywood, prior to any preservative treating, shall be certified at the time of manufacturing by an industry approved third-party inspection agency such as APA- The Engineered Wood Association (formerly the American Plywood Association), as assembled, including the sealer, attachments, and covering, shall be waterproof, nonhydroscopic, resistant to wet and dry rot, resistant to mold growth, and impervious to insects. Plywood, if used, shall be no less than 3/4 inch thick American Plywood Association, exterior grade, A C, and shall be installed with the A side up and with all edges sealed.

5.4.2.5 STEPWELLS

5.4.2.5.1 Design

Risers shall be continuous, flat, planes across the entire width of the stepwell except for notches which shall not be larger than necessary to accommodate inward opening door panels. Step risers may be inclined, not to exceed 10 degrees, from the vertical with only the lower edge inward. All corners shall have radii no less than 2 inch to facilitate cleaning.

All step treads shall be of uniform depth which shall be no less than 11 inches and the plane of the step treads shall be parallel to the plane of the floor. Treads shall be covered with 5/16-inch, nonskid, ribbed, composition-rubber material that shall remain effective in all weather conditions. Color of the tread covering shall match the vestibule flooring. The edge of the vestibule floor shall conform to ADA
requirements and shall have a maximum 5/16-inch overhang at the step riser. The edge of the vestibule floor and the end of the step tread shall have a bright, contrasting, white band no less than 2 inches wide on the full width of the step. The color shall be permanently blended into the tread covering material.

5.4.2.5.2 Structure

The following requirements are not applicable to steps that are reconfigured to provide a wheelchair lift platform. Stepwells shall be corrosion-resistant throughout the service life of the bus. Stepwells shall be replaceable as units if they are constructed of nonmetallic material. The steps shall simultaneously support 300-pound loads evenly distributed over the center half of each step tread without permanent deformation and with elastic deflection of no more than 0.125 inches. Each step tread shall support a load of 500 pounds evenly distributed over the center half of the tread without permanent deformation. The steps shall be sloped only sufficient to preclude water accumulation in the stepwells. All intersections of the step tread and riser in the stepwell shall have radii no less than 2 inch.

5.4.2.6 WHEEL HOUSING

5.4.2.6.1 Design

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. Tire chain clearance shall be provided on all driven wheels in accordance with SAE Information Report J683.

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.

5.4.2.6.2 Construction

Wheel housings shall be constructed of corrosion-resistant, fire-resistant material. Wheel housings, as installed and trimmed, shall withstand impacts of a 2-inch steel ball with at least 200 foot-pounds of energy without penetration.

5.4.3 EXTERIOR PANELS AND FINISHES

5.4.3.1 PEDESTRIAN SAFETY

Exterior protrusions greater than 2 inch and within 80 inches of the ground shall have a radius no less than the amount of the protrusion. The street-side rearview mirror and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than 7/8 inch from the body surface and shall have the exposed edges and corners rounded to the extent practicable. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize the ability of unauthorized riders to secure toeholds or handholds.

5.4.3.2 REPAIR AND REPLACEMENT
Exterior panels below the rubrail shall be divided into sections that are repairable or replaceable by a 3M mechanic in less than 30 minutes for a section up to 5 feet long (excludes painting).

Exterior side panels above the rubrail, where used, and below the lower daylight opening shall be repairable or replaceable by a 3M mechanic in less than 1-1/2 hours for a section up to 5 feet long (excludes painting).

| Baseline: No requirement for anti-graffiti/vandalism surface treatments. | Alternative: Additional requirements for anti-graffiti/vandalism treatments for exterior surfaces. Also see Sections 5.4.1.3 and 5.4.4. {obtain mfr data on feasible treatments} |

5.4.3.3 RAIN GUTTERS

Gutters shall be provided to prevent water flowing from the roof onto the side windows and passenger doors and exterior mirrors. When the bus is decelerated, the gutters shall not drain onto the windshield, or operator's side window, or into the door boarding area. Cross sections of the gutters shall be no less than 0.25 square inch adequate for proper operation.

5.4.3.4 LICENSE PLATE PROVISIONS

Provisions shall be made to mount standard size U.S. license plates per SAE J686 on the front and 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. License plates shall be mounted toward the street side of the center of the bus and shall not allow a toehold or handhold for unauthorized riders.

5.4.3.5 RUBRAILS

Rubrails composed of flexible, resilient material shall be provided to protect both sides of the bus body from damage caused by minor sideswipe accidents with automobiles. Rubrails shall have vertical dimensions of no less than 2 inches with the centerline no higher than 33 inches above the ground. The rubrails shall be capable of withstanding impacts of 200 foot-pounds of energy from a steel-faced spherical missile no less than 9 inches in diameter and of a 500-pound load applied anywhere along their length by a rigid plate 1 foot in length, wider than the rubrail, and with 1/4-inch end radii with no visible damage to the rubrail, retainer, or supporting structure. The rubrail may be discontinued at doorways and wheelwells. A damaged portion of the rubrail shall be replaceable without requiring removal or replacement of the entire rubrail.

5.4.3.6 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.

5.4.3.7 SPLASH APRONS
Splash aprons, composed of 1/4-inch-minimum composition or rubberized fabric, shall be installed behind each wheel and shall extend downward to within 3 inches of the road surface. Apron widths shall be no less than tire widths, except for the front apron which shall extend across the width of the bus. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons and their attachments shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect bus equipment.

5.4.3.8 SERVICE COMPARTMENTS AND ACCESS DOORS

5.4.3.8.1 Access Doors

Conventional or pantograph hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments including doors for checking the quantity and adding to the engine coolant, engine lubricant and transmission fluid. 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. Doors with top hinges shall have safety props stored behind the door or on the doorframe. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs 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.

Baseline: Requirement for locks on access doors. Also see Section 5.4.4.8.

Access doors larger in area than 100 square inches shall be equipped with locks. The locks shall be standardized as defined by the Procuring Agency in the attachments to Part 5: Technical Specifications so that only one tool is required to open all major access doors on the bus.

Alternative: Deletion of the requirement for locking access doors. Also see Section 5.4.4.8.

Access doors larger in area than 100 square inches shall be equipped with latches. The latches shall be standardized and shall be openable without the use of a key or tool.

The battery compartment or enclosure shall be vented and self-draining. It shall be accessible only from outside the bus. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte and gases emitted by the battery. 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 Master Battery Switch accessibility requirements are defined in Section 5.5.8 of Part 5: Technical Specifications.

5.4.3.8.2 Service Area Lighting
Lights 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. The lights in the engine compartment shall be controlled by a switch located near the rear start controls in the engine compartment. Necessary lights, located in other service compartments, shall be provided with switches on the light fixture or convenient to the light.

5.4.3.9 BUMPERS

5.4.3.9.1 Location

Bumpers shall provide impact protection for the front and rear of the bus up to 26 inches above the ground. The bumpers shall wrap around the bus without exceeding allowable bus width. The bumpers shall be faired into the body to prevent a snagging hazard. Bumper height shall be such that when one bus is parked behind another, bumper faces will contact each other.

5.4.3.9.2 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' 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 4,000 pounds parallel to the longitudinal centerline of the bus and 5.5-mph impacts into the corners at a 30° 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 flexible portion of the bumper may increase the overall bus length specified in Section 5.1.5.1.1 by no more than 6 inches.

5.4.3.9.3 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 feet 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 inch 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 4,000 pounds, at 4 mph parallel to, or up to a 30E angle to, the longitudinal centerline of the bus. The rear bumper or bumper extensions shall be shaped to preclude unauthorized riders standing on the bumper. Bumper extensions, if provided, shall not hinder service and shall be faired into the bus body with no protrusion or sharp edges. The bumper shall be independent of all power systems of the bus and shall not require service or maintenance in normal operation during the service life of the bus. Any flexible portion of the bumper may increase the overall bus length specified in Section 5.1.5.1.1 by no more than 6 inches.

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

5.4.3.10 FINISH AND COLOR

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. The bus shall be completely painted prior to installation of exterior lights, windows, mirrors and other items which 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 dirt and the following other imperfections:

A. Blisters or bubbles appearing in the topcoat film.
B. Chips, scratches, or gouges of the surface finish.
C. Cracks in the paint film.
D. Craters where paint failed to cover due to surface contamination.
E. Overspray.
F. Peeling.
G. Runs or sags from excessive flow and failure to adhere uniformly to the surface.
H. Chemical stains and water spots.

To the degree consistent with industry standards for commercial vehicle finishes, painted surfaces shall have gloss and be free of orange peel. 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. Colors and paint schemes shall be in accordance with the attachments to Part 5: Technical Specifications.

5.4.3.11 NUMBERING AND SIGNING

Monograms, numbers and other special signing specified by the Procuring Agency 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 appliqués. All decals shall be sealed with clear, waterproof sealant around all exposed edges if required by the decal supplier. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part, Subpart B, 38.27. The exact wording, size, color, and locations for these signs are found with requirements for other special signs in attachments to Part 5: Technical Specifications.
### 5.4.3.12 EXTERIOR LIGHTING

All exterior lights shall be sealed designed to prevent entry and accumulation of moisture or dust, and each lamp shall be replaceable in less than 5 minutes by a 2M mechanic helper. Commercially available LED (Light Emitting Diode)-type lamps shall be used wherever possible. Lights mounted on the engine compartment doors shall be protected from the impact shock of door opening and closing. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. 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. Lights located on the roof and sides (directionals) of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts.

Visible and audible warning 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.

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open and shall illuminate the street surface to a level of no less than 1 foot-candle for a distance of 3 feet outward from the lowest step tread edge. The lights may be positioned above or below the lower daylight opening of the windows and shall be shielded to protect passengers’ eyes from glare. Additional requirements for the illumination of doorways equipped with wheelchair elevators are defined in Section 5.4.5.4.2 of Part 5: Technical Specifications.

Turn-signal lights shall be provided on both sides of the bus. Specific number and mounting requirements are defined in attachments to Part 5: Technical Specifications.

### 5.4.4 INTERIOR PANELS AND FINISHES

#### 5.4.4.1 GENERAL

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

Interior surfaces more than 10 inches 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. The entire interior shall be cleanable with a hose, using a liquid soap attachment. Water and soap should not normally be sprayed directly on the instrument and switch panels.

| Baseline: No requirement for anti-graffiti/vandalism surface treatments. | Alternative: Additional requirements for anti-graffiti/vandalism treatments for exterior surfaces. Also see Sections 5.4.1.3 and 5.4.4. |
5.4.4.2 FRONT END

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the operator’s feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing or walking in the front of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the operator's compartment shall be formed metal or plastic material. Formed metal dash panels shall be painted and finished to the quality described in Section 5.4.3.10 or may be carpeted. Plastic dash panels shall be reinforced, as necessary, vandal-resistant, and replaceable. All colored, painted, and plated parts forward of the operator’s barrier shall be finished with a dull matte surface to reduce glare (see Section 5.4.6.1.1). Colors shall match or coordinate with the balance of the bus interior.

5.4.4.3 REAR END

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, plastic, or carpeting and trimmed with stainless steel, aluminum, or plastic. Colors, patterns, and materials are defined in attachments to Part 5: Technical Specifications.

5.4.4.4 INTERIOR PANELS

5.4.4.4.1 General

Interior side trim panels and operator's barrier shall be textured stainless steel, anodized aluminum, plastic, melamine-type material, or carpeting. 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. Untrimmed areas shall be painted and finished to the quality described in Section 5.4.3.10. All materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20,1993. Colors, patterns, and materials for the interior trim are defined in attachments to Part 5: Technical Specifications.

5.4.4.4.2 Operator Barrier

A barrier or bulkhead between the operator 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.

Baseline: Standard configuration of operator’s barrier.

The barrier shall extend from below the level of the passenger or operator's seat cushion, whichever is lower, to above the level of the seated operator's head and shall fit the bus side windows and wall to prevent passengers from reaching the operator or the operator’s personal effects.

Alternative: Full-height configuration of operator’s barrier.

The barrier shall extend from the floor to the ceiling and shall fit the bus side windows, wall, and ceiling panels to prevent passengers from reaching the operator or the operator’s personal effects.
5.4.4.4.3 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior trim shall be provided at the rear of both stepwells. Modesty panels may be installed at the sides of longitudinal seats when the required armrests are integral. 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 no higher than the lower daylight opening of the side windows and those forward of transverse seats shall extend downward to a level between 1-1/2 and 1 inches 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 2-1/2-inch clearance between the modesty panel and the opened door to protect passengers from being pinched. The modesty panel and its mounting shall withstand a static force of 250 pounds applied to a four-inch by four-inch area in the center of the panel without permanent visible deformation.

5.4.4.4 Rear Bulkhead

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls, and seat backs so that any litter, such as a cigarette package or newspaper, 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 liter being thrown or drawn through the grille. The entire panel shall be able to be removed and replaced by a 3M mechanic in less than 30 minutes. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be able to be removed and replaced by a 3M mechanic in 5 minutes. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage.

5.4.4.5 Headlining

Ceiling panels shall be textured stainless steel, anodized aluminum, melamine-type material, carpeting, or material suitable for exterior skin painted and finished to exterior quality. 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. Colors, patterns, and materials for the headlining are defined in attachments in Part 5: Technical Specifications.

5.4.4.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Panels and fasteners shall not be easily removable by passengers. Interior trim fasteners, where required, shall be rivets or cross-recessed head screws.

5.4.4.7 Insulation

Any insulation material used between the inner and outer panels shall be sealed or self-sealing to minimize 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 protected or shielded from damage that may occur during maintenance operations. All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993.

The combination of inner and outer panels on the sides, roof, wheelwells and ends of the bus, and any material used between these panels shall provide a thermal insulation sufficient to meet the interior temperature requirements of Part 5: Technical Specifications. The bus body shall be thoroughly sealed so that the operator or passengers cannot feel drafts during normal operations with the passenger doors closed.

5.4.4.5 FLOOR COVERING

The floor covering shall have be covered with a non-skid walking surface material 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 stepwell area, shall be smooth and present no tripping hazards. The standee line shall be at least 2 inches wide and shall extend across the bus aisle in line with the operator's barrier. This line shall be the same color as the edge of the steps. Color shall be consistent throughout the floor covering. Color and material of the floor covering is defined in attachment to Part 5: Technical Specifications.

The floor in the operator's compartment shall be easily cleaned and shall be arranged to prevent debris accumulation.

A one-piece center strip shall extend from the rear seat between the aisle sides of transverse seats to the standee line. The covering between the center strip and the wheel housings may be separate pieces. At the rear door, however, a separate strip as wide as the door shall extend from the center strip to the top step.

The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall cove or extend to the top of the cove.

5.4.4.6 PASSENGER INTERIOR LIGHTING

The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles. Floor surface in the aisles shall be a minimum of 10 foot-candles, 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 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. Fluorescent tubes shall be a maximum 6-foot length, single-pin, T-12 type. (with exception granted for extinguishing or dimming fixtures as noted below)

Lens material shall be clear polycarbonate. Lens shall be designed to effectively "mask" the fluorescent tube. Lens material shall not drip flaming onto seats if burned. Lens shall be sealed to inhibit incursion
of dust and insects yet are easily removable for service. The lens shall be installed by the light manufacturer and covered with a protective material to prevent damage during assembly of the vehicle. If threaded fasteners are used they must be held captive in the lens. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged. Light fixtures shall not exceed 6 feet in length.

Individual ballast, providing a maximum 205 mA RMS output current, shall be provided for each light fixture. Ballast shall be non-potted, have a fireproof housing, minimum operating frequency of 18,000 Hz, reverse polarity protection, integrated circuit breaker/automatic thermal protection, and be rebuildable.

When in the RUN and NITE/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 light when the door is opened. This shall be accomplished through use of a ballast specifically designed to accomplish this function without diminished useful fluorescent tube life. It shall be non-potted, have a fireproof housing, have minimum operating frequency of 18,000 Hz, reverse polarity protected, integrated circuit breaker/automatic thermal protection, and be rebuildable.

The light system shall be designed to interlock, requiring no additional fasteners, with form part or the entire air conditioning duct. Use of identical material to provide conditioned air duct exceeding 120 square inches in cross-section.

5.4.4.7 FARE COLLECTION

Space, as far forward as practicable, and structural provisions shall be made for installation of currently available fare collection device(s). 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 operator to easily reach the coin drop levers and to view the change platform farebox controls and to view the fare register. The fare box shall not restrict access to the operator area and shall not restrict operation of operator controls. Location and mounting of fare collection device shall allow use, without restriction, by passengers. 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. A 10-amp, 12-volt, DC, protected circuit shall be available to power the fare box. This power service shall include a grounded lead with both wires enclosed in a flexible conduit. 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. The fare box, including make, model, mounting provisions, size, weight, and meter locations, is described in attachments to Part 5: Technical Specifications.

Transfer mounting, cutting, and punching equipment shall be located in a position convenient to the operator position on the right side of the instrument panel or on the fare box support. This equipment is defined in attachments to Part 5: Technical Specifications.

5.4.4.8 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, as necessary, where practical, to hold the doors out of the mechanic's way. Retention of all interior access panels, except on the door actuator compartments, shall be with cross-recessed head.
Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the bus.

Baseline: Door actuator access doors with do not require tools or keys to open.

Access doors for the door actuator compartments shall be secured with hand screws or latches, and shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

Alternative: Requirement for locking access doors. Also see Section 5.4.3.8.1

Access doors for the door actuator compartments shall be secured with locks, and shall prevent entry of mechanism lubricant into the bus interior. The locks shall be standardized so that only one tool, as required in Section 5.4.3.8.1, is required to open access doors on the bus. All fasteners that retain access panels shall be captive in the cover.

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material shall be flush with the floor and shall be edge-bound with stainless steel, or other material that is acceptable to the Procuring 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.

5.4.5 PASSENGER ACCOMMODATIONS

5.4.5.1 PASSENGER SEATING

5.4.5.1.1 Arrangements

Baseline: Standard configuration with combination of forward facing and longitudinal seating.

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.

Alternative: Perimeter seating arrangement.

Passenger seats shall be arranged in longitudinal rows facing the centerline of the bus. One row of transverse, forward facing seats shall be provided at the rear of the bus. Longitudinal seating shall meet the requirements in Section 5.4.5.1.3 except that armrest shall be provided between every other seating position at the same location as vertical passenger assists defined in Section 5.4.5.2.6. Each seat shall have a minimum width of 17 inches, not including the armrest.

Baseline: Use for 40-ft length bus with baseline seats and baseline seating arrangement.

Seating capacity with this arrangement shall be

Alternative: Use for alternative configurations of bus length, seating arrangement and seat type. Also see Section 5.1.5.3.

Seating capacity with this arrangement shall be
no less than 43 passengers. This minimum capacity may be reduced when accommodations for more than two wheelchairs are required in Section 5.4.5.4.

no less than ___ seated passengers, not including the operator, with the specified seating arrangement.

Note:

Seating capacity must be coordinated with the configurations listed previously for Section 5.1.5.3.

Baseline: Use with standard (non-padded) seat configuration.

Hip-to-knee room, measured from the front of one seat back cushion horizontally across the highest part of the seat cushion 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 26.5 inches.

Alternative: Use with padded or cushioned seat configuration.

Hip-to-knee room, measured from the front of one seat back cushion horizontally across the highest part of the seat cushion to the seat or panel immediately in front, shall be no less than 26.5 inches. At all seating positions in paired transverse seats immediately behind other seating positions hip-to-knee room shall be no less than 28 inches.

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 inches. Seats immediately behind the wheel housings may have foot room reduced, provided the wheelhouse is shaped so that it may be used as a footrest.

Each transverse, forward facing seat, except the rear seats, shall accommodate two adult passengers. Thickness of the transverse seat backs shall be minimized to increase passenger knee room and bus capacity. The area between the longitudinal seat backs and the attachment to the bus sidewalls shall be designed to prevent debris accumulation.

Baseline: Use for 102-inch width.

The aisle between the seats shall be no less than 20 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.

Alternative: Use with 96-inch width.

The aisle between the seats shall be no less than 16 inches wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 20 inches at standing passenger hip height.

5.4.5.1.2 Dimensions

Seats for the various seating arrangements shall have the dimensions shown in the figure “Seating Dimensions and Standard Configuration.”
5.4.5.1.3 **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.

**Baseline: Use for cantilevered seats.**

The 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.

**Alternative: Use for Pedestal-mounted seats.**

The structure shall be attached to the sidewall and supported by a pedestal attached to the floor. The lowest part of the seat assembly that is within 12 inches of the aisle, excluding the pedestal, shall be at least 10 inches above the floor.

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 a 5th-percentile female of a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at .05 \(\geq\) .015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not
exceed 2 inches, measured at the aisle side of the seat. 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 1/4-inch permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than 1/4-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 seat back 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 3-1/2-inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering.

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 handhold 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 usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where vertical assist is provided in accordance with Section 5.4.5.2. 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 shall be included on the ends of each set of longitudinal seats except on the forward end of a set that is immediately to the rear of a transverse seat, the operator's barrier, or a modesty panel and these fixtures perform the function of restraining passengers from sliding forward off the seat. 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 1-1/2 to 3-1/2 inches of the end of the seat cushion. Armrests shall be located from 7 to 9 inches above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel and shall be constructed and trimmed to complement the modesty panels. The top and sides of the armrests shall have a minimum width of 2 inches and shall be free from sharp protrusions that form a safety hazard.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than 1/4-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than 1/4-inch permanent deformation and without visible deterioration.

A certified test report shall be provided as evidence of compliance with all of the 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 deformation of the seat assembly. The report shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications.
### 5.4.5.1.4 Construction and Materials

<table>
<thead>
<tr>
<th>Baseline: Standard seat configuration (non-padded).</th>
<th>Alternative: Padded seat configuration. Also see Section 5.4.5.1.1.</th>
<th>Alternative: Cushioned seat configuration. Also see Section 5.4.5.1.1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat material of the standard configuration seat shall be constructed with composite materials which include but are not limited to fiberglass, polycarbonate, or nylon, ABS plastic or other composites which comply with the test requirements cited in this document, and 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 shall be contoured for individuality, lateral support, and maximum comfort and shall fit the framework to reduce exposed edges. The seat back thickness shall not exceed 1/2 inch in the knee room area. The seat forward of a seated passenger shall absorb energy in a severe crash by allowing the passenger's knees to deform the seat back in accordance with the requirements of Section 5.4.5.1.3. Complete seat assemblies shall be interchangeable to the extent practicable. Color of the seat material and optional safety padding is defined in attachments to Part 5: Technical Specifications.</td>
<td>Seating and interior trim shall have features to improve passenger comfort. Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seat shall be contoured for lateral support, individuality, and comfort to each individual passenger. The seat cushion and back shall be padded with neoprene foam, or material with equal properties, no less than 1/2-inch thick in areas contacted and loaded by passengers in the normal seated position and shall be covered with vinyl material. Seat covering materials shall be selected on the basis of durability, ease of maintenance, and pleasing texture and appearance.</td>
<td>Seating and interior trim shall have features to maximize passenger comfort. Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seat cushion shall be supported by springs. The seat cushion and back shall be padded with neoprene foam, or material with equal properties, no less than 2 inches thick in areas contacted and loaded by passengers in the normal seated position and shall be upholstered with vinyl and/or fabric materials. Springs and cushions shall be shaped for individuality, lateral support, and comfort. The upper rear portion of the seat back, the seat back handhold, and the upper rear surface of the modesty panels located immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials to provide passenger head protection. The minimum radius of equipment in any portion of the head or chest impact zone shall be a nominal 1/4-inch. Armrests shall be padded with material that is the same as, or similar to, the seat back padding and handhold. Seats, back cushions, and other pads shall be securely attached and shall be detachable by means of a simple release mechanism employing a special tool so that they are securely attached and shall be detachable by means of a simple release mechanism employing a special tool so that they are easily</td>
</tr>
</tbody>
</table>
## 5.4.5.2 PASSENGER ASSISTS

### 5.4.5.2.1 General

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 (see Section 5.4.5.1.3) 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. Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter of between 1-1/4 and 1-1/2 inches in diameter or width or shall provide an equivalent gripping surface with no corner radii no less than 1/4 inch. All passenger assists shall permit a full hand grip with no less than 1-1/2 inches of knuckle clearance around the assist, except the assists mounted on the door panels which shall have no less than 1 inch of knuckle clearance. An impact resulting in a 1-foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assist. Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists (see Section 5.4.6.1.1 regarding bright surfaces and glare). All areas of the passenger assists that are handled by passengers including functional components used as passenger assists shall be of anodized aluminum or stainless steel. Connecting tees and angles may be powder coated metal castings. Assists shall withstand a force of 300 pounds applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. Brackets, clamps, screw heads, and other fasteners used on the passenger assists shall be flush with the surface and free of rough edges.

### 5.4.5.2.2 Front Doorway

Front doors, or the entry area, shall be fitted with assists no less than 3/4-inch in width. Assists shall be as far outward as practicable, but shall be no farther than 6 inches from the outside edge of lower step tread 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 on the front modesty panel.

| Easily removable by the maintenance staff by not by the passengers. To the extent practicable, seat cushions and pads shall be interchangeable throughout the coach bus. Materials shall have high resistance to tearing, flexing, and wetting. Color, fabrics, and patterns for seats and trim are defined in attachments to Part 5: Technical Specifications. | Removable by the maintenance staff but not by the passengers. To the extent practicable, seat cushions and pads shall be interchangeable throughout the coach bus and the pad coloring shall be consistent throughout the materials. The material shall have high resistance to tearing, flexing, and wetting. Colors, fabrics, and patterns for the seats and all interior trim is defined in attachments to Part 5: Technical Specifications. |
5.4.5.2.3 Vestibule

The aisle side of the operator's barrier and the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 inches 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. Passengers shall be able to lean against the assist for security while paying fares. The assist shall be no less than 36 inches above the floor or the average step tread surface. 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 operator's barrier or front modesty panel.

5.4.5.2.4 Rear Doorway

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. Rear doors, or the exit area, shall be fitted with assists no less than 3/4 inch in width and shall provide at least 1-1/2 inches of knuckle clearance between the assists and their mounting. A 5th-percentile female shall be provided assists that are functionally continuous during the entire exiting process, and the assists shall be more than 6 inches from the outside edge of the lower step tread.

5.4.5.2.5 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 convenient to standees anywhere in the bus and shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 inches above the floor. Overhead assists shall simultaneously support 150 pounds on any 12-inch length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

5.4.5.2.6 Longitudinal Seats

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 inches apart.

5.4.5.3 PASSENGER DOORS

5.4.5.3.1 General

Two doorways shall be provided in the curb side of the bus for passenger ingress and egress. The front doorway shall be forward of the front wheels and located so that the operator will be able to collect or monitor the collection of fares. The rear doorway centerline shall be rearward of the point midway between the front door centerline and the rearmost seat back. Passenger doors and doorways shall comply with ADA requirements.
5.4.5.3.2 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 fiberglass. The doors, when fully opened, shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. The front leaves of the passenger doors shall overlap the rear leaves.

5.4.5.3.3 Dimensions

<table>
<thead>
<tr>
<th>Baseline: Use with standard 30-inch doorway opening width.</th>
<th>Alternative: Use for doorway opening width greater than 30 inches. Also see Sections 5.1.5.3 and 5.4.5.1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each door opening width shall be no less than 30 inches with the doors fully opened.</td>
<td>The front door opening width shall be no less than <em>(procuring agency insert figure)</em> inches with the doors fully opened.</td>
</tr>
<tr>
<td></td>
<td>The rear door opening width shall be no less than <em>(procuring agency insert figure)</em> inches with the doors fully opened.</td>
</tr>
<tr>
<td></td>
<td>Note: Either or both doorway may be specified to have a width greater than 30 inches. The Procuring Agency should note that increased doorway width may result in a reduction of seating capacity.</td>
</tr>
</tbody>
</table>
When open, the doors shall leave an opening no less than 84.5 inches in height. Allowable projection into the door opening is shown on the figure “Transit Coach Minimum Door Opening.” Projections shall not form a hazard to passengers. The open doorway clear width, including door-mounted passenger assists or touch bars, shall be no less than 24 inches for each doorway, or equivalent facilitation in accordance with ADA described in 49 CFR Part 38 as determined by the FTA.

The doorway equipped for the ingress and egress of passengers in wheelchairs shall have a clear width no less than 34 inches. These doorways shall have a clear door opening height above a raised lift platform or the highest point of an access ramp of no less than 68 inches.

### 5.4.5.3.4 Door Glazing

The upper section (1/2 door height) of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section. The edge of a 6-inch-high curb shall be visible to the seated operator through the closed front door when the bus is more than 12 inches from the curb.

<table>
<thead>
<tr>
<th>Baseline: Use when standard (glass) side windows are specified in Section 5.4.7.4.2.</th>
<th>Alternative: Use when polycarbonate or acrylic side windows are specified in Section 5.4.7.4.2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The door panel glazing material shall satisfy the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.</td>
<td>The door panel glazing material in the front doorway shall satisfy the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673. Glazing material in the rear doorway door panels shall be the same material, thickness and color as the side windows defined in Section 5.4.7.4.2.</td>
</tr>
</tbody>
</table>

### 5.4.5.3.5 Door Projection

Exterior projection of the doors shall be minimized and shall not exceed 13 inches during the opening or closing cycles or when doors are fully opened. Projection inside the bus shall not exceed 21 inches. The closing edge of each door panel shall have no less than 2 inches of soft weather stripping. The doors, when closed, shall be effectively sealed and the hard surfaces of the doors shall be at least 4 inches apart. Requirements for sensitive door edges are defined in Section 5.4.5.3.7.

### 5.4.5.3.6 Door Height Above Pavement
It shall be possible to open and close either passenger door when the bus loaded to GVWR is not knelt and parked with the tires touching an 8-inch-high curb on a street sloping toward the curb so that the street side wheels are 5 inches higher than the right side wheels.

5.4.5.3.7 Closing Force

Closing door edge speed shall not exceed 19 inches per second. Power close rear doors shall be equipped with a sensitive edge or other obstruction sensing system such that if an obstruction is struck by a closing door edge, the doors will stop and/or reverse direction prior to imparting a 10-pound force on 1 square inch of that obstruction. Doors closed by return spring or counterweight-type device need not be equipped with an obstruction sensing device but shall be capable of being pushed to the point where the door starts to open with a force not to exceed 20 pounds applied to the center edge of the forward door panel. Whether or not the obstruction sensing system is present or functional it shall be possible to withdraw a 1-1/2 inch diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 pounds.

5.4.5.3.8 Actuators

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the requirements of Section 5.4.6.1.4. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing.

5.4.5.3.9 Emergency Operation

In the event of an emergency, it shall be possible to open the doors manually from inside the bus using a force of no more than 25 pounds after actuating an unlocking device at each door. The unlocking devices shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The door emergency unlocking device shall be accessible from the stepwell areas. When this emergency device is actuated, the door interlock throttle system shall return the engine to idle and the door interlock brake system shall apply to stop the bus.

Locked doors shall require a force of more than 100 pounds 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, engines, and complex mechanism.
5.4.5.4 ACCESSIBILITY PROVISIONS

5.4.5.4.1 General

The design and construction of the bus shall be in accordance with all requirements defined in 49 CFR, Part 38, Subpart B: ADA Accessibility Specifications for Transportation Vehicles - Buses, Vans and Systems. Space and body structural provisions shall be provided at the front or rear door of the bus to accommodate the wheelchair loading elevator. Specific requirements, including the number of wheelchairs to be accommodated, the tiedown and securement devices, and fold-down seats, are provided in attachments to Part 5: Technical Specifications. Prior to submission of bid, the Contractor shall provide a plan, including layout drawings for entry, maneuvering, parking, and exiting of wheelchair passengers, to show compliance with ADA regulations.

5.4.5.4.2 Loading System

A lift system shall provide ingress and egress quickly, safely, comfortably, and in a forward direction for a passenger in a wheelchair from the street level or curb. When the system is not in use, the steps and passageway shall appear normal, and no portion of the stepwell shall move when the doors open. The controls shall be simple to operate with no complex phasing operations required, and the loading operation shall be under the surveillance and complete control of the operator. If the lift device and controls are at the rear doors, a switch shall be provided in the operator's area to disarm the lift system. 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 device shall be inhibited from retracting or folding when a passenger is on the platform. A passenger on the lift platform shall be able to easily obtain support during the entire loading or unloading operation by grasping the passenger assist located on the doors or other assists provided for this purpose. The loading platform shall extend no less than 18 inches outward of the bus, with the transition from the sidewalk to the loading device not exceeding 1/2 inch, and it shall be ramped to the extent practicable. The platform shall be designed to protect the device from damage and persons on the sidewalk from injury during the extension and lowering phases of operation. The loading platform shall be covered with a replaceable or renewable, nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the ends or sides during loading or unloading. When the elevator platform is rising, no hazard shall be presented to passengers between the platform and the bottom edge of fixed step risers and other parts of the lift mechanism. When fully raised, the transition from the platform to the floor shall be smooth. Deployment or storage of the lift shall require no more than 5 seconds. The time required to perform other phases of the loading or unloading operation shall not exceed 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. Hydraulic systems incorporated in the lift mechanism shall comply with the requirements defined in Section 5.2.2.2.3 of Part 5: Technical Specifications.

Lights in compliance with ADA requirements shall be provided above the doorway equipped with the wheelchair elevator to floodlight the loading area. The lamps shall illuminate when the elevator is in operation and shall illuminate the street surface to a level of no less than 1 foot-candle for a distance of 3 feet outward from the lowest step tread edge.

5.4.5.4.3 Wheelchair Accommodations
Two forward-facing mobility aid securement positions, as close to the wheelchair loading system as practical, shall be replaced or modified to provide parking space and secure tiedown for a passenger in a wheelchair.

Additional equipment, including passenger restraint seat belts and wheelchair securement devices shall be provided for two wheelchair passengers. Passenger restraint seat belts shall be provided to accommodate passengers in electrically powered wheelchairs. All belt assemblies must stow up and out of the way when not in use.

5.4.5.4 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device through the bus to the designated parking area, and back out. No portion of the wheelchair or its occupant shall protrude into the normal aisle of the bus when parked in the designated parking space(s). As a guide, no width dimension should be less than 34 inches. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 inches and in the parking area where 180-degree turns are expected, space should be clear in a full 60-inch-diameter circle. A vertical clearance of 12 inches above the floor surface should be provided on the outside of turning areas for wheelchair footrest provided on the outside of turning areas for wheelchair footrest.

5.4.5.5 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 as required in Section 5.4.9.5 of Part 5: Technical Specifications.

Requirements for a stop-request passenger signal in accordance with 49 CFR, Part 38.37 shall be provided as required in Section 5.4.9.3 of Part 5: Technical Specifications.

Requirements for exterior destination signs in accordance with 49 CFR, Part 38.39 shall be provided as required in Section 5.4.9.1 of Part 5: Technical Specifications.

5.4.6 OPERATOR PROVISIONS

5.4.6.1 OPERATOR’S AREA

5.4.6.1.1 General

The operator’s work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the operator’s area shall be avoided. Such objects include dash panels, switches and controls, cowlings, windshield wipers and arms, barriers and modesty panels, fare box and wheelchair lift stanchions, access panels and doors, fasteners, flooring, ventilation and heating ducting, window and door frames, and
visors. Interior lighting located ahead of the standee line shall be controlled by the operator. The first section of overhead interior lighting behind the standee line on the curb side of the bus shall not be illuminated when the front passenger door is closed.

5.4.6.1.2 Visors

Adjustable sun visor(s) shall be provided for the side of the windshield and the operator'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 devices and shall not be subject to damage by overtightening. 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 operator's field of view at angles more than 5 degrees above the horizontal.

5.4.6.1.3 Operator's Controls

All switches and controls necessary for the operation of the bus shall be conveniently located in the operator's area and shall provide for ease of operation. Switches and controls shall be essentially within the hand reach envelope described in SAE Recommended Practice, J287, Driver Hand Control Reach. Controls shall be located so that boarding passengers may not easily tamper with control settings.

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

Controls for engine operation shall be closely grouped within the operator's compartment. These controls shall include separate master run switch and start switch or button. The run switch shall be a four-position rotary switch with the following functions:

- OFF: All electrical systems off, except power available for the passenger interior lighting, stoplights, turn lights, hazard lights, silent alarm, horn, fare box, fire detection equipment, engine compartment lights, auxiliary heater, if provided and electronic equipment that require continuous energizing. If the bus is not operated for a period of two weeks, the total electric load due to devices that require continuous energizing shall not cause the battery to be discharged below the level necessary to start the engine.

- CL/ID: All electrical systems off, except those listed in OFF and power to radio and marker lights.

- RUN: All electrical systems and engine on, except the headlights, parking lights and marker lights. Daytime running lights (DRL), if provided, shall be on.

- NITE/RUN: All electrical systems and engine on.
The door control, kneel control, windshield wiper/washer controls, and run switch shall be in the most convenient operator locations. They shall be identifiable by shape, touch, and permanent markings. Doors shall be operated by a single control, conveniently located and operable in a horizontal plane by the operator's left hand. The setting of this control shall be easily determined by position and touch. Turn signal controls shall be floor-mounted, foot-controlled, waterproof, heavy-duty, momentary contact switches.

All panel-mounted switches and controls shall be marked with easily read identifiers and shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the operator's seat. Switches, controls, and instruments shall be dust- and water-resistant consistent with the bus washing practice described in Section 5.4.4.1.

5.4.6.1.4 Door Control

Operation of, and power to, the passenger doors shall be completely controlled by the operator. 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 of Section 5.4.5.3.7 and the adjustment requirements of Section 5.4.5.3.8. The door control shall be a lever that rotates around a vertical staff. The lever shall be located on the street side of the operator’s area approximately 16 inches to the street side of the operator’s seat centerline, forward of the seat, and approximately 23 inches above the floor in the operator’s area.

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 doors, deactivate the door control system, release the interlocks, and permit only manual operation of the doors.

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 when the rear door control is activated. The braking effort shall be adjustable with hand tools.

5.4.6.1.5 Instrumentation

The speedometer, air pressure gauge(s), and certain indicator lights shall be located on the front cowl immediately ahead of the steering wheel. The steering wheel spokes or rim shall not obstruct the operator's vision of the instruments when the steering wheel is in the straight-ahead position. Illumination of the instruments shall be simultaneous with the marker lamps. Glare or reflection in the windshield, side window, or front door windows from the instruments, indicators, or other controls shall be minimized. Instruments and indicators shall be easily readable in direct sunlight. Indicator lights immediately in front of the operator are identified in the following table.
Visual Indicator | Audible Alarm | Condition
--- | --- | ---
Back-Up | Backup Alarm | Reverse gear is selected
Hazard | Click | Four-way flashers activated
DRL | None | Daytime Running Lights
High Beam | None | Headlamp high beams activated
Kneel | Kneel Horn | Suspension kneeling system activated
Left Turn Signal | Click | Left turn signal activated
Parking Brake | None | Parking brake is activated
Rear Door | None | Rear passenger door is not closed and locked
Right Turn Signal | Click | Right turn signal activated
Stop Request | Chime | Passenger stop request has been activated
Wheelchair Request | Double Chime | Passenger wheelchair lift request has been activated

The instrument panel shall include a speedometer indicating no more than 80 mph and calibrated in maximum increments of 5 mph. The speedometer shall be a rotating pointer type, with a dial deflection of 220 to 270 degrees and 40 mph near the top of the dial. The speedometer shall be sized and accurate in accordance with SAE Recommended Practice J678.

| Baseline: Use for hubodometer. | Alternative: Use for odometer integrated with the speedometer. |
| The bus shall be equipped with a hubodometer mounted at the curb side end of the rear axle. The hubodometer shall have a capacity reading no less than 999,999 miles. | The speedometer shall equipped with an odometer with a capacity reading no less than 999,999 miles. |

The instrument panel shall also include air brake reservoir pressure gauge(s) with indicators for primary and secondary air tanks and voltmeter(s) to indicate the operating voltage across the bus batteries. The instrument panel and wiring shall be easily accessible for service from the operator's seat or top of the panel. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

### 5.4.6.1.6 On-board Diagnostics

The bus shall be equipped with an on-board diagnostic system that will indicate conditions that require immediate action by the operator to avoid an unsafe condition or prevent further damage to the bus. This diagnostic system shall have visual and audible indicators. The diagnostic indicator lamp panel shall be located in clear sight of the operator but need not be immediately in front of him. The intensity of indicator lamps 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 have a method of momentarily testing the operation of the lamp. The audible alarm shall be temper resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear. Wherever possible, sensors shall be of the closed circuit type, so that failure of the circuit and/or
sensor shall activate the malfunction indicator. Malfunction and other indicators listed in the following table shall be supplied on all buses.

Space shall be provided on the panel for future additions of no less than (5 or number specified by procuring agency) indicators as the capability of on-board diagnostic systems improves.

<table>
<thead>
<tr>
<th>Visual Indicator</th>
<th>Audible Alarm</th>
<th>Condition or Malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C Stop</td>
<td>None</td>
<td>Compressor stopped due to high/low pressure or loss of refrigerant</td>
</tr>
<tr>
<td>Check Engine</td>
<td>None</td>
<td>Engine Electronic Control Unit detects a malfunction</td>
</tr>
<tr>
<td>Check Transmission</td>
<td>None</td>
<td>Transmission Electronic Control Unit detects a malfunction</td>
</tr>
<tr>
<td>Fire</td>
<td>Bell</td>
<td>Over-temperature condition in engine compartment</td>
</tr>
<tr>
<td>Generator Stop</td>
<td>None</td>
<td>Loss of generator output</td>
</tr>
<tr>
<td>Hot Engine</td>
<td>Buzzer</td>
<td>Excessive engine coolant temperature</td>
</tr>
<tr>
<td>Low Air</td>
<td>Buzzer</td>
<td>Insufficient air pressure in either primary or secondary reservoirs</td>
</tr>
<tr>
<td>Low Oil</td>
<td>Buzzer</td>
<td>Insufficient engine oil pressure</td>
</tr>
<tr>
<td>Low Coolant</td>
<td>Buzzer</td>
<td>Insufficient engine coolant level</td>
</tr>
<tr>
<td>Wheelchair Lift</td>
<td>Beeper</td>
<td>Wheelchair lift is not stowed and disabled</td>
</tr>
</tbody>
</table>

**5.4.6.2 WINDSHIELD WIPERS**

The bus shall be equipped with a variable speed windshield wiper for each half of the windshield, with separate controls for each side. If powered by compressed air, exhaust from the wiper motors shall be muffled or piped under the floor of the bus. No part of the windshield wiper mechanism shall be damaged by manual manipulation of the arms. 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 edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service from inside or outside the bus and shall be removable as complete units. The fastener that secures the wiper arm to the drive mechanism shall be corrosion resistant.

**5.4.6.3 WINDSHIELD WASHERS**

The windshield washer system shall deposit washing fluid on the windshield and, when used with the wipers, shall evenly and completely wet the entire wiped area. If powered by compressed air, all fluid shall be purged from the lines after each use of the washers.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling and protected from freezing. Reservoir pumps, lines, and fittings shall be corrosion-resistant, and the reservoir itself shall be translucent for easy determination of fluid level.
5.4.6.4 OPERATOR’S LIGHTING

The operator's area shall have a light to provide general illumination and it shall illuminate the half of
the steering wheel nearest the operator to a level of 10 to 15 foot-candles. This light shall be
controlled by the operator.

5.4.6.5 OPERATOR’S SEAT

5.4.6.5.1 Dimensions

The operator's seat shall be comfortable and adjustable so that persons ranging in size from the 95th-
percentile male to the 5th-percentile female may operate the bus. The operator's seat cushion shall
have a minimum width of 18 inches, a length of 16 to 18 inches, and rearward slope of 5 \(^\circ\) to 5 degrees.
The operator's seat back height, measured from the point of intersection of the uncompressed seat
cushion with the seat back to the top of the back, shall be 20 \(\pm\) 2 inches. The angle formed between
the seat back and the seat cushion shall be adjustable in the range of 95 to 110 degrees. Height of the
seat shall be adjustable so that the distance between the top of the uncompressed seat cushion and the
floor may vary between 17 and 21 inches. The seat shall be adjustable forward and rearward for a
minimum travel of 7.5 inches. While seated, the operator shall be able to make all of these
adjustments by hand without complexity, excessive effort, or being pinched. Adjustment
mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.

5.4.6.5.2 Structure and Materials

The operator's seat shall be contoured to provide maximum comfort for extended period of time.
Cushions shall be fully padded with at least 3 inches of neoprene foam, or material with equal
properties, in the seating areas at the bottom and back. Upholstery shall be ventilated, transportation
grade vinyl.

<table>
<thead>
<tr>
<th>Baseline: Use for standard (air-cushion) seat.</th>
<th>Alternative: Use for fixed seat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The operator's seat shall be cushioned supplementally by an air cylinder or air diaphragm. These devices may also provide the seat height adjustments. Damping shall be provided as required.</td>
<td></td>
</tr>
</tbody>
</table>

All visually exposed metal on the operator's seat, including the pedestal, shall be unpainted aluminum
or stainless steel.

<table>
<thead>
<tr>
<th>Baseline: Use for standard (may be lap only) seat belt.</th>
<th>Alternative: Use for three-point (lap and shoulder) seat belt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Type I seat belts shall be fastened to the seat so that the operator may adjust the seat without resetting the seat belt. Seat belts shall be stored in automatic retractors.</td>
<td>Seat belts shall be provided across the operator’s lap and diagonally across the operator’s chest. The operator shall be able to use both belts by connecting a single buckle.</td>
</tr>
</tbody>
</table>
The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. The seat shall withstand 10,000 impacts of a 40-pound sandbags dropped from a height of 12 inches without visible deterioration. The seat shall be tested in the lowest vertical position and repeated with the seat in the top vertical position.

Two 40-pound sandbags shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3-1/2-inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering.

A certified test report shall be provided as evidence of compliance with all of the 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 deformation of the seat assembly. The report shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications.

Color of the operator's seat is defined in the attachments to Part 5: Technical Specifications.

5.4.6.6 MIRRORS

5.4.6.6.1 Exterior Mirrors
Baseline: Use for mirrors on both sides. The bus shall be equipped with a corrosion-resistant, outside rearview mirror on each side of the bus. Mirrors shall permit the operator to view the highway along both sides of the bus, including the rear wheels. The right curb-side rearview mirror shall be mounted so that its lower edge is no less than 80 inches above the street surface.

Alternative: Use for replacement of curb-side mirror with CCTV camera and monitor. The bus shall be equipped with a corrosion-resistant, outside rearview mirror on the street side of the bus. A video camera shall be mounted on the curb side of the bus and connected to a monitor visible to the operator. The monitor image shall be not less than 8 inches when measured diagonally. The mirror and video system shall permit the operator to view the highway along both sides of the bus, including the rear wheels. The location of the video camera and monitor shall be approved by the Procuring Agency.

Mirrors shall be firmly attached to the bus to prevent vibration and loss of adjustment, but not so firmly attached that the bus or its structure is damaged when the mirror is struck in an accident. Mirrors shall retract or fold sufficiently to allow bus washing operations.

Baseline: standard curb-side mirror (without remote adjustment)

Baseline: non-heated exterior mirrors.

Baseline: Use with 40-ft length.

Alternative: Use for replacement of curb-side mirror with CCTV camera and monitor.

Alternative: Use for remote adjustment of curb-side mirror.

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

Alternative: Use for heated exterior mirrors.

All exterior mirrors shall be electrically heated. The heaters shall be energized whenever the operator’s heater and/or defroster is activated.

5.4.6.6.2 Interior Mirrors

Mirrors shall be provided for the operator to observe passengers throughout the bus without leaving his seat and without shoulder movement. With a full standee-load, including standees in the vestibule, he shall be able to observe passengers in the front and rear stepwells, anywhere in the aisle, and in the rear seats. Inside mirrors shall not be in the line of sight to the right outside mirror.

5.4.7 WINDOWS

5.4.7.1 GENERAL

Baseline: Use with 40-ft length.

Baseline: Use with 35-ft length.
A minimum of 11,000 square inches of window area, including door windows, shall be required on each side of the standard configuration bus.

A minimum of 10,000 square inches of window area, including door windows, shall be required on each side of the standard configuration bus.

5.4.7.2 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 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3-1/2 feet high no more than 2 feet 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 windshield shall not be used. The windshield glazing material shall have a 1/4-inch nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673. The glazing material shall have single density tint. The upper portion of the windshield above the operator's field of view shall have a dark, shaded band with a minimum luminous transmittance of 6 percent when tested in accordance to ASTM D-1003.

5.4.7.3 OPERATOR’S SIDE WINDOW

The operator's side window shall open sufficiently to permit the seated operator to easily adjust the street side outside rearview mirror. This window section shall slide rearward 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 operator’s side window glazing material shall have a 1/4-inch nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

5.4.7.4 SIDE WINDOWS
5.4.7.4.1  Dimensions

<table>
<thead>
<tr>
<th>Baseline: Use for fixed side windows.</th>
<th>Alternative: Use for all openable side window configurations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.</td>
<td>All side windows, except windows in passenger doors and those smaller than 500 square inches, shall have window panels that are openable by passengers. Openable window panels shall be equipped with latches that secure the window in the fully open and fully closed positions. (The Procuring Agency may, in attachment to Part II: Technical Specifications, define the requirements for stops limiting the window opening travel and, therefore, the window opening area to a finite dimension.)</td>
</tr>
</tbody>
</table>

| openable windows with inward-opening transom panels: Each openable 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. | openable windows with sliding transom panels. Each openable 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 consist of two horizontally-sliding panels. | . openable windows with a fixed transom panel and sliding lower panels. Each openable side window shall incorporate an upper transom portion. The transom shall be between 25 and 35 percent of the total window area. The transom portion of the window shall be fixed. The lower portion shall consist of two horizontally-sliding panels. | openable windows with full-height sliding panels. Each openable side window shall consist of two full-height horizontally sliding panels. |

All side windows 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.

An opening in the rear of the bus shall be provided to accommodate a cyclone cleaner. An openable rear window may be used if the window cannot be accidentally closed during the cleaning operation. Minimum size of this opening is defined in attachment to Part 5: Technical Specifications.

The windows shall be designed and constructed to enable a 3M mechanic to remove and replace two windows in less than 10 minutes.
5.4.7.4.2 Materials

<table>
<thead>
<tr>
<th>Baseline: Use for safety glass glazing panels.</th>
<th>Alternative: Use for polycarbonate glazing panels. Also see Section 5.1.5.2.</th>
<th>Alternative: Use for acrylic glazing panels. Also see Section 5.1.5.2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side windows glazing material shall have a 1/4-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.</td>
<td>Side window glazing material shall have a 1/4-inch nominal thickness. The material shall conform with the requirements of ANSI Z26.1-1977 Standard for Type AS-5 Safety Glazing Materials except for Test Number 17 which shall subject the specimens to 1000 cycles and the arithmetic mean of the percentages of light scattered shall not exceed 5 per cent. Windows shall be polycarbonate sheet with an abrasion resistant coating on both sides of the window.</td>
<td>Side window glazing material shall have a 1/2-inch nominal thickness. The material shall conform with the requirements of ANSI Z26.1-1977 Standard for Type AS-5 Safety Glazing Materials except for Test Number 17 which shall subject the specimens to 1000 cycles and the arithmetic mean of the percentages of light scattered shall not exceed 5 per cent. Windows shall be cell cast acrylic sheet with an abrasion resistant coating on both sides of the window.</td>
</tr>
</tbody>
</table>

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 37 percent, as measured by ASTM E-424, and the luminous transmittance shall be no less than 16 percent as measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

5.4.8 HEATING VENTILATING AND AIR CONDITIONING

5.4.8.1 CAPACITY AND PERFORMANCE

The Heating, Ventilation and Air Conditioning (HVAC) climate control system shall be capable of maintaining the interior of the bus at the temperature and humidity levels defined in the following paragraphs.

With the bus running at the design operating profile and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall maintain a passenger compartment temperature within a range between 65E and 80E F, while controlling the relative humidity to a value of 50 percent or less. The cooling requirements shall be based on each passenger generating 270 Btu per hour of sensible heat and 270 Btu per hour of latent heat. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10E to 95E F and at any ambient relative humidity levels between 5 and 50 percent. When the bus is operated in outside ambient temperatures of 95E to 115E F, the interior temperature of the bus shall be permitted to rise one degree for each degree of exterior temperature in excess of 95E.
The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110°F 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 that may be activated by an operator-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 inches from the surface of the coil, shall be less than 45°F above the condenser inlet air temperature. The bus shall be parked in direct sunlight with ambient temperature at 100°F and humidity less than 20 percent. There shall be no passengers on board, and the doors shall be closed. Manually controlled shutoff valves in the refrigerant lines shall allow isolation of the compressor and receiver for service. To the extent practicable, self-sealing couplings shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor and condenser. 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.

5.4.8.2 CONTROLS AND TEMPERATURE UNIFORMITY

All interior climate control system requirements shall be attained automatically. The operator shall control only the defroster and operator's heater. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Temperatures measured from a height of 6 inches below the ceiling shall be within ±5°F of the average temperature at the top surface of the seat cushions. Temperatures measured more than 3 inches above the floor shall be within ±10°F of the average temperature at the top surface of the seat cushions. The interior temperature, from front to rear of the bus, shall not vary more than ±5°F from the average.

5.4.8.3 AIR FLOW

5.4.8.3.1 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 feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. This air shall be composed of no less than 20 percent outside air. Airflow shall be evenly distributed throughout the bus with air velocity not exceeding 100 feet per minute on any passenger. The ventilating mode shall provide outside 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. Heated air introduced into the bus shall contain no less than 20 percent outside air. The fans shall not activate until the heating element has warmed sufficiently to assure at least 70°F air outlet temperature. The heating air outlet temperature shall not exceed 100°F under any normal operating conditions. Outside airflow may be cut off during initial warm-up, provided no manual manipulation is required.
5.4.8.3.2 Operator's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the operator'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 operator's feet and legs. The defroster or interior climate control system shall maintain visibility through the operator's side window.

5.4.8.4 AIR INTAKES

Outside openings for air intake shall be located to ensure cleanliness of air entering the climate control system, particularly with respect to exhaust emissions from the bus and adjacent traffic. All intake openings shall be baffled to prevent entry of snow, sleet, or water.

Outside air shall be filtered before discharge into the passenger compartment. The filter shall meet the ASHRAE requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 gram per 1,000 cfm cell. More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. Air filters shall be cleanable and easily removable for service. Moisture drains from air intake openings shall be located to prevent clogging from road dirt.

5.4.8.5 ROOF VENTILATORS

Two ventilators shall be provided in the roof of the bus approximately over each axle. These ventilators shall be easily opened and closed manually by one person. When open with the bus in motion, these ventilators shall provide fresh air inside the bus. Each ventilator shall cover an opening area no less than 425 square inches and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 inches, or with all four edges raised simultaneously to a height of no less than 3-1/2 inches. The escape hatch shall be incorporated into the rear roof ventilator. The Procuring Agency may in attachments to Part 5: Technical Specifications, require more than two roof ventilators. The requirements for location of these additional roof ventilators shall also be included in the attachment.

<table>
<thead>
<tr>
<th>Baseline: stepwell heating is not required</th>
<th>Alternative: Use if stepwell heating is required.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.8.6 STEPWELL HEATING</td>
<td>Heat shall be applied to the front step tread to prevent accumulation of snow, ice, or slush. Stepwell heat shall be controlled by the operator's heater and defroster system.</td>
</tr>
</tbody>
</table>
### 5.4.9 SIGNAGE AND COMMUNICATION

#### 5.4.9.1 EXTERIOR ROUTE DISPLAYS

#### 5.4.9.1.1 Destination Signs

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>An automatic electronic destination sign system shall be furnished on the front, on the right side near the front door, and on the rear of the vehicle. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. The sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements defined in 49 CFR, Part 38.39. Destination signs shall be installed in such a manner as to facilitate easy access for replacement of the entire sign assembly, or components such as fluorescent lamps and electronic control boards, from inside the bus within 30 minutes by a 3M mechanic. Lamps and associated parts shall be commercially available.</td>
<td>An automatic electronic destination sign system shall be furnished on the front, on the right side near the front door, and on the rear of the vehicle. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. The sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements defined in 49 CFR, Part 38.39. Destination signs shall be installed in such a manner as to facilitate easy access for replacement of the entire sign assembly, or components such as fluorescent lamps and electronic control boards, from inside the bus within 30 minutes by a 3M mechanic. Lamps and associated parts shall be commercially available.</td>
<td>Destination signs shall be included on the front and on the right side of the coach near the front door. At least 175 entries shall be available in the display system. Sign readings shall be selected by the driver and shall retain the setting during subsequent operations. Selections for the front and side destination signs shall be powered and controlled with a switch conveniently located near the inspection window of each sign. The switch on the side sign shall be capable of being deactivated from the driver's compartment. Each sign box or housing shall have an inspection window for the</td>
</tr>
<tr>
<td>The front destination sign shall have no less than 1,792 flip-dot pixels, 16 rows by 112 columns, with a message display area of not less than 8 inches high by not less than 56 inches wide.</td>
<td>The front destination sign shall have no less than 1,689 octagonal dot pixels, 16 rows by 105 columns, with a message display area of not less than 9.8 inches high by not less than 63 inches wide.</td>
<td></td>
</tr>
<tr>
<td>The side destination sign shall have no less than 630 flip-dot pixels, having at least 7 rows and 80 columns with a message display area of not less than 2.7 inches high by not less than 36 inches wide.</td>
<td>The side destination sign shall have no less than 672 octagonal dot pixels, having at least 8 rows and 84 columns with a message display area of not less than 3.15 inches high by not less than 30 inches wide.</td>
<td></td>
</tr>
<tr>
<td>The rear route number sign display area shall have no less than 448 octagonal dot pixels, having at least 8 rows and 28 columns with a message</td>
<td>The rear route number sign display area shall have no less than 448 octagonal dot pixels, having at least 8 rows and 28 columns with a message</td>
<td></td>
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The rear route number sign display area shall have no less than 161 flip-dot pixels, having at least 7 rows and 23 columns with a message display area of not less than 6.1 inches high by not less than 13.8 inches wide. The sign shall be capable of displaying 4 alphanumeric characters (1 through 9 and A through Z). The rear route number sign shall be located a minimum of 90 inches above ground on the curb side rear corner of the bus.

Destination messages, route designations, and public relations messages shall be independently selectable via a single Operator's Control Panel (OCP) which shall include a display monitor. The rear route number sign shall be controlled by the same OCP that operates the destination signs. The OCP display monitor readout shall show the exact information displayed on the destination signs and route number sign. The OCP shall be conveniently located for the bus operator and mounted in such a manner that will not pose any safety hazard. The OCP shall utilize a durable weatherproof keypad with tactile feel for destination message control functions.

The destination sign system shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5

display area of not less than 6.1 inches high by not less than 11 inches wide. The sign shall be capable of displaying 4 alphanumeric characters (1 through 9 and A through Z). The rear route number sign shall be located a minimum of 90 inches above ground on the curb side rear corner of the bus.

Destination messages, route designations, and public relations messages shall be independently selectable via a single Operator's Control Panel (OCP) which shall include a display monitor. The rear route number sign shall be controlled by the same OCP that operates the destination signs. The OCP display monitor readout shall show the exact information displayed on the destination signs and route number sign. The OCP shall be conveniently located for the bus operator and mounted in such a manner that will not pose any safety hazard. The OCP shall utilize a durable weatherproof keypad with tactile feel for destination message control functions.

The destination sign system shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5 to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30

driver to monitor sign selection. The entire area of both signs shall be clearly visible in direct sunlight or at night.

The front sign opening shall accommodate entries with letters no less than 5 inches high and shall accommodate a message width no less than 50 inches regardless of coach width.

A side sign shall post the same message as the front sign with provisions for characters up to 4 inches high. Provisions shall be made to mount the side sign anywhere along the coach sides with one location as far forward and as high as practicable. Regardless of location, the side sign shall be easily read from the sidewalk level.
to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30 seconds of the bus master power switch being turned off.

An emergency message shall be initiated by the closure, or opening, of a dry contact switch or relay. The emergency message shall be displayed on the exterior of the bus only. The OCP shall not display the emergency message. The destination sign shall automatically resume normal operation when the remote emergency switch is returned to its normal position.

Destination Sign Programming: The LCD electronic sign system shall be programmable via an industry standard FLASH PC-Card. The PC-Card is carried to each vehicle and inserted into the download slot of each electronic sign. The updated database is transferred from this Master Memory Card (MMC) into the internal FLASH Memory of the sign system. The MMC shall be capable of being programmed via an IBM-compatible, laptop computer. Software shall be provided and shall be capable of providing a high degree of flexibility to create, or select preprogrammed fonts and graphic displays. The sign shall have the capability of being programmed in the field using a PC or field programmer. Message program information shall be transferable to and/or from the field programmer device as specified by the Procuring Agency in attachments to Part 5: Technical Specifications.

seconds of the bus master power switch being turned off.

An emergency message shall be initiated by the closure, or opening, of a dry contact switch or relay. The emergency message shall be displayed on the exterior of the bus only. The OCP shall not display the emergency message. The destination sign shall automatically resume normal operation when the remote emergency switch is returned to its normal position.

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The bus “Master Run” switch shall control power to the sign system. The sign system shall be operable in all switch positions except "Off".
A complete listing of destination sign readings for initial sign programming by the manufacturer are provided in attachments to Part 5: Technical Specifications.

5.4.9.1.2 Bus Block Numbers

An illuminated block number sign box with four characters, 4 inches high, shall be mounted on the dash panel to the right of center of the bus. The sign shall be mounted with a built-in appearance to eliminate glare and reflections in the windshield and shall minimize obstruction of the operator's view. Manual adjustment of the block number sign entry shall be provided from inside the bus with provision for reading the sign during the adjustment operation. Illumination of the sign shall be concurrent with the marker lights. The list of required sign readings is defined in attachments to Part 5: Technical Specifications.

5.4.9.2 PASSENGER INFORMATION AND ADVERTISING

5.4.9.2.1 Interior Displays

Provisions shall be made on the rear of the operator's barrier for a frame to retain information that is sized (Procuring Agency to specify width) inches wide and (Procuring Agency to specify height) inches high posted by the Procuring Agency, such as routes and schedules. Advertising media 11 inches high and 0.09 inches 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 fluorescent light system.

5.4.9.2.2 Exterior Displays

Provisions shall be made to integrate advertising, which may be specified by the Procuring Agency, 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.

(Additional requirements for exterior advertising may be defined in the attachments to Part 5: Technical Specifications.)

5.4.9.3 PASSENGER EXIT SIGNAL

Baseline: Use for touch tape 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 touch tape, chime, and interior sign message. The touch tape shall be located the full length of the bus on the sidewalls.

Alternative: Use for 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 pull cable, chime, and interior sign message. The pull cable shall be located the full length of the bus on the sidewalls, towards the
Exit signals located in the wheelchair parking area shall be no higher than 4 feet above the floor. Pull cable(s) shall activate a solid state or magnetic proximity switch(s).

A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound when the system is first activated from wheelchair passenger areas.

A "Stop Requested" message in red letters shall be illuminated when the passenger "Stop Requested" signal system is activated. The "Stop Requested" message shall remain visible until one or both passenger doors are opened. The message shall be visible to the seated operator and seated passengers. The operator shall be able to deactivate the signal system from the operator's area.

5.4.9.4 RADIO COMMUNICATION SYSTEM

A compartment shall be provided to accommodate a communication system enabling the operator to contact the dispatcher. It shall be located within 5 feet of the operator's seat and shall be connected to the operator's area by waterproof, 2-1/4 inch inside diameter, metallic conduit. The compartment shall include a clear space 12 inches high, 18 inches wide, and 24 inches deep for location of the radio. It shall be accessible from either inside or outside the bus and shall be splashproof when the service door is secured. The radio compartment shall be supplied with a 30-amp, 12-volt, DC, protected service with positive and negative leads. A location convenient to the operator shall be provided for the radio control head, speaker, and handset, and cradle. Provisions for attaching an antenna to the roof and routing an antenna lead to the radio compartment shall include a 3/4-inch inside diameter conduit with a pull wire. The antenna mounting and lead termination shall be accessible from the bus interior.

5.4.9.5 PUBLIC ADDRESS SYSTEM

A public address system that complies with the ADA requirements of 49 CFR, Part 38.35 and enables the operator to address passengers either inside or outside the bus. Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. A speaker shall be provided outside the bus so that announcements can be clearly heard by passengers standing near the front door. An operator-controlled switch shall select inside or outside announcements. A separate volume control shall be provided for the outside system if volume adjustment would otherwise be necessary when switching from inside to outside. The system shall be muted when not in use. The microphone shall be vandal resistant, mounted on a heavy-duty, flexible gooseneck, which is secured with tamper-proof fasteners and will allow the operator to comfortably speak into it without using his hands. A provision shall be provided to secure the microphone in a stored position when not in use. An input jack shall be provided in the operator's area for a hand held microphone.
5.5 ELECTRICAL SYSTEM

5.5.1 GENERAL REQUIREMENTS

The bus shall be equipped with a programmable logic control (PLC) system that is computer based and completely modular. The PLC collects information received from input devices throughout the bus and then communicates with its system components or other output devices in remote areas of the bus through multiplex wiring system. The entire system will reduce the amount of wiring over a conventional wiring/harness electrical system. Versatility and future expansion shall be provided for by expandable system architecture. The system components shall be capable of operating in an environment of between -20 degrees F to 170 degrees F while encountering mobile shock and vibrations. The system shall store and retrieve data for the mechanical and electrical functions of the bus. All components in the system will be interchangeable. The multiplex power source shall be isolated to avoid any ground noise.

The electrical system shall provide and distribute power to ensure satisfactory performance of all electrical components. The system shall supply a nominal 12 and/or 24 volts of direct current (DC), and employ alternating current up to 220 volts that does not present an electrical shock hazard. Electrical power provided for the fare collection device and the radio compartment shall be 12 and/or 24 volts DC as specified in attachments to Part 5: Technical Specifications. Precautions shall be taken to minimize hazards to service personnel. Transient voltages above 220 volts may be used in the fluorescent lighting system. The power generating system shall be rated sufficiently higher than the total possible electrical load to maintain the charge on the batteries at all operating conditions including the engine at idle. All circuits, except for those involved in propulsion system start-up, shall be protected by circuit breakers or fuses. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable, and they shall be easily accessible for replacement.

Redundant grounds shall be used for all electrical equipment, except where it can be demonstrated that redundant grounds are not feasible or practicable. One ground may be the bus body and framing. Grounds shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), or power plant mountings. Electrical equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system. Major wiring harnesses shall not be located under the bus floor, and under-floor wiring shall be eliminated to the extent practicable. Wiring and electrical equipment necessarily located under the bus shall be insulated from water, heat, corrosion, and mechanical damage.

5.5.2 MODULAR DESIGN

Design of the electrical system shall be modular so that each major component, apparatus panel, or wiring bundle is easily separable with standard hand tools or by means of connectors. Each module, except the main body wiring harness, shall be removable and replaceable in less than 30 minutes by a 3M mechanic. Power plant wiring shall be an independent wiring module. Replacement of the engine compartment wiring module(s) shall not require pulling wires through any bulkhead or removing any terminals from the wires.
5.5.3 WIRING AND TERMINALS

All wiring between electrical components and terminations, shall have double electrical insulation, shall be waterproof, and shall conform to specification requirements of SAE Recommended Practice J1127 and J1128. Except as interrupted by the master battery disconnect switch, battery and starter wiring shall be continuous cables, grouped, numbered, and/or color-coded with connections secured by bolted terminals; and shall conform to specification requirements of SAE Standard J1127-Type SGT or SGX and SAE Recommended Practice J541. Wiring harnesses shall not contain wires of different voltages unless all wires within the harness are sized to carry the current and insulated for the highest voltage wire in the harness.

Double insulation shall be maintained as close to the terminals as possible. The requirement for double insulation shall be met by wrapping harnesses with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit. Strain-relief fittings shall be provided at points where wiring enters all electrical components. Grommets of elastomeric material shall be provided 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.

All wiring harnesses over 5 feet long and containing at least 5 wires shall include 10 percent excess wires for spares that are the same size as the largest wire in the harness excluding the battery cables. Wiring length shall allow end terminals to be replaced twice without pulling, stretching, or replacing the wire. Except for large wires such as battery cables, terminals shall be crimped to the wiring and may be soldered only if the wire is not stiffened above the terminal and no flux residue remains on the terminal. Terminals shall be corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. T splices may be used when there is less than 25,000 circular mills of copper in the cross section and a mechanical clamp is used in addition to solder on the splice; the wire supports no mechanical load in the area of the splice; and the wire is supported to prevent flexing.

All cable connectors shall be locking type, keyed, and watertight, unless enclosed in watertight cabinets. 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.

5.5.4 JUNCTION BOXES

All relays, controllers, flashers, circuit breakers, and other electrical components shall be grouped according to voltage; and mounted in easily accessible junction boxes. The boxes shall be sealed to prevent moisture from normal sources, including engine compartment cleaning, from reaching the electrical components and shall prevent fire that may occur inside the box from propagating outside the box. The components and circuits in each box shall be identified and their location permanently recorded on a schematic drawing glued to or printed on the inside of the box cover or door. The drawing shall be protected from oil, grease, fuel, and abrasion. The front junction box shall be completely serviceable from the driver's seat, vestibule, or from outside. A rear start and run control box shall be mounted in an accessible location in the engine compartment.
5.5.5 ELECTRICAL COMPONENTS

All electrical components, including switches, relays, flashers, and circuit breakers, shall be heavy-duty designs. These components shall be longest lasting, commercially available, designed to last the service life of the bus and shall be replaceable in less than 5 minutes by a 3M mechanic. Sockets of plug-in components shall be polarized where required for proper function and the components shall be positively retained. Any manually resettable circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the driver and provide visible indication of open circuits. All electric motors, except cranking motors, shall be heavy-duty brushless type, with a constant duty rating of no less than 20,000 hours. Electric motors shall be located for easy replacement and except for the cranking motor shall be replaceable in less than 15 minutes by a 3M mechanic. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time.

5.5.6 MULTIPLEX WIRING SYSTEM

The components of the multiplex system shall be of modular design, thereby providing for ease of replacement by maintenance personnel. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Each module shall be shielded to prevent interference by EMI and RFI; and shall utilize LEDs to indicate circuit integrity and assist in rapid circuit diagnostics and verification of the load and wiring integrity. Each circuit shall be capable of providing a current load of up to 10 Amperes. The internal controls shall be a solid state device, providing an extended service life. Wiring for data bus and node module power shall consist of three, 22 gage or larger, UL approved, shielded, twisted pairs. Ten percent (10%) spare input and output shall be provided at each I/O location. Wiring used for the multiplexing shall be stamped with the address of the corresponding I/O location.

Protection to each individual circuit shall be provided. An automatic test system, integral to the multiplexing, shall be provided. A single test button mounted on a panel at the driver’s compartment area, upon activation, will provide a system check of the circuits. Corresponding LED lights on the panel will indicate failure points. The system shall be hosted on an IBM-compatible personal computer as well as a hand held field diagnostic unit capable of reading the network data, control function and address data, or function code. The mechanic shall be able to use either unit to check bus wire function.

5.5.7 BATTERIES

Batteries shall be easily accessible for inspection and serviceable only from outside the bus on the street side and shall be securely mounted on a tray. Batteries shall be of premium construction and shall be fitted with threaded stud terminals. Positive and negative terminals shall have different size studs, or 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. No less than two conventional lead-acid
batteries conforming to SAE Standard J537 or four maintenance free batteries providing equivalent performance shall be provided.

The battery tray shall be made of stainless steel and accommodate both type of batteries and shall pull out easily and properly support the batteries during service, filling with manual or automatic equipment, inspection and replacement. A positive lock shall retain the battery tray in the normal position.

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, black for negative, and another color for any intermediate voltage cables.

5.5.8 MASTER BATTERY SWITCH

A master battery switch shall be provided in the battery compartment near the batteries for complete disconnecting from all bus electrical systems. The location of the master battery switch shall be clearly identified on the access panel and be accessible in less than 10 seconds for activation. The master switch shall be capable of carrying and interrupting the total circuit load. Any equipment that requires power without reference to the master battery switch shall be listed in attachments to Part 5: Technical Specifications. Opening the master switch with the power plant operating shall not damage any component of the electrical system. The location of the master battery switch shall prevent corrosion from fumes and battery acid when the batteries are washed off.

5.5.9 FIRE DETECTORS

At least 2 temperature-sensitive sensors shall be provided. They shall be located in the engine compartment under all horizontal bulkheads, above and downwind of the major heat sources, and in areas likely to be wetted by leaking flammable fluids. Additional sensors shall be located in other potentially critical areas. The sensors shall detect over-temperature in the critical areas and shall activate the fire alarm bell and warning light in the driver's compartment. The sensors shall return to normal setting and deactivate alarms when the temperature returns to normal.

5.5.10 RADIO NOISE ATTENUATION

Proper suppression equipment shall be provided in the electrical system to eliminate interference with radio and television transmission and reception. This equipment shall not cause interference with any electronic system on the bus.
5.6 ATTACHMENTS TO PART 5, TECHNICAL PROVISIONS

PROCURING AGENCY SPECIFICATIONS

The following is a list of those subsections of Part 5, Technical Specifications, which call for each Procuring Agency to attach additional detail.
5.1 General

5.1.2 Definitions  (17): Signing, colors, the destination sign reading list and other information must be provided by the Procuring Agency in attachments

(21): In attachments to Part 5: Technical Specifications, the Procuring Agency may relate the skill levels and ratings of mechanics in its operation to the above definitions.

5.2 Propulsion system

5.2.2 Drivetrain

5.2.2.1 Power Plant

5.2.2.1.1 Engine: The requirements for specific cold weather starting aids are included in attachments to Part V: Technical Specifications

5.2.2.2 Mounting

5.2.2.2.3 Hydraulic Systems (Alternative): Specific systems for which low hydraulic fluid level sensors are required are included in attachments to Part 5: Technical Specifications.

5.2.2.2.4 Fluid Lines, Fittings and Clamps, and Charge Air Pipework: Lines within the engine compartment shall be composed of steel tubing where practicable except in locations where flexible lines are specifically required by the Procuring Agency in attachments to Part 5: Technical Specifications.

5.3 Chassis

5.3.4 Pneumatic System

5.3.4.1 General: A quick disconnect fitting specified in attachments to Part 5: Technical Specifications, shall be easily accessible and located in the engine compartment and near the front bumper area for towing.

5.4 Body

5.4.3 Exterior Panels and Finishes

5.4.3.8.1 Access Doors (with locks): The locks shall be standardized as defined by the Procuring Agency in the attachments to Part 5: Technical Specifications so that only one tool is required to open all major access doors on the bus.

5.4.3.10 Finish And Color: Colors and paint schemes shall be in accordance with the attachments to Part 5: Technical Specifications.
5.4.3.11 Numbering And Signing: The exact wording, size, color, and location for these signs are found with requirements for other special signs in attachments to Part 5: Technical Specifications.

5.4.3.12 Exterior Lighting: Specific number and mounting requirements are defined in attachments to Part 5: Technical Specifications.

5.4.4 Interior Panels and Finishes

5.4.4.3 Rear End: Colors, patterns, and materials are defined in attachments to Part 5: Technical Specifications.

5.4.4.4 Interior Panels

5.4.4.4.1 General: All materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. Colors, patterns, and materials for the interior trim are defined in attachments to Part 5: Technical Specifications.

5.4.4.4.5 Headlining: Colors, patterns, and materials for the headlining are defined in attachments in Part 5: Technical Specifications.

5.4.4.5 Floor Covering: Color and material of the floor covering is defined in attachment to Part 5: Technical Specifications.

5.4.4.7 Fare Collection: The fare box, including make, model, size, weight, and meter locations, is described in attachments to Part 5: Technical Specifications. [Transfer] equipment is defined in attachments to Part 5: Technical Specifications.

5.4.5 Passenger Accommodations

5.4.5.1 Passenger Seating

5.4.5.1.4 Construction and Materials: Color of the seat material and optional safety padding is defined in attachments to Part 5: Technical Specifications. Colors, fabrics, and patterns for the seats and all interior trim is defined in attachments to Part 5: Technical Specifications.

5.4.5.4 Accessibility Provisions

5.4.5.4.1 General: Specific requirements, including the number of wheelchairs to be accommodated, the tiedown and securement devices, and fold-down seats, are provided in attachments to Part 5: Technical Specifications.

5.4.6 Operator Provisions

5.4.6.5.2 Structure and Materials: Color of the operator's seat is defined in the attachments to Part 5: Technical Specifications.

5.4.7 Windows
5.4.7.4.1 Dimensions (Cyclone cleaner opening): Minimum size of this opening is defined in attachment to Part 5: Technical Specifications.

5.4.8 Heating, Ventilating, and Air Conditioning

5.4.8.5 Roof Ventilators: The requirements for location of these additional roof ventilators shall also be included in the attachment.

5.4.9 Signage and Communication

5.4.9.1.1 Destination Signs: Message program information shall be transferable to and/or from the field programmer device as specified by the Procuring Agency in attachments to Part 5: Technical Specifications.

A complete listing of destination sign readings for initial sign programming by the manufacturer are provided in attachments to Part 5: Technical Specifications.

5.4.9.1.2 Block Numbers: The list of required sign readings is defined in attachments to Part 5: Technical Specifications.

5.4.9.2.2: (Additional requirements for exterior advertising may be defined in the attachments to Part 5: Technical Specifications.)

5.5 Electrical system

5.5.1 General Requirements: Electrical power provided for the fare collection device and the radio compartment shall be 12 and/or 24 volts DC as specified in attachments to Part 5: Technical Specifications.

5.5.8 Master Battery Switch: Any equipment that requires power without reference to the master battery switch shall be listed in attachments to Part 5: Technical Specifications.