Lower Rio Grande Valley Development Council
Purchasing & Contract Services Department

Request for Proposals for the Procurement of Thirty Two to One Hundred (32-100) Wheelchair-Lift, Equipped Transit Buses

30' Low Floor, or >30' Type XI,

5 Year Contract

R.F.P. # LRGVDC-TX-34-0010-00

Pre-Proposal Meeting Date: March 5th, 2015
Pre-Proposal Meeting Time: 2:00 PM
At the Purchasing Conference Room

PROPOSAL DUE DATE: March 20th, 2015
PROPOSAL DUE TIME: 12:00 Noon.

Lower Rio Grande Valley Development Council
Purchasing & Contract Services Department

INVITATION

**** B/P/Q (Bid/Proposal/Qualifications)***

Description	NUMBER	Pre-Bid Meeting	Bid Opening
Request for Proposals for the Procurement of Thirty two (32) to One Hundred (100), Wheelchair-Lift Equipped Transit Buses & Vans	***P LRGVDC-TX-34-0010-00**	**March 5th, 2015** at 2:00 PM at the Purchasing Conference Room	**March 20th, 2015** 12:00 Noon

Sealed, bids/proposals will be received by the Lower Rio Grande Valley Development Council, at the Office of Victor Morales, Purchasing Director, located at 301 W. Railroad St., Weslaco, Texas 78596, (956) 682-3481, e-mail: vmorales@lrgvdc.org , cleal@lrgvdc.org or bmariscal@lrgvdc.org.

Copies of the bid documents consisting of detailed specifications, general requirements or other information may be obtained at the Purchasing & Contract Services Department. Specifications are available at the Purchasing & Contract Services Department Office.

Interested Bidders/Proposer are invited to attend the Bid/Proposal opening at the Office of the Purchasing &Contract Services Department on the dates specified. Presence is not mandatory. Specifications may also be viewed and downloaded at: http://www.lrgvdc.org/procurement.

Si usted necesita información en español, favor de llamar al siguiente teléfono: 956-682-3481

Witness my hand on this the **20** day of **February 2015**.

Victor Morales
Purchasing Director

Acknowledgment of Receipt
RFP # LRGVDC-TX-34-0010-00

Please submit this page upon receipt.

For any clarifications, please contact Mr. Victor Morales, Purchasing Director, at the Lower Rio Grande Valley Development Council Purchasing Department at (956) 682-3481 or e-mail: vmorales@lrgvdc.org, cleal@lrgvdc.org or bmariscal@lrgvdc.org.

Please fax or mail this page upon receipt of R.F.P. package no later than Friday, March 20th, 2015 before 12:00 Noon CST.

Fax: (956) 969-5822

If you are unable to respond on this item, kindly indicate your reason for "Not Responding" below and fax back. This will insure you remain active on our vendor list.

( ) Yes, I will be able to submit a Proposal.

( ) No, I will not be able to submit a Proposal for the following reason:

_____

_____

_____

Name: _____

Company: _____

Phone #: _____ Fax #: _____

Email Address: _____

Please Note:

Please take a moment to register your Company with the Lower Rio Grande Valley Development Council Purchasing Department or update your registration on our new form at the following website address: http://www.lrgvdc.org/procurement

Lower Rio Grande Valley Development Council
Purchasing and Contract Services Department

Valley Metro

REQUEST FOR PROPOSAL

RFP # LRGVDC-TX-34-0010-00

TO ALL INTERESTED VENDORS:

The Lower Rio Grande Valley Development Council/Valley Metro is soliciting competitive sealed proposals for the procurement of up to 100 wheelchair-lift equipped transit buses and vans.

To receive a proposal packet, provide the following information and fax this sheet to (956) 969-5822.

Company Name:

Address:

Point of Contact:

Phone number:
Fax Number:

E-mail address:

This purchase is funded under a grant program of the Federal Transit Administration (FTA) which is handled at the state level by the Texas Department of Transportation (TxDOT). Under the regulations of TxDOT, the funds for the purchase of vehicles cannot be requisitioned until after delivery and inspection of the equipment has been completed. This means that full payment for the units will be made 15-30 days after delivery, inspection, and acceptance of the units. Please keep these points in mind when calculating your proposal. The Lower Rio Grande Valley Development Council/LRGVDC will issue a purchase order after contract award by the LRGVDC Board to the vendor that scores the highest number of points during the evaluation process.

The minimum quantity of this procurement is one (1) vehicle and the maximum quantity is one hundred (100) vehicles. The Lower Rio Grande Valley Development Council/Valley Metro is acting as the lead agency in this procurement process and may assign a quantity of the said vehicles to another agency (ies). Other agencies may join this procurement by coordinating with their TxDOT district public transportation coordinator (PTC) who should coordinate with the "host" PTC (representing the lead agency) to request participation. Such a request must be made within a one (1) month period from the proposal due date. After this period, the procurement will be closed. Each agency will be responsible for award selection and issuing individual orders to the successful proposer. The Lower Rio Grande Valley Development Council/Valley Metro will award its contract to the responsible Offerors and the competitive range, negotiations and the lowest unit cost per vehicle, including base cost plus options selected by the Lower Rio Grande Valley Development Council and participating agencies.

RFP Schedule:

RFP Advertisement:	February 25th, 2015
RFP Release:	February 25th, 2015
Request for Approved Equals (RFA):	March 5th, 2015
Response to RFA's:	March 11th, 2015
Appeals and request for reconsideration to RFA's:	March 12th, 2015
Proposal Opening Date:	**March 20th, 2015**
Proposal Opening Time:	4:00 P.M. **(C.S.T)**
Location for Proposal Submittals:	The Lower Rio Grande Valley Development Council Purchasing Department 301 Railroad St. Weslaco, TX 78596 ATTN: Mr. Victor Morales Purchasing Director
Proposal Evaluations:	March 23rd, 2015
LRGVDC Board Award Date:	March 25th, 2015

Please Note: Award date is subject to change, based upon Evaluation and Negotiation Process.

THE FOLLOWING DOCUMENTS WILL BE REQUIRED FOR THIS AGENCY AND ANY PARTICIPATING AGENCIES TO COMPLETE A PRE-AWARD AUDIT:

1) Proposal Sheet and Options List: Quote the base price per unit and the unit price for each option. Then, provide a unit price for the vehicle including the options requested by the lead agency and a total cost. List the price for all options on the option sheet. *(See attachment "A")*

2) Warranty Certification: Warranty information should be provided for each major component if it is to be provided by anyone other than the vendor. *(See attachment "B")*

3) All applicable federal clauses are included in this procurement, **so vendors must complete** the Consolidated Certification Form.

4) Form for Proposal Deviations Form should be provided by vendor according to "Conditions, Exceptions, Reservations and Understandings (See attachment D)

5) FMVSS Certification; and (See attachment "C")

6) Domestic Content Worksheet (a document from the manufacturer that lists components by manufacturer & country of origin, component costs or percentage of total cost; and gives a location and description of construction activities may be submitted in lieu of the worksheet). (See attachment "D")

The Lower Rio Grande Valley Development Council/Valley Metro and participating agencies reserve the right to refrain from issuing a purchase order or contract from this proposal process. Feel free to call me at (956) 682-3481 if you need any explanation of the proposal package and procedures.

Sincerely,

Victor Morales,
Purchasing Director

PART I GENERAL INSTRUCTIONS

1 PROPOSAL REQUIREMENTS

1.1 The proposal requires pricing per unit. Vendor guarantees product offered will meet or exceed specifications identified in the Request for Proposal.

1.2 Each proposal should be placed in a separate envelope completely and properly identified. Proposals must be received by the host agency by the time and date specified on the proposal advertising.

1.3 Late proposals will be returned to vendors unopened. Late proposals will not be considered under any circumstances.

1.4 Proposal prices are requested to be firm for 180 days from proposal opening date. Rebates payable to the purchaser after the vehicle is purchased should not be deducted from the proposal price. Concessions or discounts which reduce the purchase price of the vehicle may be deducted only if they are claimed on the Request for Proposals form and if they reduce the initial purchase cost of the vehicle.

1.5 Failure to manually sign proposals shall disqualify it from consideration for award in connection with this transaction. Person signing proposal should show title or authority to bind the firm. Firm name should appear on each page of the proposal.

1.6 Proposals cannot be altered or amended after opening time. Any alterations made before opening time shall be initialed by vendor or an authorized agent. No proposal can be withdrawn after opening time without approval by the purchaser based on a written acceptable reason.

1.7 The purchaser reserves the right to waive minor technicalities or variations to specifications. All variations to the specifications shall be accounted for through the Approved Equals process. NO OTHER VARIATIONS TO SPECIFICATIONS WILL BE ALLOWED WITHOUT WRITTEN JUSTIFICATION APPROVED BY THE HOST AGENCY (see Paragraph 4).

1.8 Failure to provide the required information with the proposal may automatically disqualify the proposal from consideration for award in connection with this transaction.

1.9 All proposals must show: price, make & model offered, and the delivery date. A proposal must include the documents listed in Part III to be considered for award.

1.10 Telegraphic or facsimile proposals are not acceptable and will not be considered for award.

1.11 The following guidelines apply to proposal procedures:

1.11.1 Reference should be made to the proposal opening

1.11.2 Proposals should be submitted in a sealed envelope which is clearly marked as a proposal, and the proposal opening date and time should be noted on the envelope.

1.11.3 When a proposal is received, the envelope should be dated and time-stamped, which may be hand written.

1.11.4 Proposal openings should be made in a place open to the public.

1.11.5 Proposal should be opened at the date and time that is shown on the face of the request for proposals. Any proposal received after the proposal opening date and time cannot be considered and will be returned unopened.

1.11.6 The actual opening of the proposals should be on time, using an official clock.

"THE READING OF PROPOSALS PROVIDED IS DONE AS A CONVENIENCE TO THE PUBLIC AND CONSISTS OF READING VENDOR'S NAME, BRAND NAMES, PRICES AND DELIVERY. IN NO CASE DOES IT CONSTITUTE AN AWARD. MORE INFORMATION WILL BE AVAILABLE AFTER PROPOSALS ARE TABULATED."

1.11.7 Proposals received will be evaluated and ranked based upon points scored. Contract award shall be by Board for the host agency.

1.11.8 After the proposal award takes place, interested parties will be allowed to view the proposals under careful supervision.

2. APPOINTMENTS

Vendors may make appointments with the purchaser to discuss the specifications. This privilege, however, does not relieve them of the requirements of paragraphs (4) and (6) below.

3. REFERENCED EXAMPLES

Any catalog, brand name, or manufacturer's reference used in the Request for Proposals is descriptive only (not restrictive) and is used to indicate type and quality required. Proposal on brands of like nature and quality will be considered. If proposing other than referenced example on the specifications, proposal should show manufacturer, brand and trade name, and other description of product offered. If proposer takes no exception to specifications or reference data in the proposal, the vendor will be required to furnish brand names, numbers, etc., as specified in the Request for Proposals. The final determination as to whether or not equipment offered is equal to the referenced examples will be made by the purchaser.

Samples, when requested, shall be furnished free of expense to the agency. Each sample should be marked with vendor's name, address, and proposal due date.

If samples are submitted, and not destroyed in examination, they will be returned to the vendor upon request. In the event products tested fail to meet or exceed all conditions and requirements of the specification, the cost of the sample used and the cost of the testing shall be borne by the vendor.

4. EQUALS AND CLARIFICATIONS

Vendors may submit requests for approved equals and clarifications to purchaser provided that such requests for approved equals and clarifications of specifications are supported by evidence such as technical data, test results, or other pertinent information that demonstrates that the substitute offered is equal to or better than the specification requirement.

4.1 ISSUANCE OF REQUEST FOR PROPOSALS (RFP):

RFP will become available at the Purchasing & Contract Services Department located at 301 W. Railroad St., Weslaco, Texas 78596 or by visiting the Purchasing Department's web site at: http://www.lrgvdc/purchasing.org

4.2 PRE-POSAL CONFERENCE
(March 5th, 2015 at 2: 00 p.m. C.S.T. at the Purchasing Department)
The session can be informal and it is not a requirement for vendor to attend. During this session, prospective vendors can ask questions about certain items in the proposal or areas that allow for an approved equal. It also allows the purchaser the opportunity to present examples of items they expect to be included in the vehicles.

4.3 REQUEST FOR APPROVED EQUALS (RFAs)
(March 5th, 2015 on or before Noon (C.S.T.)
Requests for Approved Equals (RFAs) are due to the purchaser. Request for Approved Equal Forms: If request(s) for approved equals is (are) being submitted, illustrations and complete descriptions of alternate product(s) shall be provided.

4.3 RESPONSE TO RFAs
(March 11th, 2015)
The purchaser shall provide a response to all RFAs via an addendum.

4.4 APPEALS AND REQUEST FOR RECONSIDERATION
(March 12th, 2015)
The purchaser can receive appeals and requests for reconsideration of previously submitted RFAs that were disapproved. purchaser shall respond within three (3) days with an answer to all proposal participants.

4.5 Proposal Deadline
(March 20th, 2015 at 12:00 Noon C.S.T.)
Proposals are due and publicly opened and acknowledgment. Proposals are usually opened and acknowledged in the afternoon at 4:00 p.m.(CST) Purchaser often schedule proposal due dates (openings) on the week before their regularly scheduled agenda review meetings so an award can be issued if everything is in order.

5. AMENDING MATERIALS

Any amending material used by purchasers pertaining to the proposal solicitation documents (including without limitation, clarifications, approved equals, and corrections) shall be set forth in an addendum and sent to all parties who are on record as having obtained a copy of the proposal solicitation documents.

6. APPEAL

Should any Vendor choose to appeal a purchaser's decision of approved equals or clarifications of specifications, such an appeal must be in writing and received by the purchaser not less than five (5) calendar days before the date of the proposal due date. Responses to the appeal(s) will be returned not less than four (4) calendar days before the date of the proposal deadline (due date). Purchaser has no obligation to consider appeals received less than five (5) calendar days before the date of the proposal deadline.

7. TIE PROPOSALS

In case of tie proposals the award will be made to the best offer in accordance with section 271.901 of the Local Government Code.

8. NEW MODEL – CURRENT PRODUCTION STATEMENT

Unless otherwise stated in the Request for Proposals (RFP), the equipment furnished under these specifications shall be the latest improved model in current production, as offered to commercial trade, and shall be of quality workmanship and material. The vendor represents that all equipment offered under these specifications shall be new. **USED, SHOPWORN, DEMONSTRATOR, PROTOTYPE, OR DISCONTINUED MODELS ARE NOT ACCEPTABLE.**

9. **VENDOR AGREES TO HOLD PURCHASER HARMLESS FROM ANY PATENT OR SIMILAR PROCEEDINGS WHICH ARE BASED ON PRODUCTS SOLD BY THE VENDOR HEREUNDER**. Vendor shall defend any such suits at its own expense, and purchaser shall have the right to have such litigation monitored by its own counsel.

10. **INSPECTING VEHICLES FOR SPECIFICATION COMPLIANCE**

The purchaser's designated inspector may be represented at the vendor's manufacturing plant for the purpose of inspecting the vehicles under a specific procurement. The inspector, with the cooperation of the vendor, shall have the right to inspect all materials and workmanship at any time during the manufacturing process. The inspector shall also have the right to reject all materials and workmanship that do not conform to the specifications; provided, however, that the purchaser is under no duty to make such an inspection. If such aforementioned inspection(s) by purchaser is (are) made or is (are) not made, the vendor shall not be relieved of any obligation to furnish materials and workmanship strictly in accordance with specifications.

11. **DELIVERY OF VEHICLES**

Delivery of the vehicle(s) does not constitute acceptance. Acceptance takes place *ONLY* after the vehicle(s) has undergone a pre-acceptance inspection for the purpose of determining if EVERY requirement of the proposal package and advertised specifications have been met or exceeded. In the event the vehicle(s) does not meet ONE OR MORE of the specification requirements, the vehicle may be rejected.

If the vehicle is rejected, the vendor will be notified, in writing, that the vehicle has been rejected within five (5) working days. This written notification will list all discrepancies. The vendor shall correct all discrepancies prior to acceptance and payment.

Should the pre-acceptance inspection determine that the vehicle(s) meets or exceeds the requirements of the proposal "RFP" package and advertised specifications, the vehicle(s) will be accepted and the payment processes initiated.

12. **VENDOR AFFIRMATION**

BY SIGNING THIS PRPOSAL, A Vendor AFFIRMS THAT HE OR SHE HAS NOT GIVEN, OFFERED TO GIVE, NOR INTENDS TO GIVE AT ANY TIME HEREAFTER ANY ECONOMIC OPPORTUNITY, FUTURE EMPLOYMENT, GIFT, LOAN, GRATUITY, SPECIAL DISCOUNT, TRIP, FAVOR, OR SERVICE TO AN EMPLOYEE OR FAMILY MEMBER OF AN EMPLOYEE IN CONNECTION WITH THE SUBMITTED PROPOSAL. SIGNING THE PROPOSAL WITH A FALSE STATEMENT WILL VOID THE SUBMITTED PROPOSAL OR ANY RESULTING PURCHASE ORDERS. THE VENDOR MAY BE REMOVED FROM THE VENDOR LISTS FOR ALL TYPE VEHICLES. THIS INCLUDES FAILURE TO NOTIFY AGENCY OF ANY EXCEPTIONS.

13. **NOTE TO VENDORS**

Any terms and conditions attached to the proposal will not be considered unless the vendor specifically references them on the face of the Request for Proposals. Exceptions shall be specifically referenced on the face of the Request for Proposals and explained in detail on a separate attachment, labeled as such.

WARNING: Such terms and conditions or exception(s) taken by the vendor may result in determining the proposal to be non-responsive. Any exceptions taken which are verified as a true exception and not a clarification of a product which meets specifications will result in determining the proposal to be non-responsive.

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

Attachment "A"
Invitation for Proposals
PRICING SCHEDULE

DATE: _____ MAIL SEALED PROPOSALS TO: _____ _____ _____ ATTN: _____ _____ DESTINATION OF GOODS: (If different from above) _____ _____	OPENING DATE: _____ OPENING TIME: _____ VENDOR MUST FILL IN AND SIGN: _____Name of Firm _____Address _____ City- State - ZIP _____Authorized Name Title _____Authorized Signature Date

The undersigned hereby offers the following costs for THIRTY-TWO (32) transit buses/vans with option to purchase AND/OR assign additional transit buses over the next four years at the price stated herein in accordance with the specifications stated and on file in the office of the Purchasing Director, which have been carefully examined and which are included in this solicitation. The price quoted is exclusive of Federal, State and Local taxes, and includes all delivery charges to the Lower Rio Grande Valley Development Council/Valley Metro.

List base price only for other years- PPI will be determined for that year based on formula for Category wpu 1413 "Truck and Bus body"

	MAKE AND MODEL	TENATIVE DATE OF DELIVERY	AMOUNT
DIESEL			
30' Low Floor :	_____	_____	$_____ ea
<30' Bus :	_____	_____	$_____ ea
>30" Bus :	_____	_____	$_____ ea
VAN			
Type II :	_____	_____	$_____ ea
Type III :	_____	_____	$_____ ea
Type XI :	_____	_____	$_____ ea

DISCOUNTS SHALL BE LISTED BELOW AND MUST BE A MINIMUM OF TEN (10) DAYS. IF NONE, SO STATE:_____

Discount Percentage: _____% Discount Maximum Time Period:_____ Days

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Concessions or discounts may be used in the proposal price if they are claimed on this proposal price sheet. ***Rebates payable to the purchaser after payment is made are not to be deducted from the proposal price.***

SPECIAL CONDITION: *Delivery date could be a determining factor in the award of a purchase order. Agency must be able to provide a cost justification to TxDOT.*

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

PROPOSAL COST - SECOND YEAR

The undersigned hereby offers the following costs for TWENTY FIVE (25) transit buses/vans with option to purchase AND/OR assign additional transit buses over the next three years at the price stated herein in accordance with the specifications stated and on file in the office of the Purchasing Director, which have been carefully examined and which are included in this solicitation. The price quoted is exclusive of Federal, State and Local taxes, and includes all delivery charges to the Lower Rio Grande Valley Development Council/Valley Metro.

List base price only for other years- PPI will be determined for that year based on formula for Category wpu 1413 "Truck and Bus body

	MAKE AND MODEL	TENATIVE DATE OF DELIVERY	AMOUNT
DIESEL			
30' Low Floor :	_____	_____	$_____ ea
<30' Bus :	_____	_____	$_____ ea
>30" Bus :	_____	_____	$_____ ea
VAN			
Type II :	_____	_____	$_____ ea
Type III :	_____	_____	$_____ ea
Type XI :	_____	_____	$_____ ea

DISCOUNTS SHALL BE LISTED BELOW AND MUST BE A MINIMUM OF TEN (10) DAYS. IF NONE, SO STATE:_____

Discount Percentage: _____% Discount Maximum Time Period:_____ Days

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Concessions or discounts may be used in the proposal price if they are claimed on this proposal price sheet. ***Rebates payable to the purchaser after payment is made are not to be deducted from the proposal price.***

SPECIAL CONDITION: *Delivery date could be a determining factor in the award of a purchase order. Agency must be able to provide a cost justification to TxDOT.*

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

PROPOSAL COST - THIRD YEAR

The undersigned hereby offers the following costs for TWENTY FIVE (25) transit buses/vans with option to purchase AND/OR assign additional transit LRGVDCes over the next two years at the price stated herein in accordance with the specifications stated and on file in the office of the Purchasing Director, which have been carefully examined and which are included in this solicitation. The price quoted is exclusive of Federal, State and Local taxes, and includes all delivery charges to the Lower Rio Grande Valley Development Council/Valley Metro.

List base price only for other years- PPI will be determined for that year based on formula for Category wpu 1413 "Truck and Bus body

	MAKE AND MODEL	TENATIVE DATE OF DELIVERY	AMOUNT
DIESEL			
30' Low Floor :	_____	_____	$_____ ea
<30' Bus :	_____	_____	$_____ ea
>30" Bus :	_____	_____	$_____ ea
VAN			
Type II :	_____	_____	$_____ ea
Type III :	_____	_____	$_____ ea
Type XI :	_____	_____	$_____ ea

DISCOUNTS SHALL BE LISTED BELOW AND MUST BE A MINIMUM OF TEN (10) DAYS. IF NONE, SO STATE:_____

Discount Percentage: _____% Discount Maximum Time Period:_____ Days

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Concessions or discounts may be used in the proposal price if they are claimed on this proposal price sheet. ***Rebates payable to the purchaser after payment is made are not to be deducted from the proposal price.***

SPECIAL CONDITION: *Delivery date could be a determining factor in the award of a purchase order. Agency must be able to provide a cost justification to TxDOT.*

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

PROPOSAL COST - FOURTH YEAR

The undersigned hereby offers the following costs for TWENTY FIVE (25) transit buses/vans with option to purchase AND/OR assign additional transit buses over the next year at the price stated herein in accordance with the specifications stated and on file in the office of the Purchasing Director, which have been carefully examined and which are included in this solicitation. The price quoted is exclusive of Federal, State and Local taxes, and includes all delivery charges to the Lower Rio Grande Valley Development Council/Valley Metro.

List base price only for other years- PPI will be determined for that year based on formula for Category wpu 1413 "Truck and Bus body

	MAKE AND MODEL	TENATIVE DATE OF DELIVERY	AMOUNT
DIESEL			
30' Low Floor :	_____	_____	$_____ ea
<30' Bus :	_____	_____	$_____ ea
>30" Bus :	_____	_____	$_____ ea
VAN			
Type II :	_____	_____	$_____ ea
Type III :	_____	_____	$_____ ea
Type XI :	_____	_____	$_____ ea

DISCOUNTS SHALL BE LISTED BELOW AND MUST BE A MINIMUM OF TEN (10) DAYS. IF NONE, SO STATE:_____

Discount Percentage: _____% Discount Maximum Time Period:_____ Days

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Concessions or discounts may be used in the proposal price if they are claimed on this proposal price sheet. ***Rebates payable to the purchaser after payment is made are not to be deducted from the proposal price.***

SPECIAL CONDITION: *Delivery date could be a determining factor in the award of a purchase order. Agency must be able to provide a cost justification to TxDOT.*

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

PROPOSAL COST - FIFTH YEAR

The undersigned hereby offers the following costs for TWENTY FIVE (25) transit buses/vans with option to purchase AND/OR assign additional transit buses over the next four years at the price stated herein in accordance with the specifications stated and on file in the office of the Purchasing Director, which have been carefully examined and which are included in this solicitation. The price quoted is exclusive of Federal, State and Local taxes, and includes all delivery charges to the Lower Rio Grande Valley Development Council/Valley Metro.

	MAKE AND MODEL	TENATIVE DATE OF DELIVERY	AMOUNT
DIESEL			
30' Low Floor :	_____	_____	$_____ ea
<30' LRGVDC :	_____	_____	$_____ ea
>30" LRGVDC:	_____	_____	$_____ ea
VAN			
Type II :	_____	_____	$_____ ea
Type III :	_____	_____	$_____ ea
Type XI :	_____	_____	$_____ ea

DISCOUNTS SHALL BE LISTED BELOW AND MUST BE A MINIMUM OF TEN (10) DAYS. IF NONE, SO STATE:_____

Discount Percentage: _____% Discount Maximum Time Period:_____ Days

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Concessions or discounts may be used in the proposal price if they are claimed on this proposal price sheet. ***Rebates payable to the purchaser after payment is made are not to be deducted from the proposal price.***

SPECIAL CONDITION: *Delivery date could be a determining factor in the award of a purchase order. Agency must be able to provide a cost justification to TxDOT.*

"The Authority has the unilateral right to assign part or all of any option quantity of buses to another transit property or governmental entity."

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PRICING SCHEDULE

OPTIONAL COMPONENTS

OPTIONS # Option #	Description	Qty	Unit Price	Extended Price
1	Two way radio	1 to 100		
2	Remote Controlled Mirrors	1 to 100		
3	Destination Signs	1 to 100		
4	Public Information System	1 to 100		
5	Bike Racks	1 to 100		
6	Interior Ad Racks	1 to 100		
7	QRT Wheelchair Securement	1 to 100		
8	First Aid Kit	1 to 100		
9	Stop Request Chime	1 to 100		
10	AM/FM Radio & CD/Cassette Player	1 to 100		
11	Scan Tool and Accessories *(OTC- Pathfinder 2004 w/accessory- package # 3488, currently used by LRGVDC)*	1 to 100		
12	Military Spec Undercoating (or approved equal)	1 to 100		

VEHICLE MAKE	MODEL / GVWR	# DELIVERY DAYS after receiving PO
ENGINE MAKE	**ENGINE MODEL / Displacement**	

All prices must include and itemize freight to destination, federal excise tax, and if applicable state tax. Return original and one copy of your proposal to the address noted above. Show opening date in lower left-hand corner of sealed envelope and show return address of firm.

NOTE: *The person submitting the proposal must include a copy of his/her representative license if required under the Texas Motor Vehicle Commission Code. Return original and one copy of your proposal to the address noted above. Show opening date in lower left-hand corner of sealed envelope and show return address of firm. Delivery date could be a determining factor in the award of a purchase order. Agency must be able to develop a cost justification to in order to use delivery date as a determining factor.*

PART II TERMS AND CONDITIONS

1 GENERAL INFORMATION

1.1 Purpose

The Lower Rio Grande Valley Development Council/Valley Metro is soliciting innovative Proposals from qualified vendors for transit buses and vans **over a five (5) year contract from a single, qualified vendor** in accordance with the terms and conditions set forth herein. The Contract shall be a firm- fixed price Contract.

Price Escalation/Economic Price Adjustment EPA

Lower Rio Grande Valley Development Council/Valley Metro reserves the right to order buses and equipment over the five (5) year period beginning upon the day of contract award. The prices shall remain firm/fixed for any orders issued by Lower Rio Grande Valley Development Council/Valley Metro within a period of three hundred and sixty-five (365) days of contract award. The price(s) of any buses/equipment ordered by the Lower Rio Grande Valley Development Council/Valley Metro after the initial three hundred sixty-five (365) days firm/fixed price period shall be that quoted. (Base Order Price) plus any escalation which will be calculated based on the following formula which utilize ("P.P.I.") Category wpu 1413 "Truck and Bus Body". The escalation in this price index shall be used to adjust the Base Order Prices. However, in no event will the price(s) for any purchase order released exceed, by more than 5 percent, the price(s) that would have been in effect twelve (12) months prior to the date of the release, in accordance with the terms and conditions set forth above. The Contract shall be a firm, fixed-price Contract with EPA.

Vehicles and equipment purchased to these specifications are for use by a public transportation grant recipient, hereinafter referred to as the agency or the Lower Rio Grande Valley Development Council. The project is financed in part by federal and/or state funds and is administered by the Texas Department of Transportation (TxDOT).

1.2 Method of Selection

Purchases will be made by competitive seal proposals in accordance with applicable state law and certain additional requirements of the United States (U.S.) Department of Transportation. Proposals will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described in section 5, 5.3 Evaluation Process.

An agency may establish minimum qualifications regarding the safety, durability and maintainability of the product, and may assess the demonstrated ability of vendor to deliver quality products and warranty service in the determination of minimum qualifications.

1.3 Protest Procedure

The protest must outline the specific portion of the specification or RFP procedure that had been violated.

Prospective proposers whose direct economic interest would be affected by the award of a contract or by failure to award a contract may file a protest. The purchaser (Lower Rio Grande Valley Development Council/VM) will consider all protest requested in a timely manner regarding the award of a contract, whether submitted before or after an award. All protests are to be submitted in writing to:

Victor Morales, Purchasing Director, Lower Rio Grande Valley Development Council Purchasing Department, 301 W. Railroad St., Weslaco, TX 78596. Protest submissions should be concise, logically arranged, and clearly state the grounds for protest. Protest must include the following information:

(A) name, address, and telephone number of protestor,
(B) identification of contract solicitation number,
(C) a detailed statement of the legal and factual grounds of the protest, including copies of relevant documents, and
(D) a statement as to what relief is requested.

Protest must be submitted to the Lower Rio Grande Valley Development Council Purchasing Department in accordance with these procedures and time requirements must be complete and contain all issues that the protestor believes relevant.

In the procedure outline below, the Purchasing Director is considered to be the Contracting Officer.

1.3.1 Protest Before Opening

Proposal protest alleging restrictive specifications or improprieties which are apparent prior to the proposal deadline or receipt of proposals must be submitted in writing to the Contracting Officer at the address above and must be received at least six (6) days prior to the proposal deadline or closing date for receipt of proposals. If the written protest is not received by the time specified proposals may be received and award made in the normal manner unless the Contracting Officer determines that remedial action is required. Oral protest not followed up by a written protest will be disregarded. The Contracting Officer may request additional information from the appealing party and information or responses from other proposers, which shall be submitted to the Contracting Officer not less than ten (10) days after the date of the Lower Rio Grande Valley Development Council's request. So far as practicable, appeals will be decided based on the written appeal, information and written responses submitted by the appealing party and other proposers. In failure of any party to timely respond to a request form information, it may be deemed by the purchaser that such party does not desire to participate in the proceeding, does not contest the matter, or does not desire to submit a response, and in such case, the protest will proceed and will not be delayed due to the lack of response. Upon receipt and review of written submissions and any independent evaluation deemed appropriate by the purchaser, the Contracting Officer shall either (a) render a decision, or (b) at the sole election of the Contracting Officer, conduct an informal hearing at which the interested parities will be afforded the opportunity to present their respective positions and facts, documents, justification, and technical information in support thereof. Parties may, but are not required to, be represented by counsel at the informal hearing, which will not be subject to formal rules of evidence or procedures. Following the informal hearing, if one is held, the Contracting Officer will render a decision, which shall be final, and notify all interested parties thereof in writing but no later than ten (10) days from the date of the informal hearing.

1.3.2 Protest After Opening/Prior to Award

Proposal protests against the making of an award by the purchaser must be submitted in writing to the Contracting Officer and received within seven (7) days of the award by the purchaser. Notice of the protest and the basis thereto will be given to all proposers. In addition, when a protest against the making of an award by the purchaser is received and it is determined to withhold the award pending disposition of the protest, the proposers whose proposals might become

eligible for award shall be requested, before the expiration of the time for acceptance, to extend or to withdraw the proposal. Where a written protest against the making of an award is received in the time period specified, award will not be made prior to seven (7) days after resolution of the protest unless the purchaser determines that:

(a) the items to be purchased are urgently required
(b) delivery or performance will be unduly delayed by failure to make an award promptly, or
(c) failure to make an award will otherwise cause undue harm to Lower Rio Grande Valley Development Council or the federal government.

1.3.3 Protest After Award

In instances where the award has been made, the Contractor shall be furnished with the notice of protest and the basis thereof. If the contractor has not executed the contract as of the date of the protest is received by the Lower Rio Grande Valley Development Council; the execution of the contract will not be made prior to seven (7) days after resolution of the protest unless the Lower Rio Grande Valley Development Council determines that:

(a) the items to be purchased are urgently required
(b) delivery or performance will be unduly delayed by failure to make an award promptly, or
(c) failure to make an award will otherwise cause undue harm to the Lower Rio Grande Valley Development Council or the federal government.

1.3.4 FTA Protest Review Procedures

Circumstances under which FTA will accept and review protests are limited to the following:

(a) The alleged failure of the *Lower Rio Grande Valley Development Council* to have written protest procedures;
(b) The alleged failure of the *Lower Rio Grande Valley Development Council* to follow such procedures;
(c) The alleged violation by the *Lower Rio Grande Valley Development Council* of a specific federal requirement, which provides an applicable complaint procedure.

In the instance of (c) above, the applicable complaint procedure shall be submitted and processed in accordance with pertinent federal regulations (e.g., 49 CFR Part 661, Section 661.15 for Buy America, or 49 CFR Part 23.73 for Minority Business Enterprise participation).

Should protest be filed with the FTA under either (a) or (b) above, FTA pursuant to Circular 4220.1D will use the following process:

1. Parties shall file protest with FTA not later than five days after the to make a final determination on the protest, protesters shall file a protest with FTA not later than five days after the protester knew or should have known of the *Lower Rio Grande Valley Development Council's* failure to render a final determination on the protest;

2. The *Lower Rio Grande Valley Development Council* shall not award a contract for five days following its decision on proposal protest except in accordance with the provisions and limitations of item 9 of this section. After five days, the *Lower Rio Grande Valley Development Council* shall confirm

with FTA that FTA has not received a protest on the contract in question;

3. Protests shall be filed with the FTA Region IV office with a concurrent copy to the *Lower Rio Grande Valley Development Council*;

4. The protest filed with FTA shall:

   (a) include the name and address of the protester;
   (b) identify the grantee, project number, and the number, if any, of the contract solicitation;
   (c) contain a statement of the grounds for protest and any supporting documentation. This should detail the alleged failure to follow protest procedures or the alleged failure to have procedures, and should be supported by documentation to the extent possible;
   (d) include a copy of the local protest filed with the *Lower Rio Grande Valley Development Council* along with a copy of the *Lower Rio Grande Valley Development Council*'s decision, if any.

5. FTA shall notify the *Lower Rio Grande Valley Development Council* in a timely manner of the receipt of a protest. FTA shall instruct the *Lower Rio Grande Valley Development Council* to notify the Contractor of the protest if award has been made or, if no award has been made, to notify all interested parties. The *Lower Rio Grande Valley Development Council* shall instruct all who receive such notice that they may communicate further directly with FTA;

6. The *Lower Rio Grande Valley Development Council* shall submit the following information to FTA not later than ten days after receipt of notification by FTA of the protest:

   (a) a copy of the *Lower Rio Grande Valley Development Council*'s protest procedures;
   (b) a description of the process followed concerning the protest, and;
   (c) any supporting documentation.

7. The *Lower Rio Grande Valley Development Council* shall provide the protester with a copy of the above submission;

8. The protester may provide any comments on the *Lower Rio Grande Valley Development Council*'s submission no later than ten days after the protester's receipt of such material;

9. When a protest has been filed in a timely fashion with the *Lower Rio Grande Valley Development Council* before award, the *Lower Rio Grande Valley Development Council* shall not make an award prior to five days after the resolution of the protest, or if a protest has been filed with FTA, during the period in which the protest is pending, unless the Lower Rio Grande Valley Development Council determines that:

   (a) the items to be procured are urgently required;
   (b) delivery or performance will be unduly delayed by failure to make the award promptly, or;
   (c) failure to make prompt award will otherwise cause undue harm to *Lower Rio Grande Valley Development Council* or the Federal Government.

   In the event that the *Lower Rio Grande Valley Development Council* determines that the award is to be made during the five-day period following

the local protest decision or the period in which the protest is pending, the *Lower Rio Grande Valley Development Council* shall notify FTA prior to making such award;

Upon receipt of the material described herein, FTA will either request further information or a conference among parties, or will render a decision on the protest.

1.4 Contents and Terms of the Purchase Order

The vendor shall furnish vehicles and/or equipment as described on the purchase order and the specifications or addenda referenced thereon. The contract shall begin at the time of acceptance of a purchase order or orders by the vendor(s) and shall terminate upon expiration of the warranty period for the vehicle or equipment.

1.5 Termination of Contract

1.5.1Termination for Convenience

The performance of work under this Contract may be terminated by the Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro. 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro and deliver in the manner, at the times, and to the extent, if any, directed by Contracting Officer the fabricated or un-fabricated 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 Lower Rio Grande Valley Development Council/Valley Metro; 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro has or may acquire an interest.

The Contractor shall be paid its costs, including up to 5% re-stocking charge of any materials returned to Vendor, contract close-out costs, and not to exceed 1% profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to LRGVDC to be paid by 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 “LRGVDC” shall be substituted in lieu thereof.

1.5.2Termination for Default

The Lower Rio Grande Valley Development Council/Valley Metro 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 the Lower Rio Grande Valley Development Council/Valley Metro elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by the Lower Rio Grande Valley Development Council/Valley Metro shall not limit the Lower Rio Grande Valley Development Council’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 of default, the Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro shall be at the Contract price. The Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro.

The rights and remedies of the Lower Rio Grande Valley Development Council/Valley Metro 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.

1.5.3DISPUTES

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. Pending final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the direction of the Lower Rio Grande Valley Development Council.

1. Notice of Dispute. All disputes shall be initiated through a written dispute notice submitted by either party to the other party within five (5) calendar days of the determination of the dispute.

2. 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. 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 twenty-eight (28) days after delivery of the dispute notice, the executives of both parties shall schedule a meeting at a mutually acceptable time and place, and thereafter as they reasonably deem necessary, to attempt to resolve the dispute. All reasonable request for information by one party to the other shall be honored.

3. The dispute is considered waived if not resolved by a mutually agreed to alternative dispute resolution process or to filing of a claim in any

court with jurisdiction in Texas within thirty (30) days of the initial written notice of dispute.

1.5.4 Communications

Communications in connection with this Contract shall be in writing and shall be delivered personally; or electronic mail (e-mail), or by facsimile; or by regular, registered, or certified mail addressed to the officer(s) or employee(s) of the Lower Rio Grande Valley Development Council/Valley Metro 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.

1.6 ACCEPTANCE/REJECTION OF PROPOSALS

The Lower Rio Grande Valley Development Council/Valley Metro 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 LRGVDC, price and other evaluation criteria considered. The Lower Rio Grande Valley Development Council/Valley Metro reserves the right to consider any specific proposal that is conditional or not prepared in accordance with the instructions and requirements of this RFP to be noncompetitive. The Lower Rio Grande Valley Development Council/Valley Metro 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 one 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 LRGVDC.

The Lower Rio Grande Valley Development Council/Valley Metro may reject a proposal that includes unacceptable deviations as provided in “Conditions, Exceptions, Reservations or Understandings”.

1.6.1 SINGLE PROPOSAL RESPONSE

If only one proposal is received in response to this RFP and it is found by the Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 LRGVDC to accept such a single proposal; and the Lower Rio Grande Valley Development Council/Valley Metro may reject such proposal at its sole discretion.

1.6.2 CANCELLATION OF PROCUREMENT

The Lower Rio Grande Valley Development Council/Valley Metro reserves the right to cancel the procurement, at any time for any reason before the Contract is fully executed and approved on behalf of the Lower Rio Grande Valley Development Council/Valley Metro.

2 ADDITIONAL INFORMATION TO BE SUBMITTED WITH PROPOSAL

2.1 Description of Equipment

Proposals shall be accompanied by sufficient information to enable the purchaser to ascertain that the equipment offered meets the specifications and shall include correct product literature and detailed specifications. In most cases, manufacturer's product literature alone will not fulfill this requirement. The product description shall include at a minimum:

2.1.1 Drawing of the floor plan showing interior body dimensions and placement of seats, accessories, and ancillary equipment.

2.1.2 A complete description of the vehicle and all equipment to be provided.

NOTE: Failure to provide the required information with the proposal may automatically disqualify the proposal from consideration for award in connection with this transaction.

2.2 Delivery Schedule

Each proposer shall state the estimated date of delivery of the final units from the date of the purchase order. Unrealistically short or long delivery promises may cause proposal to be rejected. Consistent failure to meet delivery promises may cause the vendor to be removed from the vendor list.

2.3 Indemnification

The Contractor shall, to the extent permitted by law (1) protect, indemnify and save the Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 other proceeding. The Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro 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 Lower Rio Grande Valley Development Council/Valley Metro shall have the right to be represented therein by advisory council 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 Lower Rio Grande Valley Development Council/Valley Metro, officers, employees and agents, or consultants. 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.

2.4 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 by 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 fifteen (15) calendar days after the date of receipt of the notice of award or within such further time as the Lower Rio Grande Valley Development Council/Valley Metro may allow. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under “Termination for Default” (Section 1.5.2).

3 DELIVERY AND PAYMENT

3.1 Delivery

Vehicles and equipment shall be delivered FOB to the address(es) shown on the purchase order between the hours of 8 a.m. and 4 p.m., Monday through Friday, excluding state holidays.

3.2 Cancellation By Purchaser

Delivery defaults by the vendor or failure to meet specifications authorize the purchaser to cancel the purchase order, purchase the merchandise elsewhere, and charge full increase, if any, in cost and handling to the defaulting vendor.

3.2.1 Should delivery be delayed because of strike, injunction, government controls, or any circumstances beyond the control of the vendor, the

vendor shall notify the purchaser in writing of the cause of such delay within five (5) days after the beginning thereof and shall state the estimated date delivery will be made.

3.2.2 If delay is foreseen, vendor shall give written notice to the agency. The agency has the right to extend delivery date if reasons appear valid. Vendor must keep the agency advised at all times of the status of the order. Default in promised delivery (without accepted reasons) or failure to meet specifications may cause the vendor to be removed from the vendor list.

3.2.3 If the vendor does not deliver the equipment on or before the quoted delivery date, and an extension has not been granted by the agency, the *purchaser may deduct $25 for each working day between the quoted and the actual delivery date from the purchase order price*. A working day is defined as a calendar day, not including Saturdays, Sundays, or regularly observed federal holidays. This provision is not intended as a penalty but, instead, as liquidated damages.

3.3 Completeness

All equipment shall be delivered complete and ready for use. All parts necessary for operation or which are normally furnished as standard equipment shall be furnished whether specified or not. No substitutions or cancellations are permitted without written approval of the purchaser.

3.4 Pre-Delivery Service

The following service shall be performed upon all motor vehicles prior to/upon delivery:

(a) pre-delivery inspection certified with an affixed Texas Motor Vehicle Inspection Certificate (annual inspection sticker);
(b) fluid levels checked and serviced with proper grade fluid;
(c) chassis lubrication;
(d) exterior wash and interior cleaning; and
(e) fuel system(s) filled to capacity.

3.5 MSO

Due to the provisions of Item 3.6 below, it shall be the vendor's decision whether to provide the Manufacturer's Statement of Origin (MSO) at the time of delivery. The vendor shall provide that document no later than at the time full payment is made by the purchaser.

3.6 Modifications

Any modification to the suspension or other parts of the vehicle shall require the vendor to provide certification that all Federal Motor Vehicle Safety Standards are met.

3.7 Inspection and Testing

The purchaser reserves five (5) working days following delivery for inspection and testing of the equipment. Should the equipment be found defective or not meeting specifications, the purchaser will notify the vendor of any deficiencies in writing within 10 working days of delivery. Failure of the vendor to correct such deficiencies or to replace faulty equipment within a reasonable period of time may be grounds for cancellation of the purchase order.

3.8 Invoicing

Invoices should be submitted in quadruplicate to the purchaser at the address shown on the Request for Proposals. To expedite payment, it is recommended that properly completed invoices be submitted as soon as possible.

3.9 Payment

Payment will be provided by LRGVDC to the agency within 21 working days after acceptance of the equipment and receipt of the bill.

3.9.3 The vendor may charge the purchaser $25 for each working day taken in excess of thirty working days after acceptance of the equipment specified in this item and any such charges shall be the sole responsibility of the purchaser. A working day is defined in Item 3.2.3 above. This provision is not intended as a penalty but, instead, as liquidated damages.

3.10 Insurance

Prior to delivery, purchaser will provide proof of insurance, naming seller as loss payee. Purchasing agency will not place the vehicle into transit service until payment is made in full to the vendor.

3.11 Vehicle Title(s)

When registering the vehicle title, the vendor will record a lien on the title, naming the Texas Department of Transportation, Public Transportation Division as lien holder.

4 AMERICANS WITH DISABILITIES ACT

All vehicles other than standard production must comply with the requirements of the Americans with Disabilities Act.

5 PROPOSAL EVALUATION, NEGOTIATION AND SELECTION

5.1 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 Officers (BAFOs) may be requested. However, the Lower Rio Grande Valley Development Council/Valley Metro may select a proposal for award without any discussions or negotiations or request for any BAFO(s). Subject to LRGVDC's right to reject any or all proposals, the Offeror will be selected whose proposal is found to be most advantageous to the Lower Rio Grande Valley Development Council/Valley Metro, based upon consideration of the criteria of "Qualification Requirements" (Sections 5.5) and "Proposal Evaluation Criteria" (Section 5.6) below.

5.2 OPENING OF PROPOSALS

Proposals will be publicly opened for acknowledgment of receipt only. All proposals and evaluations will be kept strictly confidential throughout the evaluation, negotiation and selection process. Only the members of the Evaluation Committee and Lower Rio Grande Valley Development Council/Valley Metro Officials, employees and agents having a legitimate interest will be provided access to the proposals and evaluation results during this period.

5.3 EVALUATION COMMITTEE

An Evaluation Committee consisting of employees of Lower Rio Grande Valley Development Council/Valley Metro will be established. The Procurement Director will make all decisions to the Board of Directors regarding the evaluations, determination of responsible Offerors and the competitive range, negotiations and recommend the selection of the Offeror, if any, that may be awarded the Contract.

5.4 PROPOSAL EVALUATION 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 5.5) and "Proposal Evaluation Criteria" (Section 5.6) below. Section 5.6 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 5.6 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 Lower Rio Grande Valley Development Council/Valley Metro's best interest, price and other evaluation criteria considered.

The procedures to be followed for these evaluations are provided in "Evaluation Procedures" (Section 5.7) below.

5.5 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 Evaluation Committee finds not to meet these requirements, and cannot be made to meet these requirements, may be determined by the Evaluation Committee not to be responsible and its proposal rejected. The requirements are as follows:

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 Lower Rio Grande Valley Development Council/Valley Metro or the Offeror.

B. 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 value of the proposal.

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.

D. Ability to obtain insurance with coverage values as stated below **evidenced by a letter from an underwriter** confirming that the Offeror is insured for the required amount.

The Vendor shall purchase from and maintain in a company or companies lawfully authorized and admitted to do business in the State of Texas possessing a Best's policyholder's rating of A- or better and a financial rating of no less than VII, and reasonably acceptable to the Lower Rio Grande Valley Development

Council/Valley Metro, an occurrence-based Commercial General Liability Insurance Policy which shall provide bodily injury and property damage liability on its own operations and vehicles on Work the Vendor may subcontract or sublet to others, in no less than the amounts specified below. This insurance will name LRGVDC, the Vendor, its consultants and employees, and any required governmental agencies as additional insured's for Work performed under this Contract; the Vendor's policy shall be designated primary coverage for both defense and indemnity, and any LRGVDC policies or self insurance funds shall be excess.

a. Comprehensive General Liability, Bodily Injury and Property Damage Liability, including Premise and Operations, Independent Contractors, Protective Liability, Completed Operations and Products, Contractual, Combined Single Limit of at least $1,000,000.00 per occurrence, with a per project aggregate limit of at least $2,000,000.00.

b. Comprehensive Automobile Liability, Bodily Injury and Property Damage Combined Single Limit of at least $1,000,000.00.

c. In addition, the Vendor shall maintain a true umbrella policy which provides excess limits over the primary layer, in an amount not less than $5,000,000.00.

The insurance required by Subparagraph (a) shall be written for not less than limits of liability required by law. Coverages, written on an occurrence basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Completed operations coverage shall remain in force for three years after Final Acceptance.

In addition, the Vendor shall purchase and maintain insurance for claims under workers' compensation (industrial insurance), disability benefit and other similar employee benefit acts in the State statutory amount and Stop Gap Liability Insurance (Employer's Contingent Liability Insurance) with coverage of at least $1,000,000.00 each occurrence/each accident.

Before commencing Work or exposure to loss can occur, and, in any event, as a condition of the Lower Rio Grande Valley Development Council/Valley Metro executing the contract, the Vendor shall furnish the Lower Rio Grande Valley Development Council/Valley Metro with a copy of the applicable insurance required by this Contract Document. If the Agreement is executed, the Vendor shall comply with the provisions in Section 2, 2.2.4 production Of Documents. All policies and certificates must be signed copies and shall contain a provision that coverages afforded under the policies cannot be materially altered (i.e., the coverages reduced, the limits decreased, or the additional insureds removed), allowed to expire, or canceled without first giving at least thirty (30) days' prior written notice by certified mail to the Lower Rio Grande Valley Development Council/Valley Metro. The Vendor shall furnish to the Lower Rio Grande Valley Development Council/Valley Metro copies of any subsequently issued endorsements amending, modifying, altering, or restricting coverage of limits. Furthermore, such policies or certificates shall contain a clause verifying that the policy contains coverage for blanket contractual liability including both oral and written contracts and that the indemnification provisions of Section 2.3 Indemnification are acknowledged.

LRGVDC's specification or approval of the insurance in this Contract or of its amount shall not relieve or decrease the liability of the Vendor. Coverages are the minimum to be provided and are not limitations of liability under the Contract, indemnification, or applicable law provisions. The Vendor may, at its expense, purchase larger coverage amounts.

The Vendor shall ensure and require that Subcontractors of any tier have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors of any tier.

If LRGVDC is damaged by the failure of the Vendor to maintain any of the above insurance or to so notify LRGVDC, the Vendor shall bear all costs attributable thereto. LRGVDC may withhold payment pending receipt of all certificates of insurance. Failure to withhold payment shall not constitute a waiver.

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.

D. Ability to obtain insurance with coverage values as stated in Section 5.5, I. D INSURANCE **evidenced by a letter from an underwriter** confirming that the Offeror is insured for the required amount.

III. Evidence that Offeror is qualified in accordance with 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 provided by the Offeror for vehicles delivered within the past three (3) years.

V. Evidence of complying with all applicable Federal regulations including the submission of a test report from the Altoona testing facility in accordance with 49CFR655.

5.6 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 Deviations” (Attachment “F”) which do not cause LRGVDC 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.

1) **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.

2) **Delivery**: Thirty two (32) to one hundred (100), wheelchair-equipped transit buses and vans in the base order shall be delivered within one hundred and eighty (180) days. Full points in the evaluation will be awarded to those respondents documenting their ability to deliver within the allotted time.

3) **Technical**: LRGVDC will evaluate the proposed, wheelchair-equipped transit buses and support offered in the technical proposal for the following factors that are listed in their relative order of importance. Proposers are to provide a list of vehicles delivered to transit properties within the past three (3) years with proposed power train, structure, suspension, body, and other specified sub-systems. Proposers should include contact names and phone numbers.

   A. Propulsion System: 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 III: Technical Specifications ULSD, and the needs of LRGVDC, for the engine and transmission are proposed to be met. The risks 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 III: Technical Specifications ULSD, and the needs of LRGVDC, for these systems are proposed to be met. The risks 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 III: Technical Specifications ULSD, and the needs of LRGVDC, for each major subsystem are proposed to be met. The risks of development tasks (if any) will be assessed.

   D. Quality Assurance: Sufficiency of in-place Quality Assurance Program and procedures to meet requirements. The degree to which: Quality Assurance Provisions are met.

   E. Spare Parts Availability: Degree to which the required availability of spare parts (Section 49.0) is proposed to be met or exceeded.

   F. Standard Warranty: Degree to which the standard warranty of Section 48.0 WARRANTY PROVISIONS 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 LRGVDC can analyze cost and pricing data.

4) Qualification and Resources: Degree to which Offeror exceeds the required qualifications of Section 5.5 Qualifications Requirements.

A. Human and physical resources.
B. Financial strength and resources.
C. Record of performance of LRGVDC contracts.

5.7 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.

All proposals must conform to the approved specifications. Minimum acceptable technical specifications are contained in the section entitled Part III: Technical Specifications ULSD.

A proposal may be considered non-responsive and may be rejected unless LRGVDC determines in its sole discretion that the irregularity is not required if: (1) the authorized proposal form furnished is not used or is altered; (2) the completed proposal form contains any unauthorized additions, deletions, alternatives, or conditions; (3) Offeror adds provisions reserving the right to reject or accept the award or enter into the contract; (4) the proposal form is not properly executed; (5) the proposal form is incomplete; (6) receipt of addenda is not acknowledged; (7) a member of a joint venture and the joint venture submit proposals for the same project (if such an instance, both proposals may be rejected); (8) proposal form entries are not made in ink or typed; (9) failure to include the required proposal guarantee; or (10) other reasons deemed material to LRGVDC.

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. LRGVDC 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 form and organization specified in “General Instructions” (Part 1). 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 Deviations” (Attachment “F”). 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 5.6).

Evaluations will be made in strict accordance with all of the evaluation criteria and procedures specified in “Proposal Selection Process” (Section 5) above. LRGVDC will select for any award the highest ranked proposal from a responsible Offeror, qualified under “Qualification Requirements” (Section 5.5) which does not render this procurement financially infeasible and is judged to be most advantageous to the Lower Rio Grande Valley Development Council/Valley Metrobased on consideration of the evaluation “Proposal Evaluation Criteria” (Section 5.6).

5.8 EVALUATIONS OF COMPETITIVE PROPOSALS

I. **Qualification of Responsible Offerors**. Proposals will be evaluated in accordance with requirements of “Qualification Requirements” (Section 5.5) to determine the responsibility of Offerors. Any proposals from Offerors whom the Lower Rio Grande Valley Development Council/Valley Metrofinds 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 Lower Rio Grande Valley Development Council/Weslaco Urban System, information submitted in a BAFO (Best and Final Offer) and information resulting from the Lower

Rio Grande Valley Development Council/Valley Metroinquiry 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 5).

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 Lower Rio Grande Valley Development Council/Valley Metrofinds not to meet these requirements, and may not be made to meet these requirements, may be determined by the Lower Rio Grande Valley Development Council/Valley Metroto 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 5.5), or that LRGVDC 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 LRGVDC to be either a defect that LRGVDC will waive in accordance with "Acceptance/Rejection of Proposals" (Part II, 1.6) 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. LRGVDC 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 that may render a proposal unacceptable will be documented. LRGVDC will make specific note of questions, issues, concerns and areas requiring clarification by Offerors and to be discussed in any meetings with Offerors that LRGVDC finds to be within the competitive range.

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

III. **Proposals not within Competitive Range**. Offerors of any proposals that have been determined by LRGVDC as not in the competitive range, and cannot be reasonably made to be within the competitive range, will be notified in writing. LRGVDC will attempt to give notice promptly after contract award. LRGVDC's failure to give notice shall not be deemed to affect the validity of the contract.

IV**. Discussions with Offerors in the Competitive Range**. The Offerors whose proposals are found by LRGVDC 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 LRGVDC 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 Deviations" (Section 1.1.6.9), said conditions, exceptions, reservations or understandings may be negotiated during these

meetings. However, LRGVDC 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 LRGVDC 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 the 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.

Offeror(s) within the competitive range may be required to provide a demonstration vehicle similar in design requested to LRGVDC's location on a date(s) specified by the LRGVDC for inspection by LRGVDC officials or make other arrangements agreed upon by both parties for inspection of a demonstration vehicle.

V. Factory and Site Visits. LRGVDC 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 Officers (BAFO). After determination of those Offerors within competitive range or after all interviews have been completed, each of the Offerors in the competitive range may be afforded the opportunity to amend its proposal and make its BAFO. If LRGVDC requests a BAFO it 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 LRGVDC according to the same requirements and criteria as the initial proposals "Proposal Selection Process" (Section 1.1.4.3). LRGVDC 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 LRGVDC and considered according to the relative degrees of importance of the criteria defined in "Proposal Evaluation Criteria (Section 1.1.4.3.2).

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

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

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PART III SUMMARY OF REQUIRED DOCUMENTS

1. DOCUMENTS THAT SHALL BE FURNISHED WITH THE PROPOSAL

1.1 *Consolidated Certification Form

1. 2 *Domestic Content worksheet (required for proposals over $100,000)

1.3 Printed product literature of the vehicle and all ancillary equipment

1.4 Drawing of the proposed floor plan

1.5 *Warranty Certification. Also, a complete list of companies or individuals and their addresses who stock repair parts in the agency's area and who will perform the services.

1.6 *Federal Motor Vehicle Safety Standards (FMVSS) Certification.

1.7 A copy of the franchised Texas new motor vehicle dealer's license.

1.8 A copy of the representative's license if required under the Texas Motor Vehicle Commission Code.

1.9 A copy of the manufacturer or converter license, whichever applies.

1.10 * Invitation for Proposals Cover Sheet

1.11 A list of three (3) agencies or people, including phone numbers, of those who have already purchased the proposed vehicle from the vendor and have placed the vehicle into service.

1.12 A copy of the Transit Vehicle Manufacturer's DBE certification letter sent by the manufacturer to the Federal Transit Administration.

1.13 Certification from the conversion vendor that the conversion system (specific to applicable engine families) meets EPA Memo-1A, and that tests have been performed according to procedures prescribed in 40 CFR Section 85.

1.14 Certification from the conversion vendor that the specific conversion system will not cause the vehicle to fail to meet applicable emission standards (according to procedures prescribed in 40 CFR Section 85) at any time during the vehicle's useful life.

1.15 Certification in writing from the conversion vendor that, should the conversion system fail to meet applicable emission standards according to procedures prescribed in 40 CFR Section 85) at any time during the vehicle's useful life, the conversion vendor will repair or replace the conversion system, at no charge to the purchasing entity, with a comparable conversion system meeting Memo-IA.

NOTE: Failure to provide the required information with the proposal could automatically disqualify the proposal from consideration for award in connection with this transaction.

* A blank form is provided by host agency

2. DOCUMENTS THAT SHALL BE FURNISHED AT TIME OF DELIVERY OF VEHICLE

2.1 Manufacturer's standard warranty and service policies for the chassis.
If separate warranties are available for the following, they shall be furnished:

2.1. 1 Body.
2.1. 2 Air Conditioner.
2.1. 3 Wheelchair lift.
2.1. 4 Alternative fuel conversion.

2.2 Parts and operating manual(s) providing complete operating and maintenance instructions for all installed equipment. The manual(s) shall include recommended servicing intervals.

2.3 Color-Coded Diagram(s) showing the complete, as-built electrical wiring of the vehicle, including wiring schematics for all alternative fuel conversion equipment and wheelchair accessibility features. The color coding on the alternative fuel system electrical schematic drawing shall match that of the rest of the vehicle wiring.

2.4 See Part II, Paragraph 3.5.1, for additional information regarding the Manufacturer's Statement of Origin (MSO).

2.5 Certification that the GVW rating is not exceeded by the vehicle as equipped.

2.6 Vehicle manufacturer certification that the air conditioner meets or exceeds the air conditioner performance specifications.

2.7 *Altoona Test Report if required in accordance with 49 CFR 665*.

2.8 Detailed conversion system bill-of-materials (specific to applicable engine families) identifying primary conversion system components, including but not limited to, manufacturer, part number and function. Documentation to ascertain component functionality shall be provided.

2.9 Documentation of Federal Test Procedure 75, (FTP) or comparable test.

2.10 Registration receipt recording a lien on the vehicle and naming the Texas Department of Transportation, Public Transportation Division as lien holder.

PUBLICATION

This specification is a product of the Lower Rio Grande Valley Development Council/Valley Metro (LRGVDC). This specification may not be sold for profit or monetary gain. If this specification is altered in any way, the header, and any and all references to LRGVDC must be removed. LRGVDC does not assume nor accept any liability when this specification is used in a procurement process by any other entity.

TECHNICAL SPECIFICATIONS

GENERAL

TS 1. Scope

Technical specifications define requirements for medium-duty transit buses for service in neighborhood transit services to connect passengers to feeder routes and community shuttles, including private operator and shuttle providers. Buses shall have a minimum expected life of ten (10) years or 350,000 miles, whichever comes first, and are intended for the widest possible spectrum of passengers, including children, adults, the elderly and people with disabilities.

TS 2. Definitions

Available Option: An available option specification condition to the standard bus configuration. The Agency may define available options to the standard configuration to satisfy local operating requirements. Available options for the standard configuration will be clearly identified.

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

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

> **NOTE:** Analog signals are used to represent the state of variable devices such as rheostats, potentiometers, temperature probes, etc.

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

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

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

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

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

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

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

Code: A legal requirement.

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

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

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

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

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

DC to DC Converter: A module that converts a source of direct current from one voltage level to another.

Standard Configuration Bus: The bus described if no AVAILABLE OPTIONs are selected. Signing, colors, the destination sign reading list and other information must be provided by the Agency.

Defueling: The process of removing fuel from a tank.

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

Destroyed: Physically made permanently unusable.
Discrete Signal: A signal that can take only pre-defined values, usually of a binary 0 or 1 nature, where 0 is battery ground potential and 1 is a defined battery positive potential.
DPF: Diesel particulate filter.
Driver's Eye Range: The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.
Energy Density: The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).
Energy Storage System (ESS): A component or system of components that stores energy and for which its supply of energy is rechargeable by the on-vehicle system (engine/regenerative braking/ generator) or an off-vehicle energy source.
Flow Capacity: For natural gas flow, this is the capacity in volume per unit time (normal cubic meters/minute or standard cubic feet per minute) discharged at the required flow rating pressure.
Fusible Material: A metal, alloy or other material capable of being melted by heat.
Fire Resistant: Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-90.
Fireproof: Materials that will not burn or melt at temperatures less than 2000 °F.
Free Floor Space: Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas, such as the floor space "swept" by passenger doors during operation. Floor area of 1.5 sq ft shall be allocated for the feet of each seated passenger protruding into the standee area.
Fuel Management System: Natural gas fuel system components that control or contribute to engine air fuel mixing and metering, and the ignition and combustion of a given air-fuel mixture. The fuel management system would include, but is not limited to, reducer/regulator valves, fuel metering equipment (e.g. carburetor, injectors), sensors (e.g., main throttle, waste gate).
GAWR (Gross Axle Weight Rated): The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.
Gross Load: 150 lbs for every designed passenger seating position, for the driver, and for each 1.5 sq ft of free floor space.
GVW (Gross Vehicle Weight): Curb weight plus gross load.
GVWR (Gross Vehicle Weight Rated): The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.
High Voltage (HV): Greater than 50 V (AC and DC).
Hose: Flexible line.
Hybrid: A vehicle that uses two or more distinct power sources to propel the vehicle.
Inverter: A module that converts DC to and from AC.
Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
Leakage: Release of contents through a Defect or a crack. See *Rupture*.
Line: All tubes, flexible and hard, that carry fluids.
Liner: Inner gas-tight container or gas container to which the overwrap is applied.
Local Regulations: Regulations below the state level.

Low-Floor Bus: A bus that, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.
Low Voltage (LV): 50 V or less (AC and DC).
Lower Explosive Limit: The lowest concentration of gas where, given an ignition source, combustion is possible.
Maximum Service Temperature: The maximum temperature to which a container/cylinder will be subjected in normal service.
Metallic Hose: A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.
Metering Valve: A valve intended to control the rate of flow of natural gas.
Module: An assembly of individual components
Motor (Electric): A device that converts electrical energy into mechanical energy.
Motor (Traction): An electric motor used to power the driving wheels of the bus.
Operating Pressure: The varying pressure developed in a container during service.
Physical Layer: The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.
Pipe: Nonflexible line.
Power: Work or energy divided by time
Power Density: Power divided by mass, volume or area.
Propulsion System: System that provides propulsion for the vehicle proportional to operator commands. Includes, as applicable, engine, transmission, traction motors, the hybrid drive system, (HDS), energy storage system (ESS), and system controllers including all wiring and converter/inverter.
Real-Time Clock (RTC): Computer clock that keeps track of the current time.
Regenerative Braking: Deceleration of the bus by switching motors to act as generators, which return vehicle kinetic energy to the energy storage system.
Retarder: Device used to augment or replace some of the functions of primary friction based braking systems of the bus.
Rupture: Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.
Seated Load: 150 lbs for every designed passenger seating position and for the driver.
SLW (Seated Load Weight): Curb weight plus seated load.
Serial Data Signals. A current loop based representation of ASCII or alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance.

> **NOTE:** An example is the communication that takes place between two or more electronic components with the ability to process and store information.

Service Pressure: The settled pressure at a uniform gas temperature of 21 °C (70 °F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.
Settled Pressure: The gas pressure when a given settled temperature, usually 21 °C (70 °F), is reached.
Settled Temperature: The uniform gas temperature after any change in temperature caused by filling has dissipated.
Solid State Alternator: A module that converts high-voltage DC to low-voltage DC (typically 12/24 V systems).

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

Special Tools: Tools not normally stocked by the Agency.

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

Standard: A firm guideline from a consensus group. Standards referenced in "Section 6: Technical Specifications" are the latest revisions unless otherwise stated.

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

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

Stress Loops: The "pigtails" commonly used to absorb flexing in piping.

Structure: The basic body, including floor deck material and installation, load-bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Thermally Activated Gas Relief Device: A relief device that is activated by high temperatures and generally contains a fusible material.

> **NOTE:** Since this is a thermally activated device, it does not protect against over-pressure from improper charging practices.

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

TS 3. Referenced Publications

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification. The edition indicated for each referenced document is the current edition, as of the date of the issuance of this specification.

TS 4. Legal Requirements

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

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

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

TS 5. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Contractor and Agency shall identify subcomponent vendors that shall submit installation/application approval documents with the completion of a pilot or lead bus. Components used in the vehicle shall be of medium-duty design and proven in transit or shuttle service.

TS 5.1 WEIGHT

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance.

Buses at a capacity load shall not exceed the tire factor limits, brake test criteria or structural design criteria.

TS 5.2 CAPACITY

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

TS 5.3 SERVICE LIFE

The minimum useful design life of the bus in transit service shall be at least ten (10) years or 350,000 miles. It shall be capable of operating at least 35,000 miles per year, including the 10th year.

TS 5.4 MAINTENANCE AND INSPECTION

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

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

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

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

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

> **NOTE:** Tools such as compartment door keys, bellows gauges and other tools that are required for daily maintenance and inspections shall not be included in the special tool list and shall be furnished for each bus.

TS 5.5 INTERCHANGEABILITY

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

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

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

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

TS 5.6 TRAINING

NOTE: The following is illustrative; the Agency should carefully specify its training requirements.

The Contractor shall have at least one qualified instructor who shall be available at the Agency's property for 30 calendar days between the hours of 8:00 A.M. (CST) and 5:00 P.M. (CST) after acceptance of the first bus. Instructor(s) shall conduct schools and advise the personnel of the Agency on the proper operation and maintenance of the equipment. The Contractor also shall provide visual and other teaching aids (such as manuals, slide presentations and literature) for use by the Agency's own training staff, which becomes the property of the Agency.

NOTE: The Agency should insert language that specifies the hours when it wants the training to occur, the total number of hours of instruction it wants to be provided, what items it expects the curriculum to cover and the format in which it expects the training and teaching aids to be provided (print, DVD, online e-training etc.).

TS 5.6.1 Technical / Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency 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 the provisions of "Section 7: Warranty Requirements."

TS 5.7 OPERATING ENVIRONMENT

STANDARD

The bus shall achieve normal operation in ambient temperature ranges of 10 ºF to 115 ºF, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3000 ft above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F or at altitudes above 3000 ft. Altitude requirements above 3000 ft will need separate discussions with the engine manufacturer to ensure that performance requirements are not compromised. Speed, gradability and acceleration performance requirements shall be met at, or corrected to, 77 °F, 29.31 in. Hg, dry air per SAE J1995.

TS 5.8 NOISE

TS 5.8.1 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 80 dBA. The driver area shall not experience a noise level of more than 75 dBA. Measurements of interior noise levels shall be taken in accordance with ISO 3381. An exception shall be made for the turntable area, which shall be considered a separate environment.

TS 5.8.2 Exterior Noise

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

STANDARD

Noise level should be as stated.

TS 5.9 Fire Safety

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

TS 5.9.1 Materials

STANDARD

All materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FMVSS 302.

AVAILABLE OPTION

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

TS 5.10 Fire Suppression

STANDARD

No fire suppression system.

AVAILABLE OPTION

The bus shall have a fire suppression system installed per manufacturer's recommendations.

TS 5.11 Respect for the Environment

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

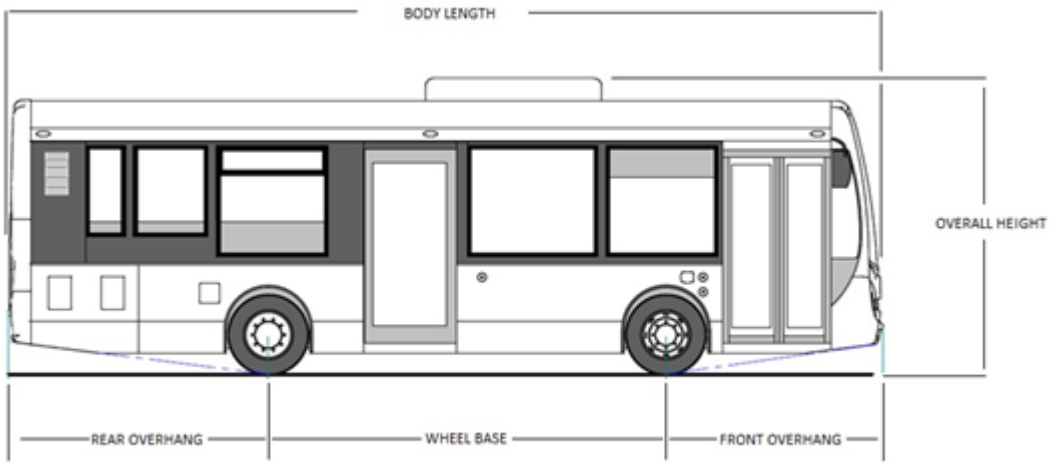
DIMENSIONS

TS 6. Physical Size

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

FIGURE 1

Transit Bus Exterior Dimensions



TS 6.1 Bus Length

The following tolerances will be allowable for each given bus length. Bus length is determined as the measurement from bumper to bumper.

- **30 ft bus:** 29 ft, 11 in. to 30 ft, 1 in.
- **35 ft bus:** 34 ft, 11 in. to 35 ft, 1 in.

TS 6.2 Bus Width

The following tolerances will be allowable for the width of the bus. Bus width is determined as the exterior measurement from side-wall to side-wall and does not include drivers or side-view mirrors.

- **96 in. Width Bus:** Body width shall be 96 in. (+1, -1 in.).

TS 6.3 Bus Height

STANDARD

Maximum Overall Height

Maximum overall height shall be 121 in., including all rigid, roof-mounted items such as A/C, exhaust, fuel system and cover, etc.

TS 6.4 Step Height

TS 6.4.1 Transit Bus

The step height shall not exceed 13.4 in. at either doorway without kneeling. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.5 Underbody Clearance

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

TS 6.6 Ramp Clearances

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

STANDARD

Refer to **Table 2b**.

TABLE 2b
AVAILABLE OPTION Break-over Angle

Angle	30 ft Bus	35 ft Bus
Approach	8 deg (min.)	8 deg (min.)
Front break-over	13 deg (min.)	9 deg (min.)
Departure	9 deg (min.)	9 deg (min.)

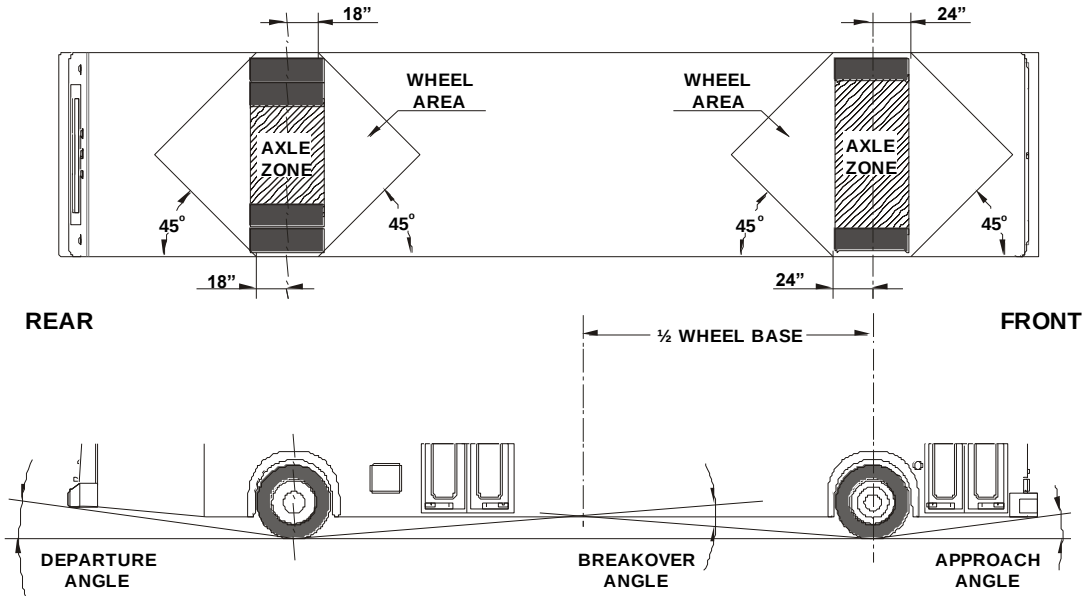
TS 6.7 Ground Clearance

Ground clearance shall be no less than 9.4 inches except within the axle zone and wheel area.
Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 4.8 in.
Wheel area clearance shall be no less than 8 in. for parts fixed to the bus body and 6 in. for parts that move vertically with the axles.

The bus shall feature an over lift system (ferry lift) where the chassis height can be adjusted to higher than normal and held to allow the bus extra clearance to avoid road hazards.

– FIGURE 2

Transit Bus Minimum Road Clearance



TS 6.8 Floor Height

TS 6.8.1 Transit Bus

Height of the step above the street shall be no more than 13.4 in. measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.9 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 in. in the forward half of the bus tapering to no less than 73.2 in. forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 61.5 in. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 in., but it shall increase to the ceiling height at the front of the seat cushion..

VEHICLE PERFORMANCE

TS 7. Power Requirements

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

TS 7.1 Top Speed

STANDARD

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

NOTE: Values are assumed to be sustained. Manufacturer shall supply Agency with data if there is a variance between peak performance and sustained vehicle performance.

TS 7.2 Gradability

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

STANDARD

The propulsion system shall enable the bus to achieve and maintain a speed of 48 mph on a 3 percent ascending grade and 15.8 mph on a 10 percent ascending grade continuous.

NOTE: Values are assumed to be sustained. Manufacturer shall supply Agency with data if there is a variance between peak performance and sustained vehicle performance.

TS 7.3 Acceleration

TS 7.3.1 Non-Hybrid

The acceleration shall meet the requirements in **Table 3** below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

TABLE 3

Maximum Start Acceleration Times on a Level Surface[1]

Speed (mph)	Maximum time (seconds)
10	1.9
20	6.4
30	13
40	22.6
50	36.3

1. Vehicle weight = GVWR

TS 7.4 Operating Range

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

TS 7.4.1 Diesel (Transit Bus)

STANDARD

The operating range of the bus when run on the FTA ABD Cycle shall be at least 350 miles (560 km) or 20 hours with full fuel capacity.

TS 8. Fuel Economy (Design Operating Profile)

Test results from the FTA ABD Cycle economy tests or other applicable test procedures shall be provided to the Agency. Results shall include vehicle configuration and test environment information. Fuel economy data shall be provided for each design operating profile. The design operating profile is assumed to be defined by the FTA ABD Cycle.

Fuel economy tests shall be run on these four duty cycles:

- Manhattan: 6.8 mph
- Orange County: 12.7 mph

- UDDS: 19 mph
- Idle time

The Agency will provide a percentage of each duty cycle that is representative of its service.

POWERPLANT

TS 9. Engine

The engine shall comply with applicable local, state and/or federal emissions and useful life requirements. The engine shall have a design life of not less than 300,000 miles without replacement or major service. The lifetime estimate is based on the design operating profile.

> **NOTE:** For commuter buses, minimum rating horsepower of 400 and minimum torque rating of 1400 ft-lbs shall be installed.

The engine shall be equipped with an electronically controlled management system, compatible with 24 V power distribution. The engine control system shall be capable of transmitting and receiving electronic inputs and data from other drive-train components and broadcasting that data to other vehicle systems. Communication between electronic drive-train components and other vehicle systems shall be made using the communications networks. The engine's electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of programmable features.

The engine starting system 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 bus when exposed to temperatures less than 30 °F 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 Agency. The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the vehicle manufacturer to meet the requirements of the transit property.

The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate engine shutdown as needed.

STANDARD

Automatic Engine Protection/Shutdown Override Feature

A control shall be available to the operator/driver that when constantly depressed and released will delay the engine shutdown or allow the bus to be moved. Override action shall be recorded. This data shall be retrievable by the Agency.

STANDARD

Engine Drain Plug

No preferred supplier for engine drain plug

AVAILABLE OPTION

Engine Drain Plug

The Engine Drain plug shall be an ETTCO/FEMCO

STANDARD

No Engine Probalizing/Sampling

Engine probalizing/sampling is not required.

AVAILABLE OPTION

Engine Probalizing/Sampling

Engine probalizing/sampling is required.

STANDARD

No Cold Weather Starting Aid(Block Heater)

A cold weather starting aid is not required.

AVAILABLE OPTION

Cold Weather Starting Aid(Block Heater)

A cold weather starting aid is required.

STANDARD

Engine Cut-Off switch

An engine Cut-Off switch shall be located in the engine compartment.

STANDARD

No By-pass oil filter

By-pass oil filter not required.

AVAILABLE OPTION

By-pass oil filter

An Engine By-pass oil filter shall be provided such as a Spinner II.

TS 10. Cooling Systems

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

with a fail-safe mode of "fan on." The cooling system shall meet the requirements stated in the operating environment.

TS 10.1 Engine Cooling

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

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

STANDARD

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

TS 10.1.1 Radiator Screen

STANDARD

Screen in Front of Radiator

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

TS 10.1.2 Coolant

STANDARD

Standard Requirement for Coolant

The engine cooling system shall utilize Cummins ES Compleat™ coolant.

TS 10.1.3 Drive Design

STANDARD

Standard Control and Drive Design

Drive of the radiator and charge air cooler fan(s) shall be Hydraulic.

TS 10.1.4 Mounting

STANDARD

Standard Mounting Design

The Radiator shall be mounted on the rear lower curbside of the bus. The main cooler, charge air cooler & hydraulic oil cooler shall be separate and be positioned beside each other. Not stacked on top of each other or in front of or behind.

TS 10.2 Charge Air Cooling

STANDARD

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

TS 10.3 Transmission Cooling

The transmission shall be cooled by a dedicated heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to the retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine cooling system should provide coolant bypass flow to the transmission cooling system with the engine thermostats closed. Unless otherwise noted, the transmission cooler is to be the first component to see cold water from the radiator outlet. In addition, all return water piping, aside from the thermostat bypass line, is to be plumbed in after the transmission cooler.

TS 11. Transmission (Conventional Powertrain)

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. 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 transmission should be easily removable without disturbing the engine and accessible for service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and of broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. Electronic controls shall be compatible with a 24 V power distribution, provide consistent shift quality, and compensate for changing conditions, such as variations in vehicle weight and engine power. At a minimum, drivetrain components consisting of the engine, transmission, retarder , and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the "on" position.

STANDARD

A nominal brake pedal application of 6 to 10 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time-stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against severe damage. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

An electronic transmission fluid level monitoring and protection system shall be provided.

STANDARD

No Automatic Neutral Function

The transmission shall not incorporate an automatic neutral shift function.

AVAILABLE OPTION

Automatic Neutral Function with Manual Re-Engagement

The transmission shall automatically shift to neutral whenever the door brake interlock is applied or the parking brake is pulled for more than 5 minutes. The driver shall be required to first disengage the parking brake and then apply the service brake to re-engage a forward or reverse range.

AVAILABLE OPTION

Automatic Neutral Function with Automatic Re-Engagement

The transmission, when in forward direction, shall automatically shift the transmission to neutral when the vehicle registers zero road speed, engine is idle and service brakes are applied. If the status of any one or more of the three signals changes, the transmission immediately and automatically resumes forward mode operation.

STANDARD

No preferred supplier for transmission plug

AVAILABLE OPTION

ETTCO/FEMCO for transmission plug

STANDARD

Transmission probalizing is not required

STANDARD

Transmission probalizing is required

TS 12. Retarder (Transit Bus)

The powertrain shall be equipped with a retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake function and shall not activate the brake lights

Actuation of ABS and/or automatic traction control (ATC) shall override the operation of the brake retarder.

STANDARD

Brake lights shall illuminate when the retarder is activated.

STANDARD

Standard Requirement for Retarder Activation

The retarder shall be adjustable within the limits of the powertrain and activated when the brake pedal is depressed. The Agency will work with the OEM/drive system manufacturer to determine retarder performance settings.

AVAILABLE OPTION

Throttle Pedal Activation of the Retarder

The retarder shall become partially engaged (approximately one-third of its total application, with a resulting deceleration of no greater than 0.077 g) when the throttle pedal is completely released. Maximum retarder shall be achieved when brake pedal is depressed prior to engagement of service brakes, with a maximum resulting deceleration of approximately 0.20 g in an empty bus. The resulting decelerations specified include the effects of engine braking, wind resistance and rolling resistance.

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

STANDARD

Accessible Retarder Disable Switch

The retarder disable switch shall be accessible to the driver but not from the seated position.

AVAILABLE OPTION

Disabling retarder shall be recorded for Agency data collection.

TS 13. Mounting

All power plant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 in. Mounts shall control the 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.

TS 13.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories and any other component requiring service or replacement shall be easily removable and independent of the engine and transmission removal.

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

STANDARD

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

STANDARD

No engine bypass oil filter.

AVAILABLE OPTION

Centrifugal, non-disposable engine bypass oil filter.

STANDARD

Oil Pressure and Coolant Temperature Display

No engine oil pressure and coolant temperature gauges required in engine compartment.

TS 14. Hydraulic Systems

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

STANDARD

No requirement for hydraulic system sensors.

TS 14.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, Fatigue Failures, degradation and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.
Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid.
All hoses, pipes, lines and fittings shall be specified and installed per the manufacturer's recommendations.

TS 14.2 Fittings and Clamps

All clamps shall maintain a constant tension at all times, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed (for example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface and so on).
Compression fittings shall be standardized to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed, even if the components are known to be interchangeable.

TS 14.3 Charge Air Piping

Charge air piping and fittings shall be designed to minimize air restrictions and leaks. Piping shall be as short as possible, and the number of bends shall be minimized. Bend radii shall be maximized to meet the pressure drop and temperature rise requirements of the engine manufacturer. The cross section of all

charge air piping shall not be less than the cross section of the intake manifold inlet. Any changes in pipe diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Piping shall be routed away from heat sources as practicable and shielded as required to meet the temperature rise requirements of the engine manufacturer.
Charge air piping shall be constructed of stainless steel, except between the air filter and turbocharger inlet, where piping may be constructed of flexible heat-resistant material. Connections between all charge air piping sections shall be sealed with a short section of reinforced hose and secured with stainless steel constant tension clamps that provide a complete 360 deg seal.

TS 15. Radiator

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

TS 16. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed (for example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface and so on). Lines within the engine compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required.
Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

TS 17. Fuel

TS 17.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion or breakage due to strain or wear.
Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected locations to prevent line or manifold damage from unsecured objects or road debris.
Fuel hose and hose connections, where permitted, shall be made from materials resistant to corrosion and fuel and protected from fretting and high heat. Fuel hoses shall be accessible for ease of serviceability.

STANDARD

Ultra low sulfur diesel.

TS 17.1.1 Fuel Lines, Diesel

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

TS 17.1.2 Fuel Lines, CNG

Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines and fittings shall not be fabricated from cast iron, galvanized pipe, aluminum, plastic or copper alloy with content exceeding 70 percent copper. Pipe fittings and hoses shall be clear and free from cuttings, burrs or scale.
Fuel lines shall be securely mounted braced and supported using “split-block” type or stainless steel P clamps; all mounting clamps shall be mounted to a rigid structure to minimize vibration and shall be protected against damage, corrosion or breakage due to strain, rubbing or wear. “Floating clamps” (not mounted to a rigid structure) shall not be permitted. Fuel lines shall not be used to secure other components (wires, air lines, etc.).

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected location(s) to prevent line or manifold damage from unsecured objects or road debris. Fuel hose connections, where permitted, shall be less than 48 in. in length, made from materials resistant to corrosion and protected from fretting and high heat and shall be supported approximately every 12 in.

TS 17.2 Design and Construction

TS 17.2.1 Design and Construction, Diesel

Fuel Tank(s)

STANDARD

The fuel tank(s) shall be made of sufficiently heavy gauge 304 series or ASTM A240 corrosion-resistant stainless steel. The Tank shall have a capacity of 265 litres (75 US gallons) with right hand side fill.

Installation

The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers.
The fuel tank(s) shall be equipped with an external, hex head, drain plug. It shall be at least a ⅜ in. size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing 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 gal of fuel over the unusable amount in the tank(s).The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 10 gal of fuel over the unusable amount in the tank(s).
The materials used in mounting shall withstand the adverse effects of road salts, fuel oils and accumulation of ice and snow for the life of the bus.

Labeling

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to federal motor carrier safety regulations shall be permanently marked on the fuel tank(s).The markings shall be readily visible and shall not be covered with an undercoating material.

Fuel Filler

The fuel filler shall be located 7 to 32 ft behind the centerline of the front door on the curbside of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.
The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standards.

STANDARD

The fuel filler shall be located 40.1” +/- 2” measured vertically from the ground

STANDARD

Traditional Fuel Filler

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

AVAILABLE OPTION

Dry-Break Fuel Filler

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 gal 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 Agency's system. The fuel filler cap shall be hinged.

TS 18. Emissions and Exhaust

TS 18.1 Exhaust Emissions

The engine and related systems shall meet all applicable emission and engine design guidelines and standards.

TS 18.2 Exhaust System

The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from discoloring or causing heat deformation to the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after treatment compartment area. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the after treatment.

STANDARD

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof.

TS 18.3 Exhaust After treatment

An exhaust after treatment system will be provided to ensure compliance to all applicable EPA regulations in effect.

Diesel Exhaust Fluid Injection

If required by the engine manufacturer to meet NOx level requirements specified by EPA, a DEF injection system will be provided. The DEF system will minimally include a tank, an injector, a pump, an ECM and a selective catalytic converter. The tanks shall be designed to store DEF in the operating environment described in the "Operating Environment" section.

STANDARD

The DEF filler shall accommodate a standard nozzle. The nozzle shall automatically shut off when the tank is essentially full. The DEF filler cap shall be a flip cap and located curbside. The tank shall have a 25 litre (6.6 US gallons) capacity, plastic construction and access to the filler shall be on the curbside of the bus.

STANDARD

The DEF fluid lines shall be designed with heated lines for temperatures up to -20 °F.

TS 18.4 Particulate After treatment

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

STRUCTURE

TS 19. General

TS 19.1 Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban or intercity duty cycle throughout its service life. The vehicle structural frame shall be designed to operate with minimal maintenance throughout the 10-year design operating profile. The design operating profile specified by the Agency shall be considered for this purpose.

STANDARD

Lightweight aluminum Body structure integrated to a mild carbon steel understructure/chassis. Stainless steel can also be used in the understructure.

STANDARD

A front skid plate shall be provided to protect the wheelchair ramp mechanism from damage.

TS 20. Altoona Testing

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

STANDARD

If available, the Altoona Test Report shall be provided to the Agency with the Proposal submittal. If not available, then the report shall be provided prior to first acceptance of bus.

TS 20.1 Structural Validation

STANDARD

Baseline Structural Analysis

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

TS 21. Distortion

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

TS 22. Resonance and Vibration

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

TS 22.1 Engine Compartment Bulkheads

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

TS 22.2 Crashworthiness (Transit Bus)

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

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

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

TS 23. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 10 years or 350,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the Agency's use of proper cleaning and neutralizing agents.

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

STANDARD

Corrosion-Resistance Requirements

All exposed steel surfaces and all steel tubing interior surfaces of the entire structure shall be corrosion resistant through application of a corrosion protection system.

TS 24. Towing

Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 deg of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the towing device shall not require the removal, or disconnection, of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices.

STANDARD

Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations.

STANDARD

No Provision of Glad-Hand Type Connectors for Towing

No glad-hand type connector shall be provided.

STANDARD

Lifted (Supported) Front Axle and Flat Towing Capability

The front towing devices shall allow attachment of adapters for a rigid tow bar and shall permit the lifting of the bus until the front wheels are clear off the ground in order to position the bus on the towing equipment by the front wheels. These devices shall also permit common flat towing.

Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the Agency. Any tow bar or adapter exceeding 50 lbs should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a 1 in. throat.

TS 25. Jacking

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

TS 26. Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post (or three-post if 60 ft articulated bus) 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.

The vehicle shall be capable of lifting by the wheels, and, as necessary to meet tire load requirements, the proper number for wheel lifts and/or adapters must be used.

TS 27. Floor

TS 27.1 Design (Transit Bus)

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

STANDARD

Bi-Level Floor Design

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

TS 27.2 Design (Articulated Transit Bus)

Section N/A

TS 27.3 Construction

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture; including decay (dry rot).It shall be impervious to wood-destroying insects such as termites.

STANDARD

Pressure-Preserved Plywood Panel

Plywood 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).Plywood shall be of a thickness adequate to support design loads, manufactured with exterior glue, satisfy the requirements of a Group I Western panel as defined in PS 1-95 (Voluntary Product Standard PS 1-95, “Construction and Industrial Plywood”) and be of a grade that is manufactured with a solid face and back. Plywood shall be installed with the highest-grade, veneer side up. Plywood shall be pressure-treated with a preservative chemical and process such as alkaline copper quaternary (ACQ) that prevents decay and damage by insects. Preservative treatments shall utilize no EPA-listed hazardous chemicals. The concentration of preservative chemicals shall be equal to or greater than required for an above ground level application. Treated plywood will be certified for preservative penetration and retention by a third-party inspection agency. Pressure-preservative treated plywood shall have a moisture content at or below 15 percent.

TS 28. Platforms

TS 28.1 Driver’s Area

The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering.

STANDARD

Edges of the driver’s platform shall be radiused fiber glass and have a smooth continuous design integrated with the floor.

TS 28.2 Driver’s Platform

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

change in floor level. **Figure 2** illustrates a means by which the platform height can be determined, using the critical line of sight.

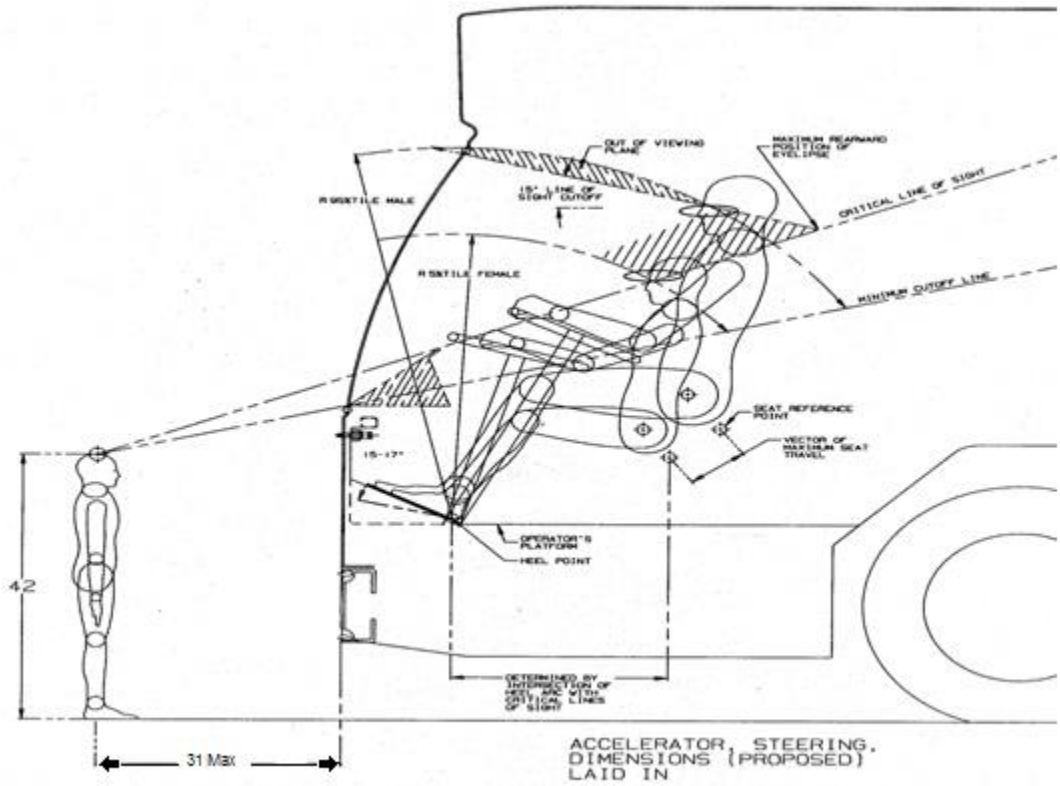


FIGURE 2
Determining Platform Height

TS 28.3 Farebox

Farebox placement should minimize impact to passenger access and minimize interference with the driver's line of sight.

STANDARD

Driver Interface Required; Platform Needed to Bring Height to Driver Access

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

STANDARD

Stanchions

No Stanchions shall be located around the farebox.

AVAILABLE OPTION

Stanchions

Stanchions shall be located around the farebox.

TS 28.4 Rear Step Area to Rear Area (Transit Bus)

If the vehicle is of a bi-level floor design, then a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 15 in. deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

TS 29. Wheel Housing

TS 29.1 Design and Construction

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

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

TS 29.2 Design and Construction (Transit Bus)

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

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

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

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

STANDARD

No provision shall be made to chain buses.

CHASSIS

TS 30. Suspension

TS 30.1 General Requirements

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

TS 30.2 Alignment

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

TS 30.3 Springs and Shock Absorbers

TS 30.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of 2.75 in. jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 3.5 in. rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than ½ in. at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to 1 in. from design normal ride height.

TS 30.3.2 Damping

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

TS 30.3.3 Lubrication

STANDARD

Standard Grease Fittings

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

TS 30.3.4 Kneeling

STANDARD

A kneeling system shall lower the entrance(s) of the bus a minimum of 2 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver. The kneeling control shall provide the following functions:

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

The brake and throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 in. per second at essentially a constant rate. After kneeling, the bus shall rise within 4 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2 g, and the jerk shall not exceed 0.3 g/second.

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

TS 31. Wheels and Tires

TS 31.1 Wheels

All wheels shall be interchangeable except for the middle axle of an articulating where a super single tire size is used 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.

STANDARD

Painted Steel

Wheels and rims shall be Spigot mounted 6.75” steel rims, Powder Coated silver.

STANDARD

No tire-pressure monitoring system.

STANDARD

Standard non-locking lug nut.

TS 31.2 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.

Sufficient space shall be provided to allow the Agency to carry a spare tire, if required.

STANDARD

The tires shall be 265/70R x 19.5 tires and supplied by the Contractor.

AVAILABLE OPTION

The tires shall be provided under a lease agreement between the Agency and the tire supplier and shall be 265/70R x 19.5 and the correct load rating for the vehicle.

TS 32. Steering

STANDARD

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

TS 32.1 Steering Axle (Transit Bus)

STANDARD

Dana NDS56XLF forged 'I' beam axle

The front axle shall be a Dana NDS56XLF solid beam, non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with grease type front wheel bearings and seals.

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

TS 32.2 Steering Wheel

TS 32.2.1 Turning Effort

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

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

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

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

TS 32.2.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18 in.; the rim diameter shall be ⅞ to 1¼ in. and shaped for firm grip with comfort for long periods of time.

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

TS 32.2.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 40 deg from the vertical and easily adjustable by the driver and shall be accessible by a 5th percentile female and 95th percentile male.

TS 32.2.4 Steering Wheel Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 in. and a minimum low-end adjustment of 29 in., measured from the top of the steering wheel rim in the horizontal position to the cab floor at the heel point.

TABLE 4

Steering Wheel Height[1] Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (29 in.)		At Maximum Telescopic Height Adjustment (5 in.)	
Angle of Slope	**Height**	**Angle of Slope**	**Height**
0 deg	29 in.	0 deg	34 in.
15 deg	26.2 in.	15 deg	31.2 in.
25 deg	24.6 in.	25 deg	29.6 in.
35 deg	22.5 in.	35 deg	27.5 in.

1. Measured from bottom portion closest to driver.

TS 33. Drive Axle

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

NOTE: The retardation duty cycle can be more aggressive than propulsion.

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

STANDARD

The Rear Drive Axle shall be a DANA 11-26 single reduction hypoid axle with ground gears

STANDARD

Axle drain plug shall be a magnetic internal hex head

AVAILABLE OPTION

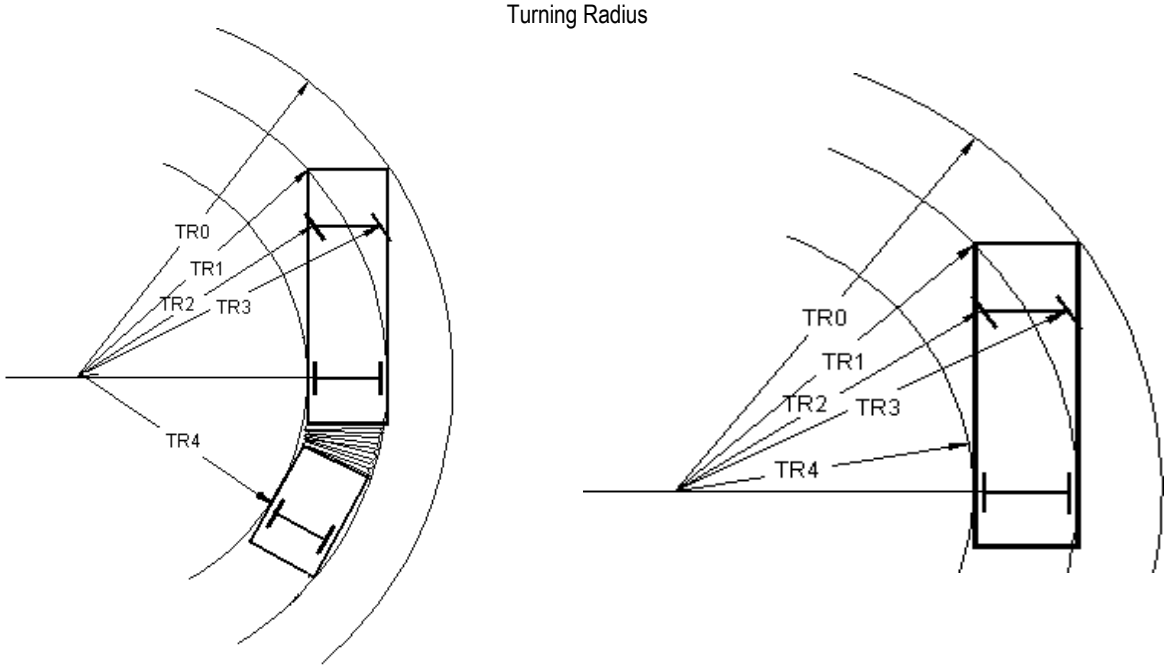
Axle drain plug shall be a magnetic external hex head

TS 34. Turning Radius

TABLE 5
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 3)	Agency Requirement
30 ft	27'11" (TR0)	
35 ft	35'2" (TR0)	

FIGURE 3
Turning Radius



TS 35. Brakes

TS 35.1 Service Brake

STANDARD

Air operated disc brakes shall be installed on both the front and rear of the bus

TS 35.2 Actuation

STANDARD

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 75 lbs at a point 7 in. above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service.

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

STANDARD

Anti-lock Braking System (ABS).

STANDARD

No automatic traction control.

AVAILABLE OPTION

Microprocessor controlled automatic traction control (ATC) shall be provided.

TS 35.3 Friction Material

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

STANDARD

No remote brake wear indicator shall be required.

TS 35.4 Hubs and Drums/Discs

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

STANDARD

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

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

TS 35.5 Parking/Emergency Brake

STANDARD

Air Brakes

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.

TS 36. Interlocks (Transit Bus)

TS 36.1 Passenger Door Interlocks

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

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a rear door enable or open position, or a rear door panel is opened more than 5 degrees from the fully closed position (as measured at the leading edge of the door panel).The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6 percent grade, with the engine at idle and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

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

STANDARD

Non-adjustable brake interlock regulator.

STANDARD

No requirements for accelerator and brake interlock whenever front doors are open.

TS 37. Pneumatic System

TS 37.1 General

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

Provision shall be made to apply shop air to the bus air systems. A quick disconnect fitting shall be easily accessible and located in the engine compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121.

TS 37.2 Air Compressor

STANDARD

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

TS 37.3 Air Lines and Fittings

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

STANDARD

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

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5 ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

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

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

TS 37.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with drain 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 drain valves that discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

TS 37.5 Air System Dryer

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system shall include one or more replaceable desiccant cartridges.

STANDARD

No requirements for additional oil separator provision.

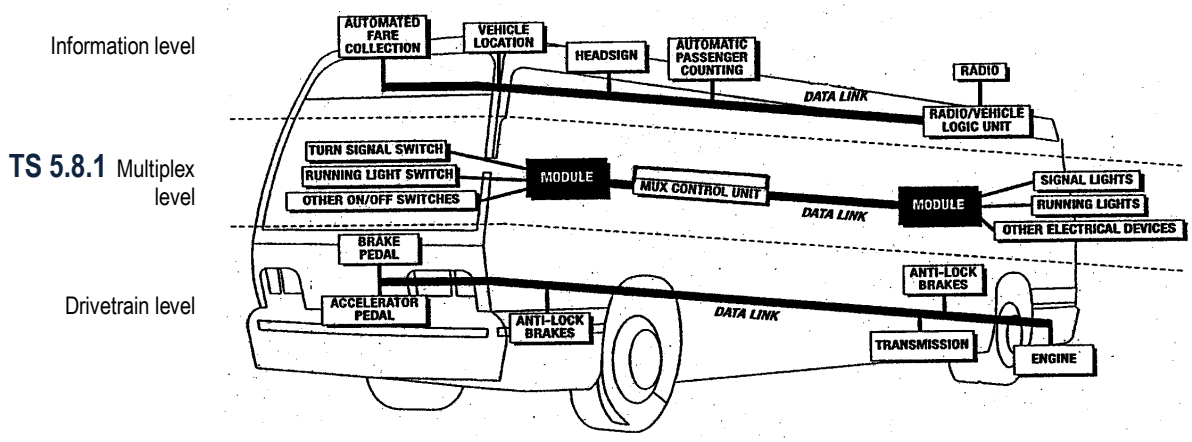
ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 38. Overview

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle. (e.g., generator, voltage regulator, wiring, relays and connectors).
Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.
The data communication system consists of the bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both on board the vehicle and off.
Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.
Data communications systems are divided into three levels to reflect the use of multiple data networks:

- **Powertrain level:** Components related to the powertrain, including the propulsion system components (engine, transmission and hybrid units) and anti-lock braking system (ABS), which may include traction control. At a minimum, powertrain components consisting of the engine, transmission, retarder, ASR and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication between components exists when the vehicle ignition is switched to the "on" position.
- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fareboxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.
- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems (if applicable); and gateway devices.

FIGURE 4
Data Communications Systems Levels



TS 38.1 Modular Design

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

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

TS 39. Environmental and Mounting Requirements

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

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile.

As a recommendation, no vehicle component shall generate, or be affected by, electromagnetic interference or radio-frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R10).

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

TS 39.1 Hardware Mounting

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

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

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

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

TS 40. General Electrical Requirements

TS 40.1 Batteries

TS 40.1.1 Low-Voltage Batteries (24 V)

STANDARD

Four Group 31 Maintenance-Free Batteries

Four Group 31 Series deep-cycling maintenance-free battery units shall be provided. Each battery shall have a minimum of 700 cold-cranking amps. Each battery shall have a purchase date no more than one year from the date of release for shipment to the Agency.

AVAILABLE OPTION

Two 8D Battery Units

Two 8D battery units conforming to SAE Standard J537 shall be provided. Each battery shall have a minimum of 1150 cold cranking amps. Each battery shall have a purchase date no more than 120 days from the date of release, and shall be fully maintained prior to shipment to the Agency. The battery compartment must be well-ventilated to prevent hydrogen buildup while protecting the compartment from road spray, water intrusion and de-icing chemicals.

AVAILABLE OPTION

Two 8D Maintenance-Free Batteries

Each battery shall have a purchase date no more than 120 days from date of release, and shall be fully maintained prior to shipment to the Agency. Battery compartment must be well ventilated to prevent

hydrogen buildup while protecting the compartment from road spray, water intrusion and de-icing chemicals.

AVAILABLE OPTION

Four Group 31 AGM Batteries

Four Group 31 Series deep-cycling sealed non spillable maintenance free absorbed glass mat (AGM) batteries shall be provided. Each battery shall have a minimum of 1000 cold cranking amps (CCA) at 0 °F. The batteries shall be designed and installed to withstand the operating environment. Each battery shall have a purchase date no more than one year from the date of release for shipment to the Agency.

STANDARD

Same Size Terminal Ends

Positive and negative terminal ends shall be the same size.

AVAILABLE OPTION

Different Size Terminal Ends

Positive and negative terminal ends shall be different sizes.

NOTE: Agency to specify post size if different sized terminal ends are utilized.

TS 40.1.2 Battery Cables

The battery terminal ends and cable ends shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, shall be flexible and shall be sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127–Type SGR, SGT, SGX or GXL and SAE Recommended Practice J541, with 2100 strand 4/0 cable or greater recommended.

STANDARD

No color code for voltage is required.

AVAILABLE OPTION

Color code each voltage.

TS 40.1.3 Jump Start

STANDARD

Jump Start Connector

The jump start connector shall be located on the Curbside rear of the bus, behind a hinged access flap

TS 40.1.4 Battery Compartment

The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The battery compartment temperature should not exceed manufacturers specification.

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

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

The battery hold-down bracket shall be constructed of a nonconductive and corrosion-resistant material (plastic or fiberglass).

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

The batteries shall be securely mounted on a stainless steel or equivalent tray that can accommodate the size and weight of the batteries. The battery tray, if applicable, shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced. A locking device shall retain the battery tray to the stowed position.

If not located in the engine compartment, the same fire-resistant properties must apply to the battery compartment. No sparking devices should be located within the battery box.

TS 40.1.5 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) batteries used for auxiliary power are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of lead-acid batteries.

TS 40.1.6 Master Battery Switch

The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

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

STANDARD

Single Switch

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

TS 40.1.7 Low-Voltage Generation and Distribution

The low-voltage generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total low-voltage generator load exceeding 70 percent of the low-voltage generator nameplate rating.
Voltage monitoring and over-voltage output protection (recommended at 32 V) shall be provided.
Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements with no greater than a 5 percent volt drop across the length of the cable.

TS 40.1.8 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid-state devices sized to the requirements of the circuit. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. This requirement applies to in-line fuses supplied by either the Contractor or a supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the Agency mechanic with visible indication of open circuits. The Agency shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits. Any manually resettable circuit breakers shall provide a visible indication of open circuits.
Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 40.2 Grounds

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

TS 40.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit.
Wiring shall be grouped, numbered and/or color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.
Strain-relief fittings shall be provided at all points where wiring enters electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.
To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from

water, heat, corrosion and mechanical damage. Where feasible, front-to-rear electrical harnesses should be installed above the window line of the vehicle.

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

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

Ultra-sonic and T-splices may be used with 8 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

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

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

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

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

TS 40.4 Electrical Components

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

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

TS 40.5 Electrical Compartments

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

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

TS 41. General Electronic Requirements

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

All electronic component suppliers shall ensure that their equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32 V DC on a 24 V DC nominal voltage rating with a maximum of 50 V DC) and reverse polarity conditions. If an electronic component is required to interface with other components, it shall not require external pull-up and/or pull-down resistors. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible and labeled.

TS 41.1 Wiring and Terminals

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

TS 41.1.1 Discrete I/O (Inputs/Outputs)

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

TS 41.1.2 Shielding

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

NOTE: A shield grounded at both end forms a ground loop, which can cause intermittent control or faults.

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

TS 41.1.3 Communications

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

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

TS 41.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc., shall use coaxial cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss that will attribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 41.1.5 Audio

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

TS 42. Multiplexing

TS 42.1 General

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

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

STANDARD

The Multiplexing system shall be VDO Continental multiplex 24v with PC based diagnostics, All nodes easily accessible.

STANDARD

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

TS 42.2 System Configuration

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

TS 42.2.1 I/O Signals

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

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

TS 43. Data Communications

TS 43.1 General

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

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision level of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.

- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

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

TS 43.2 Drivetrain Level

Drivetrain components, consisting of the engine, transmission, retarder, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols. At a minimum, drivetrain components consisting of the engine, transmission, retarder ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the “on” position.

TS 43.2.1 Diagnostics, Fault Detection and Data Access

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

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

TS 43.2.2 Programmability (Software)

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

TS 43.3 Multiplex Level

TS 43.3.1 Data Access

At a minimum, information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible. A hardware gateway and/or wireless communications system are options if requested by the Agency. The communication port(s) shall be located as specified by the Agency.

TS 43.3.2 Diagnostics and Fault Detection

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

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

STANDARD

No requirement for mock-up board.

TS 43.3.3 Programmability (Software)

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

- Password protection
- Limited distribution of the configuration software
- Limited access to the programming tools required to change the software
- Hardware protection that prevents undesired changes to the software

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

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

STANDARD

Revision control labels shall be electronic and accessed through the driver's instrument panel in diagnostic mode.

TS 43.4 Electronic Noise Control

Electrical and electronic subsystems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception, or violate regulations of the Federal Communications Commission.
Electrical and electronic subsystems on the buses shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of or onboard the buses, AC or DC power lines and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

TS 44. Driver's Area Controls

TS 44.1 Glare

The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be gray in color wherever possible to reduce the reflection of light onto the windshield. Glass fibre components in the cab area shall have a surface gloss level of <6% in order to help minimize glare.
The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

TS 44.2 Visors/Sun Shades

STANDARD

Front and Side Sun Shade/Visor

Adjustable sun visor(s) shall be provided for the driver's windshield and the driver's side window (option). 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 over-tightening. Sun visor construction and materials shall be strong enough to resist breakage during adjustments. Visors may be transparent but shall not allow a visible light transmittance in excess of 10 percent. Visors, when deployed, shall be effective in the driver's field of view at angles more than 5 deg above the horizontal.

TS 44.3 Driver's Controls

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

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

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

STANDARD

All switches/controls in the driver's controls area shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for items like food, drinks, cell phones, etc.

AVAILABLE OPTION

The transmission shift selector shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for electronic devices such as cell phones, music players, navigation systems, etc.

TS 44.4 Normal Bus Operation Instrumentation and Controls

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

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

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel.

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

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

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

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Battery master switch	Two-position switch	Dash left Wing	main master power circuits	
Ignition switch	Push button	Dash right Wing	Activates ignition circuit	
Marker/headlights (night run) switch	Two-position switch	Dash left Wing	Switch engages night run mode (Clearance, ID, Side markers & Headlights.) Note: Day light running lights shall be automatic with engine run	
Engine start, front	Approved momentary switch	Dash left Wing	Activates engine starter motor	
Drive selector	Touch panel switch	Dash left Wing	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
Driver's ventilation	Rotary, three-position detent switch or digital	Side console or dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, three-position detent switch or digital	Side console or dash left wing	Permits defroster: fan off, low, medium or high	
Defroster temperature	Variable position switch or digital	Side console or dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	One-variable rotary position operating both wipers or Part of Steering Column Mutlifunction switch	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button or part of Steering Column Mutlifunction switch	Dash left wing or steering coulmn	Activates windshield washers	
Dash panel lights	Rotary rheostat or stepping switch	Side console or dash left wing	Provides adjustment for light intensity in night run position	
Interior lights	Two-position switch	Dash left wing	On/Off – Main right hand interior passenger lights. Note: Auto dim feature required when doors close	
Interior lights	Two-position switch	Dash left wing	On/Off – Main left hand interior passenger lights Note: Auto dim feature required when doors close	
Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
Front door ramp Stow	Two-position switch	Dash right wing	Retracts & Stows front ramp	
Front door ramp Deploy	Two-position switch	Dash right wing	deploys front ramp	

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Lower suspension (kneel)	Push button	Dash right wing	Lowers the front suspension of the bus while push button pressed	
Raise Suspension(kneel recovery)	Push button	Dash right wing	Raises the front suspension of the bus while push button pressed	
Left remote mirror(if required by spec)	Four-position toggle type	Side console	Permits two-axis adjustment of left exterior mirror	
Right remote mirror(if required by spec)	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
Mirror heater(if required by spec)	Switch or temperature activated	Side console	Permits heating of outside mirrors when required	
Passenger door control	Five-position handle type detent or two momentary push buttons	Side console, forward	Permits open/close control of front and rear passenger doors	
Engine shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto engine shutdown	
Hazard flashers	Two-position switch	dash left wing	Activates emergency flashers	
Destination sign interface	Destination sign interface panel	In approved location	Facilitates driver interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches or part of steering column switch	Left foot panel or steering column mounted	Activates left and right turn signals	Two green lights and optional audible indicator
PA manual	Momentary push button	On gooseneck microphone	Permits driver to manually activate public address microphone	
High beam	Detented push button or part of steering column mutlifunction switch	In approved location	Permits driver to toggle between low and high beam	Blue light
Parking brake	Pneumatic PPV	Side console or dash left wing	Permits driver to apply and release parking brake	Red light
Master door/ interlock	On off rocker switch fitted in front electrical centre - accessed by lift up flap	Out of operator's reach	Permits driver override to disable door and brake/throttle interlock	Red light
Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated	Red light

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Retarder disable	Multi-pole switch detented	Accessible to operator but not from seated position	Permits driver override to disable brake retardation/regeneration	Red light
Indicator/ alarm test button	Automatic when ignition is switched on(no switch)			
Speedometer	Speedometer, odometer, and diagnostic capability, 5-mile increments	Dash center panel	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments or via digital LCD display	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Property specific or dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Door ajar	Door not properly closed	Property specific or dash center	Indication of rear door not properly closed	Buzzer or alarm and red light
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
Engine coolant indicator	Low coolant indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low coolant condition	Amber light
Hot engine indicator	Coolant temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects hot engine condition and initiates time delay shutdown	Red light
Low engine oil pressure indicator	Engine oil pressure indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low engine oil pressure condition and initiates time-delayed shutdown	Red light
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light
HVAC indicator	Detects system status	Dash center	Displays system failure	Amber or red light
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition and optionally detects battery high, low, imbalance, no charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Bike rack deployed indicator(if bike rack required)	Detects bike rack position	Dash center	Indication of bike rack not being in fully stowed position	Amber or red light

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/ Audible
Fuel tank level	Analog gauge, graduated based on fuel type	Dash center	Indication of fuel tank level/pressure	
DEF gauge	Level Indicator	Center dash	Displays level of DEF tank and indicates with warning light when low	Red light

1. Indicate area by drawing. Break up switch control from indicator lights.

TS 44.5 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion.

TS 44.5.1 Pedal Angle

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

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

TS 44.5.2 Pedal Dimensions and Position

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

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

TS 44.6 Brake and Accelerator Pedals

STANDARD

Brake Pedal

Non-adjustable brake pedal.

TS 44.7 Driver Foot Switches

Floor-Mounted Foot Control Platform

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

STANDARD

Steering wheel mounted (self-canceling)

AVAILABLE OPTION

Foot Switch Control

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches. The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other signals, including high beam and public address system, shall be in approved locations.
The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The foot switches for the directionals shall be momentary type, while those for the PA system and the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

TS 45. Driver's Amenities

TS 45.1 Coat Hanger

STANDARD

Coat Hanger

A suitable hanger shall be installed to the left of the driving position for the driver's coat

TS 45.2 Drink Holder

STANDARD

No drink holder.

AVAILABLE OPTION

Drink Holder

A device shall be provided to securely hold the driver's drink container, which may vary widely in diameter. It must be mounted within easy reach of the driver and must have sufficient vertical clearance for easy removal of the container. When the container is in the device, the driver's view of the road must not be obstructed, and leakage from the container must not fall on any switches, gauges or controls.

TS 45.3 Storage Box

STANDARD

Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size is 980 $in.^3$

TS 45.4 Fire Extinguisher

STANDARD

Fire Extinguisher

5 lb fire extinguisher fitted to the rear of the driver's seat.

TS 45.5 First Aid Kit

STANDARD

First Aid Kit

A first aid kit shall be provided in a location rear of the driver's seat

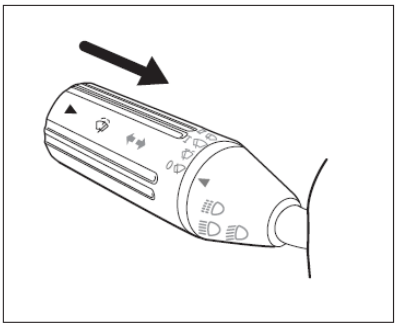
TS 46. Windshield Wipers and Washers

TS 46.1 Windshield Wipers

The bus shall be equipped with a radial windshield wiper system. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. wipers shall park along the bottom edge of the windshield. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion-resistant.

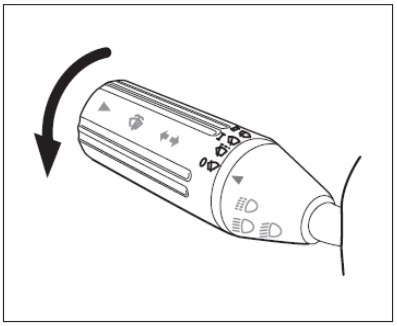
STANDARD

Steering column mounted single-control, electric multi-speed intermittent wiper controls. The wipers shall be synchronized and park along the bottom edge of windshield.



Windscreen Wash

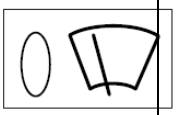
To activate the Wash System, push the body of the Switch towards the Steering Column.



Windscreen Wipers

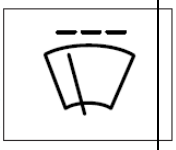
The Windscreen Wipers are switched on by rotating the body of the Multifunction Switch. To select the desired function, rotate the body until the symbol aligns with the arrow.

Off



Timed Interval

In this position the wipers make a single sweep across the windscreen at timed intervals.



Low Speed

High Speed

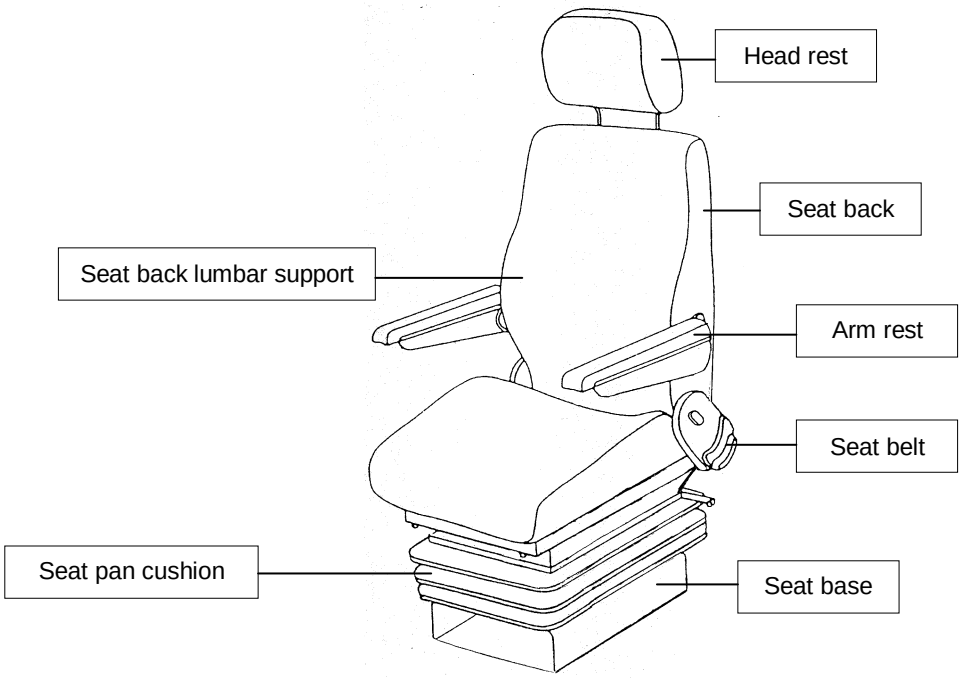
TS 46.2 Windshield Washers

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

The windshield washer system shall have a minimum 4-gallon reservoir, located for easy refilling from outside the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

TS 47. Driver's Seat

FIGURE 5
Driver's Seat



TS 47.1 Dimensions

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

TS 47.1.1 Seat Pan Cushion Length

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

SP 1.1.1 Seat Pan Cushion Height

STANDARD

Dimensions

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

TS 47.1.2 Seat Pan Cushion Slope

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

TS 47.1.3 Seat Base Fore/Aft Adjustment

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

TS 47.1.4 Seat Pan Cushion Width

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

TS 47.1.5 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 lbs. The suspension shall be capable of dampening adjustment in both directions.
Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 47.1.6 Seat Back

Width

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

Height

Standard height seat back.

TS 47.1.7 Headrests

STANDARD

Adjustable headrest.

AVAILABLE OPTION

No headrest.

TS 47.1.8 Seat Back Lumbar Support

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

TS 47.1.9 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 deg is the upright position and 90 deg-plus represents the amount of recline.
The seat back shall adjust in angle from a minimum of no more than 90 deg (upright) to at least 105 deg (reclined), with infinite adjustment in between.

TS 47.2 Seat Belt

The belt assembly should be an auto-locking retractor (ALR).All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt.
The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

STANDARD

Lap seat belt only.

STANDARD

Seatbelt webbing shall be black in color.

AVAILABLE OPTION

Lap and Shoulder (Three-Point) Seat Belt

Seat belts shall be provided across the driver's lap and diagonally across the driver's chest. The driver shall be able to use both belts by connecting a single buckle on the right side of the seat cushion. Three-point seatbelts must be emergency locking retractor (ELR) in design.

AVAILABLE OPTION

Adjustable-height D-ring.

Lap Belt Length

STANDARD

72 in.

The lap belt assembly shall be a minimum of 72 in. in length.

AVAILABLE OPTION

72 in. with Extension

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

TS 47.3 Adjustable Armrest

STANDARD

No armrests.

AVAILABLE OPTION

One armrest, right side.

AVAILABLE OPTION

One armrest, left side.

AVAILABLE OPTION

Two armrests.

TS 47.4 Seat Control Locations

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

TS 47.5 Seat Structure and Materials

Cushions

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

Cushion Materials

STANDARD

Open-cell polyurethane (FMVSS 302).

AVAILABLE OPTION

Foam and fabric that meets FTA Docket 90A.

TS 47.6 Pedestal

STANDARD

Powder-coated steel.

AVAILABLE OPTION

Stainless steel.

TS 47.7 Mirrors

TS 47.7.1 Exterior Mirrors

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

STANDARD

Spring-loaded mirror heads auto return.

STANDARD

Combination of flat and convex 2 in 1 mirrors referred to as transit-specific.

Curbside & Street side Mirrors

The rearview mirrors shall be mounted so that their lower edge is no less than 78.5 in. above the street surface.

STANDARD

Standard mirrors, not heated, no remote adjustment.

AVAILABLE OPTION

Heated and Remote Mirrors

The driver shall be able to adjust the mirrors remotely while seated in the driving position. The control for remote positioning of the mirrors shall be a single switch or device. The heaters shall be energized whenever the driver's defroster switch is activated.

TS 47.7.2 Interior Mirrors

Mirrors shall be provided for the driver to observe passengers throughout the bus without leaving the seat and without shoulder movement. The driver shall be able to observe passengers in the front/entrance and rear/exit areas (if applicable), anywhere in the aisle, and in the rear seats.

STANDARD

-15" x 8" Rearview mirror, convex lens, includes mount, 6-way adjust.

-Convex 10" round mirror at exit door

WINDOWS

TS 48. General

Use with 30 ft length: A minimum of 8700 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 35 ft length: A minimum of 10700 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 49. Windshield

The windshield shall be easily replaceable by removing 2 glazing 'laces' from the windshield retaining mouldings. Bonded-in-place windshields shall not be used. Winglets are bonded.

TS 49.1 Glazing

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

STANDARD

No band required.

STANDARD

One-piece windshield.

TS 50. Driver's Side Window

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

The driver's view, perpendicular through operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. Driver's window construction shall maximize ability for full opening of the window.

STANDARD

The driver's side window glazing material shall have a 1/5 in (5mm). nominal thickness tempered safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping AS-2 and the recommended practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor.

STANDARD

Bonded (Flush "Euro-Look") Driver's Side Window

Top slider over bottom fixed, non-egress. No tint.

TS 51. Side Windows

TS 51.1 Configuration

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. All aluminum and steel material will be treated to prevent corrosion.

TS 51.2 Emergency Exit (Egress) Configuration

STANDARD

Minimum Egress

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

STANDARD

Standard Passenger Side Window Configurations

- Hidden frame "Euro-look" (combination of bonded frameless & flush framed egress windows).

TS 51.3 Configuration

STANDARD

Fixed Side Windows

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

AVAILABLE OPTION

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

Each operable side window shall incorporate an upper transom portion. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

TS 51.4 Materials

STANDARD

Safety Glass Glazing Panels

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

STANDARD

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. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

STANDARD (LIGHT)

50 percent luminous transmittance.

STANDARD

Anti-Vandalism Polyester Sacrificial Film

Not Required

AVAILABLE OPTION

Anti-Vandalism Polyester Sacrificial Film

All glazing material that is aft of the standee line shall be equipped with laminated polyester film. This material shall be easily installed and removed without the use of specialized tools. Polyester film shall adhere to the window and be resistant to peeling, curling and discoloration by ultraviolet rays. The film shall withstand normal cleaning operations.

AVAILABLE OPTION

Anti-Vandalism Polyester Sacrificial Film

3M multi-layer film on all windows & centre door, where applicable.

AVAILABLE OPTION

Anti-Vandalism Polyester Sacrificial Film

Diamond Guard on all windows & centre door, where applicable

SHGC and light transmission performance shall be defined by the National Fenestration Rating Council.

TS 51.5 Rear Window

STANDARD

No requirement for rear window.

HEATING, VENTILATING AND AIR CONDITIONING

TS 52. Capacity and Performance

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

STANDARD

Require Roof-Mounted HVAC Unit with brush guards

The HVAC unit shall be roof-mounted. The main unit shall at a minimum meet the following specifications:

Cooling Capacity – 92,000 BTU/HR @ Rated Conditions
Heating Capacity – 102,000 BTU/HR @ Rated Conditions
Air Flow – 3,200 CFM @ 0" Static Pressure
Weight – 480 pounds or less
Dimensions (inches) – 108(L) X 78.7(W) X 9.9(H) or smaller

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

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

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

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

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

STANDARD

Capacity and Performance Requirements

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 115 to 95 °F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test, and the engine speed shall be limited to fast idle, which may be activated by a driver-controlled device. During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 in. from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," representing 4 p.m. on August 21, shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

STANDARD

R134a

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

TS 53. Controls and Temperature Uniformity

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

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

STANDARD

Manual Mode Selection of Climate Control System

After manual selection and/or activation of climate control system operation mode, all interior climate control system requirements for the selected mode shall be attained automatically to within ±2 °F of specified temperature control setpoint.

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

TS 53.1 Auxiliary Heater

STANDARD

No auxiliary heater.

AVAILABLE OPTION

Auxiliary Heater

An auxiliary heater shall be provided to supplement the heat supplied by the engine and shall have an output necessary to meet the performance criteria. The heater shall be equipped with safety devices to prevent over fueling, overheating due to loss of coolant or water pump failure, and operation during conditions of low battery voltage. The supplemental mode shall automatically cycle the auxiliary heater "on" and "off" according to the coolant temperature. No driver input shall be required when the engine is running.

The auxiliary heater coolant pump shall shut down when the coolant is up to temperature during the supplemental mode. With the engine running, there shall be coolant flow through the heater all the time. The temperature sensor shall constantly measure the coolant temperature and cycle "on" if required, at which time the coolant pump turns on.

The auxiliary heater shall be equipped with a self-priming fuel pump. The unit shall be electronically controlled with appropriate diagnostics for troubleshooting. Operation, as well as diagnostic data, shall be stored and shall be retrievable through an IBM compatible PC. The auxiliary heater maintenance/diagnostic information shall be communicated through the appropriate protocol, SAE J1708 or J1939.

AVAILABLE OPTION

Auxiliary Heater with preheat mode

An auxiliary heater shall be provided to supplement the heat supplied by the engine and shall have an output necessary to meet the performance criteria. The heater shall be equipped with safety devices to prevent over fueling, overheating due to loss of coolant or water pump failure, and operation during conditions of low battery voltage. The auxiliary heater shall have capability of functioning in the supplemental mode and preheat mode. The supplemental mode shall automatically cycle the auxiliary heater "on" and "off" according to the coolant temperature. No driver input shall be required when the engine is running. The preheat mode shall be enabled through a single-pole double-throw momentary switch. With the master run switch in the "off" position, toggling the switch to its momentary upward ("on") position shall enable the auxiliary heater to operate in preheat. Once in preheat, the unit shall continue to operate and cycle until either the preheat switch is toggled to its momentary downward ("off") position, or the master run switch is turned "on," or the time elapsed exceeds 60 minutes, at which time the preheat mode will automatically be disabled. The supplement mode will always override the preheat mode.

The auxiliary heater coolant pump shall shut down when the coolant is up to temperature during the supplemental mode. With the engine running, there shall be coolant flow through the heater all the time. The temperature sensor shall constantly measure the coolant temperature and cycle "on" if required, at which time the coolant pump turns on.

The auxiliary heater shall be equipped with a self-priming fuel pump. The unit shall be electronically controlled with appropriate diagnostics for troubleshooting. Operation, as well as diagnostic data, shall be stored and shall be retrievable through an IBM compatible PC. The auxiliary heater maintenance/diagnostic information shall be communicated through the appropriate protocol, SAE J1708 or J1939.

TS 54. Air Flow

TS 54.1 Passenger Area

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

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.
The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

STANDARD

No "Fresh Air" Requirements

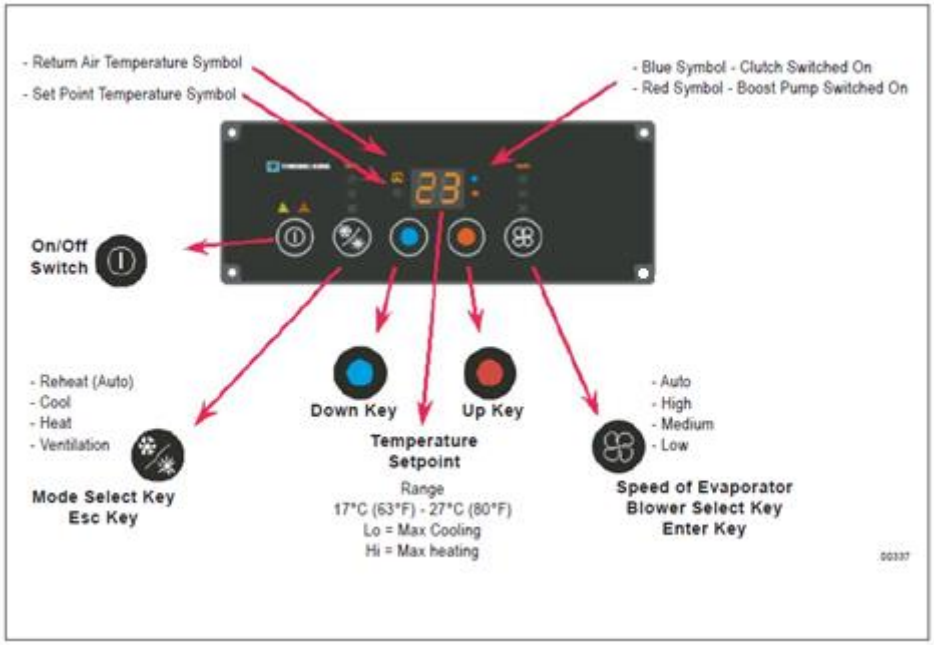
To be used by agencies that have an operating profile where the door opening cycle results in effectively providing an adequate "fresh air" mixture.

TS 54.2 Driver's Area

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

TS 54.3 Controls for the Climate Control System (CCS)

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



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

TS 54.4 Driver's Compartment Requirements

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

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

A ventilation system shall be provided to ensure driver comfort and shall be capable of providing re-circulated air in both the foot and head areas. Vents shall be controllable by the driver from the normal driving position. Fan speed & temperature shall be controlled by the driver. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

TS 54.5 **Driver's Cooling**

STANDARD

Air from the evaporator shall be provided to the driver's area through vents located above the driver's head at the left & right

TS 55. Air Filtration

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

STANDARD

Disposable Type Filters

Air filters shall be of disposable type.

TS 56. Roof Ventilators

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

STANDARD

One Roof Ventilator

One ventilator shall be provided in the roof of the bus located approximately over the rear axle.

TS 57. Maintainability

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

STANDARD

No high & low refrigerator electronic gauges fitted. Provision for fitting only

AVAILABLE OPTION

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

NOTE: The Agency may include the following sections if an available option for colder ambient performance is specified above.

TS 58. Entrance/Exit Area Heating

STANDARD

No requirements for entrance/exit area heating.

AVAILABLE OPTION

Entrance/Exit Area Heating

Heat shall be supplied to the entrance and exit areas to maintain a tread surface temperature no less than 35 °F in an ambient of -10 °F to prevent accumulation of snow, ice or slush with the bus operating under design operating profile and corresponding door opening cycle.

TS 59. Floor-Level Heating

TS 59.1 Transit Bus

STANDARD

Floor-Level Heating

Sufficient floor-level heaters shall be provided to evenly supply heated forced air. Control of the floor-level heating shall be through the main heating system electronic control.

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 60. Design

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

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

TS 60.1 Materials

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

STANDARD

requirement for protection against graffiti/vandalism for body material surfaces.

TS 61. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 in. of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than ⅞ in. from the body surface. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.
Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 62. Repair and Replacement

TS 62.1 Side Body Panels (Transit Bus)

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

STANDARD

Easily Replaceable Lower Side Body Panels

The lower section (approximately 17.5 in.) of the side body shall be made of impact-resistant material and shall be easily and quickly replaceable.

TS 63. Rain Gutters

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

TS 64. License Plate Provisions

Provisions shall be made to mount standard-size U.S./Canada 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. The rear license plate provision shall be illuminated per SAE J587.

STANDARD

Lighting and Location provided for License plate provided front and rear.

TS 64.1 Rub Rails

STANDARD

requirement for rub rails.

NOTE: Installation of rub rails may preclude the installation and/or size of exterior advertising signs or racks.

TS 65. Fender Skirts

STANDARD

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

TS 66. Wheel Covers (Transit Bus)

STANDARD

Wheel covers required.

TS 66.1 Splash Aprons

STANDARD

Standard Splash Aprons

Splash aprons, composed of ¼ in. minimum composition or rubberized fabric, shall be installed behind wheels as needed to reduce road splash and to protect under floor components. The splash aprons shall extend downward to within 6 in. off the road surface at static conditions. Apron widths shall be no less than tire widths. 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 shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect bus equipment.

TS 67. Service Compartments and Access Doors

TS 67.1 Access Doors (Transit Bus)

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. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.
If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

Exhaust & after treatment access flaps to be removable due to their height from the ground.

TS 67.2 Access Door Latch/Locks

STANDARD

Requirement for Latches on Access Doors

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

STANDARD

Other Locks and Latches

Latches on exterior access doors shall be South Co C2-99-217-125 or South Co A3-99-122-12

TS 68. Bumpers

STANDARD

Integrated Design

The bumper shall be integrated into the styling of the front mask and rear paneling and give a flush European look. The bumper shall be constructed from multiple GRP fiber glass pieces, supported by a steel frame and each piece be easily replaceable.

STANDARD

bike rack installation shall be made.

TS 68.1 Bumper Material

Bumper material shall be corrosion-resistant and constructed of easily replaceable GRP fiber glass pieces.

TS 69. Finish and Color

TS 69.1 Appearance

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

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

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

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

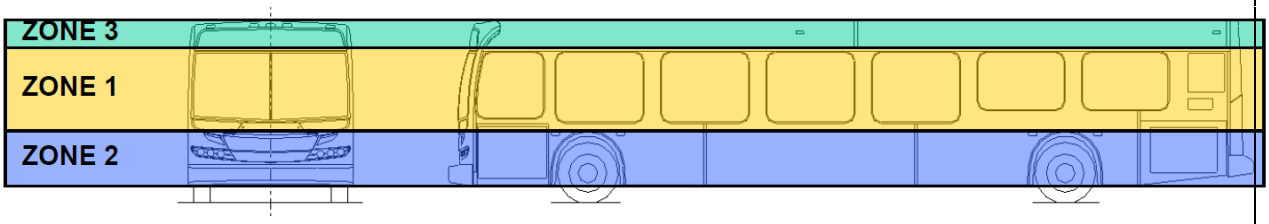
Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 ft-lbs. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

STANDARD

The Paint shall be DuPont ® Imron Elite.

Appearance Zones

Zone	Description
1	Sides - From below drip rail to top of wheel wells - (Entrance/Exit doors Included) Front mask - From bottom of destination sign enclosure down to bottom of windshields Rear - From below drip rail to top of zone 2
2	Sides - From top of wheel wells to bottom of panels (access doors Included) Front - bottom of windshields to top of front bumper Rear - Bottom 15" of engine door and corner pillars
3	Roof sides - drip rail up to top of roof side Front mask - bottom of destination sign enclosure to top of mask Rear - Top 14.5" of rear crown/door
4	Top of roof panels
5	Wheel Rims and painted chassis - visible



Solids Gloss using a multi angle observer

Zone	Requirements
1	80 units +
2	80 units +
3	80 units +
4	70 units
5	N/A

Flat Black Gloss - All Int/Ext Parts using a 60° observer

Zone	Requirements
1	17units +/-4
2	17units +/-4
3	17units +/-4
4	17units +/-4
5	N/A

Orange Peel

Zone	Requirements
1	≥ 3.5
2	≥ 3.5
3	≥ 3.5
4	≥ 3.0
5	N/A

The dry film thickness (DFT) will be the sum of coatings applied as per recommended DFT as supplied by DuPont ® which is .003" - .020" or 3 – 20 Mils.

STANDARD

The bus shall be the manufacturer's DuPont Paint Code: L0317 EB Indian Silver , with clear coat and no customer specific exterior decals such as agency logos. Fleet number & Safety decals are still required.

AVAILABLE OPTION

The Agency/Transit Authority shall specify the number of colors, and describe the required exterior decals.

TS 70. Decals, Numbering and Signing

Monograms, numbers and other special signing shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip- and peel-resistant. They may be painted signs, decals or pressure-sensitive appliqués. All decals shall be installed per the decal Supplier recommendations. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part 38, Subpart B, 38.27.

NOTE: The Agency should supply a list of interior and exterior decals including size and location.

TS 70.1 Passenger Information

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

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

TS 71. Exterior Lighting

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer.

STANDARD

Commercially available LED-type lamps shall be utilized at all exterior lamp locations with exception of the headlamps which shall utilize LED for daytime running and Bi-halogen for high and low beams.

STANDARD

Tail Lights

There shall be two white 4" round LED reverse lights located on the rear of the bus.
There shall be two amber 7" round LED turn lights located on the rear of the bus.
There shall be two red 7" round LED brake light located on the rear of the bus.
There shall be a single red high center mount LED strip light; Hella part number 2DA-959-071-757.

STANDARD

A flashing LED light shall be provided on the front curbside near the entrance door to signal bus kneeling and/or the ramp is being actuated.

TS 71.1 Backup Light/Alarm

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

TS 71.2 Doorway Lighting

Lamps at the front and rear passenger doorways (if applicable) shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than 1 foot-candle for a distance of 3 ft outward from the outboard edge of the door threshold. 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.

TS 71.3 Turn Signals

STANDARD

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with federal regulations.

TS 71.4 Headlights

Headlamps shall be designed for ease of replacement.

STANDARD

Head Lamps

The headlamps, daytime running lights and front turn lights shall be independent but grouped in a cluster.

Headlamps shall be 90mm round Bi-halogen and SAE approved.

Daytime running lights shall be 90 mm round clear LED and SAE approved.

Front turn lights shall 4" round amber LED and SAE approved.

TS 71.5 Brake Lights

TS 71.5.1 Transit Bus

Brake lights shall be provided in accordance with federal regulations.

STANDARD

High and Center Mount Red Brake Lamp

Bus shall include a red LED, high and center mount brake lamp along the backside of the bus in addition to the lower brake lamps required under FMVSS. The high and center mount brake lamp shall illuminate steadily with brake application.

INTERIOR PANELS AND FINISHES

TS 72. General Requirements

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

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

STANDARD

No requirement for anti-graffiti/vandalism surface treatments.

TS 73. Interior Panels

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

STANDARD

Interior panel required to meet FMVSS 302.

AVAILABLE OPTION

Fire Resistance

Materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, dated October 20,1993.

STANDARD

Lower side wall panels

Melamine/ Formica-type material.

STANDARD

Interior pier panels

Aluminum extrusion and integrated with the buses overall body structure.

STANDARD

Ceiling panels

The roof panels shall be constructed out of a Melamine/ Formica-type material. The ceiling panels forming the HVAC ducting shall be constructed from Dibond.

STANDARD

Driver's Cab Ceiling panels

The Ceiling panels in the driver's cab area shall be constructed of matt GRP and have integrated molded doors/ panels to access the driver's locker, entrance shelf plate locker, & destination unit.

STANDARD

Interior well house material

The front wheel house interior material shall GRP 5mm. The rear wheel house material shall be stainless steel with a layer of vinyl flooring on top.

TS 73.1 Driver Area Barrier

TS 73.1.1 Transit Bus

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough for mounting of such equipment as, fire extinguishers (1.2 kg), The panel should be properly attached to minimize noise and rattles.

STANDARD

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

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects. The barrier should also double as a compartment to house electrical equipment and be constructed from GRP material.

AVAILABLE OPTION

Driver enclosure or door.

TS 73.2 Modesty Panels

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

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

STANDARD

Modesty panels shall be installed as stated and be constructed from Arborite/Formica type material

TS 73.3 Front End

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

TS 73.4 Rear Bulkhead

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

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or liter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, then the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage and limit unauthorized access.

TS 73.5 Headlining

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

TS 73.6 Fastening

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

TS 73.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. Any insulation

material used inside the engine compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.
The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

STANDARD

FMVSS 302

Insulation shall meet the requirements of FMVSS 302.

AVAILABLE OPTION

FTA Docket 90-A

All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, dated October 20, 1993.

TS 73.8 Floor Covering

The floor covering shall have a non-skid walking surface that remains effective in all weather conditions. The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be smooth and present no tripping hazards. Seams shall be sealed/welded per manufacturer's specifications. The standee line shall be approximately 2 in. wide and shall extend across the bus aisle. The color and pattern shall be consistent throughout the floor covering.
Any areas on the floor that are not intended for standees shall be clearly and permanently marked.
The floor shall be easily cleaned and shall be arranged to minimize debris accumulation.
A one-piece center strip shall extend from the vertical wall of the rear settee between the aisle sides of transverse seats to the standee line. If the floor is of a bi-level construction, then the center strip shall be one piece at each level. 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 outboard edge of the rear/exit area.
The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall in a fully sealed butt joint or extend to the top of the cove.

TS 73.9 Interior Lighting

The light source shall be located to minimize windshield glare (in conjunction with the colors of the vertical assists), with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct.
The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels.

TS 73.10 Passenger Lights

STANDARD

The interior lights shall be LED.

STANDARD

First Row Lights

The first light on each side (behind the driver and the front door) is normally turned on only when the front or centre door is opened. As soon as the door closes, these lights shall go out.

STANDARD

Dimming Lights

To help eliminate windshield reflection on suburban roads where street lighting is at a low level. Both left & right interior lights shall dim to 50% output when doors are closed.

TS 73.11 Driver's Area

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

TS 73.12 Entrance & Exit Door Interior lights

The passenger entrance & exit door(s) shall have LED overhead lights to illuminate the floor of the bus in the door areas and to illuminate the ground immediately outside the door and will only function when the door is opening, open or closing and the sidelights are active.

TS 73.13 Seating Areas (Transit Bus)

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

TS 73.14 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of 4 foot-candles and shall illuminate in all engine run positions. The step lighting shall be low profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

TS 73.15 Ramp Lighting (Transit Bus)

Exterior and interior ramp lighting shall comply with federal regulations.

TS 73.16 Farebox Lighting

TS 73.16.1 Transit Bus

STANDARD

farebox light.

TS 74. Fare Collection

Space and structural provisions shall be made for installation of currently available fare collection devices, which shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not—either by itself or in combination with

stanchions, transfer mounting, cutting and punching equipment, or route destination signs—restrict the driver's field of view per. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.
Contractor shall provide fare collection installation layout to the Agency for approval.
Transfer mounting, cutting and punching equipment shall be located in a position convenient to the driver.

STANDARD

AGENCY WILL SPECIFY A FAREBOX FOR CONTRACTOR TO INSTALL

TS 75. Interior Access Panels and Doors (Transit Bus)

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 over-center springs, where practical, to hold the doors out of the mechanic's way. Panels shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

STANDARD

Access Doors that Do Not Require Tools or Keys to Open

Access doors shall be secured with hand screws or latches. All fasteners that retain access panels shall be captive in the cover. All latches shall be South Co. C2-99-217-125-3 or South Co. A3-99-122-12.

TS 75.1 Floor Panels

STANDARD

No access panels in floor.

AVAILABLE OPTION

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

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

PASSENGER ACCOMMODATIONS

TS 76. Passenger Seating

TS 76.1 Arrangements and Seat Style (Transit Bus)

The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements. At a minimum any forward facing seating configuration shall provide accommodation for 27 seated passengers on a 30' bus and 35 seated passengers on a 35' bus.

NOTE: The Agency recognizes that ramp location, foot room, hip-to-knee room, doorway type, width, seat construction, floor level type, seat spacing requirements, ramp or lift, number of wheelchair positions, etc. ultimately affect seating capacity and layout.

STANDARD

Forward-Facing Seat Configuration, two forward facing wheelchair positions, exit door.

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

AVAILABLE OPTION

Forward-Facing Seat Configuration, two forward facing wheelchair positions, no exit door.

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

AVAILABLE OPTION

Forward-Facing Seat Configuration, one forward facing & one rear facing wheelchair position (curb side only), exit door.

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

AVAILABLE OPTION

Forward-Facing Seat Configuration, one forward facing & one rear facing wheelchair position (curb side only), no exit door.

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

AVAILABLE OPTION

Forward-Facing Seat Configuration, no wheelchair positions (not ADA compliant), no exit door.

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at platforms (such as for fuel tank storage space).

AVAILABLE OPTION

Forward-Facing Seat Configuration, no wheelchair positions(not ADA compliant), with exit door.

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at platforms (such as for fuel tank storage space).

AVAILABLE OPTION

"Airport Style" Forward-Facing Seat Configuration, Large Interior Luggage Rack, Large exit door.

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at platforms (such as for fuel tank storage space).

AVAILABLE OPTION

Perimeter Seating Arrangement, without exit door.

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. Exit door between the front and rear axles on the curbside of the vehicle required.

AVAILABLE OPTION

Perimeter Seating Arrangement, with exit door.

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. No exit door required.

TS 76.2 Rearward Facing Seats (Transit Bus)

STANDARD

Rearward facing seats not allowed.

TS 76.3 Padded Inserts/Cushioned Seats (Transit Bus)

STANDARD

Non-Padded Inserts

The passenger seats shall be equipped with non-padded inserts throughout the bus.

STANDARD

Non-Padded Seat Configuration

The seat back thickness shall not exceed 1 in. in the knee room area.

TS 76.4 Drain Hole in Seats

STANDARD

No requirements for drain hole provision in seat inserts.

TS 76.5 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to a vertical surface immediately in front, shall be a minimum of 26 in. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 27 in.

TS 76.6 Foot Room

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 in. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

TS 76.7 Aisles (Transit Bus)

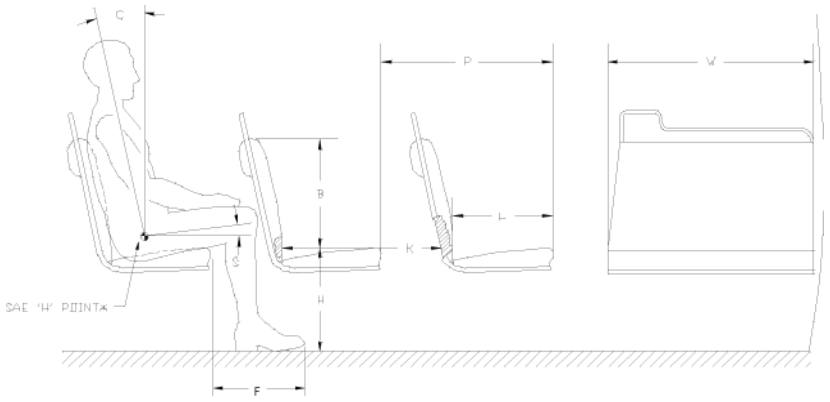
The aisle between the seats shall be no less than 19.7 in. wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 in. at 32 in. above the floor (standing passenger hip height).

TS 76.8 Dimensions (Transit Bus)

Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to **Figure 6**):

- The width, W, of the two-passenger transverse seat shall be a minimum 35 in.
- The length, L, shall be 16.75 in., ±1 in.
- The seat back height, B, shall be a minimum of 15 in.
- The seat height, H, shall be 18 in., ± 1 in. For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under-floor components, a cushion height of up to 18 in., ±2 in., will be allowed. This shall also be allowed for limited transverse seats, but only with the expressed approval of the Agency.
- Foot room = F.
- The seat cushion slope, S, shall be between 5 and 11 deg.
- The seat back slope, C, shall be between 8 and 18 deg.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

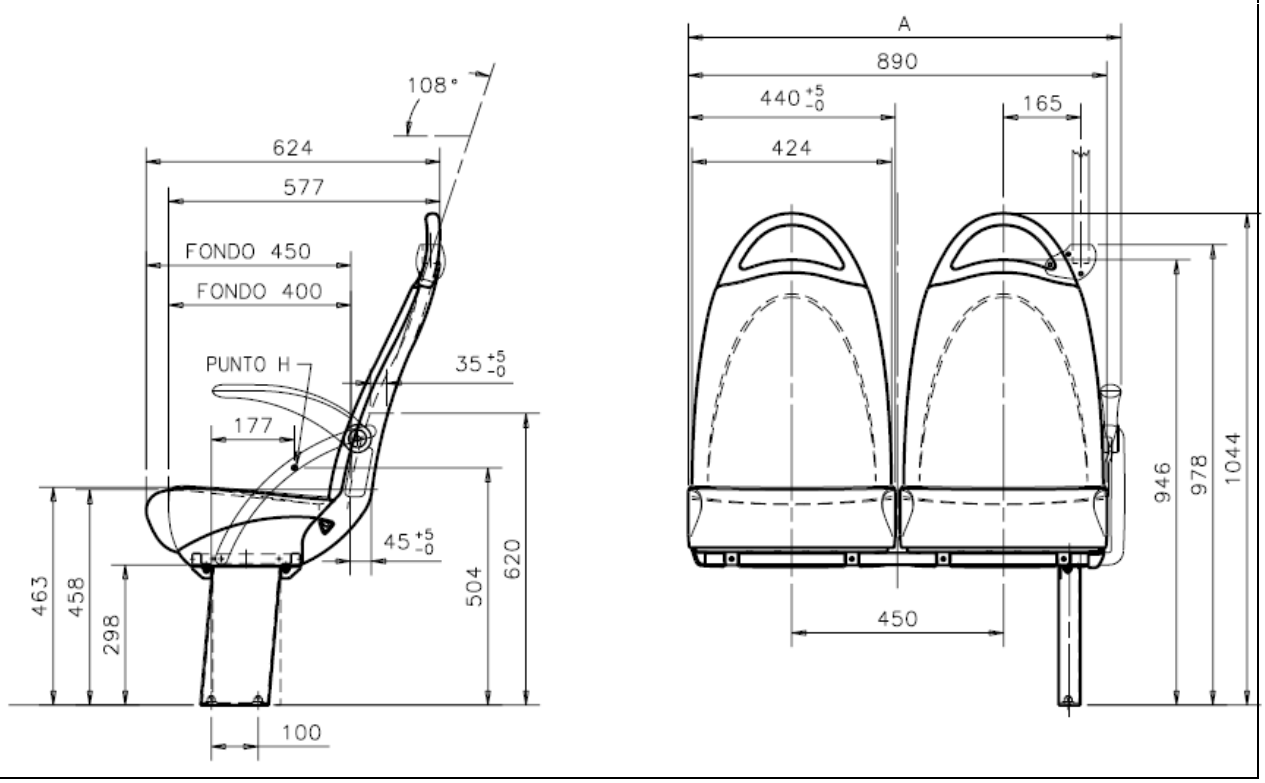
FIGURE 6
Seating Dimensions and Standard Configuration



STANDARD

Esteban Civic V2

Standard Features:
-Anti-vandal backrest shell,
-Cushion and backrest fully trimmed in fabric
-Integral top grab handle, grey
-Interchangeable covers
-Fabric: Holdsworth Aura CAA323
-Seat back color: grey
-Frame color: grey



TS 76.9 Structure and Design (Transit Bus)

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized and is completely free of obstructions to facilitate cleaning.
Seats, structures and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.
In the low floor area the transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 in. of the aisle shall be at least 10 in. above the floor. In locations at which cantilevered installation is precluded by design, structure and/or under seat heating, other seat mounting may be allowed.

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 1000 lbs onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus.

This deceleration shall peak at 0.05 to 0.015 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 in., measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 in., measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 lbs applied to the top of the seat cushion in each seating position with less than ¼ in. permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 lbs evenly distributed along the top of the seat back with less than ¼ in. 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-lb 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 in. pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10 and 12 in. Seats at both seating positions shall withstand 4000 vertical drops of a 40-lb sandbag without visible deterioration. The sandbag shall be dropped 1000 times each from heights of 6, 8, 10 and 12 in. Seat cushions shall withstand 100,000 randomly positioned 3½ in. drops of a squirming, 150-lb, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ in. 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 in. 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 upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy-absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where a vertical assist is provided.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the driver's barrier, or a modesty panel, when 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 3½ in. of the end of the seat cushion. Armrests shall be located from 7 to 9 in. above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 1 in. 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 lbs applied anywhere along their length with less than ¼ in. permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 lbs with less than ¼ in. permanent deformation and without visible deterioration.

TS 76.10 CONSTRUCTION AND MATERIALS (TRANSIT BUS)

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. Coloring shall be consistent throughout the seat material. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼ in. The seat back and seat back handhold immediately forward of transverse

seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, to allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

TS 77. Passenger Assists (Transit Bus)

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 the seat back assist or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and the other without losing support. All handholds and stanchions at the front doorway, around the farebox, and at interior steps for bi-level designs shall be coated in a high-contrast red color. The gloss level of the handholds and stanchions shall be such that they reduce the glare on the windshield

Each forward facing passenger seat in the gangway shall have a passenger assist fitted in the form of a looped handrail attached only to the seat. The colour is not required to be of a high contrast to the surrounding area.

STANDARD

All vertical stanchions in the passenger and driver's area shall be constructed of mild steel and be coated in Nylon R; Flame Red RAL3000.

AVAILABLE OPTION

All vertical stanchions in the passenger and driver's area shall be constructed of mild steel and be epoxy powder coated Flame Red RAL3000.

AVAILABLE OPTION

All vertical stanchions in the passenger and driver's area shall be constructed of stainless steel and be coated in Nylon R; Flame Red RAL3000.

AVAILABLE OPTION

All vertical stanchions in the passenger and driver's area shall be constructed of stainless steel and be epoxy powder coated Flame Red RAL3000.

TS 77.1 Assists (Transit Bus)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ in. or shall provide an equivalent gripping surface with no corner radii less than ¼ in. All passenger assists shall permit a full hand grip with no less than 1½ in. of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Door-mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be coated metal castings. Assists shall withstand a force of 300 lbs applied over a 12 in. lineal dimension in any direction

normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

TS 77.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA-compliant assists. Assists shall be as far outward as practicable, but shall be located no farther inboard than 6 in. from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.

TS 77.3 Vestibule (Transit Bus)

The aisle side of the driver's barrier, the wheel housings and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 in. of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. The assist shall be no less than 36 in. above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel.

TS 77.4 Rear Doorway(s) (Transit Bus)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1½ in. or providing an equivalent gripping surface with no corner radii less than ¼ in., and shall provide at least 1½ in. of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 in. from the outside edge of the rear doorway step.

TS 77.5 Overhead (Transit Bus)

Except forward of the standee line and at the rear door, a continuous, full-grip, overhead assist shall be provided. This assist shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 in. above the floor.

STANDARD

No requirements for overhead grab straps/extensions.

AVAILABLE OPTION

Vinyl grab straps are required.

Overhead assists shall simultaneously support 150 lbs on any 12 in. length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

TS 77.6 Longitudinal Seat Assists (Transit Bus)

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 in. apart or functionally continuous for a 5th percentile female passenger.

TS 77.7 Wheel Housing Barriers/Assists (Transit Bus)

Passenger assists shall be mounted around the exposed sides of the wheel housings, which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housings.

TS 78. Passenger Doors

TS 78.1 Transit Bus

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TS 78.1.1 Front door

STANDARD

Door shall be forward of the front wheels and under direct observation of the driver.

TS 78.1.2 Rear Door

STANDARD

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

In cases where curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door independently or in the combinations shown in **Table 7** while providing positive tactile feedback to the operator identifying the door control selection.

Front	Curbside Rear
Closed	Closed
Open	Closed
Open	Open
Closed	Open

STANDARD

If air-powered, the door system shall operate per specification at air pressures between 90 and 130 psi.

TS 78.2 Materials and Construction

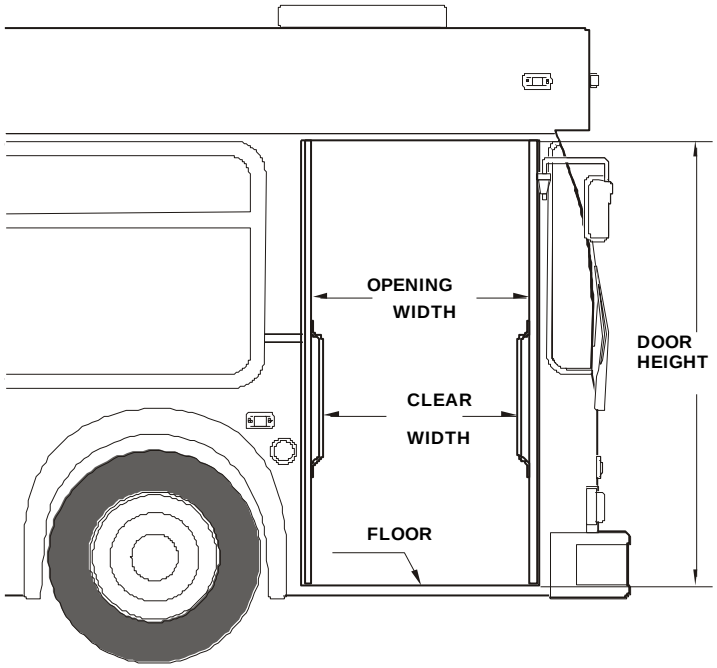
Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be corrosion resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture, noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

The closing edge of each door panel shall have no less than 2 in. of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least 4 in. apart (not applicable to single doors).The combined weather seal and window glazing elements of the front door shall not exceed 10 deg of binocular obstruction of the driver's view through the closed door.

TS 78.3 Dimensions

TS 78.3.1 Transit Bus

FIGURE 7
Transit Bus Minimum Door Opening



When open, the doors shall leave an opening no less than 81 in. in height.

STANDARD

Doorway Clear Width 32 in.

The front door clear width shall be a minimum of 32 in. with the doors fully opened. The rear door clear width shall be a minimum of 32 in. with the doors fully opened.

TS 78.4 Door Glazing

The upper section 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.
Door glazing shall be easily replaceable.

STANDARD

Bonded or adhesive.

STANDARD

The front & rear (if fitted) door panel glazing material shall have a nominal ¼ in. thick tempered glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the recommended practices defined in SAE J673.

TS 78.5 Door Projection (Transit Bus)

TS 78.5.1 Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 10 in. during the opening or closing cycles or when doors are fully opened

TS 78.5.2 Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

TS 78.6 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an 8 in. high curb on a street sloping toward the curb so that the street-side wheels are 5 in. higher than the right-side wheels.

TS 78.7 Closing Force

Closing door edge speed shall not exceed 12 in. per second, and opening door speed shall not exceed 19 in. per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

TS 78.7.1 Rear Door Closing Force (Transit Bus)

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-lb force on 1 sq in. of that obstruction.

If a contactless obstruction sensing system is employed, it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 78.8 Actuators

Doors shall open or close completely in not more than 5 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be re-buildable.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

STANDARD

The rear door actuator(s) shall be under the complete control of the vehicle operator and shall open and close in response to the position of the driver's door control.

TS 78.8.1 Rear Door Interlocks (Transit Bus)

See "Hardware Mounting" for door system interlock requirements.

TS 78.9 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 lbs after actuating an unlocking device. The unlocking device shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the doorway area. The unlocking device shall be easily reset by the operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "emergency exits" shall meet the requirements of FMVSS 217.

TS 78.10 Door Control

The door control shall be located in the operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile feedback to indicate commanded door position and resist inadvertent door actuation.

STANDARD

Door control located on street side.

STANDARD

The front door shall remain in commanded state position even if power is removed or lost.

TS 78.11 Door Controller

TS 78.11.1 Transit Bus

STANDARD

Five-Position Driver's Door Controller

The control device shall be protected from moisture. Mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.

Position of the door control handle shall result in the following operation of the front and rear doors:

- **Center position:** Front door closed, rear door(s) closed or set to lock.
- **First position forward:** Front door open, rear door(s) closed or set to lock.
- **Second position forward:** Front door open, rear door(s) open or set to open.
- **First position back:** Front door closed, rear door(s) open or set to open.
- **Second position back:** Front door open, rear door(s) open or set to open.

TS 78.12 Door Open/Close

STANDARD

Operator-Controlled Front and Rear Doors (If Applicable)

Operation of, and power to, the passenger doors shall be completely controlled by the operator.

STANDARD

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 control or valve which is not within reach of the seated operator, when set in the "off" position shall dump the power from the front door mechanism to permit manual operation of the front door with the bus shut down.

TS 79. Accessibility Provisions

Space and body structural provisions shall be provided at the front door of the bus to accommodate a wheelchair loading system.

TS 79.1 Loading Systems

- low-floor ramp

STANDARD

Hydraulically Powered Fold-out Style Ramp

When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be present, and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the driver. If the loading system and controls are at the rear doors, then a keyed switch shall be provided in the driver's area to disable the loading system. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The loading system shall be inhibited from stowing/deploying when a passenger is on the ramp/platform. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose.

The 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 sides during loading or unloading.

Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 5000 miles in all weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 lbs of force.

TS 79.2 Loading System for 30 to 35 ft Low-Floor Bus

A driver controlled power-operated ramp system compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

STANDARD

Front Door Location of Loading System, Flip-Out Design Ramp with 6:1 Slope

The wheelchair loading system shall be located at the front door, with the ramp being of a simple hinged, flip-out type design being capable of deploying to the ground at a maximum 6:1 slope.

TS 79.3 Wheelchair Accommodations

NOTE: Agency will approve acceptable securement system.

STANDARD

Two Forward-Facing Wheelchair Securement Locations

Two forward-facing locations, as close to the wheelchair loading system as practical, shall provide parking space and securement system compliant with ADA requirements for a passenger in a wheelchair.

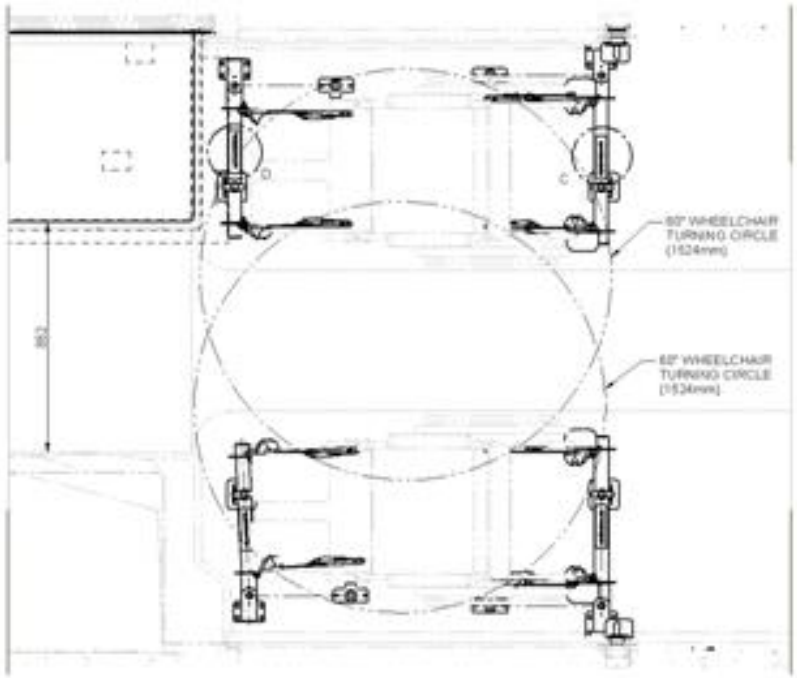
AVAILABLE OPTION

One Forward-Facing & One Rear Facing Wheelchair Securement Locations

The rearward facing wheelchair position shall be on the right (curb) side of the bus so that the driver has direct visibility

TS 79.4 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device to and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 18 in. shall be maintained. As a guide, no width dimension should be less than 30 in. Areas requiring 90 deg turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180 deg turns are expected, space should be clear in a full 60 in. diameter circle. A vertical clearance of 12 in. above the floor surface should be provided on the outside of turning areas for wheelchair footrests.



SIGNAGE AND COMMUNICATION

TS 80. Destination Signs

STANDARD

Front & Curbside Destination Sign

A destination sign system shall be furnished on the front & on the right side near the front door.

STANDARD

No Rear Route Sign

Route sign on the rear of the vehicle not required

AVAILABLE OPTION

Rear Route Sign

Route sign on the rear of the vehicle required.

STANDARD

Curb Side Front Route Sign (Run Number Sign) Not Required

AVAILABLE OPTION

Curb Side Front Route Sign (Run Number Sign)

The sign located near the front door shall not block the driver's critical horizontal line of sight. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. Parts shall be commercially available.

All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.

STANDARD

The sign or HMI shall not be located within reach of the seated driver.

STANDARD

No active defogging required.

AVAILABLE OPTION

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself.
- Access shall be provided to allow cleaning of inside compartment window and unit glazing.
- The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide.

TS 81. Passenger Information and Advertising (Transit Bus)

TS 81.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

STANDARD

Advertising media space shall be provided near the junction of the bus ceiling and sidewall to attached adhesive decals in the minimum sizes as follows:

2 positions: 271mm (10.7") height x 1580mm (62.2") length (max)
1 position: 510mm (20") height x 1820(71.7") length (max)

2 positions: 510 mm (20”) height x 1760(60”) length (max)

TS 81.2 Exterior Displays

Provisions shall be made to integrate advertising into the exterior design of the bus. Advertising media, frames or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, and vehicle fittings or in any other manner restrict the operation or serviceability of the bus.

TS 82. Passenger Stop Request/Exit Signal

TS 82.1 Transit Bus

STANDARD

“Stop request” button located on the majority of vertical stanchion in the passenger compartment.

TS 82.2 Signal Chime

TS 82.2.1 Transit Bus

STANDARD

A single “stop requested” chime shall sound when the system is first activated. A visual indicator on the driver’s control will flash on subsequent activation A double chime shall sound when the system is first activated from wheelchair passenger areas. A visual indicator on the driver’s control will flash on subsequent activation Exit signals located in the wheelchair passenger area shall be no higher than 4 ft above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.

TS 83. Communications

TS 83.1 Camera Surveillance System

STANDARD

Provide all wiring & mounting locations for a 7 camera surveillance system. The installation of cameras, recorders & microphones.

TS 83.2 Public Address System

A public address system shall be provided on each bus for facilitating radio system and driver-originated announcements to passengers.

TS 83.2.1 Speakers

STANDARD

4 interior loudspeakers shall be provided, semi-flush mounted, on alternate sides of the bus passenger compartment, installed with proper phasing. Total impedance seen at the input connecting end shall be 8 Ohms. Mounting shall be accomplished with machine screws. 1 exterior speaker shall be provided and designed in way to inhibit water entry and corrosion.

TS 83.3 Automatic Passenger Counter (APC)

STANDARD

No APC system shall be installed.

TS 83.4 Radio Handset and Control System

To be specified by customer.

TS 83.4.1 Handset

Contractor will install a handset for driver use.

TS 83.4.2 Driver Display Unit (DDU)

Contractor shall install a driver display unit as close to the driver's instrument panel as possible.

TS 83.4.3 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view.

TS 83.5 TELEMATICS SYSTEM

STANDARD

No telematics system fitted

OPTION:

A Telematics system shall be provided. The system shall be capable of monitoring various vehicle codes and conditions and generate metrics for drivers, buses & bus fleets.

TS 84. Event Data Recorders (EDR)

STANDARD

No EDR shall be installed.

AVAILABLE OPTION

Fault event recorded as part of the multiplex system, data recorded as part of optional telematics system

TS 85. Hubodometer

STANDARD

No Hubodometer required

AVAILABLE OPTION

Hubodometer required

TS 86. Approved Equals

Table 8 lists products that have been approved for the bus procurement. The list contains products that are of interest to the Agency and is not intended to be a comprehensive listing of every product required for the manufacture of the subject buses. Product categories not listed are left to the discretion of the Contractor so long as the product complies with the specifications. Product specification information is for reference only and may not reflect the latest or future improvements by manufacturers. Any change, revision or substitution of specified products requires approval .of the agency. To add to or revise this list, Contractor must submit a written request per the Specification by the due date found in the RFP for approved equals.

NOTE: Transit agencies are encouraged to list as many suppliers as possible.

TABLE 8
Approved Equals Products

Product	Manufacturer	Product Specification

BLANK PAGE

TO BE SUPPLIED WITH PROPOSAL

The data contained herein are for the purpose of evaluating the Proposer's intent to meet the requirements of the technical specifications. The proposer certifies that the products and items specified herein are the minimum that will be supplied. Acceptance of this certification does not relieve the proposer of the obligation to meet the requirements of the specifications. All materials supplied herein shall be included in current manufacturer literature.

Incomplete information could be reason for not accepting this proposal.

A. LRGVDC Manufacturer _____

B. LRGVDC Model Number _____

C. Dimensions

1. Overall length _____

a. Over bumpers _____ ft _____ in

b. Over body _____ ft _____ in

2. Overall width options

a. Over body excluding mirrors _____ in

b. Over body including mirrors _____ in

c. Over tires _____ in

3. Overall height

a. Maximum _____ in

b. Main roof line _____ in

4. Doorway clean opening (including grab handles _____ in

Width _____ in height _____ in

5. Steps

a. Number _____

b. Step load capacity _____ lbs.

c. Step height and depth (measured at center of step) with LRGVDC in unkneeled position

From ground to first step _____ in depth _____ in

6. Interior head room (center of aisle)

a. Front axle location _____ in

b. Drive axle location _____ in

7. Aisle width _____ in

8. Floor height above ground (at door) _____ in

9. Minimum ground clearing (at door)

a. Excluding all axles _____ in

b. Axle zone _____ in

10. Wheel base _____ ft _____ in

11. Overhang, centerline of axle over bumper

a. Front _____ ft _____ in

b. Rear _____ ft _____ in

12. Floor

a. Interior length _____ ft _____ in

b. Interior width _____ ft _____ in

13. Seats

a. Manufacturer _____

b. Type _____

c. Model number _____

d. Total number of seat _____

e. Covering material _____

14. Graphics (supplier) _____

15. Angle of approach _____ degrees

16. Angle of departure _____ degrees

D. Weight of coach Full Complement of fuel, oil, water At GWVR

1. On front axle _____ lbs. _____ lbs.

2. On rear axle _____ lbs. _____ lbs.

3. Total _____ lbs. _____ lbs.

E. Engine

1.Manufacturer _____

2.Type _____

3.Model number_____

4. # of cylinders _____

5. Bore _____ in

6. Stroke _____ in

7. Displacement _____ cu in

8. Compression ratio _____

9. Injector type and size _____

10. Net SAE horsepower _____ HP at _____ RPM

11. Net SAE torque _____ ft lb. at _____ RPM

12. Weight, dry _____ lbs.

13. Crankcase oil capacity

a. New engine, dry _____ gals

b. New engine, wet _____ gals

14. Turbo chargers, make & type _____

15. Maximum speed, no load _____ RPM

16. Maximum speed, full load _____ RPM

17. Speed at idle _____ RPM

18. Speed at fast idle _____ RPM

F. Transmission

1. Manufacturer _____

2. Type _____

3. Model number _____

4. Gear ratios:

Forward 1 _____ Reverse _____

Forward 2 _____

Forward 3 _____

Forward 4 _____

Forward 5 _____

5. Shift speeds _____

a. 1st - 2nd _____ MPH

b. 2nd - 3rd _____ MPH

c. 3rd - 4th _____ MPH

d. 4th - 5th _____ MPH

6. Oil capacity (including heat exchanger) _____

G. Alternator

1. Manufacturer _____
2. Type _____
3. Model _____
4. Output amps at idle _____
5. Output amps at maximum speed _____
6. Maximum warranted speed_____
7. Speed at idle _____
8. Drive type _____

H. Starter Motor

1. Manufacturer _____
2. Type _____
3. Model _____

I. Air Compressor

1. Manufacturer _____
2. Type _____
3. Capacity, cfm at idle _____
4. Capacity, cfm at maximum speed _____
5. Maximum warranted speed _____
6. Speed at idle _____
7. Drive type _____

J. Axle, front

1. Manufacturer _____
2. Type _____
3. Model _____
4. Gross axle weight rating _____ lbs.

K. Axle, rear

1. Manufacturer _____

2. Type _____

3. Model _____

4. Gross axle weight rating _____ lbs.

L. Drive Axle Ratio

1. Axle ratio _____

2. Final _____

M. Steering, power

1. Pump

a. Manufacturer and model # _____

b. Type _____

c. Relief pressure _____

2. Booster

a. Manufacturer and model # _____

b. Type _____

c. Ratio _____

3. Power Steering Fluid Capacity _____ gallons

4. Effort at Steering Wheel (unloaded, stationary coach on dry asphalt paving) _____ lbs.

N. Brakes

1. Make of fundamental brake system _____

2. Brake chambers, vendor's size _____and part number_____

a. Front

1) Right _____

2) Left _____

b. Rear

1) Right _____

2) Left _____

3. Slack adjusters vendor's type _____ and part number _____

a. Front

1) Right _____

2) Left _____

b. Rear

1) Right _____

2) Left _____

c. Length

1. Front take-up _____ in

2. Rear take-up _____ in

4. Brake drums

a. Front

1) Manufacturer _____

2) Part number _____

3) Diameter _____in

b. Rear

1) Manufacturer _____

2) Part number _____

3) Diameter _____in

5. Brake block manufacturer _____

6. Brake block identification _____

a. Front

1. Forward _____

2. Reverse _____

b. Rear

1. Forward _____

2. Reverse _____

7. Brake blocks per shoe

a. Front _____

b. Rear _____

8. Brake block widths

a. Front _____in

b. Rear _____in

9. Brake block lengths

a. Front _____in

b. Rear _____in

10. Brake block thickness _____in

11. Brake block area per wheel

a. Front _____ sq. in

b. Rear _____ sq. in

O. Cooling System

1. Radiator

a. Manufacturer _____

b. Type _____

c. Model # _____

d. # of tubes _____

e. Tubes outer diameter _____in

f. Fins per inch _____

g. Fin thickness _____in

2. Total cooling and heating system capacity _____ gals

3. Radiator fan speed control _____ type

4. Surge tank, capacity _____

5. Engine thermostat temperature setting _____

6. Overheat alarm temperature sending unit setting _____

7. Condenser Fan

a. Manufacturer and model _____

b. Fan diameter _____ in

c. Speed maximum _____ RPM

d. Flow rate (maximum) _____ CFM

8. Receiver

a. Manufacturer & model _____

b. Capacity _____lbs.

9. Condenser fan drive, if separate condenser used - motor

a. Manufacturer _____

b. Model _____

c. Type _____

d. Horsepower _____hip

e. Operating speed _____

10. AC Generator

a. Manufacturer _____

b. Model _____

c. Type _____

d. Output _____

e. Drive type _____

11. Evaporator(s)

a. Manufacturer & model _____

b. Number of rows _____

c. Number of fins/in _____

d. Outer diameter of tube _____ in

e. Fin thickness _____ in

f. Number of evaporators _____ in

12. Expansion valve

a. Manufacturer & model _____

13. Filter - drier

a. Manufacturer & model _____

P. Heating and Ventilation Equipment

1. Heating system capacity _____Btu

2. Ventilating capacity _____cfm

3. Heater cores

a. Manufacturer & model _____

b. # of rows _____

c. # of fins/in _____

d. Outer diameter of tube _____in

e. Fin thickness _____in

f. # of heater cores _____

4. Heater blowers

a. Heater motors

1) Manufacturer & model _____

2) Horsepower _____

3) Speed(s) _____

b. Heater blower

1) Manufacturer & model _____

2) Capacity _____cfm

5. Controls

a. Type _____

b. Manufacturer & model _____

6. Driver's heater

a. Manufacturer _____

b. Model number _____

c. Capacity _____Btu

Q. Interior Lighting

1. Type _____

2. # of fixtures _____

3. Size of fixture _____

4. Powerpack manufacturer & model _____

R. Wheelchair Ramp (lift)

1. Manufacturer _____

2. Type _____

3. Model _____

4. Platform dimensions

a. Width _____ in

b. Depth _____ in

5. Lifting capacity _____ lbs.

S. Farebox

1. Manufacturer _____

2. Type _____

3. Model _____

T. Radios

1. Manufacturer _____

2. Type _____

3. Model _____

U. Fuel tanks

1. Manufacturer _____

2. Type _____

3. Model _____

4. Number of tanks _____

5. Capacity _____ gallons

FIGURE 1
TRAINING SCHEDULE

COURSE TITLE	# of COURSE	# of TRAINEES	DURATION OF COURSE
Basic Familiarization	1	12	20 hours
Heating/Ventilating	1	12	20 hours
Electrical System including main and auxiliary circuits battery and generator	1	12	30 hours
Engine	1	12	40 hours
Transmission	1	12	40 hours
Destination Signs	1	12	16 hours
Brake System	1	12	30 hours
Wheelchair RAMP Maintenance	1	12	8 hours
Diesel Engine & Fuel System	4	12	40 hours

All training shall be conducted at LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL/VALLEY METRO facilities and scheduled jointly by LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL/VALLEY METRO and the Manufacturer.

Attachment "B"

WARRANTY CERTIFICATION

The name and address of the Texas servicing dealer nearest the FOB point that will perform the warranty work for the chassis:

FIRM NAME	
FIRM ADDRESS	
FIRM TELEPHONE	
PRINT PROPOSER'S NAME	PROPOSER'S SIGNATURE
NAME OF INDIVIDUAL TO CONTACT FOR WARRANTY	

The agency may contact the vendor below for assistance in warranty administration.

FIRM NAME OF PROPOSER
ADDRESS
PHONE
PROPOSER'S SIGNATURE
PRINT PROPOSER'S NAME
DATE

Attachment "C"

FMVSS CERTIFICATION - 49 CFR 571 Part D
(Circle all applicable standard #s)

#	Title	#	Title
101	#*Controls and Displays	102	#*Transmission shift lever sequence, starter, interlock, transmission braking effect
103	#*Windshield defrost and defogging system	104	#*Windshield wiping and washing system
105	#*Hydraulic brake system	106	#*Brake hoses
107	#*Reflecting surfaces	108	#*Lamps, reflective devices, and assoc. equip.
109	#New pneumatic tires	110	#Tire selection and rims.
111	#*Rearview mirrors	112	#*Headlamps concealment devices.
113	#*Hood latch system	114	#Theft Protection (not for walk-in vans)
115	#*V.I.N. - basic requirements	116	#*Motor vehicle brake fluids
117	#Retreaded pneumatic tires (to be used on rear wheels only)	118	#Power-operated window, partition, roof panel system (GVWR < 10K)
119	*New pneumatic tires for vehicles other than passenger cars	120	*Tire selection & rims for vehicles other than passenger cars
121	*Air brake system	124	#*Accelerator control system
129	#New non-pneumatic tires for passenger cars	201	#@Occupant protection in interior impact
202	#@Head restraints	203	#@Impact protect driver steering control system
204	#*Steering control rearward displace (not walk-in vans)	205	#*Glazing materials
206	#Doors, locks, and door retention components	207	#*Seating system
208	#*Occupant crash protection	209	#*Seat belt assemblies
210	#@Seat belt assembly anchorages	211	#Wheels, nuts, wheel discs, and hub caps
212	#@Windshield mounting	213	#*Child restraint system
214	#@Side impact protection (not walk-in vans)	217	*LRGVDC emergency exits / window retention & release
219	#@Windshield zone intrusion	220	*School LRGVDC rollover protection
301	#@Fuel system integrity (+School LRGVDC >10K GVWR)	302	#*Flammability of interior materials
403	*Platform Lift Systems for Motor Vehicles	404	*Platform Lift Installations in Motor Vehicles

The undersigned PROPOSER/BIDDER hereby certifies that all vehicles furnished meet the FMVSS IAW 49 CFR 571.

Name of Company	Date
Printed Name of Person Signing Form	Signature

*LRGVDC @LRGVDC with GVWR below 10,000 lbs. #Passenger Car

Attachment "D"
Domestic Content Worksheet

(Typical Components of buses from Appendix B to 49 CFR Sec. 661.11, an itemized component listing from the manufacturer that verifies compliance with the Buy America Provisions may be submitted in lieu of this form)

I. Components	% Domestic	X % Value	Dom. Value
1. engines			
2. transmissions			
3. front axle assemblies			
4. rear axle assemblies			
5. drive shaft assemblies			
6. front suspension assemblies			
7. rear suspension assemblies			
8. air compressor and pneumatic systems			
9. generator, alternator & electrical systems			
10. steering system assemblies			
11. front and rear air brake assemblies			
12. air conditioning compressor assemblies			
13. air conditioning evaporator/condenser assemblies			
14. heating systems.			
15. passenger seats			
16. driver's seat assemblies			
17. window assemblies			
18. entrance and exit door assemblies			
19. door control systems			
20. destination sign assemblies			
21. interior lighting assemblies			
22. front and rear end cap assemblies			
23. front and rear bumper assemblies			
24. specialty steel (structural steel tubing etc.) and aluminum extrusions			
25. aluminum, steel or fiberglass exterior panels and interior trim			
26. flooring and floor coverings			
TOTAL DOMESTIC CONTENT OF COMPONENTS (%)		**1**	

II. Construction Activities (Describe Activities)	
Location of Construction Activities:	% OF DOMESTIC CONSTRUCTION ACTIVITIES:

Vehicle Manufacturer	Model	Model Year
Vendor Name	Signature	Date

Attachment "E"

Evaluation Criteria Score Sheet

Criteria	Max. Points Value	Score	Comments
Price.	**45**	***1.*** ___	
Delivery.	**25**	***2.*** ___	
Technical	**20**	***3.*** ___	
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 5: Technical Specifications and the needs of LRGVDC, for the engine and transmission are proposed to be met. The risks of development tasks (if any) will be assessed.	3	_____	
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 5: Technical Specifications and the needs of LRGVDC, for these systems are proposed to be met. The risks of development tasks (if any) will be assessed.	3	_____	
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 5: Technical Specifications and the needs of LRGVDC, for each major subsystem are proposed to be met. The risks of development tasks (if any) will be assessed.	3	_____	
D. Quality Assurance: Sufficiency of in-place Quality Assurance Program and procedures to meet requirements. The degree to which Part 3: Quality Assurance Provisions are met.	3	_____	
E. Spare Parts Availability: Degree to which the required availability of spare parts (Section 2.5.4) is proposed to be met or exceeded.	3	_____	
F. Standard Warranty: Degree to which the standard warranty of Part 4 WARRANTY PROVISIONS is proposed to be met or exceeded.	3	_____	
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.	1	_____	
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 LRGVDC can analyze cost and pricing data.	1	_____	
Qualification and Resources: Degree to which Offeror exceeds the required qualifications. A. Human and physical resources. B. Financial strength and resources. C. Record of performance of LRGVDC contracts.	**10**	***4.*** ___ ___	
TOTAL POINTS	**100**		

Attachment "F"

FORM FOR PROPOSAL DEVIATIONS

The following form shall be completed for each condition, exception, reservation or understanding (i.e., Deviations) in the proposal according to "Conditions, Exceptions, Reservations and Understandings".

Deviations # _____ Offeror :_____

Sollicitation Ref: _____ Page:_____ Section:_____

Complete Description of Deviations: _____

_____

_____

_____

_____

Rationale (Pros & Cons): _____

_____

_____

_____

_____

Attachment "G"

OFFEROR SERVICE AND PARTS SUPPORT DATA

Location of nearest Technical Service Representative to LRGVDC

Name _____

Address _____

Telephone _____

Offeror to describe technical services readily available from said representative.

Location to nearest Parts Distribution Center to LRGVDC

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 LRGVDC _____

Attachment "H"
Consolidated Certification Form

I. FOR ALL PROPOSALS:

In submitting this proposal, the undersigned certifies to abide by theses clauses and include the following clauses in each subcontract financed in whole or in part with Federal Transit Administration funds. It is further agreed that these clauses shall not be modified, except to identify the subcontractor subject to its provisions. Vendors are certifying by reference the entire list of FTA FY 2004 Certifications and Assurances, and shall download the same at:
http://www.fta.dot.gov/6092_12203_ENG_HTML.htm
http://www.fta.dot.gov/6092_12203_ENG_HTML.html

A DBE Certification

The PROPOSER complies with 49 CFR 26.49 regarding the transit vehicle manufacturer's overall DBE goal.

B Air Conditioning Performance

The PROPOSER will provide vehicles that meet or exceed the performance requirements of the air conditioning system(s) as detailed in Part IV of the specification.

C Interest of Members of or Delegates to Congress

The PROPOSER certifies that 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.

D Prohibited Interest

The PROPOSER certifies that no member, officer, or employee of the Public Body or of a local public body during his or her tenure or one year thereafter shall have any interest, direct or indirect, in this contract or the proceeds thereof.

E Cargo Preference - Use of United States-Flag Vessels

The PROPOSER agrees: a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels; b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of leading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of -lading in English for each shipment of cargo to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of-lading.)

F Energy Conservation

The PROPOSER 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.

G No Obligation by the Federal Government.

The Purchaser and PROPOSER 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 Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract

H. Program Fraud and False or Fraudulent Statements or Related Acts

The PROPOSER 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. The PROPOSER certifies or affirms the truthfulness and accuracy of any statement it makes pertaining to the resultant contract or the FTA assisted project for which this work is being performed. The PROPOSER further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate. The PROPOSER also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.

I. Contract Work Hours

(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 therefore shall be liable for unpaid wages. 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 purchaser 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 Contract Work Hours and Safety Standards 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 include the clauses set forth in this section and require the same from 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 these clauses.

(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.

J. Civil Rights

(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 PROPOSER 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 PROPOSER agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) **Equal Employment Opportunity** - The following equal employment opportunity requirements apply:
(a) 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 PROPOSER 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 PROPOSER 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 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 PROPOSER agrees to comply with any implementing requirements FTA may issue. (b) Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and Federal transit law at 49 U.S.C. § 5332, the PROPOSER agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the PROPOSER agrees to comply with any implementing requirements FTA may issue. (c) Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the PROPOSER 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 PROPOSER agrees to comply with any implementing requirements FTA may issue.

K. Altoona Test Certification (Check one of the following):
( ) The vehicle has been Altoona tested, report number:_____
( ) The vehicle is exempt from testing IAW 49 CFR 665
( ) The vehicle is currently being tested at Altoona

FEDERAL FUNDS WILL NOT BE RELEASED UNTIL THE PURCHASING AGENCY RECEIVES A COPY OF THE ALTOONA TEST REPORT IF REQUIRED IAW 49 CFR 665

II. FOR PROPOSALS OVER $100,000:

The PROPOSER agrees to include these requirements in subcontracts exceeding $100,000 financed in whole or in part by FTA.

A. Buy America (Check where applicable):
( ) The PROPOSER will comply with the requirements of 49 USC 5323(j) and 49 CFR 661, by providing vehicles with over 60% domestic content.

( ) The PROPOSER cannot comply with the requirements 49 USC 5323(j), but may qualify for an exception to the requirement pursuant to the regulations in 49 CFR 661.7.

B. Non-Lobbying
The PROPOSER hereby certifies that no funds to be provided under this Contract will be used in any way to attempt to influence in any manner any member of or delegate to Congress to favor or oppose any legislation or appropriation by Congress, or for lobbying the state or local legislatures, or for lobbying with any officer or employee of an agency. The PROPOSER also certifies that it will comply with the requirements of "Restrictions on Lobbying: Certification and Disclosure Requirements" imposed by 29 CFR.

C. Debarment and Suspension
The PROPOSER hereby certifies that it and its principals have not presently or within a three year period been debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal agency; and The PROPOSER hereby certifies that it and its principals have not presently or within a three year period been convicted of or had a civil judgment rendered against them for the commission of a fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, state or local) transaction; violation of Federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

D. Clean Water & Air
The PROPOSER agrees to 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 PROPOSER agrees to 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 PROPOSER agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

Attachment "I"

CERTIFICATION TO PURCHASER:

A. The undersigned PROPOSER/BIDDER certifies that the vehicle(s) furnished will meet or exceed the specifications.

B. The PROPOSER/BIDDER hereby certifies that it has attached all applicable documentation listed in Part III, Paragraph 5: Summary of Required documents on page 9 of the General Instructions.

C. The undersigned PROPOSER/BIDDER certifies that it has read all of the proposal documents "RFP package" and agrees to abide by the terms, certifications, and conditions thereof.

Name of Company	Printed Name of Person Completing Form
Address	SS# or Tax ID #
Telephone	Signature

Disadvantaged Business Enterprise Information	*Type of Organization (circle)*	
	Sole Proprietorship	General Proprietorship
Is your firm a DBE? (yes) (no)	Corporation	Limited Partnership
If yes, what type?	Limited Proprietorship	

Attachment "J"

Change Form / Request for Approved Equals

PREPARED BY:	**DATE:**
ADDRESS:	**PHONE: ( )**
SPEC. #: TXDOT-070-99-_____ (VEHICLE TYPE)	**SPEC. DATE:**
LOCATION OF REQUEST FOR CHANGE (PAGE, PARAGRAPH #):	
CHANG E REQUESTED	
COMMENTS / REASON FOR CHANGE:	

AGENCY USE ONLY

REVIEWED BY: **DATE:** **CONTROL #: _____ -**
ACTION TAKEN: **(VEH.TYPE) - (#)**

COMMENT:

Attachment "K"

BUY AMERICA CERTIFICATION
(To be submitted with a Proposal or Offer exceeding the small purchase threshold for Federal assistance programs, currently set at $100,000.)

Certificate of Compliance

The proposer 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 proposer 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: _____

Attachment "L"

TRANSIT VEHICLE MANUFACTURER'S (TVM) DBE PARTICIPATION CERTIFICATION OF COMPLIANCE

This procurement is subject to the provisions of 49 CFR § 26.49. Accordingly, as a condition of permission to propose, the following certification must be completed and submitted with the Proposal. A Proposal which does not include the certification will not be considered.

_____(Name of Firm), a transit vehicle manufacturer, hereby certifies that it has complied with the requirements of 49 CFR § 26.49 by submitting a current annual disadvantaged business enterprise (DBE) goal to the Federal Transit Administration (FTA). The goals apply to Federal Fiscal Year _____ (October 1, 20___ to September 30, 20___ and have been approved or not disapproved by the FTA.

_____(Name of Firm), hereby certifies that the manufacturing of the transit vehicles to be supplied, _____ has complied with the above-referenced requirement of 49 CFR § 26.49.

Date _____

Signature _____
(Authorized Representative)

Title _____

Firm _____

Attachment "M"

DEBARMENT AND SUSPENSION CERTIFICATION

(To be submitted with a Proposal or Offer exceeding the small purchase threshold for Federal assistance programs, currently $25,000.)

The prospective participant (Proposer) certifies, by submission of this Offer, that 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 participant (Proposer) is unable to certify to the statement above, it shall attach an explanation, and indicate that it has done so, by placing an "X" in the following space _____.

**THE PROPOSER, _____,
CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND EXPLANATION, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 U.S.C. §§ 3801 ET SEQ. APPLY TO THIS CERTIFICATION AND EXPLANATION, IF ANY.**

_____
Signature of the Proposer's Authorized Official

_____
Name and Title of the Proposer's Authorized Official

_____
Date

PROVIDE SCREEN SHOT FROM "SAM"

Attachment "N"

LOBBYING CERTIFICATION

(To be submitted with an Offer exceeding $100,000)

The Proposer certifies, to the best of 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.

THE PROPOSER, _____,
CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND DISCLOSURE, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 U.S.C. § 3801 ET SEQ. APPLY TO THIS CERTIFICATION AND DISCLOSURE, IF ANY.

_____
Signature of the Proposer's Authorized Official

_____
Name and Title of the Proposer or Proposer's Authorized Official

_____
Date

Attachment "O"

CERTIFICATE OF COMPLIANCE WITH LRGVDC TESTING REQUIREMENTS

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 were 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 LRGVDC.

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: _____

Attachment "P"

COMPLIANCE WITH SPECIFICATIONS

The Proposer hereby states that they will comply with the specifications in all areas including those approved equals that were granted by the Purchaser.

_____
Signature and also Name Printed

_____
Firm Name

Subscribed and sworn to before me this _____ day of _____, 20__.

_____
Notary Public

My commission expires _____, 20_____.

Attachment "Q"

MOTOR VEHICLE SAFETY POLLUTION REQUIREMENTS CERTIFICATION

The contractor will certify in writing on delivery of each LRGVDC to the Lower Rio Grande Valley Development Council/Valley Metro under contract, that it meets the U.S. Environmental Protection Agency emission standards as of date of manufacture. Also, the contractor will furnish certification in writing that each LRGVDC delivered meets the following:

The horsepower of the vehicle is adequate for the speed, range and terrain in which it will be required to operate and also to meet the demands of all auxiliary power equipment.

All gases and vapors emanating from the crankcase of a spark- ignition engine are controlled to minimize their escape into the atmosphere.

Visible emissions from the exhaust pipe will not exceed #1 on the Ringlemann Scale when measured at a point 6" from the tail pipe with the vehicle in a steady state of operation.

When the vehicle has been idled for three minutes and then accelerated to 80 percent of rated speed under load, the capacity of the exhaust will not exceed #2 on the Ringlemann Scale for more than five seconds, and not more than #1 on the Ringlemann Scale thereafter

Automatic transmission provided is of adequate strength and capacity to perform under the frequent start-stop duty cycle anticipated.

The Contractor has obtained the necessary certification and approval of the LRGVDC engine by the U.S. Environmental Protection Agency.

_____
Company

_____
Authorized Signature

_____
Date

Attachment "R"

SAFETY CERTIFICATION

The _____ (Name of firm) hereby certifies that the vehicles offered in this Proposal comply with the Motor Vehicle Safety Standard as established by the Department of Transportation and with requirements of the laws of the State of Texas, all as are in effect at the time of delivery of the vehicles, as to lighting equipment and all warning, operating and safety devices.

If the requirements of this section change between the date of the contract and the date of manufacture or delivery, any additional costs or cost reductions resulting from such changes will be negotiated to the mutual satisfaction of the Lower Rio Grande Valley Development Council/Valley Metro and the contractor.

_____
Name of Firm

_____
Address

_____
City State Zip

_____
Authorized Signature

_____
Date

Attachment "S"

LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL REQUIRED FORMS

DISCLOSURE OF INTEREST FORM - Please complete the attached Disclosure of Interest Form and submit with your proposal.

STATEMENT OF NON-COLLUSION FORM - Enclosed is a Statement of Non-Collusion which must be completed by the vendor and submitted with the proposal.

The Lower Rio Grande Valley Development Council reserves the right to reject any and all proposals.

LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL
STATEMENT OF NON-COLLUSION

The undersigned affirms that they are dully authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this proposal in collusion with any other proposer, and that the contents of this proposal as to prices, terms or conditions of said proposal have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this proposal.

Date _____

Company_____

Address _____

Phone_____

Fax Number_____

Proposer
(Signature)_____

Proposer
(Print Name)_____

Position
with Company_____

Signature of Company
Official Authorizing This
Proposal _____

Company Official
(Print Name)_____

Official Position_____

Note: This form must be filled in and submitted with the sealed proposal.

LOWER RIO GRANDE VALLEY DEVELOPMENT COUNCIL
DISCLOSURE OF INTERESTS

Lower Rio Grande Valley Development Council, Texas requires all persons or firms seeking to do Business with the City to provide the following information. Every question must be answered. If the question is not applicable, answer with "NA." Corporations whose shares are publicly traded and listed on national or regional stock exchanges or over-the-counter markets may file a current Securities and Exchange Commission Form 10-K with the City in lieu of answering the questions below. See reverse side for definitions.

FIRM NAME:_____

ADDRESS:_____

FIRM is: 1. Corporation ( ) 2. Partnership ( ) 3. Sole Owner ( )
4. Association ( ) 5. Other ( )_____

DISCLOSURE QUESTIONS

If additional space is necessary, please use the reverse side of this page or attach separate sheet.

1. State the names of each "employee" of the Lower Rio Grande Valley Development Council having an "ownership interest constituting 10% or more of the voting stock or shares of the business entity or ownership of $2,500 or more of the fair market value of the business entity or employed by the above named "firm."

Name	Title	Department

2. State the name of each "official" of the Lower Rio Grande Valley Development Council having an "ownership interest" constituting 10% or more of the ownership in the above named "firm", or employed by the above named "firm."

Name	Title	Department

3. State the names of each "board member" of the Lower Rio Grande Valley Development Council having an "ownership interest" constituting 10% or more of the ownership in the above named "firm", or employed by the above named "firm."

Name	Board, Commission, or Committee

CERTIFICATE

I certify that all information provided is true and correct as of the date of this statement, that I have not knowingly withheld disclosure of any information requested; and that supplemental statements will be promptly submitted to the Lower Rio Grande Valley Development Council, Texas as changes occur.

Certifying Person:_____Title:_____
(Type or Print)

Signature of Certifying Person: _____Date:_____

DEFINITIONS

The following definitions of terms should be used in answering the questions set forth below:

a. **"Board member."** A member of any board, commission, or committee appointed by the City Commission of the Lower Rio Grande Valley Development Council, Texas.

b. **"Employee."** Any person employed by the Lower Rio Grande Valley Development Council, Texas either on a full or part-time basis, but not as an independent contractor.

c. **"Firm."** Any entity operated for economic gain, whether professional, industrial or commercial, and whether established to produce or deal with a product or service, including but not limited to, entities operated in the form of sole proprietorship, as self-employed person, partnership, corporation, joint stock company, joint venture, receivership or trust, and entities which for purposes of taxation are treated as non-profit organizations.

d. **"Official."** The Mayor, members of the City Commission, City Manager, Assistant City Managers, Department and Division Heads, and Municipal Court Judge of the Lower Rio Grande Valley Development Council, Texas.

e. **"Ownership interest."** Legal or equitable interest, whether actually or constructively held, in a firm, including when such interest is held through an agent, trust, estate or holding entity. "Constructively held" refers to holdings or control established through voting trusts, proxies, or special terms of venture of partnership agreements."

OFFERER

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

OFFERER

By execution below Offeror hereby offers to furnish equipment and services as specified in Valley Metro Request for Proposals No. HDB-55-0409 including the General Provisions, Quality Assurance Provisions, Warranty Provisions and Technical Specifications therein.

Offeror:

Name_____

Street Address_____

City, State, Zip_____

Phone Number_____

Signature of Authorized Representative_____

Title_____

AWARD

NOTICE OF AWARD

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

Contracting Officer: _____
Signature

Date of Award: _____

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END OF RFP PACKAGE