

OHIO

Department of
Public Safety

OHIO SCHOOL BUS CONSTRUCTION STANDARDS



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FOREWORD

CONTAINED HEREIN ARE THE STANDARDS FOR OHIO SCHOOL BUSES, AS RECOMMENDED BY THE OHIO SCHOOL BUS CONSTRUCTION STANDARDS ADVISORY COMMITTEE AND ADOPTED BY THE OHIO DEPARTMENT OF PUBLIC SAFETY. ALL SCHOOL BUSES OWNED AND/OR OPERATED IN THIS STATE SHALL MEET OR EXCEED THESE REQUIREMENTS.

THE OHIO SCHOOL BUS CONSTRUCTION STANDARDS ADVISORY COMMITTEE, COMPRISED OF REPRESENTATIVES OF PUBLIC AND PRIVATE SCHOOLS, HEAD START PROGRAMS, BOARDS OF MENTAL HEALTH AND RETARDATION, PRIVATE SCHOOL BUS OWNERS/OPERATORS AND VARIOUS SCHOOL TRANSPORTATION OFFICIALS MEET QUARTERLY TO REVIEW AND REFINE THE STANDARDS AND SPECIFICATIONS IN THE INTERESTS OF SAFETY, ADEQUACY AND ECONOMY. THESE STANDARDS ARE A RESULT OF THOSE COMMITTEE RECOMMENDATIONS.

SCHOOL BUS OWNERS AND OTHERS WORKING WITH SCHOOL TRANSPORTATION SHOULD THOROUGHLY FAMILIARIZE THEMSELVES WITH THE STANDARDS CONCERNING NEW SCHOOL BUS EQUIPMENT AND APPROVED OPTIONAL EQUIPMENT. THOSE RESPONSIBLE FOR THE PURCHASE OF NEW SCHOOL BUS EQUIPMENT SHALL ENSURE THAT BUSES BID OR PURCHASED IF NOT SUBJECT TO COMPETITIVE BIDDING, ON OR AFTER SEPTEMBER 1, 1998 ARE IN COMPLIANCE WITH THE STANDARDS PRESCRIBED HEREIN.

THE DEPARTMENT OF PUBLIC SAFETY AND THE OHIO STATE HIGHWAY PATROL ARE APPRECIATIVE OF THE DEDICATION AND COMMITMENT OF THOSE WHO HAVE ASSISTED IN THE WRITING OF THESE STANDARDS.

ALL SCHOOL BUS PURCHASES SHALL BE MADE WITH THE UNDERSTANDING AND CERTIFICATION THAT ALL CHASSIS, BODY, ADDITIONAL AND/OR OPTIONAL EQUIPMENT MEET THESE NEW STANDARDS AND ARE SUBJECT TO FINAL APPROVAL BY THE OHIO DEPARTMENT OF PUBLIC SAFETY.

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The following table shows the results of the experiment. The first column is the number of trials, the second column is the number of correct responses, and the third column is the percentage of correct responses.

Number of Trials	Number of Correct Responses	Percentage of Correct Responses
10	7	70%
20	14	70%
30	21	70%
40	28	70%
50	35	70%
60	42	70%
70	49	70%
80	56	70%
90	63	70%
100	70	70%

As can be seen from the table, the percentage of correct responses is constant at 70% for all numbers of trials. This suggests that the subject is performing the task at a constant level of accuracy.

The results of the experiment are consistent with the hypothesis that the subject is performing the task at a constant level of accuracy.

GENERAL PROVISIONS

(A)	Effective Date	1
(B)	Use of Equivalent	1
(C)	Failure to Comply	1
(D)	Statement of Compliance	1
(E)	Manufacturer Specifications	1
(F)	Pre-Delivery Inspection	1
(G)	Delivery	2
(H)	Warranty	2
(I)	Pre-Delivery Service	2
(J)	Changes in Design or Equipment	2
(K)	New Products and Equipment	2
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(M)	Repair Manual	3
(N)	Replacement Parts	3
(O)	Responsibility for Compliance	3
(P)	Safety-Related Product Recalls	4
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1. The first part of the document
describes the general situation
and the objectives of the study.
2. The second part of the document
describes the methodology used
in the study.
3. The third part of the document
describes the results of the study.
4. The fourth part of the document
describes the conclusions of the study.
5. The fifth part of the document
describes the recommendations of the study.

4501-5-02

**STANDARDS AND SPECIFICATIONS FOR TYPE B, C AND D
SCHOOL BUS CHASSIS**

(A)	Air Cleaner	5
(B)	Axle or other types of Suspension	5
(C)	Battery	5
(D)	Braking Systems and Components	6
(E)	Bumper - Front	7
(F)	Energy-Absorbing System Manufacturer	8
(G)	Clutch	8
(H)	Color of Chassis	8
(I)	Cooling System	9
(J)	Drive Shaft and Differential	9
(K)	Electrical System	10
(L)	Exhaust System	11
(M)	Fenders	11
(N)	Frame	12
(O)	Fuel Tank	12
(P)	Engine Speed Governor	13
(Q)	Horn(s)	13
(R)	Instruments and Instrument Panel	14

(S)	Chassis Lamps and Signals	15
(T)	Oil Filter	15
(U)	Openings	16
(V)	Power Train	16
(W)	Shock Absorbers	17
(X)	Springs	17
(Y)	Steering Gear Assembly	17
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(AA)	Tow Hooks	18
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(G)	Doors	28
(H)	Emergency Equipment	35
(I)	Floor Covering	37
(J)	Fuel Fill Opening	38
(K)	Heaters	39
(L)	Hood Engine Cover	40
(M)	Identification	41
(N)	Inside Body Height	43
(O)	Insulation	43
(P)	Interior	44
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(U)	Openings	52
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(W)	Overall Width	52
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(Y)	Seat - Driver	53
(Z)	Seat - Passengers	53
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(BB)	Steps - Access	55
(CC)	Sun Visor	56
(DD)	Wheel Housings	56
(EE)	Windshield and Windows	56
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(R)	Chassis Lamps and Signals	69

(S)	Oil Filter	69
(T)	Openings	70
(U)	Power Train	70
(V)	Shock Absorbers	70
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(Y)	Tires	70
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(I)	Windshield Wipers	105
(J)	Windshield Washers	105

1	1000	1000
2	1000	1000
3	1000	1000
4	1000	1000
5	1000	1000
6	1000	1000
7	1000	1000
8	1000	1000
9	1000	1000
10	1000	1000
11	1000	1000
12	1000	1000
13	1000	1000
14	1000	1000
15	1000	1000
16	1000	1000
17	1000	1000
18	1000	1000
19	1000	1000
20	1000	1000
21	1000	1000
22	1000	1000
23	1000	1000
24	1000	1000
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26	1000	1000
27	1000	1000
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30	1000	1000
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33	1000	1000
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35	1000	1000
36	1000	1000
37	1000	1000
38	1000	1000
39	1000	1000
40	1000	1000
41	1000	1000
42	1000	1000
43	1000	1000
44	1000	1000
45	1000	1000
46	1000	1000
47	1000	1000
48	1000	1000
49	1000	1000
50	1000	1000

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4501-5-01 GENERAL PROVISIONS

- (A) THE EFFECTIVE DATE OF THESE RULES SHALL BE NINETY DAYS FOLLOWING THE DATE OF ADOPTION BY THE DEPARTMENT OF PUBLIC SAFETY. ALL SCHOOL BUSES BID IN OR AFTER THE EFFECTIVE DATE, SHALL CONFORM TO THE RULES IN THIS CHAPTER. THESE RULES ALSO CANCEL ALL EXISTING "APPROVED EQUAL" CERTIFICATION AND ALL CONSTRUCTION APPROVALS OR WAIVERS.
- (B) PERMISSION TO USE A DEVICE OR MATERIAL AS "EQUIVALENT" TO THAT CALLED FOR IN THE RULE MUST BE REQUESTED IN WRITING BY THE MANUFACTURER OR OWNER. ANY ITEM SUPPLIED AS AN EQUIVALENT MUST HAVE PRIOR APPROVAL, IN WRITING, FROM THE DIRECTOR OF THE OHIO DEPARTMENT OF PUBLIC SAFETY.
- (C) A MANUFACTURER'S AND/OR DEALER'S FAILURE TO COMPLY WITH ANY OF THE RULES IN THIS CHAPTER AND ALL NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RECALLS MAY RESULT IN THE SUSPENSION OF AUTHORIZATION FOR SALE AND/OR USE OF THE CHASSIS AND/OR BODY IN THE STATE OF OHIO UNTIL SUCH DISCREPANCY IS CORRECTED BY THE MANUFACTURER OR RESPONSIBLE REPRESENTATIVE AND WRITTEN APPROVAL IS ISSUED BY THE OHIO DEPARTMENT OF PUBLIC SAFETY.
- (D) EACH MANUFACTURER SHALL FILE A STATEMENT OF COMPLIANCE WITHIN THIRTY DAYS AFTER THE EFFECTIVE DATE OF THIS RULE. THE STATEMENT SHALL CERTIFY THAT ALL PRODUCTS AND COMPONENTS MANUFACTURED FOR USE IN SCHOOL BUSES SOLD FOR USE IN OHIO, AS DEFINED IN DIVISION (F) OF SECTION 4511.01 OF THE REVISED CODE, WILL MEET OR EXCEED ALL RULES IN THIS CHAPTER.
- (E) SPECIFICATIONS SHALL BE FILED WITH THE DIRECTOR OF THE OHIO DEPARTMENT OF PUBLIC SAFETY IN DUPLICATE BY THE SCHOOL BUS CHASSIS AND/OR BODY MANUFACTURER THAT WILL MEET OR EXCEED THE STANDARDS IN THIS CHAPTER. SPECIFICATIONS BEING SUBMITTED BY THE MANUFACTURERS SHALL ALSO INCLUDE ANY SALES BROCHURES AND PERTINENT LITERATURE. WHEN NEW MODELS ARE INTRODUCED, SPECIFICATIONS SHALL BE FILED WITH THE DIRECTOR OF THE OHIO DEPARTMENT OF PUBLIC SAFETY.
- (F) PRE-DELIVERY INSPECTION SHALL BE CONDUCTED BY BOTH BODY AND CHASSIS MANUFACTURERS TO ASSURE THE BUS BEING DELIVERED IS IN SATISFACTORY OPERATING ORDER (ALL COMPONENTS) AND MEETS ALL APPLICABLE FEDERAL AND OHIO STANDARDS. THIS PREDELIVERY INSPECTION SHALL BE ACCORDING

TO THE SPECIFIC INSTRUCTIONS OF THE PURCHASER AND TO THE PURCHASER'S SATISFACTION.

- (G) THE BUS SHALL BE DELIVERED CLEAN INSIDE AND OUT.
- (H) BODY AND CHASSIS MANUFACTURERS SHALL PROVIDE A WRITTEN DOCUMENT SPECIFYING WARRANTY PROVISIONS AND ENUMERATING MAJOR PARTS AND EQUIPMENT COVERED UNDER WARRANTY. BUS BODY AND CHASSIS DEALERS SHALL BE RESPONSIBLE FOR PROVIDING FULL WARRANTY SERVICE.
- (I) THE CHASSIS MANUFACTURER SHALL PROVIDE FOR PREDELIVERY SERVICE AT THE BODY PLANT LOCATION AFTER THE BODY IS MOUNTED AND PRIOR TO DELIVERY TO THE PURCHASER. AT THE TIME OF DELIVERY, THE CHASSIS DEALER SHALL PROVIDE TO THE PURCHASER THE FOLLOWING DOCUMENTS:
 - (1) LINE SET TICKETS.
 - (2) PREDELIVERY SERVICE CHECK LIST.
 - (3) PREDELIVERY CHECK-OUT FORM BY THE CHASSIS MANUFACTURER OR DESIGNATED AGENT .
 - (4) WARRANTY BOOK AND STATEMENT OF WARRANTY.
- (J) ANY CHANGES IN DESIGN OR EQUIPMENT BY SCHOOL BUS OWNERS AFTER RECEIPT OF THE SCHOOL BUS MUST HAVE PRIOR APPROVAL IN WRITING FROM THE DIRECTOR OF THE OHIO DEPARTMENT OF PUBLIC SAFETY.
- (K) NEW PRODUCTS AND EQUIPMENT SHALL BE SUBJECT TO THE EXPERIMENTAL AND FIELD TEST EVALUATION PROCEDURES, AS DEFINED IN RULE 4501-5-09 OF THE OHIO ADMINISTRATIVE CODE.
- (L) SCHOOL BUS DEFINITIONS
 - (1) A "TYPE A SCHOOL BUS" IS A CONVERSION OR BODY CONSTRUCTED UPON A VAN-TYPE COMPACT OR CUTAWAY FRONT-SECTION VEHICLE WITH A LEFT SIDE DRIVER'S DOOR, DESIGNED FOR CARRYING MORE THAN TEN PERSONS. THIS DEFINITION SHALL INCLUDE TWO CLASSIFICATIONS: TYPE A-I WITH A GROSS VEHICLE WEIGHT RATING OVER TEN THOUSAND POUNDS; AND TYPE A-II WITH A GROSS VEHICLE WEIGHT RATING TEN THOUSAND POUNDS OR LESS.
 - (2) A "TYPE B SCHOOL BUS" IS A CONVERSION OR BODY CONSTRUCTED AND INSTALLED UPON A VAN OR FRONT-SECTION VEHICLE CHASSIS, OR STRIPPED CHASSIS, WITH A GROSS VEHICLE WEIGHT RATING OF MORE THAN TEN

THOUSAND POUNDS, DESIGNED FOR CARRYING MORE THAN TEN PERSONS. PART OF THE ENGINE IS BENEATH AND/OR BEHIND THE WINDSHIELD AND BESIDE THE DRIVER'S SEAT. THE ENTRANCE DOOR IS BEHIND THE FRONT WHEELS.

- (3) A "TYPE C SCHOOL BUS" IS A BODY INSTALLED UPON A FLAT BACK COWL CHASSIS WITH A GROSS VEHICLE WEIGHT RATING OF MORE THAN TEN THOUSAND POUNDS, DESIGNED FOR CARRYING MORE THAN TEN PERSONS, INCLUDING THE DRIVER. ALL OF THE ENGINE IS IN FRONT OF THE WINDSHIELD AND THE ENTRANCE DOOR IS BEHIND THE FRONT WHEELS.
- (4) A "TYPE D SCHOOL BUS" IS A BODY INSTALLED UPON A CHASSIS, WITH THE ENGINE MOUNTED IN THE FRONT, MIDSHIP, OR REAR, WITH A GROSS VEHICLE WEIGHT RATING OF MORE THAN TEN THOUSAND POUNDS AND DESIGNED FOR CARRYING MORE THAN TEN PERSONS, INCLUDING THE DRIVER. THE ENGINE MAY BE BEHIND THE WINDSHIELD AND BESIDE THE DRIVER'S SEAT, AT THE REAR OF THE BUS BEHIND THE REAR WHEELS, OR MIDSHIP BETWEEN THE FRONT AND REAR AXLES. THE ENTRANCE DOOR IS AHEAD OF THE FRONT WHEELS.
- (M) ALL BODY AND CHASSIS MANUFACTURERS SHALL PROVIDE A CURRENT UP-TO-DATE PARTS AND SERVICE REPAIR MANUAL (S) FOR EACH BODY AND CHASSIS. THIS IS NOT TO BE INTERPRETED AS AN OWNERS MANUAL. IF THE SCHOOL BUS OWNER IS ORDERING MORE THAN ONE OF THE SAME BODY AND CHASSIS THEN ONLY ONE PARTS AND SERVICE MANUAL WOULD BE REQUIRED.
- (N) ALL CHASSIS AND BODY REPLACEMENT PARTS SHALL BE READILY AVAILABLE FOR A MINIMUM OF FIFTEEN YEARS.
- (O) THE RESPONSIBILITY FOR COMPLIANCE WITH THESE RULES AND/OR NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RECALLS LIES WITH THE SCHOOL BUS OWNER. FAILURE TO COMPLY WITH THESE RULES AND/OR NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RECALLS SHALL CONSTITUTE CAUSE FOR THE WITHHOLDING OF STATE TRANSPORTATION FUNDS FOR SUCH TIME AND TO SUCH EXTENT AS IS NECESSARY TO ENSURE COMPLIANCE. A MANUFACTURER'S AND/OR DEALER'S FAILURE TO COMPLY WITH ANY OF THE RULES IN THIS CHAPTER AND ALL NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RECALLS MAY RESULT IN THE SUSPENSION OF AUTHORIZATION FOR SALE AND/OR USE OF THE CHASSIS AND/OR BODY IN THE STATE OF OHIO UNTIL SUCH DISCREPANCY IS CORRECTED BY MANUFACTURER OR THE RESPONSIBLE REPRESENTATIVE AND WRITTEN APPROVAL IS ISSUED BY THE OHIO DEPARTMENT OF PUBLIC SAFETY.

SCHOOL BUS OWNERS SHALL MAINTAIN ALL SCHOOL BUSES IN SUCH CONDITION THAT THEY CONTINUE TO MEET OR EXCEED OHIO SCHOOL BUS MINIMUM CONSTRUCTION STANDARDS IN EFFECT AS SUCH STANDARDS OR SPECIFICATIONS WERE SUBSEQUENTLY REPEALED OR REDUCED.

- (P) ALL SCHOOL BUS BODY AND CHASSIS MANUFACTURERS SHALL IMMEDIATELY NOTIFY THE DIRECTOR OF THE OHIO DEPARTMENT OF PUBLIC SAFETY AND THE SUPERINTENDENT OF PUBLIC INSTRUCTION OF ANY SAFETY-RELATED PRODUCT RECALLS.
- (Q) ANY COMPOSITE MATERIALS USED IN SCHOOL BUS CONSTRUCTION SHALL MEET OR EXCEED ALL APPLICABLE FMVSS IN STRENGTH AND DURABILITY.

REPLACES: RULE 3301-87-01

EFFECTIVE: SEPTEMBER 1, 1998

CERTIFICATION
 MITCHELL J. BROWN
 DIRECTOR

JANUARY 15, 1998

DATE

PROMULGATED UNDER R.C. CHAPTER 119
 RULE AUTHORIZED BY R.C. SECTION 4511.76

RULE AMPLIFIES: R.C. SECTION 4511.76
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4501-5-02 STANDARDS AND SPECIFICATIONS FOR TYPE B, C, AND D SCHOOL BUS CHASSIS

(A) DRY ELEMENT TYPE AIR CLEANER SHALL BE PROVIDED. AIR CLEANER AND ELEMENT SHALL MEET ALL APPROPRIATE SOCIETY OF AUTOMOTIVE ENGINEERS J726 TESTS FOR ENGINE APPLICATION.

(B) AXLES OR OTHER TYPES OF SUSPENSION:

(1) THE FRONT AND REAR AXLES, INCLUDING SUSPENSION ASSEMBLIES, AND ALL FRAME-TO-GROUND COMPONENTS, SHALL HAVE A GROSS AXLE WEIGHT RATING AT GROUND AT LEAST EQUAL TO THAT PORTION OF THE LOAD AS WOULD BE IMPOSED BY THE CHASSIS MANUFACTURER'S MAXIMUM GROSS VEHICLE WEIGHT RATING.

(2) ALL VEHICLES SHALL BE EQUIPPED WITH APPROPRIATE GROSS VEHICLE WEIGHT RATING AXLES OR SUSPENSION SYSTEMS AND TIRES BY THE CHASSIS MANUFACTURER.

(3) FRONT AXLE SHALL BE HEAVY-DUTY BUS TYPE.

(C) BATTERY.

(1) AN EIGHT HUNDRED COLD CRANKING AMPERES OR LARGER BATTERY SHALL BE USED WITH A GASOLINE ENGINE. A ONE THOUSAND TWO HUNDRED FIFTY COLD CRANKING AMPERES OR LARGER BATTERY, DEPENDING ON ADDITIONAL AMPERES DRAW, SHALL BE USED WITH DIESEL ENGINES.

(2) ONE-PIECE NON-SPLICED BATTERY CABLES SHALL BE PROVIDED BY THE CHASSIS MANUFACTURER. ALL CABLES SHALL CONFORM TO SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD J541 WITH RESPECT TO ELECTRICAL RESISTANCE. ALL CABLE ASSEMBLIES SHALL CONFORM TO AMERICAN TRUCKING ASSOCIATION - TRUCK MAINTENANCE COUNCIL RP105.

FIFTY PASSENGER CHASSIS SCHOOL BUS AND ABOVE WITH DIESEL ENGINE, SHALL HAVE COPPER WIRE CIRCUIT TO AND FROM STARTER.

(3) BATTERIES FOR TYPES B, C, AND D SCHOOL BUSES SHALL BE MOUNTED IN THE BODY SKIRT BY THE BODY MANUFACTURER. IN THIS CASE THE CHASSIS MANUFACTURER SHALL TEMPORARILY MOUNT THE BATTERY ON THE CHASSIS FRAME,

WITH PROPER CABLES OF APPROPRIATE LENGTH FOR MOUNTING, WHICH SHALL CONFORM TO THE SCHOOL TRANSPORTATION MANUFACTURING TECHNICAL COMMITTEE'S CURRENT OBJECTIVES. EXCEPTION: TYPE D REAR ENGINE BUS MAY HAVE BATTERIES MOUNTED IN ENGINE COMPARTMENT.

- (D) ALL BRAKING SYSTEMS AND COMPONENTS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS SPECIFIED IN APPLICABLE FMVSS 571.105, 571.121 AND THE FOLLOWING:
- (1) AIR OR HYDRAULIC BRAKE SYSTEMS ARE ACCEPTABLE. IF BRAKES ARE AIR ACTUATED, THEY SHALL BE OF THE CAM DRUM TYPE ON FRONT AND REAR WHEELS, IF BRAKES ARE HYDRAULICALLY ACTUATED, THEY SHALL BE DISC FRONT AND DRUM REAR OR FOUR WHEEL DISC. ONLY SPLIT TYPE SYSTEMS ARE ACCEPTABLE.
 - (2) ALL BRAKE LININGS INCLUDING THOSE USED IN THE PARKING BRAKE SYSTEM SHALL BE ASBESTOS FREE.
 - (3) ALL AIR BRAKE SYSTEMS SHALL HAVE BOTH VISUAL AND AUDIBLE WARNING SYSTEMS THAT ACTIVATE WHEN THE AIR PRESSURE DROPS BELOW SIXTY POUNDS PER SQUARE INCH IN ANY SERVICE RESERVOIR. HYDRAULIC BRAKE SYSTEMS THAT UTILIZE HYDRAULIC POWER ASSIST SHALL HAVE BOTH SYSTEMS TO INDICATE LOSS OF FLUID FLOW TO POWER ASSIST UNIT.
 - (4) ALL BUSES EQUIPPED WITH AIR BRAKES SHALL HAVE OIL DEFLECTORS INSTALLED BETWEEN THE REAR HUB AND DRUM TO DIVERT EXCESSIVE OIL OR GREASE FROM CONTAMINATING BRAKE LINING DUE TO A REAR AXLE SEAL LEAK.
 - (5) AIR COMPRESSORS THAT SUPPLY AIR TO BRAKES MUST HAVE A RATED CAPACITY OF AT LEAST THIRTEEN CUBIC FEET PER MINUTE AND MUST BE PRESSURE OIL FED. CLEAN AIR TO ALL COMPRESSORS SHALL BE SUPPLIED AND FILTERED THROUGH ENGINE AIR CLEANER. SEPARATE COMPRESSORS THAT SUPPLY AIR TO ACCESSORIES ONLY AND NOT BRAKING SYSTEMS, SHALL BE A MINIMUM OF NINE AND ONE HALF CUBIC FEET PER MINUTE. AIR COMPRESSOR MAY BE GEAR OR BELT DRIVEN.
 - (6) ALL AIR SUPPLIED FROM THE WET, PRIMARY, SECONDARY, AND ACCESSORY AIR TANKS SHALL BE TAKEN AT OR ABOVE THE CENTER LINE OF THE AIR TANK TO AVOID WATER ENTERING THE BRAKING SYSTEM OR AIR OPERATED ACCESSORIES.

- (7) THE WET, PRIMARY, SECONDARY, AND ACCESSORY AIR TANKS SHALL ALL BE EQUIPPED WITH MANUAL AIR TANK DRAINS.
- (8) ALL SCHOOL BUSES EQUIPPED WITH AIR BRAKES SHALL REQUIRE A DESICCANT TYPE AIR DRYER WITH "SPIN OFF" REPLACEABLE FILTER ELEMENT. DRYER SHALL INCORPORATE AN AUTOMATIC PURGE AND DRAIN CYCLE WITH HEATING ELEMENT.
- (9) ALL PARKING BRAKES SHALL BE MECHANICALLY APPLIED AND HELD. A RED INDICATOR LIGHT, LOCATED IN THE DASHBOARD WITH THE WORDS "PARKING BRAKE", SHALL LIGHT WHENEVER THE PARKING BRAKE HAS BEEN APPLIED.

(E) FRONT BUMPER

- (1) FRONT BUMPER ON ALL CONVENTIONAL-TYPE BUSES SHALL BE FURNISHED BY THE CHASSIS MANUFACTURER.
- (2) FRONT BUMPER ON ALL TRANSIT BUSES SHALL BE FURNISHED BY THE BODY MANUFACTURER.
- (3) FRONT BUMPER SHALL BE AT LEAST THREE-SIXTEENTHS OF AN INCH THICK PRESSED STEEL CHANNEL, ONE-PIECE CONSTRUCTION, WITH A MINIMUM WIDTH OF EIGHT INCHES AFTER FORMING.
- (4) FRONT BUMPER SHALL BE CONTOURED TO OFFER MAXIMUM PROTECTION OF FENDER LINES WITHOUT PERMITTING SNAGGING OR HOOKING.
- (5) FRONT BUMPER SHALL BE ATTACHED TO THE FRAME AND EXTENDED FORWARD OF GRILLE, HEAD LAMPS, FENDER, OR HOOD SECTIONS AND EXTEND THE ENTIRE WIDTH OF THE BUS TO PROVIDE MAXIMUM PROTECTION.
- (6) FRONT BUMPER SHALL BE OF SUFFICIENT STRENGTH TO PERMIT LIFTING THE BUS WITH A BUMPER TYPE LIFT FOR SERVICING AND PUSHING A VEHICLE OF EQUAL WEIGHT WITHOUT PERMANENT DISTORTION TO BUMPER, CHASSIS, OR BODY.

- (7) AN OPTIONAL ENERGY-ABSORBING FRONT BUMPER MAY BE USED, PROVIDING ITS DESIGN SHALL INCORPORATE A SELF-RESTORING ENERGY ABSORBING SYSTEM OF SUFFICIENT STRENGTH TO:
- (a) PUSH ANOTHER VEHICLE OF SIMILAR GROSS VEHICLE WEIGHT WITHOUT PERMANENT DISTORTION TO THE BUMPER, CHASSIS, OR BODY; AND
 - (b) WITHSTAND REPEATED IMPACTS WITHOUT DAMAGE TO THE BUMPER, CHASSIS, OR BODY ACCORDING TO THE FOLLOWING PERFORMANCE STANDARDS:
 - (i) SEVEN AND ONE HALF MILES PER HOUR FIXED-BARRIER IMPACT (FMVSS CART AND BARRIER TEST)
 - (ii) FOUR MILES PER HOUR CORNER IMPACT AT THIRTY DEGREES (49 CFR, CHAPTER 5, PART 581)
 - (iii) TWENTY MILES PER HOUR INTO PARKED PASSENGER CAR (CLASS B, C, AND D BUSES OF EIGHTEEN THOUSAND POUNDS GROSS VEHICLE WEIGHT RATING OR MORE)
- (F) THE MANUFACTURER OF THE ENERGY-ABSORBING SYSTEM SHALL PROVIDE EVIDENCE FROM AN APPROVED TEST FACILITY CAPABLE OF PERFORMING THE ABOVE STANDARDS TESTS THAT THEIR PRODUCT CONFORMS TO THE ABOVE.
- (G) CLUTCH - CHASSIS USING MANUAL TRANSMISSION SHALL BE EQUIPPED WITH A CLUTCH WHICH SHALL HAVE A RATED CAPACITY IN A RANGE FROM EQUAL TO THE MAXIMUM NET ENGINE TORQUE UP TO TEN PERCENT GREATER THAN THE MAXIMUM NET ENGINE TORQUE.
- (H) COLOR OF CHASSIS.
- (1) BUMPER SHALL BE PAINTED BLACK.
 - (2) COWL AND FENDER SHALL BE PAINTED NATIONAL SCHOOL BUS YELLOW.
 - (3) HOOD SHALL BE PAINTED NON-REFLECTIVE NATIONAL SCHOOL BUS YELLOW OR FLAT BLACK.

- (4) FRAME SHALL BE PAINTED BLACK.
- (5) GRILLE MAY BE PAINTED NATIONAL SCHOOL BUS YELLOW OR MAY ALSO BE CHROME OR ANODIZED ALUMINUM FINISH.
- (6) WHEELS, SPOKES AND RIMS SHALL BE PAINTED BLACK, EXCEPT RIMS THAT ARE NATURAL UNPAINTED IRON GRAY NEED NOT BE PAINTED BLACK.

(I) COOLING SYSTEM.

- (1) THE COOLING SYSTEM RADIATOR SHALL BE OF SUFFICIENT CAPACITY TO COOL THE ENGINE AT ALL SPEEDS IN ALL GEARS. THERMOSTATIC CONTROLS SHALL KEEP THE ENGINE AT THE MANUFACTURER'S RECOMMENDED OPERATING TEMPERATURE.
- (2) PERMANENT ETHYLENE-GLYCOL OR PROPYLENE-GLYCOL BASE ANTIFREEZE SHALL BE PROVIDED BY CHASSIS MANUFACTURER. ANTI-FREEZE SHALL BE COMPATIBLE WITH THE COOLING SYSTEM AND ENGINE.
- (3) THE COOLING SYSTEM SHALL BE EQUIPPED WITH A COOLANT RECOVERY OR A DEAERATION SYSTEM. THE SYSTEM SHALL BE OF SUFFICIENT SIZE TO ALLOW FOR THE ADDED EXPANSION FROM THE ADDED COOLANT NEEDED FOR THE BODY HEATING SYSTEM. THE COOLING SYSTEM SHALL HAVE A MEANS OF CHECKING THE COOLANT WITHOUT HAVING TO REMOVE THE RADIATOR CAP.
- (4) A CHASSIS EQUIPPED WITH AN AUTOMATIC TRANSMISSION SHALL HAVE A HEAVY DUTY COOLING SYSTEM TO PROVIDE ADDITIONAL COOLING REQUIRED BY THE AUTOMATIC TRANSMISSION.
- (5) THE FAN SHALL BE A VISCOUS, AIR OPERATED, OR ELECTROMAGNETIC DRIVE TYPE. THE FAN, ALTERNATOR, AND WATER PUMP MAY BE DRIVEN BY MATCHED DUAL BELTS OR A SINGLE MULTIPLE GROOVE SERPENTINE BELT OF EQUIVALENT CAPACITY.

(J) DRIVE SHAFT AND DIFFERENTIAL

- (1) DRIVE SHAFTS AND UNIVERSAL JOINTS ARE TO BE ORIGINAL EQUIPMENT MANUFACTURER STANDARD.

- (2) METAL DRIVE SHAFT GUARDS ARE REQUIRED FOR EACH DRIVE SHAFT TO PREVENT PROJECTING THROUGH THE FLOOR OR DROPPING TO THE GROUND IF BROKEN.
- (3) THE REAR AXLE RATIO SHALL BE COMPATIBLE WITH ENGINE, TRANSMISSION, AND TIRE SIZE.

(K) ELECTRICAL SYSTEM

(1) ALTERNATOR

- (a) SCHOOL BUSES WITH DESIGNED MAXIMUM CAPACITY OF THIRTY-FIVE PASSENGERS OR LARGER SHALL BE PROVIDED WITH A MINIMUM OF ONE HUNDRED FORTY-FIVE AMPERE ALTERNATOR WITH A MATCHED REGULATOR. TRANSIT BUSES WITH A DESIGNED MAXIMUM CAPACITY OF MORE THAN SEVENTY PASSENGERS SHALL BE EQUIPPED WITH A ONE HUNDRED FORTY-FIVE AMPERE ALTERNATOR MINIMUM. OUTPUT MUST BE APPROXIMATELY SIXTY AMPERES AT ENGINE MANUFACTURERS RECOMMENDED IDLE SPEED.
 - (b) ALL SCHOOL BUSES OF TWENTY-FOUR THROUGH THIRTY-FOUR DESIGNED CAPACITY SHALL BE PROVIDED WITH A MINIMUM OF ONE HUNDRED FIVE AMPERE ALTERNATOR. SCHOOL BUSES WITH TWENTY-FOUR THROUGH THIRTY-FOUR CAPACITY EQUIPPED WITH A LIFT SHALL BE PROVIDED WITH A ONE HUNDRED FORTY-FIVE AMPERE ALTERNATOR.
 - (c) ALTERNATOR SHALL BE DRIVEN BY DUAL BELTS WITH MATCHED PULLEYS AND MATCHED BELTS. A SINGLE MULTIPLE-GROOVED SERPENTINE BELT OF EQUIVALENT OR GREATER HORSEPOWER CAPACITY MAY BE USED.
- (2) VOLTAGE REGULATORS SHALL BE FULL TRANSISTOR MATCHING CAPACITY TYPE.
 - (3) CHASSIS MANUFACTURER SHALL PROVIDE AN ADEQUATE ELECTRIC POWER SOURCE TERMINAL FOR BUS BODY POWER CONNECTION. THIS TERMINAL SHALL BE CONNECTED BY NUMBER EIGHT WIRE OR LARGER WIRE OF ADEQUATE GAUGE RUNNING FROM THE POWER SUPPLY. THE TERMINAL SHALL BE OF THE SINGLE-POST TYPE, A MINIMUM OF ONE-FOURTH INCH STUD, AND LOCATED ON THE FIRE WALL ABOVE THE TOE-BOARD ON THE LEFT HAND SIDE.

- (4) ALL BUSES SHALL BE EQUIPPED WITH A VOLTMETER WITH GRADUATED SCALE TO SIXTEEN VOLTS.

(L) EXHAUST SYSTEM

- (1) EXHAUST PIPE, MUFFLER, AND TAILPIPE SHALL BE OUTSIDE BUS BODY AND ATTACHED TO CHASSIS.
- (2) MUFFLER SHALL BE HEAVY-DUTY TRUCK TYPE OF ALUMINIZED OR STAINLESS STEEL OR CERAMIC COATED TO OFFER MAXIMUM RESISTANCE TO CORROSION OR OXIDATION.
- (3) ALL EXHAUST PIPES AND TAILPIPES SHALL BE CONSTRUCTED OF SIXTEEN GAUGE ALUMINIZED STEEL TUBING OR BETTER. TAILPIPE SHALL EXTEND AT LEAST FIVE INCHES BEYOND CHASSIS FRAME WITH SUFFICIENT LENGTH TO REACH, BUT NOT TO EXTEND BEYOND THE REAR BUMPER. SHORT SECTIONS OF FLEXIBLE PIPE FOR GAS AND DIESEL ENGINES ARE PERMITTED. WHEN THE FRAME EXTENDS TO THE REAR BUMPER, FIVE INCH EXTENSION IS NOT REQUIRED.
- (4) DIAMETER OF TAILPIPE SHALL NOT BE REDUCED AFTER IT LEAVES THE MUFFLER.
- (5) THE REAR END OF TAILPIPE MUST BE LOCATED AT LEAST TWENTY INCHES TO THE RIGHT OR LEFT OF THE CENTER LINE OF THE CHASSIS. A LEFT SIDE EXIT IS PERMITTED FOR GAS AND DIESEL-POWERED BUSES. THE TAILPIPE MUST BE AT LEAST THREE INCHES IN FRONT OF THE REAR WHEEL AND BENT DOWNWARD AT A FORTY-FIVE DEGREE ANGLE SIX INCHES FROM THE END OF THE PIPE. RIGHT SIDE EXHAUST SYSTEMS ARE NOT PERMITTED.
- (6) THE EXHAUST SYSTEM ON A GAS-POWERED CHASSIS SHALL BE INSULATED FROM THE REAR FUEL TANK AND FUEL TANK CONNECTIONS BY A SECURELY ATTACHED METAL SHIELD AT ANY POINT WHERE IT IS TWELVE INCHES OR LESS FROM THE FUEL TANK. METAL SHIELD IS NOT REQUIRED ON DIESEL-POWERED BUSES.

(M) FENDERS

- (1) TOTAL SPREAD AT OUTER EDGES OF FRONT FENDERS, MEASURED AT FENDER LINE, SHALL EXCEED TOTAL SPREAD OF FRONT TIRES WHEN FRONT WHEELS ARE IN STRAIGHT AHEAD POSITION

- (2) FRONT FENDERS SHALL BE BRACED AND FREE FROM ANY BODY ATTACHMENT. TRAILING EDGE OF FRONT FENDER SHALL EXTEND TO BOTTOM OF FRONT BODY SECTION. FENDER EXTENSIONS ARE ACCEPTABLE.
 - (3) CHASSIS SHEET METAL SHALL NOT EXTEND BEYOND REAR FACE OF COWL.
- (N) FRAME
- (1) FRAME SHALL BE DESIGNED TO CORRESPOND WITH OR EXCEED STANDARD PRACTICE PERFORMANCE CRITERIA FOR TRUCKS OF SAME GENERAL LOAD SPECIFICATIONS USED FOR HIGHWAY SERVICE.
 - (2) FRAME SIDE MEMBERS SHALL BE ONE-PIECE CONSTRUCTION WITH THE FOLLOWING EXCEPTIONS:
 - (a) EXTENSION OF THESE MEMBERS SHALL BE DESIGNED, FURNISHED, AND GUARANTEED BY CHASSIS OR BODY MANUFACTURER. INSTALLATION SHALL BE GUARANTEED BY THE COMPANY INSTALLING EXTENSION. EXTENSION OF FRAME LENGTHS SHALL NOT BE FOR THE PURPOSE OF EXTENDING WHEEL BASE.
 - (b) NO HOLES SHALL BE PERMITTED IN THE CHASSIS RAILS EXCEPT THOSE DRILLED AT THE CHASSIS PLANT OR AUTHORIZED BY THE CHASSIS MANUFACTURER.
 - (c) WELDING TO CHASSIS RAILS IS PERMITTED ONLY WHEN GUARANTEED BY THE COMPANY MAKING THE MODIFICATIONS.
- (O) ALL FUEL TANK SPECIFICATIONS SHALL CONFORM WITH FMVSS 571.301.
- (1) FUEL TANK SHALL HAVE A MINIMUM CAPACITY OF THIRTY-FIVE GALLONS FOR SCHOOL BUSES UP TO AND INCLUDING FIFTY-NINE PASSENGERS. SCHOOL BUSES OF SIXTY PASSENGERS AND ABOVE SHALL HAVE A MINIMUM CAPACITY OF SIXTY GALLON WITH A FIFTY-FIVE GALLON ACTUAL DRAW. IT SHALL BE FILLED AND VENTED OUTSIDE OF THE BODY. CONSTRUCTION WILL PREVENT THE SPILLAGE OR DRAINAGE OF FUEL ON ANY PART OF THE EXHAUST SYSTEM. TYPE B BUSES FUEL TANK SHALL HAVE A MINIMUM CAPACITY OF THIRTY GALLONS WITH A TWENTY-FIVE GALLON ACTUAL DRAW.

- (2) FUEL FILTER WITH REPLACEABLE ELEMENT SHALL BE INSTALLED BETWEEN FUEL TANK AND INJECTOR PUMP. A FLEXIBLE CONNECTION WHICH IS GASOLINE AND OIL-PROOF SHALL BE PROVIDED AT ENGINE END OF FUEL LINE.
 - (3) A WATER SEPARATOR SHALL BE INSTALLED BETWEEN FUEL TANK AND ALL DIESEL ENGINE FUEL AND/OR FUEL INJECTOR PUMPS.
 - (4) DRAIN PLUG OF AT LEAST ONE-FOURTH INCH PIPE THREAD SHALL BE LOCATED IN CENTER OF BOTTOM OF TANK.
 - (5) FUEL TANK INSTALLATION SHALL BE IN ACCORDANCE WITH SCHOOL TRANSPORTATION MANUFACTURING TECHNICAL COMMITTEE'S CURRENT OBJECTIVES.
- (P) ENGINE SPEED GOVERNOR SHALL BE INSTALLED ON ALL SCHOOL BUSES. SETTING SHALL COMPLY WITH MANUFACTURER'S MAXIMUM RECOMMENDED GOVERNED SPEED AND BE SET BY THE CHASSIS MANUFACTURERS.
- (Q) HORN(S)
- (1) SCHOOL BUS SHALL BE EQUIPPED WITH DUAL HORNS OF STANDARD MAKE, EACH HORN CAPABLE OF PRODUCING COMPLEX SOUND IN BAND OF AUDIO FREQUENCIES FROM TWO HUNDRED FIFTY TO TWO THOUSAND HERTZ AND HAVING TOTAL SOUND LEVEL OF ONE HUNDRED TO ONE HUNDRED TWENTY DECIBELS WITHIN THESE FREQUENCY LIMITS WHEN MEASURED AT FIFTY FEET FROM THE VEHICLE.
 - (2) SOUND LEVEL MEASUREMENTS SHALL BE MADE WITH METER THAT COMPLIES WITH AMERICAN NATIONAL STANDARDS INSTITUTE. MEASUREMENT SHALL BE MADE WITH METER SET TO FLAT RESPONSE.
 - (3) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH AN AUDIBLE ELECTRICAL WARNING DEVICE, AUTOMATICALLY ACTUATED WHEN THE BUS IS IN REVERSE GEAR. DEVICE SHALL BE ONE HUNDRED SEVEN DECIBELS OR EQUIVALENT, MEETING SOCIETY OF AUTOMOTIVE ENGINEERS 1994. DEVICE SHALL BE MOUNTED BEHIND REAR AXLE, BETWEEN FRAME RAILS, AND SHALL EMIT INTERMITTENT SOUND. DEVICE TO BE PROVIDED AND INSTALLED BY BODY MANUFACTURER.

(R) INSTRUMENTS AND INSTRUMENT PANEL

- (1) CHASSIS SHALL BE EQUIPPED WITH THE FOLLOWING INSTRUMENTS AND GAUGES. LIGHTS IN LIEU OF GAUGES ARE NOT ACCEPTABLE.**
 - (a) SPEEDOMETER**
 - (b) ODOMETER WHICH WILL GIVE ACCRUED MILEAGE UP TO NINE HUNDRED NINETY NINE THOUSAND AND NINE HUNDRED NINETY NINE.**
 - (c) A VOLTMETER WITH A GRADUATED SCALE OF SIXTEEN VOLTS. VOLTMETER SHALL SHOW THE BATTERY VOLTAGE. IT SHALL BE OFF WHEN THE KEY IS IN THE OFF POSITION.**
 - (d) ELECTRICAL OR MECHANICAL OIL PRESSURE GAUGE.**
 - (e) ELECTRICAL WATER TEMPERATURE GAUGE.**
 - (f) FUEL GAUGE.**
 - (g) UPPER BEAM HEAD LAMP INDICATOR LIGHT.**
 - (h) LEFT AND RIGHT TURN SIGNAL INDICATOR.**
 - (i) REAR ENGINE TRANSIT TYPE D CHASSIS SHALL BE EQUIPPED WITH AN ELECTRICAL TACHOMETER.**
- (2) ALL DIESEL POWERED BUSES SHALL HAVE A WARNING SYSTEM CONSISTING OF A LIGHT AND BUZZER TO NOTIFY DRIVER OF LOW ENGINE OIL PRESSURE, LOW ENGINE COOLANT LEVEL, AND COOLANT OVERHEATING. SYSTEM SHALL NOT AUTOMATICALLY SHUT OFF ENGINE.**
- (3) ALL INSTRUMENTS SHALL BE EASILY ACCESSIBLE FOR MAINTENANCE AND REPAIR.**
- (4) THE ABOVE INSTRUMENTS AND GAUGES SHALL BE MOUNTED ON INSTRUMENT PANEL IN SUCH A MANNER THAT EACH IS CLEARLY VISIBLE TO DRIVER IN A SEATED POSITION. THE VISIBILITY OF THE INSTRUMENTS MUST COMPLY WITH FMVSS 571.101.**
- (5) ALL INSTRUMENT FACES SHALL BE ILLUMINATED.**

- (6) THE CHASSIS MANUFACTURER SHALL PROVIDE AND COVER INSTRUMENT PANEL WITH PLASTIC COVERING OR EQUIVALENT IN ORDER TO PROVIDE PROTECTION FROM PRECIPITATION FROM THE TIME OF MANUFACTURE UNTIL THE BODY IS MOUNTED.
- (S) CHASSIS LAMPS AND SIGNALS
- (1) ALL LAMPS AND THEIR INSTALLATION SHALL CONFORM TO CURRENT FMVSS 571.108.
- (2) CHASSIS SHALL BE EQUIPPED WITH SEALED BEAM HEAD LAMPS; BEAMS TO BE CONTROLLED BY A COLUMN MOUNTED DIMMER SWITCH.
- (3) A SELF-CANCELING TURN SIGNAL SHALL BE INSTALLED BY THE MANUFACTURER AS AN INTEGRAL PART OF THE STEERING COLUMN ASSEMBLY AND SHALL HAVE CIRCUIT WIRES OF SUFFICIENT LENGTH FOR THE CONNECTION OF THE BUS TURN SIGNALS BY THE SCHOOL BUS BODY MANUFACTURERS.
- (a) TURN SIGNAL SYSTEM SHALL BE INDEPENDENT UNITS AND THE CHASSIS MANUFACTURER SHALL PROVIDE A FOUR-WAY HAZARD WARNING SWITCH TO CAUSE SIMULTANEOUS FLASHING OF TURN SIGNAL LAMPS WHEN NEEDED AS VEHICULAR TRAFFIC HAZARD WARNING.
- (b) THE CHASSIS MANUFACTURER SHALL INSTALL A LEFT AND RIGHT TURN SIGNAL DIRECTION INDICATOR ON THE INSTRUMENT PANEL PLAINLY VISIBLE TO THE DRIVER.
- (c) FRONT TURN SIGNALS SHALL BE SUPPLIED BY THE CHASSIS MANUFACTURER IN COMPLIANCE WITH REQUIREMENTS OF FMVSS 571.108. PLACEMENT SHALL BE IN AN AREA MOST VISIBLE TO OTHER MOTORISTS.
- (T) OIL FILTER OF REPLACEABLE ELEMENT OR CARTRIDGE TYPE SHALL BE PROVIDED AND SHALL BE CONNECTED BY FLEXIBLE HIGH-PRESSURE TYPE HOSE WITH WIRE BRAID REINFORCEMENT THAT WILL WITHSTAND PRESSURE AND HEAT IF IT IS NOT OF BUILT-IN OR ENGINE-MOUNTED DESIGN. HOSE MUST MEET FMVSS 571.106 AND SOCIETY OF AUTOMOTIVE ENGINEERS J1402. DIESEL OIL FILTER SHALL BE MANUFACTURER'S STANDARD CAPACITY.

- (U) ALL OPENINGS MADE BY THE CHASSIS MANUFACTURER IN THE FLOORBOARD AND FIRE-WALL SHALL BE SEALED BY THE CHASSIS MANUFACTURER TO PREVENT GASES FROM ENTERING DRIVER'S COMPARTMENT. BOOTS FOR THE ACCELERATOR PEDAL, GEARSHIFT, AND EMERGENCY BRAKE, WHEN REQUIRED, SHALL BE SUPPLIED BY THE CHASSIS MANUFACTURER.

(V) POWER TRAIN

- (1) UNDER GROSS VEHICLE WEIGHT CONDITIONS THE POWER TRAIN SHALL BE CAPABLE OF MAINTAINING A SPEED OF FIFTY-FIVE MILES PER HOUR OF A ROAD GRADE OF ONE PERCENT WHEN THE ENGINE IS OPERATING AT NINETY PERCENT OF THE ENGINE MANUFACTURER'S RECOMMENDED MAXIMUM GOVERNED REVOLUTIONS PER MINUTE.

(2) DIESEL ENGINES

<u>PASSENGERS</u>	<u>MINIMUM HORSE POWER</u>	<u>MINIMUM TORQUE</u>	<u>MAXIMUM REVOLUTIONS PER MINUTE</u>
24 - 48	160	350 FOOT/POUNDS	3000
49 - 54	165	350 FOOT/POUNDS	3000
55 - 59	175	400 FOOT/POUNDS	3000
60 - 84	185	400 FOOT/POUNDS	3000

(3) GASOLINE ENGINE

<u>PASSENGERS</u>	<u>MINIMUM HORSE POWER</u>	<u>MINIMUM TORQUE</u>	<u>MAXIMUM REVOLUTIONS PER MINUTE</u>
24 - 48	160	275 FOOT/POUNDS	3800
49 - 54	180	290 FOOT/POUNDS	3800
55 - 59	180	290 FOOT/POUNDS	3800
60 - 84	190	310 FOOT/POUNDS	3800

- (4) ALL DIESEL ENGINES SHALL BE EQUIPPED WITH A TURBOCHARGER AND AIR TO AIR INTERCOOLER.
- (5) ALL DIESEL ENGINES SHALL BE EQUIPPED WITH A BLOCK HEATER. HEATER SHALL BE A MINIMUM OF SEVEN HUNDRED FIFTY WATTS.
- (6) A PRIMARY FUEL FILTER AND A FUEL WATER SEPARATOR SHALL BE INSTALLED BETWEEN FUEL TANK AND ENGINE TRANSFER/INJECTION PUMP ON DIESEL ENGINES. FUEL WATER SEPARATOR SHALL NOT SERVE AS THE ONLY FUEL FILTER.

- (7) DRY TYPE AIR CLEANER WITH AN AIR FILTER RESTRICTION INDICATOR IS REQUIRED.
 - (8) A WARNING SYSTEM SHALL CONSIST OF LIGHT/BUZZER TO ALERT THE DRIVER OF LOW OIL PRESSURE, LOW COOLANT LEVEL, AND HIGH COOLANT TEMPERATURE CONDITIONS. SYSTEM SHALL NOT AUTOMATICALLY SHUT OFF ENGINE.
 - (9) ENGINE SHALL BE EQUIPPED WITH A FAST IDLE (AIR, ELECTRONIC, OR MANUAL) THROTTLE.
- (W) HEAVY-DUTY DOUBLE -ACTING SHOCK ABSORBERS COMPATIBLE WITH THE MANUFACTURER'S RATED AXLE CAPACITY SHALL BE INSTALLED ON THE FRONT AND REAR OF THE SCHOOL BUS CHASSIS.
- (X) SPRINGS
- (1) SUSPENSION ASSEMBLIES AS SPECIFIED SHALL MAINTAIN CONTROL STABILITY OF SCHOOL BUS UNDER ALL LOADING CONDITIONS.
 - (2) SPRING OR SUSPENSION ASSEMBLIES SHALL BE DESIGNED TO CARRY THEIR PROPORTIONED SHARE OF GROSS VEHICLE WEIGHT IN ACCORDANCE WITH THE WEIGHT DISTRIBUTION AS STATED IN PARAGRAPH (CC) OF THIS RULE.
 - (3) IF LEAF-TYPE FRONT SPRINGS ARE USED, STATIONARY EYES SHALL BE PROTECTED BY FULL WRAPPER LEAF IN ADDITION TO MAIN LEAF.
 - (4) IF LEAF-TYPE REAR SPRINGS ARE USED, THEY SHALL BE OF PROGRESSIVE TYPE. WRAPPER LEAVES ON REAR SPRINGS ARE PERMISSIBLE.
- (Y) STEERING GEAR ASSEMBLY
- (1) ALL SCHOOL BUS CHASSIS IN ALL PASSENGER CAPACITIES SHALL BE EQUIPPED WITH HEAVY-DUTY, TRUCK- TYPE INTEGRAL POWER STEERING. POWER STEERING COMPONENTS SHALL BE COMPATIBLE WITH THE GROSS VEHICLE WEIGHT FOR EACH CAPACITY AS SHOWN IN CHASSIS MANUFACTURER'S OWNER'S MANUAL.
 - (2) STEERING MECHANISM SHALL PROVIDE FOR EASY ADJUSTMENT FOR LOST MOTION.

- (3) STEERING GEAR ASSEMBLY SHALL BE SO CONSTRUCTED AND GUARANTEED BY CHASSIS MANUFACTURER TO PROVIDE MAXIMUM SAFETY AND STEERING PERFORMANCE OF SCHOOL BUS UNDER ALL CONDITIONS OF LOAD AND SPEED.
- (4) NO CHANGES SHALL BE MADE IN THE STEERING MECHANISM UNLESS APPROVED BY CHASSIS MANUFACTURER.
- (5) THERE SHALL BE A CLEARANCE OF AT LEAST TWO INCHES BETWEEN STEERING WHEEL AND ANY OTHER SURFACE OR CONTROL.
- (6) CHASSIS MANUFACTURER SHALL PROVIDE AND COVER STEERING WHEEL AND COLUMN WITH A TEMPORARY PLASTIC COVERING OR EQUIVALENT IN ORDER TO PROVIDE PROTECTION FROM PRECIPITATION FROM THE TIME OF MANUFACTURE UNTIL BODY IS MOUNTED.

(Z) TIRES, RIMS, AND WHEELS

- (1) CHASSIS MANUFACTURER OR AUTHORIZED DEALER SHALL BALANCE ALL WHEELS AND MAKE NECESSARY ALIGNMENTS PRIOR TO DELIVERY.
- (2) DUAL REAR TIRES AND WHEELS SHALL BE PROVIDED ON ALL TYPE B, C AND D SCHOOL BUSES.
- (3) ALL TIRES ON A GIVEN VEHICLE SHALL BE OF SAME SIZE, CONSTRUCTION, AND CAPACITY.
- (4) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH TUBELESS RADIAL TIRES OF PROPER SIZE AND LOAD RANGE FOR CHASSIS GROSS VEHICLE WEIGHT RATINGS AND BODY COMBINATIONS AS REQUIRED BY FMVSS 120. DISC OR SPOKE WHEELS MAY BE USED.

(AA) TOW HOOKS ARE OPTIONAL ON FRONT OF BUS

(BB) TRANSMISSION.

- (1) CHASSIS MANUFACTURER SHALL FURNISH AN AUTOMATIC TRANSMISSION UNLESS THE SCHOOL BUS OWNER SPECIFIES A MANUAL TRANSMISSION.

- (2) THE AUTOMATIC TRANSMISSION SHALL INCLUDE AN EXTERNAL SPIN- ON FILTER INSTALLED IN THE TRANSMISSION OIL COOLER RETURN LINE. EXTERNAL FILTER NOT REQUIRED ON ALLISON MD-3060 TRANSMISSION.
 - (3) THE TORQUE RATING OF THE AUTOMATIC TRANSMISSION SHALL MEET OR EXCEED THE MAXIMUM TORQUE OUTPUT OF THE ENGINE.
 - (4) MANUAL TRANSMISSIONS SHALL BE FULL SYNCHROMESH IN ALL FORWARD GEARS EXCEPT FIRST AND REVERSE. MANUAL TRANSMISSIONS SHALL CONFORM TO THE FOLLOWING DESIGNED MAXIMUM CHASSIS CAPACITIES.
 - (a) TEN THROUGH FORTY-NINE PASSENGER REQUIRES A MINIMUM OF FOUR FORWARD SPEEDS AND ONE REVERSE.
 - (b) FIFTY THROUGH EIGHTY-FOUR PASSENGER REQUIRES A MINIMUM OF FIVE FORWARD SPEEDS AND ONE REVERSE. SIX SPEED TRANSMISSION IS OPTIONAL.
- (CC) ALL SCHOOL BUS CHASSIS SERIAL NUMBER IDENTIFICATION PLATES SHALL BE ATTACHED TO THE BUS AND BE CLEARLY IDENTIFIABLE AND LEGIBLE FOR THE ENTIRE LIFE OF THE BUS.
- (DD) WIRING
- (1) ALL WIRING SHALL CONFORM TO CURRENT SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS.
 - (2) TAIL LIGHT AND STOP LIGHT ELECTRICAL CONNECTIONS SHALL BE SUPPLIED BY THE CHASSIS MANUFACTURER THROUGH THE MAIN ELECTRICAL TERMINAL BLOCK, TO BE CONNECTED BY THE SCHOOL BUS BODY MANUFACTURER.

REPLACES: RULE 3301-87-02

EFFECTIVE: SEPTEMBER 1, 1998

**CERTIFICATION
MITCHELL J. BROWN
DIRECTOR**

**JANUARY 15, 1998
DATE**

**PROMULGATED UNDER R.C. CHAPTER 119
RULE AUTHORIZED BY R.C. SECTION 4511.76
RULE AMPLIFIES: R.C. SECTION 4511.76
119.032 REVIEW DATE: 3/9/03**

**PRIOR EFFECTIVE DATES: 11/01/71,
4/01/78,
7/01/88,
1/01/90**

4501-5-03 SCHOOL BUS BODY STANDARDS FOR TYPE B, C, AND D.

(A) AISLE.

- (1) MINIMUM CLEARANCE BETWEEN SEATS SHALL BE TWELVE INCHES AT SEAT LEVEL AND FOURTEEN INCHES AT TOP OF SEAT BACK.
- (2) ON TYPE D TRANSIT FORWARD CONTROL FRONT ENGINE BUSES THE AISLE SHALL NOT BE LESS THAN TWELVE INCHES BETWEEN ENGINE COVER AND ANY OTHER OBJECT (MEASURED AT FLOOR LEVEL). HOLD-DOWN FASTENING DEVICES USED ON ENGINE COVER SHALL BE DESIGNED TO PREVENT HOOKING OR CATCHING ON SHOES OR CLOTHING.

(B) BATTERIES.

- (1) BATTERIES AND ALL BATTERY CABLES SHALL BE PROVIDED BY THE CHASSIS MANUFACTURER.
- (2) BODY MANUFACTURER SHALL PROVIDE A DRAWER-TYPE PULL-OUT TRAY ON ALL TYPE B, C, AND D BUSES. THE BATTERIES SHALL BE ENCLOSED BY A COMPARTMENT CONSTRUCTED OF MILL-APPLIED ZINC STEEL PROVIDED WITH DRAIN PORTS, HOLD-DOWN CARRIER MOUNTED SO AS TO AVOID BLOCKING FILLER PORTS, AND LOCKING DEVICE TO PREVENT ACCIDENTAL OPENING. DRAWER ASSEMBLY SHALL BE COVERED WITH ACID-RESISTANT PAINT. RUSTPROOFING SHALL BE PROVIDED AND APPLIED TO BATTERY BOX. BATTERY TRAY SHALL BE EQUIPPED WITH A POSITIVE LOCKING DEVICE TO KEEP TRAY FROM SLIDING COMPLETELY OUT TO PREVENT BATTERY FROM BEING DROPPED. EXCEPTION: TYPE D REAR ENGINE BUSES - BATTERY MAY BE LOCATED IN ENGINE COMPARTMENT.

(C) REAR BUMPER

- (1) REAR BUMPER SHALL BE OF SUFFICIENT STRENGTH TO PERMIT LIFTING THE BUS WITH A BUMPER TYPE LIFT FOR SERVICING AND SHALL BE ONE PIECE, HEAVY-DUTY TYPE OF PRESSED STEEL CHANNEL, AT LEAST THREE-SIXTEENTHS INCH OF THICKNESS AND A MINIMUM OF EIGHT INCHES IN HEIGHT AFTER FORMING.

- (2) REAR BUMPER SHALL BE WRAPPED AROUND BACK CORNERS OF BUS AND EXTEND FORWARD AT LEAST TWELVE INCHES, MEASURED FROM REAR-MOST POINT OF BODY AT FLOOR LINE. REAR BUMPER SHALL ALSO PROTECT REAR CORNERS OF BODY BY EXTENDING BEYOND THE BODY EXTERIOR SIDE PANELS. THE BEND OF THE REAR BUMPER AT THE REAR BODY CORNERS SHALL BE SUFFICIENT TO ALLOW THE ENTIRE CONTOUR OF THE FORWARD END OF THE REAR BUMPER TO EXTEND NO MORE THAN ONE INCH BEYOND THE BODY LINE OF THE EXTERIOR SIDE PANELS.
- (3) BUMPER SHALL BE FASTENED TO CHASSIS FRAME SIDE RAILS IN SUCH A MANNER AS TO DEVELOP FULL STRENGTH OF BUMPER SECTION FROM REAR OR SIDE IMPACT. BRACING MATERIALS SHALL HAVE AN IMPACT RATIO COMPARABLE TO THAT OF BUMPER MATERIAL AND SHALL BE FASTENED AT THE ENDS AND RADII OF THE BUMPER, ATTACHED TO THE SIDE OF THE FRAME ONLY AND NOT TO THE BODY AT ANY POINT.
- (4) REAR BUMPER SHALL EXTEND BEYOND REAR-MOST PART OF BODY SURFACE AT LEAST ONE INCH, MEASURED AT FLOOR LINE.
- (5) NO SPACES, PROJECTIONS, OR CUTOUTS THAT WILL PERMIT A HANDHOLD ARE PERMITTED.
- (6) TWO REAR TOW HOOKS SHALL BE INSTALLED, WITH THE HOOKS AND THEIR MOUNTING OF SUFFICIENT STRENGTH TO TOW THE VEHICLE AT THE VEHICLE'S CURB WEIGHT.
- (7) FRONT ENDS OF THE BUMPER SHALL BE ENCLOSED BY ENDCAPS OR OTHER PROTECTIVE METAL OR SHALL HAVE THE ENDS ROUNDED OR TUCKED IN AND SHALL BE FREE FROM SHARP EDGES OR PROJECTIONS LIKELY TO CAUSE INJURY OR SNAGGING.
- (8) A RUBBER OR METAL STRIP SHALL BE INSTALLED TO CLOSE ANY OPENING EXCEEDING ONE-FOURTH INCH BETWEEN REAR BUMPER AND BODY METAL.

(D) COLOR OF BODY EXTERIOR AND INTERIOR.**(1) BODY EXTERIOR.**

(a) ALL EXTERIOR BODY AND CHASSIS SHEET METAL INCLUDING FIBERGLASS SHALL BE PAINTED WITH POLYURETHANE PAINT OR EQUIVALENT.

(b) COMPONENTS TO BE PAINTED BLACK:

(i) LETTERING AND NUMBERING.

(ii) BUMPERS.

(iii) FLOOR LEVEL RUB RAIL.

(iv) SEAT LEVEL RUB RAIL.

(v) BACKGROUND AREA AND HOODS FOR WARNING LIGHT SYSTEM.

(c) WHITE PAINTED EXTERIOR ROOF PANELS ARE PERMITTED.

(2) ALL INTERIOR PANELS, WALLS, AND ROOF SURFACES SHALL BE PAINTED BY THE BODY MANUFACTURER.

ALL SCHOOL BUS BODY CONSTRUCTION COMPONENTS EXCEPT (D)(1) AND (D)(2) ABOVE SHALL BE OF PRIME COMMERCIAL QUALITY MILL-APPLIED ZINC-COATED STEEL OR COMPOSITES MUST MEET OR EXCEED CURRENT STRENGTH AND DURABILITY AND ALL APPLICABLE FMVSS. THE ZINC PLATING SHALL BE ONE HUNDRED TWENTY GRAMS PER METER TWO MINIMUM COATING WEIGHT (GRADE SIXTY) OR EQUIVALENT APPLIED BY EITHER HOT DIPPING OR ELECTROPLATING. ALL SUCH CONSTRUCTION MATERIALS SHALL BE FIRE RESISTANT. DOOR HANDLES, GRAB HANDLES, INTERIOR DECORATIVE PARTS, OTHER INTERIOR PLATED PARTS, AND COMPONENTS HEAVIER THAN TWELVE GAUGE ARE EXCLUDED.

(4) PAINT FINISH COATS TO BUS BODY, HOOD, COWL, AND ALL ATTACHING SHEET METAL AND FIBERGLASS PARTS SHALL BE WARRANTED FOR SIXTY MONTHS WITH NO MILEAGE LIMIT, ONE HUNDRED PERCENT PARTS AND LABOR, FOR ADHESION AND COLOR RETENTION.

(5) PAINT SHALL BE APPLIED FOR A TOTAL DRY THICKNESS AT A MINIMUM OF ONE AND EIGHT TENTHS MILS OVER ALL PAINTED SURFACES.

(6) CONVENTIONAL BUS HOODS MAY BE PAINTED FLAT BLACK.

(E) BODY CONSTRUCTION.

(1) ALL SCHOOL BUS BODY CONSTRUCTION COMPONENTS EXCEPT, DOOR HANDLES, GRAB HANDLES, INTERIOR DECORATIVE PARTS, OTHER INTERIOR PLATED PARTS, AND COMPONENTS HEAVIER THAN TWELVE-GAUGE, SHALL BE OF PRIME COMMERCIAL QUALITY MILL-APPLIED ZINC COATED STEEL OR COMPOSITE MATERIALS. COMPONENTS MUST MEET OR EXCEED CURRENT STRENGTH AND DURABILITY AND ALL APPLICABLE FMVSS. THE ZINC PLATING SHALL BE ONE HUNDRED TWENTY GRAMS PER METER SQUARE MINIMUM COATING WEIGHT (GRADE SIXTY) OR EQUIVALENT APPLIED BY EITHER HOT DIPPING OR ELECTROPLATING. ALL SUCH CONSTRUCTION MATERIALS SHALL BE FIRE RESISTANT.

(2) ALL METAL SURFACES THAT WILL BE PAINTED SHALL BE CHEMICALLY CLEANED, ETCHED, ZINC-PHOSPHATE COATED, AND ZINC-CHROMATE OR EPOXY-PRIMED, OR CONDITIONED BY EQUIVALENT PROCESS.

(3) IN PROVIDING FOR THE REQUIREMENTS IN PARAGRAPHS (E) (1) AND (E) (2) OF THIS RULE, PARTICULAR ATTENTION SHALL BE GIVEN TO LAPPED SURFACES, WELDED CONNECTIONS OF STRUCTURAL MEMBERS, CUT EDGES, PUNCHED OR DRILLED HOLED AREAS IN SHEET METAL, CLOSED OR BOX SECTIONS, UNVENTED OR UNDRAINED AREAS, AND SURFACES SUBJECT TO ABRASION DURING VEHICLE OPERATION.

(4) UPON FINAL ASSEMBLY OF THE SCHOOL BUS BODY AND AFTER MOUNTING BODY UPON CHASSIS, THE TOTAL UNIT STRENGTH OF THE SCHOOL BUS SHALL MEET OR EXCEED ALL STRENGTH CRITERIA AS ESTABLISHED BY FMVSS 571.220 AND 571.221.

(5) BODY CONSTRUCTION SHALL PROVIDE A DUSTPROOF AND WATERTIGHT UNIT.

- (6) WHEN WATER LEAKS OR DUST LEAKS OCCUR DURING THE FIRST TWENTY-FOUR MONTHS OF USE, WHICH ARE DUE TO WORKMANSHIP AT POINT OF MANUFACTURER, THESE LEAKS SHALL BE REPAIRED ENTIRELY AT THE EXPENSE OF THE SCHOOL BUS BODY MANUFACTURER AS A PART OF THE REGULAR WARRANTY.

(7) FLOOR.

- (a) THE FLOOR SHALL BE NOT LESS THAN FOURTEEN-GAUGE MILL APPLIED ZINC-COATED STEEL. THE ZINC PLATING SHALL BE ONE HUNDRED TWENTY GRAMS PER METER SQUARE MINIMUM COATING WEIGHT (GRADE SIXTY) OR EQUIVALENT APPLIED BY EITHER HOT DIPPING OR ELECTROPLATING.
- (b) THERE SHALL BE A MAIN FLOOR CROSS MEMBER OF AT LEAST TEN-GAUGE STEEL OR EQUIVALENT PLACED AT EACH SIDE POST EXTENDING THE FULL WIDTH OF THE FLOOR PLATE AND PERMANENTLY ATTACHED.
- (c) THERE SHALL BE A MINIMUM OF TWO INTERMEDIATE FLOOR CROSS MEMBER OF AT LEAST SIXTEEN-GAUGE STEEL PLACED EQUALLY BETWEEN THE MAIN FLOOR CROSS MEMBERS AND PERMANENTLY ATTACHED.
- (8) ALL THREE LONGITUDINAL SIDE STRAINERS AND MEMBERS SHALL BE A MINIMUM OF SIXTEEN-GAUGE STEEL AND THREE INCHES WIDE.
- (a) THERE SHALL BE ONE LONGITUDINAL SIDE STRAINER OR IMPACT RAIL MOUNTED AT BELT LINE, WINDOWSILL LEVEL, AND EXTENDING AT LEAST FROM THE FRONT MAIN VERTICAL POST, EXCLUDING THE FRONT DOOR ENTRANCE, TO THE LAST MAIN VERTICAL POST ON EACH SIDE OF BODY. THIS MEMBER SHALL BE ATTACHED AT EACH VERTICAL POST.
- (b) THERE SHALL BE ONE LONGITUDINAL SIDE STRAINER MOUNTED AT THE SIDE WINDOW HEADER LEVEL AND EXTENDED COMPLETELY AROUND THE SCHOOL BUS BODY. THIS MEMBER SHALL BE ATTACHED AT EACH VERTICAL POST.

- (c) AN ADDITIONAL LONGITUDINAL SIDE STRAINER IS PERMITTED AND SHALL FORM AN INTEGRAL PART OF THE SCHOOL BUS BODY CONSTRUCTION AND MEET ALL FASTENING REQUIREMENTS.
- (d) SIDE STRAINERS USED IN BASIC CONSTRUCTION AT FLOOR LEVEL AND EXTENDING ABOVE FLOOR LINE MAY BE UTILIZED AS MOUNTING BASE AT WALL LINE FOR RAIL-MOUNTED SEATS.

(9) RUB RAILS.

- (a) BODY MANUFACTURERS SHALL INSTALL ONE RUB RAIL AT APPROXIMATELY SEAT LEVEL, EXCEPT FOR OPENING FOR ENGINE COMPARTMENT SIDE DOOR IN A TYPE D BUS. THIS RAIL SHALL EXTEND FROM THE MAIN VERTICAL POST BEHIND THE ENTRANCE DOOR TO THE FORWARD-MOST VERTICAL POST ON THE LEFT SIDE OF THE BODY, INCLUDING LEFT SIDE EMERGENCY DOOR.
- (b) A SECOND RUB RAIL SHALL BE INSTALLED AT APPROXIMATELY THE FLOOR LINE AND COVER THE SAME LONGITUDINAL AREA AS THE SEAT LEVEL RAIL, EXCEPT AT WHEEL HOUSINGS, AND SHALL EXTEND THE RADII OF RIGHT AND LEFT REAR CORNERS. A THIRD RUB OR SNOW RAIL MAY BE INSTALLED ON LOWER EDGE OF SKIRT PANEL. RAIL MAY BE PAINTED EITHER BLACK OR NATIONAL SCHOOL BUS YELLOW.
- (c) ALL RUB RAILS SHALL BE ATTACHED AT EACH BODY POST AND ALL OTHER UPRIGHT STRUCTURAL MEMBERS.
- (d) ALL RUB RAILS SHALL BE FOUR INCHES OR MORE IN WIDTH AFTER FORMED AND SHALL BE A MINIMUM OF SIXTEEN-GAUGE STEEL, CORRUGATED, OR RIBBED PATTERN.
- (e) ALL RUB RAILS SHALL BE MOUNTED OUTSIDE BODY PANELS.
- (f) EXTERNAL LONGITUDINAL MEMBERS ARE PERMISSIBLE IN ADDITION TO ALL PREVIOUSLY SPECIFIED MEMBERS IF THEY FORM AN INTEGRAL PART OF THE BODY CONSTRUCTION AND MEET THE FASTENING REQUIREMENTS.

- (10) TWO OR MORE ROOF STRAINERS OR LONGITUDINAL MEMBERS SHALL BE PROVIDED TO CONNECT, TO REINFORCE FLATTEST PORTION OF ROOF SKIN, AND TO SPACE ROOF BOWS. THESE STRAINERS MAY BE INSTALLED BETWEEN ROOF BOWS OR APPLIED EXTERNALLY. THEY SHALL EXTEND FROM THE WINDSHIELD HEADER AND ARE TO FUNCTION AS CONTINUOUS LONGITUDINAL ROOF MEMBERS. AT ALL POINTS OF CONTACT BETWEEN STRAINERS OR LONGITUDINAL MEMBERS AND OTHER STRUCTURAL MATERIAL, ATTACHMENT SHALL BE MADE BY MEANS OF WELDING, RIVETING, OR BOLTING.
- (11) REAR CORNER CONSTRUCTION OF THE BUS BODY BETWEEN THE FLOOR AND WINDOWSILL AND BETWEEN THE EMERGENCY DOOR POSTS AND LAST VERTICAL SIDE POSTS SHALL CONSIST OF AT LEAST THREE STRUCTURAL MEMBERS WHICH WILL PROVIDE IMPACT AND PENETRATION RESISTANCE EQUAL TO OR GREATER THAN THAT PROVIDED BY FRAME MEMBERS IN THE SIDES OF THE BODY. SUCH STRUCTURAL MEMBERS SHALL BE SECURELY ATTACHED AT EACH END.
- (12) IF THE CEILING IS SO CONSTRUCTED TO CONTAIN LAP JOINTS, THE FORWARD PANEL SHALL BE LAPPED BY THE REAR PANEL AND THE EXPOSED EDGES SHALL BE BEADED, HEMMED, FLANGED OR OTHERWISE TREATED TO MINIMIZE SHARP EDGES.
- (13) ALL BODY COMPONENTS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO AVOID THE ENTRAPMENT OF MOISTURE.

(F) DEFROSTER.

- (1) DEFROSTER SYSTEM SHALL EXCEED SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD J381-J382 PERFORMANCE REQUIREMENTS WITHOUT USE OF AUXILIARY FAN AND WITH THREE GALLONS PER MINUTE ONE HUNDRED SEVENTY DEGREE WATER APPLIED.
- (2) ALL MANUFACTURERS SHALL DEMONSTRATE THE CAPABILITIES OF THEIR HEATING AND DEFROSTING SYSTEM PRIOR TO BID AWARD UPON REQUEST. SUPPLEMENTAL COOLANT ADDITIVE LEVEL SHALL MEET ENGINE ORIGINAL EQUIPMENT MANUFACTURER SPECIFICATIONS. LEVELS SHALL BE RECORDED AT PRE-DELIVERY.

- (3) A DEFROSTER SYSTEM OF SUFFICIENT CAPACITY TO KEEP WINDSHIELD AREA, LEFT FRONT SIDE WINDOW TO REAR OF THE DRIVER'S VISION, AND SERVICE DOOR GLASS AREA FREE OR CONDENSATION OR ICE UNDER ALL POSSIBLE COMBINATIONS OF PUPIL LOAD AND CLIMATIC CONDITIONS SHALL BE INSTALLED.
- (4) DEFROSTER SYSTEM SHALL BE CAPABLE OF PROVIDING AT LEAST SIXTY PERCENT FRESH AIR.
- (5) TWO ADJUSTABLE SIX-INCH AUXILIARY DEFROSTER FANS SHIELDED WITH SMALL MESH METAL OR POLYPROPYLENE GUARDS SHALL BE INSTALLED.
 - (a) FANS SHALL BE MOUNTED TO COMPLEMENT THE DEFROSTER SYSTEM USED BY THE MANUFACTURER.
 - (b) AUXILIARY DEFROSTER FANS SHALL BE CONTROLLED INDIVIDUALLY BY TWO-SPEED SWITCHES LOCATED IN THE ELECTRICAL CONTROL PANEL.

(G) DOORS.

(1) SERVICE DOORS.

- (a) SERVICE DOOR SHALL BE OUTWARD OPENING SPLIT TYPE ON ALL TYPE B, C, AND D BUSES. SERVICE DOOR SHALL BE AIR, ELECTRIC, OR MANUALLY OPERATED. DOOR SHALL BE UNDER THE CONTROL OF THE DRIVER AND DESIGNED TO AFFORD EASY RELEASE AND PREVENT ACCIDENTAL OPENING. WHEN A MANUAL LEVER IS USED, NO PARTS SHALL COME TOGETHER SO AS TO SHEAR OR CRUSH FINGERS. LEVER SHALL BE EQUIPPED WITH AN APPROVED SAFETY LATCH TO PREVENT ACCIDENTAL OPENING WHICH WILL LOCK IN THE OVER-CENTER POSITION WHEN DOOR IS FULLY OPENED. MANUALLY OPERATED DOORS SHALL REQUIRE NO MORE THAN TWENTY-FIVE POUNDS OF PULL TO CLOSE AND MAY BE HYDRAULICALLY ASSISTED.
- (b) MANUAL DOOR CONTROL MECHANISM SHALL BE HEAVY-DUTY BEARING TYPE, ADJUSTABLE FOR WEAR, NON-CORROSIVE, ANODIZED STEEL, OR EQUIVALENT.

- (c) SERVICE DOOR SHALL BE LOCATED ON RIGHT SIDE OF BUS OPPOSITE THE DRIVER AND WITHIN THE DRIVER'S DIRECT VIEW.
- (d) SERVICE DOOR SHALL HAVE MINIMUM HORIZONTAL OPENING OF TWENTY-FOUR INCHES AND MINIMUM VERTICAL OPENING OF SIXTY-EIGHT INCHES.
- (e) GLASS IN SERVICE DOOR SHALL PROVIDE MAXIMUM AREA OF VISIBILITY FOR OPERATION OF BUS.
- (f) ALL EDGES OF SERVICE DOOR SHALL BE SEALED BY FLEXIBLE RUBBER OR EQUIVALENT MATERIAL TO PREVENT AIR FROM ENTERING DOOR ENTRANCE WHEN CLOSED.
- (g) THERE SHALL BE NO SAFETY RAIL OR HANDHOLDS MOUNTED ON THE SERVICE DOOR.
- (h) THERE SHALL BE A HEAD BUMPER PAD INSTALLED ON THE INSIDE AT THE TOP OF THE ENTRANCE DOOR. THIS PAD SHALL BE APPROXIMATELY FOUR INCHES IN WIDTH AND EXTEND ACROSS THE ENTIRE TOP OF THE ENTRANCE DOOR OPENING.
- (i) SERVICE DOOR SHALL HAVE SUITABLE ACCESS FOR EASY LUBRICATION.
- (j) ALL ELECTRICALLY OR AIR-OPERATED SERVICE DOORS SHALL BE EQUIPPED WITH A SWITCH OR LEVER LOCATED IN EITHER HINGED PANEL ABOVE THE ENTRANCE DOOR OR ABOVE THE PASSENGER SIDE WINDSHIELD THAT HAVE EMERGENCY AND NORMAL POSITIONS. THE SWITCH OR LEVER SHALL BE IDENTIFIED BY A DECAL WITH THE HEADING "ENTRANCE DOOR OPERATION." THE WORDS "EMERGENCY" AND "NORMAL" WILL BE PLACED WHERE SWITCH LEVER IS LOCATED WHEN IN THESE POSITIONS.
- (k) WHEN THE SWITCH OR LEVER IS IN THE EMERGENCY POSITION, IT WILL OVERRIDE DOOR CONTROL IN DRIVER'S AREA MAKING IT NON-OPERATIONAL IN ANY OF THE DOOR CONTROL POSITIONS.

(l) WHENEVER THE SWITCH OR LEVER IS PLACED IN THE EMERGENCY POSITION, IT WILL ALLOW THE SERVICE DOOR TO BE OPENED OR CLOSED FREELY IN THE EVENT OF AN EMERGENCY.

(m) AIR DOOR SWITCHES AND DISTRIBUTION BLOCK THAT CONTROL EIGHT LIGHT WARNING SYSTEMS SHALL BE SECURELY FASTENED NEAR THE DOOR CONTROL VALVE IN THE SWITCH PANEL AND SHALL BE EASILY ACCESSIBLE FOR SERVICE OR REPAIR.

(2) EMERGENCY DOORS.

(a) EMERGENCY DOORS SHALL MEET FMVSS 571.217 AND BE DESIGNED TO BE OPENED FROM INSIDE AND OUTSIDE OF BUS AND SHALL BE EQUIPPED WITH A FASTENING DEVICE WHICH MAY BE QUICKLY RELEASED, BUT IS DESIGNED TO OFFER PROTECTION AGAINST ACCIDENTAL RELEASE.

(b) ALL EMERGENCY DOORS SHALL BE EQUIPPED WITH SLIDE BAR-CAM OR GEAR-OPERATED LATCH. EMERGENCY DOOR LATCH SHALL BE EQUIPPED WITH SUITABLE ELECTRIC PLUNGER TYPE SWITCH CONNECTED TO TWO BUZZERS, WITH ONE LOCATED AT EMERGENCY DOOR AND THE OTHER IN DRIVER'S COMPARTMENT. SWITCH SHALL BE ENCLOSED IN METAL OR EQUIVALENT COMPOSITE MATERIAL CASE, AND WIRES LEADING FROM SWITCH SHALL BE CONCEALED IN THE SCHOOL BUS BODY. SWITCH SHALL BE SO INSTALLED THAT PLUNGER CONTACTS FARTHEST EDGE OF SLIDE BAR IN SUCH A MANNER THAT ANY MOVEMENT OF SLIDE BAR WILL IMMEDIATELY CLOSE CIRCUIT ON SWITCH AND ACTIVATE BOTH BUZZERS AND ALL DOME LIGHTS, DRIVER DOME LIGHT EXCLUDED. A SEPARATE INTERIOR HANDLE SHALL BE PROVIDED TO PULL THE DOOR SHUT FROM THE INSIDE.

(c) EXTERIOR DOOR HANDLE SHALL BE OF PERMANENT HITCH-PROOF DESIGN AND MOUNTED WITH ENOUGH CLEARANCE TO PERMIT OPENING WITHOUT TOUCHING DOOR SURFACE.

(d) ALL EMERGENCY DOOR OPENINGS SHALL BE COMPLETELY WEATHER-STRIPPED.

- (e) OPERATION INSTRUCTIONS FOR OPENING THE DOOR SHALL BE LETTERED OR DECALED ON THE INSIDE OF THE EMERGENCY DOOR.
- (f) THERE SHALL BE NO STEP-TYPE MECHANISM IN THE USE OF THE EMERGENCY DOOR.
- (g) NO SEAT, CHASSIS OR BODY COMPONENT SHALL BE INSTALLED IN THE AISLEWAY LEADING TO THE EMERGENCY DOOR. THIS REQUIREMENT DOES NOT APPLY TO A REAR ENGINE TYPE D BUS.
- (h) EMERGENCY DOOR SHALL DISPLAY THE WORDS "EMERGENCY DOOR" BOTH INSIDE AND OUTSIDE IN LETTERS AT LEAST TWO INCHES HIGH. WORDS SHALL BE PLACED DIRECTLY ABOVE THE EMERGENCY DOOR OR ON THE UPPER PORTION OF THE DOOR.
- (i) REAR EMERGENCY DOOR.
 - (i) ON ALL BUSES, EXCEPT REAR-ENGINE TRANSITS, AN EMERGENCY DOOR SHALL BE LOCATED IN THE REAR OF THE SCHOOL BUS BODY AND CENTERED WITH RESPECT TO THE BODY.
 - (ii) EMERGENCY DOOR SHALL HAVE A MINIMUM HORIZONTAL OPENING OF TWENTY-FOUR INCHES AND A MINIMUM VERTICAL OPENING OF FORTY-EIGHT INCHES MEASURED FROM FLOOR LEVEL.
 - (iii) REAR EMERGENCY DOOR SHALL BE HINGED ON RIGHT SIDE AND SHALL OPEN OUTWARD.
 - (iv) THE REAR EMERGENCY DOOR SHALL CONTAIN UPPER AND LOWER GLASS PANELS AND SHALL BE ACCOMPANIED BY A NUMBER DESIGNATING GLAZING STANDARD FROM AMERICAN NATIONAL INSTITUTE, TWO TEMPERED OR BETTER AND COMPLY WITH FMVSS 571.205.
 - (v) GLASS IN EMERGENCY DOOR SHALL PROVIDE MAXIMUM AREA OF VISIBILITY FOR SAFE OPERATION OF SCHOOL BUS.

- (vi) THERE SHALL BE A HEAD BUMPER PAD INSTALLED OVER THE EMERGENCY DOOR ON THE INSIDE OF THE SCHOOL BUS BODY. THIS PAD SHALL BE AT LEAST THE WIDTH OF THE DOOR OPENING. PADDING SHALL BE OF THE SAME MATERIAL AS THE PADDING USED OVER THE SERVICE DOOR EXIT.

(j) LEFT SIDE EMERGENCY DOOR.

- (i) ON ALL REAR-ENGINE TRANSIT SCHOOL BUSES, A SIDE EMERGENCY DOOR SHALL BE LOCATED IN THE REAR HALF OF THE LEFT SIDE OF THE BUS BODY. THE DOOR SHALL BE HINGED ON THE FRONT SIDE. A THEATER TYPE FLIP UP SEAT BOTTOM IS PERMITTED TO ACHIEVE A MINIMUM TWELVE INCH AISLE.

- (ii) IF A DOOR SILL OR HEATER LINE EXTENDS ABOVE THE FLOOR LINE, A RAMP SHALL BE PROVIDED COVERING THE AREA OVER WHICH A FOOT MUST PASS AS AN INDIVIDUAL EXITS THROUGH THE DOOR.

(3) EMERGENCY SIDE WINDOW EXITS.

- (a) ALL TYPE B, C, AND D SCHOOL BUSES SHALL BE EQUIPPED WITH SIDE WINDOW EMERGENCY EXITS.
- (b) SCHOOL BUSES WITH DESIGNED MAXIMUM SEATING CAPACITY OF LESS THAN FIFTY SHALL HAVE TWO EMERGENCY SWING OUT WINDOWS, ONE ON EACH SIDE LOCATED MIDWAY BETWEEN THE FRONT AND REAR SIDE WINDOWS.
- (c) SCHOOL BUSES WITH A DESIGNED MAXIMUM SEATING CAPACITY OF FIFTY OR LARGER SHALL HAVE TWO EMERGENCY SWING OUT WINDOWS ON THE RIGHT AND LEFT SIDE OF THE BODY. THESE WINDOWS SHOULD BE LOCATED IN THE FRONT AND REAR THIRD OF THE BUS.
- (d) EMERGENCY WINDOW GLASS SHALL BE ACCOMPANIED BY A NUMBER DESIGNATING GLAZING STANDARD FROM AMERICAN NATIONAL STANDARDS INSTITUTE, TWO TEMPERED OR BETTER.

- (e) EMERGENCY WINDOW SHALL DISPLAY THE WORDS "EMERGENCY EXIT" IN LETTERS AT LEAST TWO INCHES HIGH, BOTH INSIDE AND OUTSIDE THE WINDOW. WORDS SHALL BE PLACED NO MORE THAN THREE INCHES DIRECTLY ABOVE WINDOW.
- (f) EMERGENCY WINDOWS SHALL ACTIVATE EMERGENCY DOOR BUZZER IN DRIVER'S COMPARTMENT AND ALL DOME LIGHTS WHEN NOT FULLY LATCHED, DRIVER DOME LIGHTS EXCLUDED. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN THE ON-OFF AND ACCESSORY POSITIONS.

(4) EMERGENCY WINDOWS, TYPE D REAR-ENGINE BUSES.

- (a) AN EMERGENCY WINDOW SHALL BE INSTALLED ABOVE THE ENGINE COMPARTMENT AND SHALL BE NO SMALLER THAN SIXTEEN INCHES IN HEIGHT AND FIFTY-FOUR INCHES IN WIDTH.
- (b) EMERGENCY WINDOW GLASS SHALL BE ACCOMPANIED BY A NUMBER DESIGNATING GLAZING STANDARD FROM AMERICAN NATIONAL STANDARDS INSTITUTE OF TWO TEMPERED OR BETTER.
- (c) WINDOWS SHALL BE HINGED FROM TOP AND PROVIDED WITH A DEVICE TO ENSURE AGAINST ACCIDENTAL LOCKING DURING AN EMERGENCY.
- (d) EMERGENCY WINDOW IN REAR SHALL BE EQUIPPED WITH LATCH ON THE INSIDE, AND ALSO BE EQUIPPED WITH A HANDLE OF HITCH PROOF DESIGN WHICH WILL PERMIT OPENING FROM THE OUTSIDE.
- (e) EMERGENCY WINDOW SHALL DISPLAY THE WORDS "EMERGENCY EXIT" IN LETTERS AT LEAST TWO INCHES HIGH, BOTH INSIDE AND OUTSIDE THE WINDOW. WORDS SHALL BE PLACED NO MORE THAN THREE INCHES DIRECTLY ABOVE WINDOW.
- (f) EMERGENCY WINDOWS SHALL ACTIVATE EMERGENCY DOOR BUZZER IN THE DRIVER'S COMPARTMENT AND ALL DOME LIGHTS WHEN NOT FULLY LATCHED, DRIVER DOME LIGHTS EXCLUDED. BUZZER AND DOME LIGHTS WILL BE OPERATIONAL WITH KEY IN THE ON-OFF OR ACCESSORY POSITIONS.

- (g) IF THE TYPE D BUS IS EQUIPPED WITH A LEFT SIDE EMERGENCY DOOR, THEN ONLY ONE EMERGENCY SWING OUT SIDE WINDOW IS REQUIRED ON THE LEFT SIDE OF THE BODY MIDWAY BETWEEN THE DRIVER WINDOW AND THE LEFT SIDE EMERGENCY DOOR.

(5) EMERGENCY ROOF ESCAPE EXIT TYPE B, C, AND D BUSES.

- (a) BUSES THAT HAVE FIFTY OR LARGER DESIGNED MAXIMUM CAPACITY SHALL HAVE A MINIMUM OF TWO ROOF VENTILATOR EMERGENCY ESCAPE EXITS LOCATED IN THE FRONT THIRD AND REAR THIRD OF THE BUS.
- (b) BUSES THAT ARE LESS THAN FIFTY CAPACITY SHALL HAVE A MINIMUM OF ONE ROOF VENTILATOR EMERGENCY ESCAPE EXIT LOCATED IN THE MIDDLE OF THE BUS.
- (c) ROOF ESCAPE HATCHES/VENTS SHALL BE ADJUSTABLE AND OF SUFFICIENT CAPACITY TO PROVIDE ADEQUATE FRESH AIR UNDER OPERATING CONDITIONS WITHOUT THE OPENING OF WINDOWS, EXCEPT IN EXTREMELY WARM WEATHER. THIS VENT SHALL HAVE MULTI-POSITIONS AND SHALL BE STATIC-TYPE WITH EXHAUST VENT. THE VENT SHALL HAVE A RELEASE HANDLE OR HANDLES PERMITTING OPERATING AS AN EMERGENCY EXIT WHICH CAN BE OPENED FROM INSIDE OR OUTSIDE THE SCHOOL BUS. A BUZZER SHALL SOUND WHEN THE VENT IS OPENED IN THE ESCAPE POSITION. ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHTS EXCLUDED) AND EMERGENCY DOOR BUZZER LOCATED IN DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHEN THE ROOF HATCH IS OPEN PAST THE VENT POSITION. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON-OFF" OR ACCESSORY POSITIONS. POWER FOR EMERGENCY LIGHTING AND BUZZER SHALL BE SUPPLIED BY TWELVE VOLT SUPPLY LINE GOING TO THE BODY CONTINUOUS DUTY SOLENOID. THE SYSTEM SHALL BE PROTECTED BY A CIRCUIT BREAKER. BUSES HAVE ONE COMBINATION UNIT LOCATED IN THE MIDDLE OF THE BUS. BUSES WITH FIFTY PASSENGER DESIGNED MAXIMUM CAPACITY, OR GREATER, SHALL HAVE TWO COMBINATION VENTS INSTALLED IN THE BUS. THE MULTI-FUNCTIONAL ROOF VENTS/EMERGENCY EXITS MUST MEET ALL REQUIREMENTS OF FMVSS 571.217.

(H) EMERGENCY EQUIPMENT SHALL BE MOUNTED IN THE DRIVER'S COMPARTMENT AREA IN AN EASILY ACCESSIBLE LOCATION.

(1) BUS SHALL BE EQUIPPED WITH AT LEAST ONE DRY-CHEMICAL-TYPE FIRE EXTINGUISHER OF AT LEAST FIVE-POUND CAPACITY, 3A - 40 B.C. RATING, MOUNTED IN A QUICK RELEASE-TYPE BRACKET AND EASILY ACCESSIBLE FROM THE DRIVER COMPARTMENT. THE EXTINGUISHER SHALL BE EQUIPPED WITH A DIAL-TYPE GRADUATED GAUGE WHICH INDICATES LOSS OF PRESSURE. FIRE EXTINGUISHER SHALL BE OF THE TYPE THAT PERMITS THE DRY-CHEMICAL CASE TO BE REFILLED BY ORDINARY PROCEDURES. FIRE EXTINGUISHER SHALL BE EQUIPPED WITH METAL HEAD.

(2) FIRST AID KITS SHALL BE DUSTPROOF, PLAINLY LABELED, MOUNTED IN A LOCATION EASILY ACCESSIBLE TO THE DRIVER, AND SECURELY MOUNTED IN A METAL OR PLASTIC CONTAINER. MINIMUM UNITS FOR THE SCHOOL BUS SHALL BE AS FOLLOWS: A SIXTEEN-UNIT KIT SHALL BE USED ON BUSES LESS THAN FIFTY DESIGNED MAXIMUM CAPACITY. A TWENTY-FOUR UNIT KIT IS REQUIRED FOR BUSES OF FIFTY OR MORE DESIGNED MAXIMUM CAPACITY.

(3) CONTENTS OF SIXTEEN-UNIT FIRST AID KIT:
3 UNITS - 1 INCH ADHESIVE COMPRESS
2 UNITS - 2 INCH BANDAGE COMPRESS
1 UNIT - 3 INCH BANDAGE COMPRESS
1 UNIT - 4 INCH BANDAGE COMPRESS
1 UNIT - 3 INCH X 3 INCH PLAIN GAUZE PADS
1 UNIT - 4 INCH GAUZE ROLLER BANDAGE
2 UNITS - PLAIN ABSORBENT GAUZE - 1/2 SQUARE YARD
2 UNITS - PLAIN ABSORBENT GAUZE - 24 INCH X 72 INCH
3 UNITS - TRIANGULAR BANDAGES

(4) CONTENTS OF TWENTY-FOUR-UNIT FIRST AID KIT:
4 UNITS - 1 INCH ADHESIVE COMPRESS
3 UNITS - 2 INCH BANDAGE COMPRESS
2 UNITS - 3 INCH BANDAGE COMPRESS
1 UNIT - 4 INCH BANDAGE COMPRESS
1 UNIT - 3 INCH X 3 INCH PLAIN GAUZE PADS
2 UNITS - 4 INCH GAUZE ROLLER BANDAGE
4 UNITS - PLAIN ABSORBENT GAUZE - 1/2 SQUARE YARD
3 UNITS - PLAIN ABSORBENT GAUZE - 24 INCH X 72 INCH
4 UNITS - TRIANGULAR BANDAGES

THREE TRIANGLE REFLECTORS WITH WEIGHTED STANDS SHALL BE PROPERLY ENCASED FOR EASY STORAGE. SIX THIRTY-MINUTE FUSEES SHALL BE ENCASED WITH THE TRIANGLE REFLECTORS. THE TRIANGLE REFLECTORS SHALL MEET FMVSS 571.125. THE REFLECTORS AND FUSEES SHALL BE ENCASED TOGETHER IN A HEAVY-DUTY CONTAINER. A LOCKABLE METAL BRACKET SHALL BE PROVIDED TO HOLD THESE ITEMS AND SHALL BE MOUNTED WITHIN EASY ACCESS OF THE DRIVER.

- (6) ONE BODY FLUID KIT SHALL BE REQUIRED. BODY FLUID CLEAN-UP KITS SHALL MEET ALL APPLICABLE STATE AND FEDERAL REGULATIONS. THE KIT SHALL CONTAIN THE FOLLOWING ITEMS:
- (a) EFFECTIVE CHLORINE ABSORBENT DEODORANT.
 - (b) EFFECTIVE GERMICIDAL DETERGENT. IF DETERGENT CONTAINS ALCOHOL, NO MORE THAN ONE FLUID OUNCE IS PERMITTED IN A SINGLE-USE DISPOSABLE CONTAINER.
 - (c) SINGLE-USE, DISPOSABLE BAG
 - (D) SINGLE-USE, DISPOSABLE SCRAPER
 - (e) MINIMUM OF ONE PAIR OF DISPOSABLE, SINGLE-USE, EFFECTIVE PROTECTIVE GLOVES.
 - (f) EFFECTIVE HAND RINSE. IF HAND RINSE CONTAINS ALCOHOL, NO MORE THAN ONE-HALF FLUID OUNCE IS PERMITTED IN A SINGLE-USE DISPOSABLE CONTAINER.
 - (g) THE BODY FLUID CLEAN-UP KIT SHALL BE EASILY ACCESSIBLE TO THE DRIVER IN THE AREA OF THE FIRST AID KIT AND SHALL BE SECURELY MOUNTED IN A METAL CONTAINER.
 - (h) IF ALCOHOL IS INCLUDED, THE BODY FLUID CLEAN-UP KIT SHALL NOT CONTAIN MORE THAN ONE AND ONE-HALF FLUID OUNCES OF ALCOHOL.

(I) FLOOR COVERING.

- (1) ALL FLOOR COVERING SHALL BE FIRE RESISTANT AND PERMANENTLY BONDED TO THE FLOOR AND MUST NOT CRACK OR LOSE ITS ADHESIVE POWER WHEN VEHICLE IS SUBJECTED TO SUDDEN CHANGES IN TEMPERATURE. BONDING OR ADHESIVE MATERIAL SHALL BE WATERPROOF AND RECOMMENDED BY THE MANUFACTURER OF THE FLOOR COVERING MATERIAL.**
- (2) UNDERSEAT AREAS SHALL HAVE A SMOOTH FIRE-RESISTANT FLOOR COVERING, HAVING A MINIMUM OVERALL THICKNESS OF ONE-EIGHTH INCH. THE ENTIRE JOINT BETWEEN THE FLOOR COVERING AND THE WALL OF THE SCHOOL BUS BODY SHALL BE COVERED WITH A CURVED, FITTED, RUST-FREE METAL OR COMPOSITE MOLDING OR REFORMED INTERIOR PANEL.**
- (3) DRIVER'S COMPARTMENT FLOOR AREA SHALL PROVIDE SURE FOOTING WHEN WET AND BE OF THE SAME QUALITY MATERIAL AS THE UNDERSEAT FLOOR COVERING. THE DRIVER'S COMPARTMENT FLOOR COVERING SHALL BE PERMANENTLY BONDED TO THE FLOOR. A FLOOR MAT IS NOT ACCEPTABLE.**
- (4) CENTER AISLE COVERING SHALL BE FIRE-RESISTANT, NON-SKID, WEAR-RESISTANT AND RIBBED. MINIMUM THICKNESS SHALL BE ONE HUNDRED EIGHTY-SEVEN THOUSANDTHS INCH MEASURED FROM THE TOP OF THE RIBS.**
- (5) A TRANSMISSION INSPECTION PLATE SHALL BE INSTALLED FOR EASY SERVICING OF THE CLUTCH AND TRANSMISSION. THE PLATE SHALL BE INSTALLED ABOVE THE REGULAR FLOOR COVERING WHEN POSSIBLE AND SHALL NOT BE UNDERCOATED.**
- (6) BRAKE, GEAR SHIFT, AND ACCELERATOR BOOTS SUPPLIED BY THE CHASSIS MANUFACTURER SHALL BE INSTALLED BY THE SCHOOL BUS BODY MANUFACTURER.**
- (7) METAL OR COMPOSITE MOLDING OR NON-METAL WELDING IS ACCEPTABLE.**
 - (a) METAL OR COMPOSITE MOLDING OR NON-METAL WELDING SHALL COVER ALL FLOOR-COVERING JOINTS BETWEEN THE RIBBED CENTER AISLE AND SMOOTH UNDERSEAT FLOOR COVERING.**

- (b) COVE MOLDING IS REQUIRED AT THE JUNCTION OF THE FLOOR COVERING AND SIDE WALL. MOLDING MAY BE FORMED TO THE SIDE WALL PANEL OR SEPARATE COVER BASE.
- (c) MOLDING AROUND THE WHEEL-WELL AND FLOOR COVERING SHALL BE PROVIDED TO SEAL FLOOR COVERING WITH THE WHEELWELL.
- (8) ACCELERATOR BOOT WILL BE USED AROUND THE ACCELERATOR ROD PASSING THROUGH THE TOE-BOARD OR FLOORBOARD TO PREVENT FUMES OR DUST FROM ENTERING THE DRIVER'S COMPARTMENT.
- (9) ENTRANCE STEP TREADS, INCLUDING THE EDGE AT FLOOR LEVEL, SHALL BE OF THE SAME QUALITY AS THE AISLE MATERIAL AND SHALL BE FORMED WITH A MINIMUM TURNDOWN LIP OF THREE-FOURTHS INCH. STEP TREADS SHALL HAVE AN INTEGRAL WHITE, YELLOW OR ORANGE NOSING OF ONE AND ONE-HALF INCH OR MORE OR USE DIAGONAL STRIPES. TREADS SHALL BE PERMANENTLY BONDED TO THE METAL STEPS AND SEALED TO PREVENT WATER FROM GETTING UNDERNEATH THE STEP TREAD.
- (10) A FUEL ACCESS PLATE SHALL BE INSTALLED FOR EASY ACCESS TO FUEL GAUGE MECHANISM AND SHALL BE INSTALLED ABOVE THE REGULAR FLOOR COVERING WHEN POSSIBLE. THE ACCESS PLATE SHALL NOT BE UNDERCOATED. PANEL SHALL BE IDENTICAL TO FLOOR MATERIAL IN THICKNESS AND COATING AND SHALL BE SEALED TO PREVENT ANY LEAKAGE OR MOISTURE. INTERIOR SHALL NOT BE UNDERCOATED.
- (11) FLOOR COVERING ON TOP STEP LANDING SHALL BE ONE PIECE.
- (J) THE FUEL FILL OPENING IN THE BODY SKIRT SHALL BE EQUIPPED WITH A HINGED COVER HELD CLOSED BY A SPRING OR OTHER CONVENIENTLY OPERATED DEVICE. THE MECHANISM THAT HOLDS THIS COVER CLOSED SHALL BE SUFFICIENT TO KEEP IT CLOSED UNDER SEVERE OPERATING CONDITIONS. THE FUEL FILL OPENING SHALL BE LARGE ENOUGH TO PERMIT THE ENTIRE PUMP NOZZLE TO PASS THROUGH THE OPENING AND REACH THE FILL NECK OF THE FUEL TANK.

(K) HEATERS.

- (1) SCHOOL BUS HEATING SYSTEMS SHALL PROVIDE EVENLY DISTRIBUTED HEAT THROUGHOUT THE BUS BODY AND PROVIDE DEFROSTING FOR WINDSHIELD AND ENTRANCE DOOR.**
- (2) HEATERS SHALL HAVE THE CAPABILITY OF PROVIDING EVENLY DISTRIBUTED HEAT CREATING A TEMPERATURE RISE TO FIFTY DEGREES FAHRENHEIT INSIDE BODY SHELL WHEN SOAKED IN AMBIENT TEMPERATURE OF ZERO DEGREE FAHRENHEIT FOR FIFTEEN HOURS.**
- (3) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH THREE OR MORE HOT WATER HEATERS CAPABLE OF MAINTAINING INSIDE TEMPERATURE OF FIFTY DEGREES FAHRENHEIT WITH ONE HUNDRED FIFTY DEGREE FAHRENHEIT WATER BEING DELIVERED TO THE SYSTEM AT A RATE OF SIX GALLONS PER MINUTE USING AN AMBIENT TEMPERATURE OF ZERO DEGREES TO TEN DEGREES FAHRENHEIT.**
- (4) CONVENTIONAL-TYPE BUSES SHALL BE EQUIPPED WITH RIGHT AND LEFT FRONT HEATERS, AN INTEGRATED DEFROSTER SYSTEM WITH THE CAPACITY TO PROVIDE HEAT FOR THE FRONT PART OF THE BUS DRIVER'S COMPARTMENT TO KEEP THE WINDSHIELD AREA, SERVICE DOOR GLASS, DRIVER'S LEFT GLASS AREA AND STEP-WELL CLEAR OF MOISTURE, ICE AND SNOW, SHALL BE PROVIDED.**
- (5) TYPE D TRANSIT-BUSES SHALL BE EQUIPPED WITH FRONT HEATER(S). AN INTEGRATED DEFROSTER SYSTEM WITH THE CAPACITY TO PROVIDE HEAT FOR THE FRONT PART OF THE BUS AND THE DRIVER'S COMPARTMENT, TO KEEP WINDSHIELD AREA, DRIVER'S LEFT GLASS AREA, SERVICE DOOR GLASS AREA AND STEP-WELL CLEAR OF MOISTURE, ICE AND SNOW, SHALL BE PROVIDED.**
- (6) HOT WATER HEATERS SHALL DISPLAY THE NAME PLATE RATING IN ACCORDANCE WITH THE STANDARD CODE FOR TESTING AND RATING AUTOMOTIVE BUS HOT WATER HEATER AND VENTILATING EQUIPMENT.**
- (7) A THIRD HEATER IS REQUIRED ON ALL TYPE B, C, AND D SCHOOL BUSES AND IS TO MOUNTED TO THE REAR OF THE REAR WHEEL-WELL.**

- (8) TWO-SPEED SWITCHES SHALL OPERATE ALL HEATER FANS INDEPENDENTLY.
- (9) ALL HOT WATER LINES SHALL BE A MINIMUM OF ONE INCH INSIDE DIAMETER AND SHALL BE ENCLOSED.
- (10) HEATER CORES AND FANS SHALL BE COMPLETELY ENCASED, BUT DESIGNED TO PERMIT SERVICING HEATING ASSEMBLY BY REMOVING ALL OR PART OF THE CASE.
- (11) HEATER HOSE INSTALLATION IN THE ENGINE COMPARTMENT SHALL INCLUDE TWO BRASS SHUT-OFF VALVES ABLE TO SHUT OFF COOLANT COMPLETELY WHEN NECESSARY.
 - (a) ONE SHUT-OFF VALVE SHALL BE MOUNTED BETWEEN THE WATER PUMP INLET AND HEATER HOSE CONNECTION.
 - (b) ONE SHUT-OFF VALVE SHALL BE MOUNTED BETWEEN THE MOTOR BLOCK AND THE HEATER HOSE CONNECTION.
- (12) THE BODY MANUFACTURER SHALL ADD THE REQUIRED AMOUNT OF PERMANENT ETHYLENE-GLYCOL BASE ANTI-FREEZE TO PROTECT THE COOLING SYSTEM TO MINUS TWENTY DEGREES FAHRENHEIT TESTED AT NORMAL ENGINE TEMPERATURE.
- (13) THERE SHALL BE A HEATER WATER-FLOW REGULATING VALVE INSTALLED FOR CONVENIENT OPERATION WHEN THE DRIVER IS IN A NORMAL SEATED POSITION.
- (14) HEATER CORES SHALL MEET THE FOLLOWING TEST STANDARDS:
 - (a) STATIC PRESSURE TEST OF ONE HUNDRED FIFTY POUNDS PER SQUARE INCH
 - (b) CYCLE TEST OF TWENTY TO FIFTY POUNDS PER SQUARE INCH HYDRAULIC SURGE PRESSURE, FOUR HUNDRED FIFTY THOUSAND CYCLES MINIMUM.
- (L) THE HOOD ENGINE COVER ON TYPE D BUSES MUST BE SECURED WHEN OPEN TO PREVENT ACCIDENTAL CLOSING WHILE ENGINE IS BEING CHECKED.

(M) BODY SHALL DISPLAY THE FOLLOWING IDENTIFICATION:

- (1) "SCHOOL BUS" IN BLACK LETTERS AT LEAST EIGHT INCHES HIGH ON BOTH FRONT AND REAR OF BODY. LETTERING SHALL BE PLACED AS HIGH AS POSSIBLE WITHOUT IMPAIRMENT OF VISIBILITY. THE BACKGROUND FOR THE SCHOOL BUS LETTERING MAY BE REFLECTIVE GRADE FIVE OR EQUIVALENT YELLOW TAPE ON THE FRONT AND REAR OF THE SCHOOL BUS BODY.
- (2) "STOP" ON THE REAR OF THE SCHOOL BUS IN LETTERS APPROXIMATELY TEN INCHES HIGH ON THE DOOR OR THE CENTER OF THE SCHOOL BUS.
- (3) NAME OF THE SCHOOL DISTRICT SHALL APPEAR ON BOTH SIDES OF THE VEHICLE AT THE BELT LINE AND BE AT LEAST FIVE INCHES HIGH.
- (4) COUNTY OF THE SCHOOL DISTRICT SHALL APPEAR ON BOTH SIDES OF THE VEHICLE IN FIVE-INCH LETTERS WITH THE NAME, UNLESS THE NAME OF THE CITY OR EXEMPTED VILLAGE APPEARS AS A PART OF THE SCHOOL DISTRICT NAME.
- (5) OWNERSHIP OF THE VEHICLE SHALL APPEAR ON THE ENTRANCE DOOR SIDE IN TWO-INCH HIGH LETTERS TO THE REAR OF THE ENTRANCE DOOR.
- (6) LOCAL SCHOOL BUS NUMBERS SHALL BE FIVE INCHES HIGH AND SHALL BE LOCATED AS FOLLOWS:
 - (a) ON BODY ABOVE THE ENTRANCE DOOR;
 - (b) ON THE REAR IN THE AREA OF THE RIGHT SIDE OF THE TAIL LIGHT
 - (c) ON THE LEFT SIDE IN THE VICINITY OF THE DRIVER'S WINDOW;
 - (d) ON THE FRONT IN THE AREA DESIGNATED BY THE BUYER.

- (7) BUSES SHALL BE MARKED WITH REFLECTORIZED MATERIAL AS FOLLOWS (SEE APPENDIX A):
- (a) ALL REFLECTORIZED MATERIAL SHALL BE PRISMATIC RETRO-REFLECTIVE SUPER-HIGH INTENSITY GRADE FIVE OR EQUIVALENT. THE REFLECTORIZED MATERIAL SHALL MEET OR EXCEED THE INITIAL REFLECTIVE VALUE AS OUTLINED IN FEDERAL HIGHWAY ADMINISTRATION (ASTM D4956-90). THE COLOR SPECIFICATION SHALL REQUIRE A MINIMUM REFLECTANCE OF FIFTEEN FOR WHITE-SILVER.
 - (b) ALL REFLECTIVE MATERIAL SHALL BE ABLE TO RETAIN AT LEAST FIFTY PERCENT OF THE REFLECTIVE VALUES FOR A MINIMUM OF SEVEN YEARS.
 - (c) ALL REFLECTIVE MATERIAL SHALL BE WARRANTED AGAINST PEELING, CRACKING, SEPARATION AND LIFTING DUE TO WEATHER CONDITIONS, PRESSURE, AND MECHANICAL WASHING FOR A MINIMUM OF SEVEN YEARS.
 - (d) REFLECTIVE YELLOW MATERIAL TWO INCHES IN WIDTH SHALL BE APPLIED TO BOTH CORNERS OF THE REAR OF THE BUS AND EXTEND FROM THE BUMPER VERTICALLY UP TO THE TOP OF THE REAR WINDOWS.
 - (e) THREE SEVEN BY FOURTEEN INCH WIDE WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED TO THE FRONT AND REAR OF THE BUS TO ACCOMMODATE THE STATE IDENTIFICATION AND LOCAL BUS NUMBERS AS FOLLOWS:
 - (i) ONE SEVEN BY FOURTEEN INCH PIECE OF WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED AND CENTERED ON THE FRONT BUMPER. IF THE BUMPER IS MANUFACTURED WITH THE HOLES IN THE CENTER FOR TWO HOOKS, THE SEVEN BY FOURTEEN PIECE OF MATERIAL MAY BE LOCATED ON THE DRIVER'S SIDE OF THE BUMPER. IF THE BUMPER IS LESS THAN SIX INCHES IN HEIGHT, A SEVEN BY FOURTEEN INCH PLATE WILL BE PERMANENTLY ATTACHED TO THE BUMPER TO ACCOMMODATE THE SEVEN BY FOURTEEN INCH REFLECTIVE MATERIAL.

(ii) IN THE REAR, TWO SEVEN BY FOURTEEN INCH PIECES OF WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED AND CENTERED ON THE FLAT SURFACE UNDER THE LEFT AND RIGHT LOWER TAIL LIGHTS.

(f) THE LOCAL BUS NUMBER SHALL BE APPLIED AND CENTERED BELOW THE RIGHT LOWER TAIL LIGHT IN FIVE INCH BLACK NUMBERS.

(g) ALL EMERGENCY DOORS, WINDOWS, AND ROOF ESCAPE HATCHES SHALL BE OUTLINED AROUND THE OUTSIDE PERIMETER WITH ONE INCH YELLOW REFLECTIVE MATERIAL.

(h) REFLECTIVE MATERIAL USED ON STOP SIGNS SHALL BE RED GRADE FIVE OR EQUIVALENT.

(N) INSIDE BODY HEIGHT SHALL BE SEVENTY-TWO INCHES OR MORE MEASURED METAL-TO-METAL AT ANY POINT ON LONGITUDINAL CENTER LINE FROM FRONT VERTICAL BOW TO REAR VERTICAL BOW.

(O) INSULATION.

(1) BUS BODY SHALL BE FULLY INSULATED IN THE ROOF AND ALL BODY PANELS TO DEADEN SOUND, REDUCE VIBRATIONS AND HEAT TRANSFER. INSULATION, ONE-INCH MINIMUM THICKNESS, IN ADDITION TO THE USUAL SPRAYED ON MATERIAL, SHALL BE A FIBERGLASS OR EQUAL AND FIRE-RESISTANT MATERIAL.

(2) A PLYWOOD FLOOR SHALL BE APPLIED ON TOP OF THE STEEL FLOOR. FLOOR COVERING SHALL BE APPLIED ON TOP OF THE PLYWOOD. PLYWOOD SHALL BE FIVE-EIGHTHS INCH FIVE-PLY TYPE CD EXTERIOR GRADE. PLYWOOD SHALL EXTEND TO FIRE-WALL AND UNDER THE DRIVER'S SEAT. PLYWOOD SHALL BE SANDED AND VACUUMED BEFORE COVERING IS APPLIED. WATERPROOF SEALING MATERIAL SHALL BE APPLIED TO SEAMS IN THE SECTION OF PLYWOOD FLOOR. PLYWOOD SHALL BE FOUR FEET BY EIGHT FEET SECTIONS, PIECED ONLY AS NECESSARY. WATERPROOF SEALING APPLIED ON TOP OF THE PLYWOOD TO HOLD THE FLOOR COVERING IS CONSIDERED AS ONE METHOD OF SEALING THE SEAMS IN THE PLYWOOD FLOOR AND IS ACCEPTABLE.

(P) INTERIOR.

- (1) INTERIOR OF THE SCHOOL BUS SHALL BE FREE OF ALL PROJECTIONS.**
- (2) ALL SCHOOL BUSES SHALL REQUIRE INNER LINING ON CEILING AND WALLS AND SHALL INCLUDE SOUND ABATEMENT PACKAGE IN THE DRIVER AREA. THE INTERIOR SOUND LEVEL AT THE DRIVER'S SEATING POSITION SHALL NOT EXCEED NINETY DECIBELS WHEN MEASURED IN ACCORDANCE WITH TEST PROCEDURES FOUND IN 49CFR 393.94C.**

(Q) LAMPS AND SIGNALS.

ALL LAMPS HEREIN LISTED AND THEIR INSTALLATION SHALL CONFORM TO CURRENT STANDARDS AND RECOMMENDATIONS OF THE SOCIETY OF AUTOMOTIVE ENGINEERS AND MEET FMVSS 571.108.

(1) CONSTRUCTION OF COMPONENTS.

- (a) ALL LAMPS, REFLECTORS AND THEIR INSTALLATION SHALL CONFORM TO FMVSS WHERE APPLICABLE, SOCIETY OF AUTOMOTIVE ENGINEERS J887, AND THE NATIONAL STANDARD FOR SCHOOL TRANSPORTATION WHERE NOT COVERED BY FEDERAL STANDARDS OR ADDITIONAL REQUIREMENTS STATED HEREIN.**
- (b) DIRECTIONAL SIGNAL, STOP LIGHT, TAILLIGHT, MARKER LIGHT, CLEARANCE LIGHT, IDENTIFICATION LIGHT, BACK UP LIGHT AND REFLECTOR LENSES SHALL BE OF ACRYLIC PLASTIC. ALTERNATELY FLASHING RED AND AMBER SIGNAL LAMPS SHALL BE SEALED BEAM OF ACRYLIC PLASTIC LENS CONSTRUCTION. BODY-MOUNTED STOP LAMPS, DIRECTIONAL SIGNALS AND RED SIGNAL LAMPS SHALL BE VISIBLE THROUGHOUT ONE HUNDRED EIGHTY DEGREES.**
- (c) ALL EXTERIOR LAMP SOCKETS SHALL BE ZINC-PLATED OR CHROMATED STEEL, OR OTHER SUITABLE NON-CORROSIVE MATERIALS SUCH AS PLASTIC OR STAINLESS STEEL.**

- (d) ALTERNATELY FLASHING RED SIGNAL LAMPS, BODY-MOUNTED DIRECTIONAL SIGNALS AND STOP LAMPS SHALL BE GROUNDED BY ATTACHING A GROUND WIRE OR STRAP FROM THE LAMP SOCKET OR NEGATIVE SIDE OF THE BULB OR GROUND WIRE INCLUDED IN THE WIRING.
- (e) WIRING SHALL CONFORM TO CURRENT SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS. A BODY LOAD DISCONNECT SOLENOID OF ONE HUNDRED AMPERES CONTINUOUS-DUTY SHALL BE SUPPLIED AND INSTALLED SO THAT WHEN THE IGNITION SWITCH IS IN THE OFF POSITION, ALL BODY ELECTRICAL CIRCUITS WILL BE INOPERATIVE, EXCEPT THE DIRECTIONAL SIGNALS, HAZARD WARNING, STOP LIGHT, BACK UP LIGHT, MARKER, CLEARANCE, IDENTIFICATION, AND HEAD LAMP CIRCUITS.

(2) ADDITIONAL REQUIREMENTS.

- (a) THE SERVICE DOOR STEP-WELL LIGHT SHALL BE WIRED WITH THE MARKER LIGHT CIRCUIT AND ACTIVATED BY A SWITCH CONTROLLED BY THE SERVICE DOOR. THE LIGHT SHALL BE A MINIMUM OF SIX CANDLEPOWER.

(3) PASSENGER DOME LIGHTS AND EMERGENCY LIGHTING.

- (a) PASSENGER DOME LIGHTS WHEN ACTIVATED SHALL ADEQUATELY AND UNIFORMLY ILLUMINATE AISLEWAY TO THREE TO FOUR FOOT CANDLES.
- (b) ALL DOME LIGHT BULBS SHALL HAVE A MINIMUM CANDLE POWER OF FIFTEEN.
- (c) ALL DOME LIGHTS SHALL BE EQUIPPED WITH SHATTER-PROOF, CLEAR PLASTIC OR POLYCARBONATE LENSES.

(4) EMERGENCY DOME LIGHT OPERATION, EMERGENCY DOORS, ROOF ESCAPE HATCHES, PUSH-OUT WINDOWS, ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHT EXCLUDED) AND EMERGENCY DOOR BUZZERS LOCATED AT EMERGENCY DOOR AND DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHENEVER AN EMERGENCY DOOR HANDLE IS LIFTED TO BE OPENED. ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHTS EXCLUDED) AND THE EMERGENCY DOOR BUZZER LOCATED IN DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHENEVER AN EMERGENCY WINDOW HANDLE IS LIFTED TO BE OPENED OR WHEN A ROOF ESCAPE HATCH IS OPENED PAST THE VENT POSITION. BUZZERS AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON", "OFF", AND ACCESSORY POSITIONS. POWER FOR EMERGENCY LIGHTING AND BUZZERS SHALL BE SUPPLIED BY THE TWELVE VOLT SUPPLY LINE GOING TO THE CONTINUOUS DUTY SOLENOID. THE SYSTEM SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(a) THE EMERGENCY LIGHTING SYSTEM SHALL BE WIRED SO THAT WHEN IT IS ACTIVATED WITH THE KEY IN THE "OFF" POSITION, IT WILL NOT ALLOW FOR AN ELECTRICAL FEED BACK THROUGH THE DOME LIGHT SWITCH OR TO POWER ANY ACCESSORIES THAT NORMALLY WOULD BE FED BY THE CONTINUOUS DUTY SOLENOID WHEN THE KEY IS IN THE "ON" OR "ACCESSORY" POSITION.

(5) PASSENGER DOME LIGHTS SHALL BE CONTROLLED BY A SINGLE SWITCH IN THE DRIVER'S CONSOLE. POWER SHALL BE PROVIDED BY THE SWITCHED SIDE OF THE CONTINUOUS DUTY SOLENOID WHEN KEY IS ON THE "ON" OR "ACCESSORY" POSITION AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(6) A SINGLE DRIVER DOME LIGHT SHALL BE PROVIDED AND CONTROLLED BY A SINGLE SWITCH IN THE DRIVER'S CONSOLE. POWER TO THE SWITCH SHALL BE PROVIDED BY THE SWITCHED SIDE OF THE CONTINUOUS DUTY SOLENOID WHEN THE IGNITION KEY IS IN THE "ON" OR "ACCESSORY" POSITION AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(7) DIRECTIONAL SIGNALS.

(a) SIDE AND REAR DIRECTIONAL SIGNALS SHALL BE WIRED TO OPERATE PROPERLY WITH THE FRONT DIRECTIONAL SIGNALS SUPPLIED BY THE CHASSIS MANUFACTURER ON ALL CONVENTIONAL-TYPE SCHOOL BUSES. TRANSIT-TYPE SCHOOL BUSES SHALL HAVE FRONT, SIDE, AND REAR DIRECTIONAL SIGNALS INSTALLED BY THE MANUFACTURER.

(b) SCHOOL BUS BODY MANUFACTURER SHALL INSTALL REQUIRED SIGNAL LAMPS TO THE DIRECTIONAL SIGNAL CONTROL SWITCH SO ALL DIRECTIONAL SIGNAL LAMPS SHALL BE OPERATIVE. THE DIRECTIONAL SIGNAL SYSTEM SHALL BE INSTALLED ON AN INTEGRAL PART OF THE HAZARD WARNING SIGNAL SWITCH ACTIVATED BY AN INDEPENDENT SWITCH FURNISHED BY THE CHASSIS MANUFACTURER.

(c) COLOR OF LENSES SHALL BE AMBER. ALL REAR DIRECTIONAL SIGNALS INSTALLED BY THE BODY MANUFACTURER SHALL BE DOUBLE-OPTIC AND AT LEAST SEVEN INCHES IN DIAMETER. SIDE DIRECTIONAL SIGNALS SHALL BE ARMOR PROTECTED.

(8) TWO BACK UP LIGHTS ARE REQUIRED AND SHALL BE MOUNTED ON OR BELOW THE BELT LINE ON THE SCHOOL BUS BODY. BACK UP LIGHTS SHALL CONFORM WITH FMVSS 571.108. THESE LAMPS SHALL HAVE WHITE LENSES AT LEAST SEVEN INCHES IN DIAMETER AND SHALL BE A MINIMUM OF THIRTY-TWO CANDLE POWER.

(9) SCHOOL BUS ALTERNATELY FLASHING WARNING SIGNAL LAMP.

(a) EACH SCHOOL BUS BODY SHALL BE EQUIPPED WITH A SYSTEM OF FOUR RED SIGNAL LAMPS AND FOUR AMBER SIGNAL LAMPS. BOTH RED AND AMBER LAMPS SHALL BE INSTALLED IN ACCORDANCE WITH SOCIETY OF AUTOMOTIVE ENGINEERS J887.

(i) EACH AMBER SIGNAL LAMP SHALL BE LOCATED NEAR EACH RED SIGNAL LAMP, AT THE SAME LEVEL, BUT CLOSER TO THE VERTICAL CENTER LINE OF THE BUS.

- (ii) THE SYSTEM SHALL BE WIRED SO THAT THE AMBER SIGNAL LAMPS ARE ACTIVATED ONLY BY A MANUAL SWITCH, AND IF ACTIVATED, ARE AUTOMATICALLY DEACTIVATED WHEN THE BUS ENTRANCE DOOR IS OPEN.
- (b) THESE LAMPS SHALL FLASH AT A DESIGNATED RATE FROM SIXTY TO ONE HUNDRED TWENTY CYCLES PER MINUTE.
- (c) OPERATION OF WARNING LIGHTS AND STOP ARM SYSTEM:
 - (i) POWER FOR THE EIGHT LIGHT WARNING SYSTEM SHALL BE PROVIDED BY THE BODY CONTINUOUS DUTY SOLENOID WHEN THE KEY IS IN THE "ON" POSITION.
 - (ii) WITH THE KEY IN THE "ON" POSITION AND MASTER SWITCH ON, GREEN PILOT LIGHT SHALL ILLUMINATE TO INDICATE SYSTEM IS READY FOR OPERATION.
 - (iii) WITH ENTRANCE DOOR CLOSED AND THE MANUAL MOMENTARY (AMBER) START SWITCH ACTIVATED AND RELEASED, THE AMBER PILOT LIGHT AND AMBER WARNING LIGHTS SHALL FLASH.
 - (iv) WHEN THE ENTRANCE DOOR HANDLE IS MOVED TOWARD THE OPEN POSITION, THE AMBER PILOT AND THE AMBER WARNING LIGHTS SHALL GO OFF AND THE RED PILOT AND THE RED WARNING LIGHTS SHALL FLASH AND STOP ARM SHALL AUTOMATICALLY EXTEND AND LIGHTS ON THE STOP ARM SHALL FLASH.
 - (v) WHEN ENTRANCE DOOR IS CLOSED, ALL LIGHTS SHALL GO OUT AND THE STOP ARM SHALL RETRACT AUTOMATICALLY. THE ENTRANCE DOOR SWITCH THAT ACTIVATED THE RED LIGHTS IN THE LIGHT SYSTEM SHALL BE LOCATED IN A POSITION BY A COVER OR GUARD THAT WILL PREVENT THE SWITCH FROM BEING ACTIVATED OR DEACTIVATED BY PUPILS BOARDING OR LEAVING THE BUS.

- (vi) WITH ENTRANCE DOOR OPEN AND THE MANUAL MOMENTARY (AMBER) START SWITCH ACTIVATED AND RELEASED, THE RED PILOT AND RED WARNING LIGHTS SHALL FLASH AND THE STOP ARM SHALL AUTOMATICALLY EXTEND, AND THE LIGHTS ON STOP ARM SHALL FLASH.
- (vii) AN EMERGENCY SYSTEM FOR EXTENDING THE STOP ARM AND FLASHING THE RED WARNING LIGHTS ON THE BUS BODY AND THE STOP ARM SHALL BE INSTALLED ON EACH BUS BODY.
- (viii) A RED EMERGENCY OVERRIDE ON/OFF SWITCH SHALL BE INSTALLED IN THE BUS BODY ELECTRICAL ACCESSORY PANEL IN AN AREA ISOLATED FROM THE OTHER SWITCHES. THIS SWITCH SHALL BE INSTALLED WITH A STANDARD SWITCH IDENTIFICATION DECAL WITH THE WORDS "EMERGENCY WARNING LIGHTS."
- (ix) THE EMERGENCY OVERRIDE SYSTEM SHALL OPERATE THE RED PILOT LIGHT, THE RED WARNING LIGHTS AND AUTOMATICALLY EXTEND THE STOP ARM WITH LIGHTS FLASHING IN ANY DOOR POSITION. SYSTEM SHALL OPERATE WITH KEY IN THE ON/OFF OR ACCESSORY POSITION.
- (x) POWER FOR THE EMERGENCY OVERRIDE SYSTEM SHALL BE TAKEN OFF THE TWELVE VOLT SUPPLY LINE GOING TO THE BODY CONTINUOUS DUTY SOLENOID AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.
- (xi) THE MASTER AND MOMENTARY ACTIVATING SWITCHES AND PILOT LIGHTS SHALL BE IN A POSITION THAT IS CLEARLY ACCESSIBLE AND VISIBLE TO THE DRIVER. THE AMBER AND RED PILOT LIGHT LENSES SHALL BE APPROXIMATELY ONE-HALF INCH IN DIAMETER.
- (xii) IF THE BUS IS EQUIPPED WITH A CROSSING GATE, IT SHALL EXTEND AND RETRACT IN THE SAME MANNER AS OUTLINED FOR THE STOP SIGN.

(10) INSTALLATION REQUIREMENTS.

- (i) EACH FLASHING SIGNAL LAMP SHALL BE MOUNTED WITH ITS AXIS SUBSTANTIALLY PARALLEL TO LONGITUDINAL AXIS OF VEHICLE.**
- (ii) FRONT AND REAR ALTERNATELY FLASHING SIGNAL LAMPS SHALL BE SPACED AS FAR APART Laterally AS PRACTICABLE.**
- (iii) ALTERNATELY FLASHING SIGNAL LAMPS SHALL BE MOUNTED AT THE FRONT ABOVE THE WINDSHIELD AND AT THE REAR SO THAT THE LOWER EDGE OF THE LENS IS NOT LOWER THAN THE TOP LINE OF THE SIDE WINDOW.**
- (iv) VERTICAL AND LATERAL VISION OF THE FRONT AND REAR ALTERNATELY FLASHING WARNING LIGHTS SHALL NOT BE OBSTRUCTED BY ANY PART OF THE BODY OF THE LAMP-HOUSE INSOFAR AS STANDARD BUS BODY CONSTRUCTION WILL PERMIT.**
- (v) A SQUARE OR RECTANGULAR AREA AROUND THE LENS OF EACH ALTERNATELY FLASHING SIGNAL LIGHT AND EXTENDING OUTWARD APPROXIMATELY THREE INCHES SHALL BE PAINTED BLACK. IN INSTALLATIONS WHERE THERE IS NO FLAT VERTICAL PORTION OF THE BODY IMMEDIATELY SURROUNDING THE ENTIRE LENS OF THE LAMP, A SQUARE OR RECTANGULAR BAND OF BLACK, APPROXIMATELY THREE INCHES WIDE, IMMEDIATELY BELOW AND TO BOTH SIDES OF THE LENS, SHALL BE PAINTED ON THE BODY OR ROOF AREA AGAINST WHICH SIGNAL LIGHT IS VISIBLE FROM A DISTANCE OF FIVE HUNDRED FEET ALONG THE AXIS OF THE VEHICLE.**

(11) ALL SCHOOL BUS BODY LAMPS AND REFLECTORS SHALL COMPLY WITH FMVSS 571.108, CLEARANCE LAMPS.

(a) BODY SHALL BE EQUIPPED WITH A RED ARMORED CLEARANCE LAMP AT EACH OF THE REAR CORNERS AND AN AMBER ARMORED CLEARANCE LAMP AT EACH OF THE FRONT CORNERS. THESE LAMPS SHALL BE MOUNTED AT THE HIGHEST AND WIDEST POSITIONS OF THESE CORNERS.

(b) BODY SHALL BE EQUIPPED WITH AN AMBER ARMORED INTERMEDIATE OR MID-BODY MARKER OR CLEARANCE LIGHT ON BOTH SIDES. THESE LAMPS SHALL BE MOUNTED IN ACCORDANCE WITH FMVSS 571.108.

(c) ARMORED CLEARANCE LAMPS SHALL CONFORM TO SOCIETY OF AUTOMOTIVE ENGINEERS CODE PC.

(D) THESE CLEARANCE LAMPS SHALL BE CONNECTED TO THE CHASSIS HEADLIGHT CIRCUIT AND SHALL BE ACTIVATED BY THE CHASSIS HEADLIGHT SWITCH.

(R) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH MIRRORS MEETING THE REQUIREMENTS OF FMVSS 571.111. ALL MIRRORS SHALL BE HEATED AND FULLY ADJUSTABLE.

(1) INTERIOR REAR VIEW MIRROR SHALL BE A MINIMUM OF SIX BY THIRTY INCHES.

(2) MIRROR ASSEMBLIES MAY INCLUDE STAINLESS STEEL MATERIALS AS NECESSARY (INCLUDING MOUNTING BRACKETRY), BE WARRANTED ONE HUNDRED PERCENT REPLACEMENT COVERAGE FOR THIRTY-SIX MONTHS AGAINST RUST AND CORROSION, AND AGAINST ANY REDUCTION IN CLARITY OF VIEW DUE TO DISCOLORATION OR OTHER DETERIORATION OF THE LENS.

(S) MOUNTING OF BODY ON CHASSIS.

(1) INSULATING MATERIAL SHALL BE PLACED BETWEEN ALL MAIN CROSS-SILL AND INTERMEDIATE MEMBERS. INSULATING MATERIAL SHALL BE AT LEAST ONE-FOURTH INCH THICK AND SHALL BE ATTACHED TO CHASSIS FRAME OR BODY MEMBERS SO THAT THE BODY WILL NOT MOVE UNDER SEVERE OPERATING CONDITIONS.

- (2) CHASSIS FRAME SHALL EXTEND TO REAR EDGE OF REAR BODY CROSS MEMBER.
 - (3) BUS BODY SHALL BE ATTACHED TO CHASSIS FRAME IN SUCH A MANNER AS TO PREVENT SHIFTING OR SEPARATION OF THE BODY FROM THE CHASSIS UNDER SEVERE OPERATING CONDITIONS.
 - (4) BODY FRONT SHALL BE ATTACHED AND SEALED TO THE CHASSIS COWL IN SUCH A MANNER AS TO PREVENT ENTRY OF MOISTURE.
- (T) ALL BUSES SHALL BE EQUIPPED WITH TWO FRONT FENDER MUD FLAPS AND TWO REAR MUD FLAPS.
- (U) ALL OPENINGS CREATED IN MOUNTING OF BUS BODY TO CHASSIS SHALL BE SEALED BY BODY MANUFACTURER TO PREVENT ENTRANCE OF GASES, DUST OR MOISTURE INTO PASSENGER AND DRIVER'S COMPARTMENTS.
- (V) OVERALL LENGTH OF A SCHOOL BUS SHALL NOT EXCEED FORTY FEET.
- (W) OVER ALL WIDTH OF A SCHOOL BUS SHALL NOT EXCEED ONE HUNDRED AND TWO INCHES, EXCLUDING MIRRORS.
- (X) SEAT BELT AND UPPER TORSO RESTRAINT SYSTEM FOR DRIVER
- (1) A LOCKING RETRACTOR-TYPE SEAT BELT FOR DRIVER SHALL BE PROVIDED. BELTS SHALL BE EQUIPPED WITH PROTECTIVE BOOTS OF SUFFICIENT QUALITY AND STRENGTH TO KEEP IT RETRACTED AND OFF THE FLOOR AND WITHIN EASY REACH OF THE DRIVER. BELT SHALL BE ADJUSTABLE ON ONE SIDE ONLY AND KEEP THE DRIVER FROM SLIDING SIDEWAYS UNDER THE BELT.
 - (2) BELT AND EMERGENCY LOCKING RETRACTOR UPPER TORSO RESTRAINT SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT FEDERAL AND SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS.
 - (3) AN EMERGENCY LOCKING RETRACTOR UPPER TORSO RESTRAINT SHALL BE PROVIDED AND SHALL WORK IN UNISON WITH THE SEAT BELTS.

(Y) DRIVER'S SEAT.

- (1) MINIMUM DISTANCE BETWEEN STEERING WHEEL AND BACK REST OF DRIVER'S SEAT SHALL BE ELEVEN INCHES. DRIVER'S SEAT SHALL HAVE VERTICAL ADJUSTMENT OF NOT LESS THAN FOUR INCHES AND HORIZONTAL ADJUSTMENT OF NOT LESS THAN FOUR INCHES.**
- (2) ALL SEWING ON CUSHIONS AND BACKS SHALL BE SINGLE-STITCHED, WITH A MINIMUM OF NUMBER TWELVE FOUR-PLY GLAZE FINISH THREAD OF THE BEST GRADE OR ITS APPROVED EQUIVALENT. SEAMS IN CUSHIONS AND SEAT BACKS SHALL BE FORTY-TWO OUNCES OR EQUIVALENT MATERIAL STRENGTH AS UPHOLSTERY.**
- (3) THE DRIVER'S SEAT MUST BE COVERED WITH FLAME-BARRIER, FIRE-RETARDANT SEAT MATERIAL AND MUST PASS THE "SCHOOL BUS UPHOLSTERY FIRE BLOCK" TEST.**

(Z) PASSENGER SEATS.

- (1) ALL SEATING AND RESTRAINING BARRIER DESIGN AND CONSTRUCTION MUST MEET THE PROVISIONS OF FMVSS 571.222. ALL SEAT BACK BARRIERS MUST BE A MINIMUM OF TWENTY-EIGHT INCHES IN HEIGHT, AS MEASURED FROM THE INTERSECTION OF THE FORWARD SURFACE OF THE SEAT BACK AND THE UNDEPRESSED SURFACE OF THE SEAT CUSHION. THE TOP SURFACE OF THE BARRIERS SHALL BE THE SAME HEIGHT AS THE TOP SURFACES OF THE SEAT BACKS.**
- (2) ALL SEATS SHALL HAVE A MINIMUM DEPTH OF FIFTEEN INCHES.**
- (3) ALL SEATS SHALL BE FORWARD-FACING.**
- (4) SCHOOL BUSES WITH LEFT SIDE EMERGENCY DOOR(S) MAY BE EQUIPPED WITH ONE JUMP SEAT. SUCH SEAT WILL BE LOCATED ONLY IMMEDIATELY ADJACENT TO SIDE EMERGENCY EXIT(S) AND SHALL CONFORM TO ALL APPLICABLE FEDERAL STANDARDS.**
- (5) SEATS SHALL BE MOUNTED SO AS TO PROVIDE A MINIMUM OF THIRTY-SIX INCHES HEADROOM FOR SITTING POSITION ABOVE THE TOP OF UNDEPRESSED CUSHION LINE OF ALL SEATS. MEASUREMENT SHALL BE MADE VERTICALLY NOT MORE THAN SEVEN INCHES FROM SIDE WALL AT CUSHION HEIGHT AND AT FORE AND AFT CENTER OF CUSHION.**

(6) SEAT CONSTRUCTION.

- (a) BACKS OF ALL SEATS SHALL BE SAME WIDTH AT THE TOP AND SAME HEIGHT FROM FLOOR, ALSO SLANTING AT THE SAME ANGLE WITH THE FLOOR.**
- (b) SEAT, SEAT BACK CUSHION AND CRASH BARRIER SHALL BE COVERED WITH FLAME-BARRIER FIRE-RETARDANT SEATING MATERIAL. SUCH MATERIAL MUST PASS THE "FIRE BLOCK" TEST.**
- (i) THE FLAME WILL NOT SPREAD TO SEAT BACK IN FRONT OF THE FIRE.**
- (ii) THE FLAMES ON THE REAR SEAT WILL SELF-EXTINGUISH.**
- (iii) THE FLAME-BARRIER, FIRE RETARDANT SEATING MATERIAL WILL SUCCESSFULLY PREVENT THE UNDERLYING PADDING MATERIAL FROM BEING EXPOSED TO THE FLAMES.**
- (c) ALL SEAT BACKS AND RAILS SHALL BE COVERED WITH ENERGY-ABSORBING PADDING MATERIAL AS REQUIRED BY FMVSS 571.222.**
- (d) A PASSENGER SEAT CUSHION RETENTION SYSTEM SHALL BE EMPLOYED TO PREVENT THE PASSENGER SEAT CUSHION FROM DISENGAGING FROM THE SEAT FRAME IN THE EVENT OF AN ACCIDENT. EACH SEAT CUSHION RETENTION SYSTEM SHALL BE CAPABLE OF WITHSTANDING A VERTICAL STATIC LOAD EQUAL TO A MINIMUM OF FIVE TIMES THE WEIGHT OF THE CUSHION. THE SYSTEM SHALL ALSO BE CAPABLE OF WITHSTANDING A FORWARD OR REARWARD STATIC LOAD EQUAL TO TWENTY TIMES THE WEIGHT OF THE CUSHION.**
- (e) A BARRIER/PADDED GUARD PANEL SHALL BE PLACED FORWARD OF ALL SEATS NOT HAVING ANOTHER PASSENGER SEAT IN FRONT OF IT.**

(AA) SERVICE DOOR STEPS.

- (1) THE FIRST STEP OF THE SERVICE DOOR SHALL BE NOT LESS THAN SIX INCHES AND NOT MORE THAN SIXTEEN INCHES FROM THE GROUND.
- (2) SERVICE DOOR ENTRANCE SHALL BE EQUIPPED WITH THREE STEPS. RISERS IN EACH CASE SHALL BE APPROXIMATELY EQUAL.
- (3) STEPS SHALL BE ENCLOSED TO PREVENT ACCUMULATION OF ICE AND SNOW.
- (4) STEPS SHALL NOT PROTRUDE BEYOND SIDE BODY LINE.
- (5) GRAB HANDLES OF MAXIMUM LENGTH, BUT NOT LESS THAN TEN INCHES LONG, SHALL BE INSTALLED ON BOTH SIDES OF THE INTERIOR STEP-WELL AREA. THESE HANDLES SHALL BE STAINLESS STEEL CLAD. BOTH GRAB HANDLES SHALL BE SECURELY FASTENED AND DESIGNED SO AS TO PREVENT CLOTHING OR ANY OTHER ITEM FROM BEING CAUGHT.
- (6) SURFACE OF STEPS SHALL BE OF NON-SKID MATERIAL.
 - (a) STEPS SHALL BE COVERED WITH FIRST-QUALITY STEP COVERING MATERIAL WHICH SHALL HAVE NON-SKID CHARACTERISTICS AND BE OF NON-SKID OR CORRUGATED DESIGN. STEP COVERING SHALL HAVE A TURNED-DOWN NOSING OF A CONTRASTING COLOR OF EITHER WHITE, YELLOW, OR BRIGHT ORANGE.
 - (b) STEP COVERING SHALL BE SECURELY FASTENED TO THE STEPS IN A MANNER THAT WILL MINIMIZE TRIPPING. THIS REQUIRES THAT THE HEADS OF MOUNTING SCREWS OR BOLTS BE BELOW THE TOP SURFACE OF THE STEP TREAD.

(BB) ACCESS STEPS

- (1) STEPS SHALL BE INSTALLED ON EACH SIDE OF THE SCHOOL BUS TO ALLOW ACCESS TO WINDSHIELD FOR CLEANING.
- (2) GRAB HANDLES SHALL BE SECURELY MOUNTED IN A SUITABLE POSITION.

(CC) SUN VISOR.

- (1) THE SCHOOL BUS SHALL BE EQUIPPED WITH AT LEAST ONE INTERIOR ADJUSTABLE TRANSPARENT SUN VISOR, FOLDING TYPE, WHICH IS A MINIMUM OF SIX BY THIRTY INCHES IN SIZE.
- (2) A RIGHT SUN VISOR WHICH IS AT LEAST SIX BY SIXTEEN INCHES IN SIZE IS PERMITTED.

(DD) WHEEL-HOUSINGS.

- (1) WHEEL-HOUSE SHALL BE ATTACHED TO FLOOR COMPONENTS IN SUCH A MANNER TO PREVENT WATER, DUST OR FUMES FROM ENTERING THE BUS BODY.
- (2) WHEEL-HOUSE OPENINGS SHALL ALLOW FOR EASY TIRE REMOVAL AND SERVICE.
- (3) INSIDE HEIGHT OF WHEEL-HOUSING ABOVE FLOOR LINE SHALL NOT EXCEED TEN INCHES.
- (4) WHEEL-HOUSING SHALL PROVIDE CLEARANCE FOR DUAL WHEELS TO PERMIT THE INSTALLATION OF TIRE CHAINS.

(EE) WINDSHIELD AND WINDOWS SHALL MEET FMVSS 571.205.

- (1) ALL GLASS IN WINDSHIELDS SHALL BE APPROVED LAMINATED SAFETY GLASS WITH THE RATING OF ONE OR BETTER, AS SPECIFIED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE.
- (2) GLASS IN WINDSHIELD SHALL BE HEAT-ABSORBENT, LAMINATED PLATE. WINDSHIELD SHALL BE LARGE ENOUGH TO PERMIT THE DRIVER TO SEE THE ROADWAY CLEARLY, INSTALLED TO REDUCE GLARE, AND BE INSTALLED BETWEEN FRONT CORNER POSTS THAT ARE DESIGNED AND PLACED TO PROVIDE MAXIMUM VISIBILITY FOR THE DRIVER.
- (3) WINDOW TO THE IMMEDIATE RIGHT OF DRIVER (ENTRANCE DOOR) AND LEFT OF DRIVER SHALL BE ACCOMPANIED BY A NUMBER DESIGNATING GLAZING STANDARD FROM AMERICAN NATIONAL STANDARDS INSTITUTE, TWO LAMINATED SAFETY GLASS. DRIVER'S SIDE WINDOW SHALL BE CAPABLE OF OPENING AND EQUIPPED WITH A LOCK-TYPE CLOSURE.

(4) WINDSHIELD SHALL HAVE ENOUGH HORIZONTAL GRADIENT BAND STARTING SLIGHTLY ABOVE LINE OF DRIVER'S VISION AND GRADUALLY DECREASING IN LIGHT TRANSMISSION TO TWENTY PERCENT OR LESS AT THE TOP OF THE WINDSHIELD. WINDSHIELD MAY BE FULLY TINTED IN LIEU OF ABOVE. WINDSHIELD AND WINDOWS TO THE IMMEDIATE RIGHT AND LEFT OF THE DRIVER MUST HAVE MINIMUM OF SEVENTY PERCENT LIGHT TRANSMITTANCE.

(5) ALL GLASS IN SIDE WINDOWS AND DOORS BEHIND THE DRIVER'S POSITION SHALL BE AS-2 OR AS-3 TEMPERED GLASS OR BETTER.

(6) EACH SIDE WINDOW SHALL BE DOUBLE SASH AND PROVIDE UNOBSTRUCTED EMERGENCY OPENING AT LEAST NINE INCHES HIGH AND TWENTY-TWO INCHES WIDE, OBTAINED BY LOWERING THE UPPER SASH. ALL EXPOSED EDGES OF GLASS SHALL BE BANDED.

(7) INDIVIDUAL WINDOWS SHALL NOT HAVE A VERTICAL OPENING GREATER THAN TWELVE INCHES. STOPS SHALL BE INSTALLED WHERE NEEDED TO OBTAIN THIS DIMENSION.

(FF) WINDSHIELD WIPERS.

(1) BUS BODY TO BE EQUIPPED WITH TWO HEAVY-DUTY WINDSHIELD WIPERS.

(2) EACH WINDSHIELD WIPER TO BE OPERATED BY A SEPARATE ELECTRIC MOTOR.

(3) WINDSHIELD WIPER SHALL BE CONTROLLED WITH ONE SWITCH. SWITCH SHALL PROVIDE TWO-SPEED OPERATION AND SHALL INCORPORATE AN INTERMITTENT POSITION.

(4) WIPERS SHALL BE WET TYPE.

(5) THE WINDSHIELD WIPER MOTORS SHALL HAVE SUFFICIENT POWER AND THE WIPER ARMS AND BLADES SHALL BE OF SUFFICIENT LENGTH TO PROVIDE THE LARGEST CLEANING AREA POSSIBLE.

(6) WIPER BLADES SHALL BE A MINIMUM OF SIXTEEN INCHES IN LENGTH. THE BLADE HOLDERS SHALL BE THE TYPE THAT PERMIT REPLACEMENT OF ONLY THE RUBBER BLADE.

- (7) THE LEFT SIDE WINDSHIELD WIPER SHALL BE SO POSITIONED THAT THE APPROXIMATE CENTER OF THE WIPED AREA WILL BE DIRECTLY IN FRONT OF THE DRIVER IN A NORMAL SEATED POSITION. THE RIGHT SIDE WINDSHIELD WIPER SHALL BE SO POSITIONED THAT THE WIPED AREA WILL PROVIDE THE DRIVER WITH MAXIMUM VISION TO THE RIGHT IN A NORMAL SEATED POSITION.

(GG) WINDSHIELD WASHERS.

- (1) THE SCHOOL BUS BODY SHALL BE EQUIPPED WITH AN ELECTRICALLY OPERATED WINDSHIELD WASHER BY WHICH A STREAM OF WASHING FLUID IS DIRECTED TO BOTH SIDES OF THE WINDSHIELD IN THE APPROXIMATE CENTER OF THE WIPED AREA.
- (2) THE WINDSHIELD WASHER FLUID RESERVOIR SHALL HAVE A MINIMUM CAPACITY OF TWO QUARTS IN A RIGID PLASTIC CONTAINER. IT SHALL BE MOUNTED IN THE ENGINE COMPARTMENT IN A POSITION READILY ACCESSIBLE FOR REFILLING, EXCEPT TYPE D SCHOOL BUSES.
- (3) WINDSHIELD WASHER SHALL INCORPORATE A CHECK VALVE IN SUPPLY LINE. CHECK VALVE WILL NOT ALLOW WASHER FLUID TO DRAIN BACK INTO WASHER TANK WHEN NOT IN USE.

(HH) WIRING

- (1) ALL WIRING SHALL CONFORM TO CURRENT SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS. ALL WIRES SHALL BE CODED AND NUMBERED AS REQUIRED BY THE "1995 NATIONAL STANDARDS FOR SCHOOL TRANSPORTATION". WIRING DIAGRAMS MUST BE MADE AVAILABLE TO SCHOOL BUS OWNERS.
- (2) THERE SHALL BE NO LESS THAN EIGHT REGULAR CIRCUITS, AS FOLLOWS:
- (a) HEAD, TAIL, STOP (BRAKE), AND INSTRUMENT PANEL LAMPS.
 - (b) CLEARANCE AND STEP-WELL LAMPS.
 - (c) DOME.
 - (d) STARTER MOTOR.

- (e) IGNITION AND EMERGENCY DOOR SIGNAL.
 - (f) TURN SIGNAL LAMPS.
 - (g) ALTERNATELY FLASHING RED AND AMBER SIGNAL LAMPS.
 - (h) HORN.
- (3) ANY OF THE ABOVE COMBINATION CIRCUITS MAY BE SUBDIVIDED INTO ADDITIONAL INDEPENDENT CIRCUITS.
 - (4) WHENEVER HEATERS AND DEFROSTERS ARE USED, AT LEAST ONE ADDITIONAL CIRCUIT SHALL BE INSTALLED.
 - (5) WHENEVER POSSIBLE, ALL OTHER ELECTRICAL FUNCTIONS, SUCH AS SANDERS AND ELECTRIC-TYPE WINDSHIELD WIPERS, SHALL BE PROVIDED WITH INDEPENDENT AND PROPERLY PROTECTED CIRCUITS.
 - (6) EACH BODY CIRCUIT SHALL BE COLOR CODED AND A DIAGRAM OF THE CIRCUITS SHALL BE ATTACHED TO THE BODY IN A READILY ACCESSIBLE LOCATION.
 - (7) A CIRCUIT BREAKER SHALL BE PROVIDED FOR EACH CIRCUIT EXCEPT STARTER MOTOR AND IGNITION CIRCUITS.
 - (8) ALL WIRES WITHIN BODY SHALL BE INSULATED AND PROTECTED BY A COVERING WHICH WILL PROTECT THEM FROM EXTERNAL DAMAGE AND MINIMIZE DANGERS FROM SHORT CIRCUITS. WHENEVER WIRES PASS THROUGH BODY MEMBERS, ADDITIONAL PROTECTION IN THE FORM OF AN APPROPRIATE TYPE OF INSERT SHALL BE PROVIDED.
 - (9) WIRES NOT ENCLOSED WITHIN BODY SHELL SHALL BE FASTENED SECURELY AT INTERVALS OF NOT MORE THAN TWENTY-FOUR INCHES. ALL JOINTS SHALL BE SOLDERED OR JOINED BY EQUALLY EFFECTIVE CONNECTORS.

(II) STOP ARM SIGN SPECIFICATIONS.

- (1) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH AN OCTAGONAL "STOP" SIGN. THE BACKGROUND SHALL BE A MINIMUM OF EIGHTEEN INCHES IN HEIGHT AND EIGHTEEN INCHES IN WIDTH AND SHALL BE REFLECTIVE MATERIAL, RED IN COLOR WITH WHITE LETTERING. THE SIGN SHALL BE SO MOUNTED AS TO NOT INTERFERE WITH THE DRIVER'S VISION TO THE REAR WHEN THE SIGN IS EXTENDED. THE STANDARD OCTAGONAL SIGN SHALL CONTAIN TWO FLASHING RED LAMPS WHICH ARE VISIBLE FROM BOTH SIDES OF THE EXTENDED SIGN. RED STROBE LIGHTS MAY BE USED IN PLACE OF THE FLASHING LIGHTS.**
- (2) THE WORD "STOP" SHALL BE IN REFLECTIVE WHITE LETTERS ON BOTH SIDES OF THE SIGN. THE SIGN SHALL BE VACUUM, ELECTRIC OR AIR-POWER CONTROLLED AND SO CONSTRUCTED AS TO LOCK IN EXTENDED AND CLOSED POSITION.**
- (3) THE STOP ARM SHALL OPERATE WHEN THE SERVICE DOOR IS OPENED AND WHEN THE RED FLASHING WARNING LIGHTS COME ON DURING THE WARNING LIGHT CYCLE.**
- (4) REFLECTIVE MATERIAL FOR STOP SIGN SHALL BE HIGH INTENSITY RETRO-REFLECTIVE SHEETING, GRADE FIVE OR EQUIVALENT.**

REPLACES: RULE 3301-87-03

EFFECTIVE: SEPTEMBER 1, 1998

CERTIFICATION
MITCHELL J. BROWN
DIRECTOR

JANUARY 15, 1998
DATE

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1951

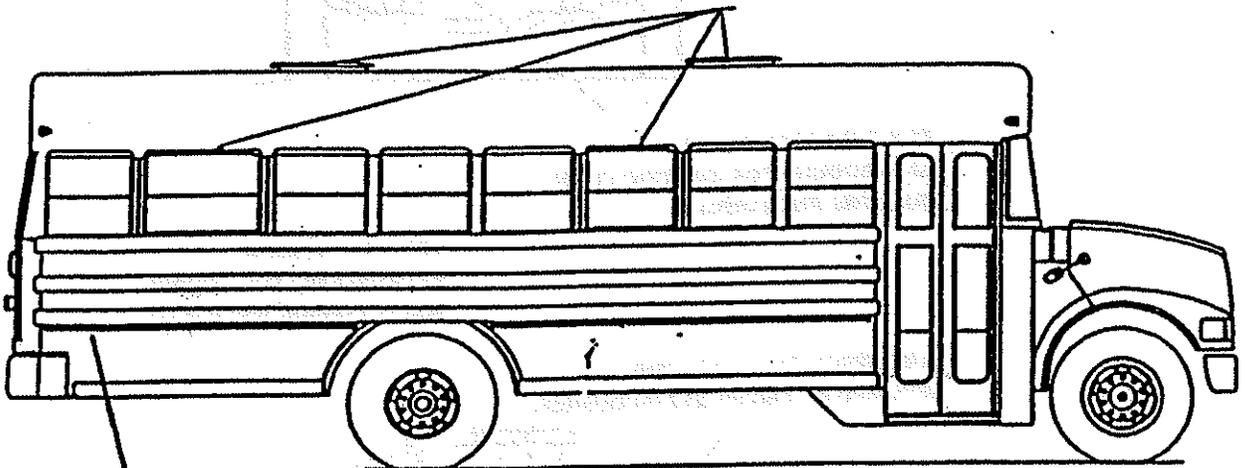
1952

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1960

REFLECTIVE MARKINGS

EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).



YELLOW REFLECTIVE MATERIAL TWO INCHES
IN WIDTH MAY BE APPLIED TO BOTH SIDES
OF THE BUS. THE REFLECTIVE MATERIAL
SHALL RUN PARALLEL TO AND THE SAME DISTANCE
AS THE LOWER RUB RAIL AND SHALL NOT EXCEED
FORTY INCHES IN HEIGHT FROM THE GROUND (OPTIONAL).

REFLECTIVE MARKINGS

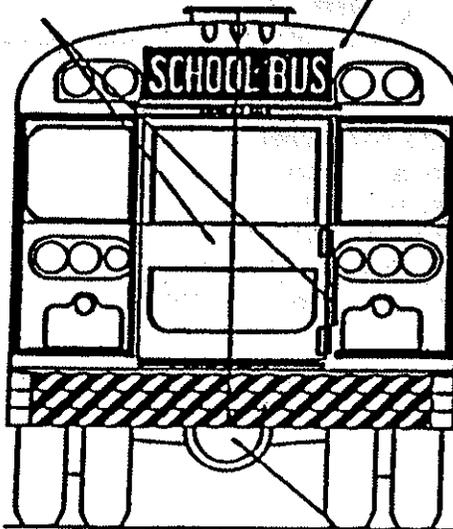
10" X 44" YELLOW BACKGROUND FOR SCHOOL BUS LETTERING (OPTIONAL).



7" X 14" WHITE-SILVER BACKGROUND FOR IDENTIFICATION NUMBERS (REQUIRED).

10" X 44" YELLOW BACKGROUND FOR SCHOOL BUS LETTERING (OPTIONAL).

EMERGENCY EXIT OUTLINING REQUIRED BY FMVSS 217 (REQUIRED).



TWO INCH YELLOW STRIPS OUTLINING REAR OF BUS (REQUIRED).

7" X 14" WHITE-SILVER BACKGROUND FOR IDENTIFICATION AND LOCAL BUS NUMBERS (REQUIRED).

TWO INCH WIDE YELLOW STRIPS APPLIED DIAGONALLY AT A FORTY-FIVE DEGREE ANGLE ON REAR BUMPER (OPTIONAL).

"STAY BACK TEN FEET" IN FOUR INCH ITALICIZED WHITE-SILVER LETTERS MAY BE APPLIED TO FRONT AND REAR BUMPERS (OPTIONAL).

4501-5-04 TYPE B SCHOOL BUS BODY AND CHASSIS.

- (A) TYPE B SCHOOL BUSES SHALL MEET ALL REQUIREMENTS OF RULES 4501-5-01 TO 4501-5-03 OF THE OHIO ADMINISTRATIVE CODE WITH THE FOLLOWING MODIFICATIONS:
- (1) MANUFACTURER'S STANDARDS SHALL BE FOLLOWED FOR FRONT BUMPERS, EXHAUST SYSTEMS, FENDER PAINT, AND FUEL TANKS;
 - (2) MANUAL TRANSMISSION SHALL BE A MINIMUM OF THREE SPEEDS FORWARD, ONE REVERSE. AUTOMATIC TRANSMISSION SHALL BE A MINIMUM OF THREE SPEEDS FORWARD, ONE REVERSE.
 - (3) FUEL-INJECTED GASOLINE ENGINE SHALL BE NOT LESS THAN THREE HUNDRED FIFTY CUBIC INCHES. DIESEL ENGINE SHALL BE NOT LESS THAN ONE HUNDRED SIXTY HORSEPOWER;
 - (4) ENGINE SPEED GOVERNOR IS OPTIONAL.

REPLACES: RULE 3301-87-04

EFFECTIVE: SEPTEMBER 1, 1998

CERTIFICATION
 MITCHELL J. BROWN
 DIRECTOR

JANUARY 15, 1998
 DATE

PROMULGATED UNDER: R.C. CHAPTER 119
 RULE AUTHORIZED BY: R.C. 4511.76
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 4/1/78,
 7/1/88,
 1/01/90 .

CONFIDENTIAL - SECURITY INFORMATION

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

DATE 01/15/2001 BY 60322 UCBAW/STP

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DATE 01/15/2001 BY 60322 UCBAW/STP

CONFIDENTIAL - SECURITY INFORMATION

4501-5-05 TYPES A-I AND A-II SCHOOL BUS CHASSIS

- (A) DRY ELEMENT TYPE AIR CLEANER SHALL BE PROVIDED. AIR CLEANER SHALL MEET ALL APPROPRIATE SOCIETY OF AUTOMOTIVE ENGINEERS J726 TESTS PER ENGINE APPLICATION.
- (B) AXLES AND SUSPENSIONS
- (1) FRONT AND REAR AXLES, INCLUDING SUSPENSION ASSEMBLIES AND ALL FRAME-TO-GROUND COMPONENTS SHALL HAVE A GROSS AXLE RATING AT GROUND AT LEAST EQUAL TO THAT PORTION OF THE LOAD AS WOULD BE IMPOSED BY THE CHASSIS MANUFACTURER'S MAXIMUM GROSS VEHICLE WEIGHT RATING.
 - (2) ALL VEHICLES SHALL BE EQUIPPED WITH APPROPRIATE GROSS VEHICLE WEIGHT RATING AXLES, SUSPENSION SYSTEM AND TIRES BY THE CHASSIS MANUFACTURER.
 - (3) AXLES SHALL BE HEAVY-DUTY.
- (C) BATTERY
- (1) GASOLINE POWERED ENGINE SHALL BE EQUIPPED WITH ONE SIX HUNDRED COLD CRANKING AMPERES OR LARGER.
 - (2) DIESEL POWERED ENGINE SHALL BE EQUIPPED WITH TWO FIVE-HUNDRED COLD CRANKING AMPERES OR LARGER.
 - (3) ONE-PIECE NON-SPLICED BATTERY CABLES SHALL BE PROVIDED BY THE CHASSIS MANUFACTURER.
 - (a) ALL CABLES SHALL CONFORM TO SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD J541 WITH RESPECT TO ELECTRICAL RESISTANCE.
 - (b) ALL CABLE ASSEMBLIES SHALL CONFORM TO AMERICAN TRUCKING ASSOCIATION TRUCK MAINTENANCE COUNCIL RP105.
 - (4) BUSES EQUIPPED WITH A LIFT SHALL HAVE DUAL BATTERIES OF SIX HUNDRED COLD CRANKING AMPERES OR LARGER.
- (D) ALL BRAKING SYSTEMS SHALL COMPLY WITH FMVSS 105 AND SHALL BE MANUFACTURER'S STANDARD.
- (E) FRONT BUMPER SHALL BE MANUFACTURER'S STANDARD.

(F) CLUTCH SHALL BE MANUFACTURER'S STANDARD.

(G) CHASSIS COLOR

(1) BUS SHALL BE PAINTED NATIONAL SCHOOL BUS YELLOW. HOOD SHALL BE NON-GLARE NATIONAL SCHOOL BUS YELLOW OR NON-GLARE BLACK.

(2) WHEELS SHALL BE PAINTED BLACK OR NATURAL IRON GRAY.

(H) COOLING SYSTEM

(1) THE COOLING SYSTEM RADIATOR SHALL BE OF SUFFICIENT CAPACITY TO COOL THE MOTOR AT ALL SPEEDS IN ALL GEARS. THERMOSTAT CONTROLS SHALL BE HIGH TEMPERATURE TYPE.

(2) ON ALL CHASSIS REQUIRING HOSES OR EXTENSIONS TO FILL RADIATORS, THE HOSE OR EXTENSION SHALL BE SO DESIGNED TO PERMIT ADDING COOLANT WITHOUT TRAPPING AIR.

(3) PERMANENT ETHYLENE-GLYCOL BASE ANTIFREEZE SHALL BE PROVIDED BY CHASSIS MANUFACTURER TO PROTECT THE COOLING SYSTEM TO MINUS TWENTY DEGREES FAHRENHEIT WHEN TESTED AT NORMAL ENGINE TEMPERATURE.

(4) WHEN A CHASSIS IS EQUIPPED WITH AN AUTOMATIC TRANSMISSION, THE CHASSIS SHALL HAVE A HEAVY-DUTY COOLING SYSTEM WITH INCREASED CAPACITY IN THE RADIATOR, FAN, AND OTHER NECESSARY COMPONENTS TO PROVIDE FOR THE ADDITIONAL COOLING REQUIRED BY THE AUTOMATIC TRANSMISSION.

(5) CHASSIS SHALL BE EQUIPPED WITH A COOLANT RECOVERY SYSTEM OR A DEAERATION SYSTEM.

(I) MANUFACTURER'S STANDARD DRIVE SHAFT GUARD SHALL BE REQUIRED TO PREVENT DRIVE SHAFT FROM DROPPING TO GROUND.

(J) DRIVER'S SEAT:

- (1) ALL SEWING ON CUSHIONS AND BACKS SHALL BE SINGLE-STITCHED, WITH A MINIMUM OF NUMBER TWELVE FOUR-PLY GLAZE FINISH THREAD OF THE BEST GRADE OR ITS APPROVED EQUAL. SEAMS IN CUSHIONS AND SEAT BACKS SHALL BE FORTY-TWO OUNCE OR EQUIVALENT MATERIAL STRENGTH AS UPHOLSTERY. DRIVER'S SEAT MUST BE COVERED WITH FLAME BARRIER FIRE RETARDANT MATERIAL.

(K) ELECTRICAL SYSTEM

- (1) ALTERNATOR SHALL BE A MINIMUM ONE HUNDRED AMPERE.
- (2) ALL BUSES SHALL BE EQUIPPED WITH A VOLTMETER. MANUFACTURER'S STANDARD ACCEPTABLE.

(L) EXHAUST SYSTEM

- (1) EXHAUST PIPE, MUFFLER, AND TAILPIPE SHALL BE OUTSIDE BUS BODY AND ATTACHED TO CHASSIS.
- (2) MUFFLER SHALL BE HEAVY-DUTY TRUCK TYPE OF ALUMINIZED OR STAINLESS STEEL, OR CERAMIC COATED TO OFFER MAXIMUM RESISTANCE TO CORROSION OR OXIDATION.

(M) FRONT FENDERS

- (1) TOTAL SPREAD OF OUTER EDGES OF FRONT FENDERS MEASURED AT FENDER LINE SHALL EXCEED TOTAL SPREAD OF FRONT TIRES WHEN FRONT WHEELS ARE IN STRAIGHT-AHEAD POSITION.
- (2) FRONT FENDERS SHALL BE BRACED AND FREE FROM ANY BODY ATTACHMENT. TRAILING EDGE OF FRONT FENDER SHALL EXTEND TO BOTTOM OF FRONT BODY SECTION. FENDER EXTENSIONS ARE ACCEPTABLE.
- (3) COLOR SHALL CONFORM WITH PARAGRAPH (G) OF THIS RULE.

(N) FRAME

- (1) FRAME SHALL BE DESIGNED TO CORRESPOND WITH OR EXCEED STANDARD PRACTICE PERFORMANCE CRITERIA FOR TRUCKS OF THE SAME GENERAL LOAD SPECIFICATIONS USED FOR HIGHWAY SERVICE.**
- (2) FRAME SIDE MEMBERS SHALL BE ONE-PIECE CONSTRUCTION WITH THE FOLLOWING EXCEPTIONS:**
 - (a) EXTENSION OF THESE MEMBERS SHALL BE DESIGNED, FURNISHED, AND GUARANTEED BY CHASSIS OR BODY MANUFACTURER. INSTALLATION SHALL BE GUARANTEED BY THE COMPANY INSTALLING THE EXTENSION. EXTENSION OF FRAME LENGTH SHALL NOT BE FOR THE PURPOSE OF EXTENDING WHEEL-BASE.**
 - (b) NO HOLES SHALL BE PERMITTED IN THE CHASSIS FRAME RAILS EXCEPT THOSE DRILLED AT THE CHASSIS PLANT OR AUTHORIZED BY THE CHASSIS MANUFACTURER.**
 - (c) ANY WELDING TO CHASSIS FRAME RAILS MUST BE GUARANTEED BY THE COMPANY PERFORMING THE WELDING PROCEDURE.**
- (O) MANUFACTURER'S STANDARD FUEL TANK CONSTRUCTION SHALL PREVENT SPILLAGE OR DRAINAGE OF FUEL ON ANY PART OF THE EXHAUST SYSTEM.**
- (P) HORN(S)**
 - (1) SCHOOL BUS SHALL BE EQUIPPED WITH DUAL HORNS OF STANDARD MAKE, EACH CAPABLE OF PRODUCING COMPLEX SOUND IN BAND OF AUDIO FREQUENCIES FROM TWO HUNDRED FIFTY TO TWO THOUSAND HERTZ AND HAVING A TOTAL SOUND BAND OF EIGHTY TWO TO ONE HUNDRED TWO DECIBELS WITHIN THESE FREQUENCY LIMITS WHEN MEASURED AT FIFTY FEET FROM THE VEHICLE.**
 - (2) SOUND LEVEL MEASUREMENTS SHALL BE MADE WITH METER THAT COMPLIES WITH AMERICAN NATIONAL STANDARDS INSTITUTE. STANDARDS MEASUREMENT SHALL BE MADE WITH METER SET TO FLAT RESPONSE.**

(3) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH AUDIBLE ELECTRICAL WARNING DEVICE, AUTOMATICALLY ACTUATED WHEN THE BUS IS IN REVERSE GEAR. DEVICE SHALL BE AT LEAST ONE-HUNDRED-SEVEN DECIBELS, MEETING SOCIETY OF AUTOMOTIVE ENGINEERS 1994. DEVICE SHALL BE MOUNTED BEHIND REAR AXLE, BETWEEN FRAME RAILS, AND SHALL EMIT INTERMITTENT SOUND. DEVICE SHALL BE PROVIDED AND INSTALLED BY BODY MANUFACTURER.

(Q) INSTRUMENTS AND INSTRUMENT PANEL SHALL BE MANUFACTURER'S STANDARD.

(R) CHASSIS LAMPS AND SIGNALS

(1) ALL LAMPS AND THEIR INSTALLATION SHALL CONFORM TO CURRENT FMVSS 571.108.

(2) CHASSIS SHALL BE EQUIPPED WITH SEALED BEAM HEAD LAMPS. BUS SHALL BE EQUIPPED WITH A COLUMN MOUNTED DIMMER SWITCH.

(3) A SELF-CANCELING TURN SIGNAL SHALL BE INSTALLED BY THE CHASSIS MANUFACTURER AS AN INTEGRAL PART OF THE STEERING COLUMN ASSEMBLY, AND SHALL HAVE CIRCUIT WIRES OF SUFFICIENT LENGTH FOR THE CONNECTION OF THE BUS TURN SIGNALS BY THE SCHOOL BUS BODY MANUFACTURERS.

(a) TURN SIGNAL SYSTEMS SHALL BE INDEPENDENT UNITS AND THE CHASSIS MANUFACTURER SHALL PROVIDE A FOUR-WAY HAZARD WARNING SWITCH TO CAUSE SIMULTANEOUS FLASHING OF TURN SIGNAL LAMPS WHEN NEEDED AS A VEHICULAR TRAFFIC HAZARD WARNING.

(b) THE CHASSIS MANUFACTURER SHALL INSTALL A LEFT AND RIGHT TURN SIGNAL DIRECTION INDICATOR ON THE INSTRUMENT PANEL PLAINLY VISIBLE TO THE DRIVER.

FRONT TURN SIGNALS SHALL BE INSTALLED BY THE CHASSIS MANUFACTURER IN COMPLIANCE WITH THE REQUIREMENTS OF FMVSS 571.108. PLACEMENT SHALL BE IN AN AREA MOST VISIBLE TO OTHER MOTORISTS.

(S) OIL FILTER SHALL BE MANUFACTURER'S STANDARD.

(T) ALL OPENINGS MADE BY THE CHASSIS MANUFACTURER IN THE FLOORBOARD AND FIRE-WALL SHALL BE SEALED BY THE CHASSIS MANUFACTURER TO PREVENT GASES FROM ENTERING THE DRIVER'S COMPARTMENT. BOOTS FOR THE ACCELERATOR PEDAL, CLUTCH, SERVICE BRAKE, GEARSHIFT, AND EMERGENCY BRAKE, WHEN REQUIRED, SHALL BE SUPPLIED BY THE CHASSIS MANUFACTURER.

(U) POWER TRAIN

(1) UNDER GROSS VEHICLE WEIGHT RATING LOADED CONDITION, THE ENGINE, TRANSMISSION, AND OTHER DRIVE LINE COMPONENTS SHALL BE CAPABLE OF MAINTAINING A SPEED OF FIFTY-FIVE MILES PER HOUR ON A ROAD GRADE OF ONE PER CENT WHEN THE ENGINE IS OPERATING AT NINETY PER CENT OF THE ENGINE MANUFACTURER'S RECOMMENDED MAXIMUM OR GOVERNED REVOLUTIONS PER MINUTE.

(2) CHASSIS EQUIPPED WITH GASOLINE ENGINE SHALL HAVE A MINIMUM THREE-HUNDRED FIFTY CUBIC-INCH DISPLACEMENT AND SHALL BE FUEL-INJECTED.

(3) CHASSIS EQUIPPED WITH DIESEL ENGINE SHALL HAVE A MINIMUM OF ONE HUNDRED-SIXTY HORSEPOWER.

(V) HEAVY-DUTY DOUBLE-ACTING SHOCK ABSORBERS COMPATIBLE WITH THE MANUFACTURER'S RATED AXLE CAPACITY SHALL BE INSTALLED ON THE FRONT AND REAR OF THE SCHOOL BUS CHASSIS.

(W) SPRINGS

(1) SUSPENSION ASSEMBLIES AS SPECIFIED SHALL MAINTAIN CONTROL STABILITY OF SCHOOL BUS UNDER ALL LOAD CONDITIONS.

(X) STEERING GEAR ASSEMBLY SHALL BE EQUIPPED WITH HEAVY-DUTY INTEGRAL POWER STEERING COMPATIBLE WITH THE GROSS VEHICLE WEIGHT FOR EACH CAPACITY.

(Y) TIRES

(1) ALL TIRES SHALL BE TUBELESS RADIAL AND MEET ALL APPLICABLE TIRE AND RIM ASSOCIATION STANDARDS. TIRES SHALL BE OF ADEQUATE SIZE AND LOAD RATING FOR APPLICABLE GROSS VEHICLE WEIGHT.

(Z) TRANSMISSION

- (1) AUTOMATIC TRANSMISSION SHALL HAVE AT LEAST THREE FORWARD GEARS, NEUTRAL, AND REVERSE.**
- (2) MANUAL TRANSMISSION SHALL BE SYNCHROMESH IN ALL GEARS EXCEPT FIRST AND REVERSE GEARS. GEARSHIFT SHALL NOT INTERFERE WITH OPERATION OF SERVICE/ENTRANCE DOOR.**

(AA) ALL WIRING SHALL MEET APPLICABLE SOCIETY OF AUTOMOTIVE ENGINEERS REQUIREMENTS.

REPLACES: RULE 3301-87-05

EFFECTIVE: SEPTEMBER 1, 1998

**CERTIFICATION
MITCHELL J. BROWN
DIRECTOR**

**JANUARY 15, 1998
DATE**

**PROMULGATED UNDER R.C. CHAPTER 119
RULE AUTHORIZED BY R.C. SECTION 4511.76
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**11/01/71
04/01/78
07/01/88
01/01/90**

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY

PH.D. THESIS
SUBMITTED TO THE FACULTY OF THE DIVISION OF THE PHYSICAL SCIENCES
IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
BY
[Name]

DEPARTMENT OF CHEMISTRY
5800 S. UNIVERSITY AVENUE
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DATE OF DEFENSE: [Date]
BY: [Name]

CHICAGO, ILLINOIS
[Date]

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4501-5-06 SCHOOL BUS BODY STANDARDS - TYPES A-I AND A-II SCHOOL BUS WITH BODY SUPPLIED BY BODY MANUFACTURER.

- (A) MINIMUM AISLE CLEARANCE BETWEEN SEATS SHALL BE TWELVE INCHES AT FLOOR LEVEL AND FOURTEEN INCHES AT TOP OF SEAT BACK.
- (B) BATTERY SHALL BE PROVIDED BY THE CHASSIS MANUFACTURER.
- (C) REAR BUMPER SHALL BE ONE PIECE, HEAVY-DUTY TYPE, PRESSED STEEL CHANNEL AT LEAST THREE SIXTEENTHS INCH THICK AND A MINIMUM OF SIX INCHES HIGH AFTER FORMING.
- (D) COLOR OF BODY EXTERIOR AND INTERIOR
 - (1) ALL EXTERIOR BODY COMPONENTS SHALL BE PAINTED NATIONAL SCHOOL BUS YELLOW.
 - (2) WITH EXCEPTION OF THOSE AREAS LISTED BELOW, ALL LISTED COMPONENTS NOT PAINTED YELLOW SHALL BE PAINTED BLACK:
 - (A) LETTERING AND NUMBERING.
 - (B) BUMPERS.
 - (C) FLOOR LEVEL RUB RAIL.
 - (D) SEAT LEVEL RUB RAIL.
 - (E) BACKGROUND AREA AND HOODS FOR WARNING LIGHT SYSTEM.
- (E) BODY CONSTRUCTION

ALL SCHOOL BUS BODY CONSTRUCTION COMPONENTS (EXCEPT DOOR HANDLES, GRAB HANDLES, INTERIOR DECORATIVE PARTS AND COMPONENTS HEAVIER THAN TWELVE GAUGE) SHALL BE OF PRIME COMMERCIAL QUALITY MILL-APPLIED ZINC-COATED STEEL OR COMPOSITE MATERIALS. COMPONENTS MUST MEET OR EXCEED CURRENT STRENGTH AND DURABILITY AND ALL APPLICABLE FMVSS. THE ZINC PLATING SHALL BE ONE HUNDRED TWENTY GRAMS PER SQUARE METER MINIMUM COATING WEIGHT (GRADE SIXTY) OR EQUIVALENT APPLIED BY EITHER HOT-DIPPING OR ELECTROPLATING. ALL SUCH CONSTRUCTION MATERIALS SHALL BE FIRE RESISTANT.

- (1) ALL PAINTED METAL SURFACES SHALL BE CHEMICALLY CLEANED, ETCHED, ZINC-PHOSPHATE-COATED, AND ZINC-CHROMATE, EPOXY PRIMED, OR CONDITIONED BY EQUIVALENT PROCESS IN ADDITION TO THE ABOVE REQUIREMENTS.
- (2) IN PROVIDING FOR THE REQUIREMENTS IN PARAGRAPHS (E)(1) AND (E)(2) OF THIS RULE, PARTICULAR ATTENTION SHALL BE GIVEN TO LAPPED SURFACES, WELDED CONNECTIONS OF STRUCTURAL MEMBERS, CUT EDGES, PUNCHED OR DRILLED HOLD AREAS IN SHEET METAL, CLOSED OR BOX SECTIONS, UNVENTED OR UNDRAINED AREAS, AND SURFACES SUBJECT TO ABRASION DURING VEHICLE OPERATION.
- (3) UPON FINAL ASSEMBLY THE SCHOOL BUS BODY AND CHASSIS MUST MEET OR EXCEED ALL STRENGTH CRITERIA AS ESTABLISHED BY FMVSS 571.220. SCHOOL BUS BODY SHALL MEET OR EXCEED FMVSS 571.221.
- (4) BODY CONSTRUCTION SHALL PROVIDE A DUST-PROOF AND WATERTIGHT UNIT.
- (5) WHEN WATER OR DUST LEAKS DUE TO WORKMANSHIP AT POINT OF MANUFACTURE OCCUR DURING THE FIRST TWENTY FOUR MONTHS OF USE, THE LEAKS SHALL BE REPAIRED ENTIRELY AT THE EXPENSE OF THE BODY MANUFACTURER AS A PART OF THE REGULAR WARRANTY.
- (6) THE FLOOR SHALL BE NOT LESS THAN FOURTEEN GAUGE MILL-APPLIED ZINC-COATED STEEL SHEET OR COMPOSITE MATERIALS. COMPONENTS MUST MEET OR EXCEED STRENGTH AND DURABILITY AND MEET ALL APPLICABLE FMVSS. THE ZINC PLATING SHALL BE ONE HUNDRED TWENTY GRAMS PER SQUARE METER MINIMUM COATING WEIGHT OF GRADE SIXTY OR EQUIVALENT APPLIED BY EITHER HOT-DIPPING OR ELECTROPLATING. IF THE FLOOR AND FRAME ARE OF A UNITIZED TYPE CONSTRUCTION, THE MANUFACTURER'S STANDARD FLOOR IS ACCEPTABLE.

(7) ALL LONGITUDINAL SIDE STRAINERS AND MEMBERS SHALL BE A MINIMUM OF SIXTEEN-GAUGE STEEL OR COMPOSITE MATERIALS. MATERIALS MUST MEET OR EXCEED IN STRENGTH AND DURABILITY AND ALL APPLICABLE FMVSS.

(a) THERE SHALL BE ONE LONGITUDINAL SIDE STRAINER OR IMPACT RAIL MOUNTED AT BELT LINE OR WINDOW SILL LEVEL AND EXTENDING AT LEAST FROM THE FRONT MAIN VERTICAL POST, EXCLUDING THE FRONT DOOR ENTRANCE, TO THE LAST MAIN VERTICAL POST ON EACH SIDE OF THE BODY. THIS MEMBER SHALL BE ATTACHED AT EACH VERTICAL POST.

(b) THERE SHALL BE ONE LONGITUDINAL SIDE STRAINER MOUNTED AT THE SIDE WINDOW HEADER LEVEL AND EXTENDED AROUND THE SCHOOL BUS BODY. THIS MEMBER SHALL BE ATTACHED AT EACH VERTICAL POST.

(c) ADDITIONAL LONGITUDINAL SIDE STRAINERS ARE PERMISSIBLE IF THEY FORM AN INTEGRAL PART OF THE SCHOOL BUS BODY CONSTRUCTION AND MEET ALL FASTENING REQUIREMENTS.

(d) SIDE STRAINERS USED IN BASIC CONSTRUCTION AT FLOOR LEVEL AND EXTENDING ABOVE FLOOR LINE MAY BE UTILIZED AS BASE AT WALL LINE FOR RAIL MOUNTED SEATS.

(9) RUB RAILS

(a) BODY MANUFACTURERS SHALL INSTALL ONE RUB RAIL AT APPROXIMATELY SEAT LEVEL, EXCEPT FOR OPENING FOR EMERGENCY DOOR. THIS RAIL SHALL EXTEND FROM THE MAIN VERTICAL POST BEHIND THE ENTRANCE DOOR TO THE MOST FORWARD VERTICAL POST ON THE LEFT SIDE OF THE BODY.

(b) A SECOND RUB RAIL SHALL BE INSTALLED AT APPROXIMATELY THE FLOOR LINE AND COVER THE SAME LONGITUDINAL AREA AS THE SEAT LEVEL RAIL, EXCEPT AT WHEEL-HOUSINGS, AND SHALL EXTEND TO THE RADIUS OF RIGHT AND LEFT REAR CORNERS. A THIRD RUB RAIL INSTALLED ON THE LOWER EDGE OF THE BODY SKIRT IS OPTIONAL AND SHALL BE PAINTED BLACK OR YELLOW.

- (c) ALL RUB RAILS SHALL BE ATTACHED AT EACH BODY POST AND ALL OTHER UPRIGHT STRUCTURAL MEMBERS.
- (d) ALL RUB RAILS SHALL BE FOUR INCHES OR MORE IN WIDTH AFTER FORMING AND SHALL BE A MINIMUM OF SIXTEEN-GAUGE STEEL, CORRUGATED OR RIBBED PATTERN.
- (e) ALL RUB RAILS SHALL BE MOUNTED OUTSIDE BODY PANELS.
- (f) EXTERNAL LONGITUDINAL MEMBERS ARE PERMISSIBLE IN ADDITION TO ALL PREVIOUSLY SPECIFIED MEMBERS IF THEY FORM AN INTEGRAL PART OF THE BODY CONSTRUCTION AND MEET FASTENING REQUIREMENTS.

(10) TWO OR MORE ROOF STRAINERS OR LONGITUDINAL MEMBERS SHALL BE PROVIDED TO CONNECT, TO REINFORCE FLATTEST PORTION OF ROOF SKIN, AND TO SPACE ROOF BOWS. STRAINERS MAY BE INSTALLED BETWEEN ROOF BOWS OR APPLIED EXTERNALLY. THEY SHALL EXTEND FROM THE WINDSHIELD HEADER AND ARE TO FUNCTION AS CONTINUOUS LONGITUDINAL ROOF MEMBERS AT ALL POINTS OF CONTACT BETWEEN STRAINERS OR LONGITUDINAL MEMBERS AND OTHER STRUCTURAL MATERIAL, ATTACHMENT SHALL BE MADE BY MEANS OF WELDING, RIVETING, OR BOLTING.

(11) REAR CORNER CONSTRUCTION OF THE BUS BODY BETWEEN THE FLOOR AND WINDOW SILL AND BETWEEN THE EMERGENCY DOOR POSTS AND LAST VERTICAL SIDE POST SHALL CONSIST OF AT LEAST THREE STRUCTURAL MEMBERS. SHALL PROVIDE IMPACT AND PENETRATION RESISTANCE EQUAL TO OR GREATER THAN THAT PROVIDED BY FRAME MEMBERS IN THE SIDES OF THE BODY. SUCH STRUCTURAL MEMBERS SHALL BE SECURELY ATTACHED AT EACH END.

(12) IF THE CEILING IS SO CONSTRUCTED TO CONTAIN LAP JOINTS, THE FORWARD PANEL SHALL BE LAPPED BY THE REAR PANEL AND THE EXPOSED EDGES SHALL BE BEADED, HEMMED, OR FLANGED OR OTHERWISE TREATED TO MINIMIZE SHARP EDGES.

(13) ALL BODY COMPONENTS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO AVOID THE ENTRAPMENT OF MOISTURE.

(F) DEFROSTER

- (1) A DEFROSTER SYSTEM SHALL BE INSTALLED CAPABLE OF KEEPING THE WINDSHIELD AREA, LEFT FRONT SIDE WINDOW BESIDE THE DRIVER, AND SERVICE DOOR GLASS AREA FREE OF CONDENSATION OR ICE UNDER ALL POSSIBLE COMBINATIONS OF PUPIL LOAD AND CLIMATE CONDITIONS. DEFROSTER MUST BE CAPABLE OF PROVIDING AT LEAST SIXTY PER CENT FRESH AIR.
- (2) ONE ADJUSTABLE SIX-INCH AUXILIARY DEFROSTER FAN SHIELDED WITH SMALL MESH METAL OR POLYPROPYLENE GUARD SHALL BE INSTALLED.
 - (a) FAN SHALL BE MOUNTED TO COMPLEMENT THE DEFROSTER SYSTEM USED BY THE MANUFACTURER.
 - (b) AUXILIARY DEFROSTER FAN SHALL BE CONTROLLED INDIVIDUALLY BY TWO-SPEED SWITCH LOCATED IN THE ELECTRICAL CONTROL PANEL.

(G) DOORS**(1) SERVICE DOORS**

- (a) SERVICE DOOR SHALL BE OUTWARD OPENING SPLIT TYPE. SERVICE DOOR SHALL BE AIR, ELECTRIC, OR MANUALLY OPERATED. DOOR SHALL BE UNDER THE CONTROL OF THE DRIVER AND DESIGNED TO AFFORD EASY RELEASE AND PREVENT ACCIDENTAL OPENING. WHEN A MANUAL LEVER IS USED, NO PARTS SHALL COME TOGETHER SO AS TO SHEAR OR CRUSH FINGERS. LEVER SHALL BE EQUIPPED WITH AN APPROVED SAFETY LATCH TO PREVENT ACCIDENTAL OPENING WHICH WILL LOCK IN THE OVER-CENTER POSITION WHEN DOOR IS FULLY OPENED. MANUALLY OPERATED DOORS SHALL REQUIRE NO MORE THAN TWENTY-FIVE POUNDS OF PULL TO CLOSE AND MAY BE HYDRAULICALLY ASSISTED.
- (b) MANUAL DOOR CONTROL MECHANISM SHALL BE HEAVY-DUTY BEARING TYPE, ADJUSTABLE FOR WEAR, NON-CORROSIVE, ANODIZED STEEL OR EQUIVALENT.
- (c) SERVICE DOOR SHALL BE LOCATED ON RIGHT SIDE OF BUS OPPOSITE THE DRIVER AND WITHIN THE DRIVER'S DIRECT VIEW.

- (d) SERVICE DOOR SHALL HAVE MINIMUM HORIZONTAL OPENING OF TWENTY-FOUR INCHES AND MINIMUM VERTICAL OPENING OF SIXTY-EIGHT INCHES.
- (e) GLASS IN SERVICE DOOR SHALL PROVIDE MAXIMUM AREA OF VISIBILITY FOR OPERATION OF BUS
- (f) ALL EDGES OF SERVICE DOOR SHALL BE SEALED BY FLEXIBLE RUBBER OR EQUIVALENT MATERIAL TO PREVENT AIR FROM ENTERING DOOR ENTRANCE WHEN CLOSED.
- (g) THERE SHALL BE NO SAFETY RAIL OR HAND-HOLDS MOUNTED ON THE SERVICE DOOR
- (h) THERE SHALL BE A HEAD BUMPER PAD INSTALLED ON THE INSIDE OF THE BUS BODY AT THE TOP OF THE ENTRANCE DOOR. THIS PAD SHALL BE APPROXIMATELY FOUR INCHES IN WIDTH AND EXTEND ACROSS THE ENTIRE TOP OF THE ENTRANCE DOOR OPENING.
- (i) SERVICE DOOR SHALL HAVE ACCESS FOR EASY LUBRICATION.

(2) EMERGENCY DOORS

- (a) EMERGENCY DOOR SHALL MEET FMVSS 571.217 AND BE DESIGNED TO BE OPENED FROM THE INSIDE AND OUTSIDE OF THE BUS AND SHALL BE EQUIPPED WITH A FASTENING DEVICE WHICH MAY BE QUICKLY RELEASED, BUT IS DESIGNED TO OFFER PROTECTION AGAINST ACCIDENTAL RELEASE.

(b) ALL EMERGENCY DOORS SHALL BE EQUIPPED WITH SLIDE BAR-CAM OR GEAR-OPERATED LATCH. EMERGENCY DOOR LATCH SHALL BE EQUIPPED WITH SUITABLE ELECTRIC PLUNGER TYPE SWITCH CONNECTED TO TWO BUZZERS, WITH ONE LOCATED AT EMERGENCY DOOR AND THE OTHER IN DRIVER'S COMPARTMENT. SWITCH SHALL BE ENCLOSED IN METAL CASE, AND WIRES LEADING FROM SWITCH SHALL BE CONCEALED IN SCHOOL BUS BODY. SWITCH SHALL BE SO INSTALLED THAT PLUNGER CONTACTS FARTHEST EDGE OF SLIDE BAR IN SUCH A MANNER THAT ANY MOVEMENT OF SLIDE BAR WILL IMMEDIATELY CLOSE CIRCUIT ON SWITCH AND ACTIVATE BOTH BUZZERS AND ALL DOME LIGHTS, DRIVER DOME LIGHT EXCLUDED. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON-OFF", OR ACCESSORY POSITION. A SEPARATE INTERIOR HANDLE SHALL BE PROVIDED TO PULL THE DOOR SHUT FROM THE INSIDE.

(c) EXTERIOR DOOR HANDLE SHALL BE OF PERMANENT HITCH-PROOF DESIGN AND MOUNTED WITH ENOUGH CLEARANCE TO PERMIT OPENING WITHOUT TOUCHING DOOR SURFACE.

(d) ALL EMERGENCY DOOR OPENINGS SHALL BE COMPLETELY WEATHER-STRIPPED.

(e) OPERATION INSTRUCTIONS FOR OPENING THE DOOR SHALL BE LETTERED OR DECALED ON THE INSIDE OF THE EMERGENCY DOOR.

(f) THERE SHALL BE NO STEP-TYPE MECHANISM IN THE USE OF THE EMERGENCY DOOR.

(g) NO SEAT, CHASSIS OR BODY COMPONENT SHALL BE INSTALLED IN THE AISLE LEADING TO THE EMERGENCY DOOR.

(h) EMERGENCY DOOR SHALL DISPLAY THE WORDS, "EMERGENCY DOOR" BOTH INSIDE AND OUTSIDE IN LETTERS AT LEAST TWO INCHES HIGH. WORDS SHALL BE PLACED DIRECTLY ABOVE EMERGENCY DOOR OR ON THE UPPER PORTION OF THE DOOR.

(i) REAR EMERGENCY DOOR

- (i) EMERGENCY DOOR SHALL BE LOCATED IN THE REAR OF THE SCHOOL BUS BODY AND CENTERED WITH RESPECT TO THE BODY.**
- (ii) EMERGENCY DOOR SHALL HAVE A MINIMUM HORIZONTAL OPENING OF TWENTY-FOUR INCHES, AND A MINIMUM VERTICAL OPENING OF FORTY-EIGHT INCHES MEASURED FROM THE FLOOR LEVEL.**
- (iii) EMERGENCY DOOR SHALL BE HINGED ON THE CURB SIDE AND SHALL OPEN TO THE OUTSIDE.**
- (iv) EMERGENCY DOOR SHALL CONTAIN UPPER AND LOWER GLASS PANELS WHICH COMPLY WITH FMVSS 571.205.**
- (v) GLASS IN EMERGENCY DOOR SHALL PROVIDE MAXIMUM AREA OF VISIBILITY FOR SAFE OPERATION OF SCHOOL BUS.**
- (vi) THERE SHALL BE A HEAD BUMPER PAD INSTALLED OVER THE EMERGENCY DOOR ON THE INSIDE OF THE SCHOOL BUS BODY. THIS PAD SHALL BE AT LEAST FOUR INCHES IN WIDTH AND COVER THE ENTIRE WIDTH OF THE DOOR OPENING. PADDING SHALL BE SAME MATERIAL AS PADDING USED OVER THE SERVICE DOOR.**

(3) EMERGENCY SIDE WINDOW EXITS

- (a) SCHOOL BUSES WITH A DESIGNED MAXIMUM CAPACITY OF LESS THAN FIFTY SHALL HAVE ONE EMERGENCY SWING OUT WINDOW ON EACH SIDE OF THE BUS BODY.**
- (b) EMERGENCY WINDOW SHALL MEET FMVSS 571.205.**
- (c) EMERGENCY WINDOW SHALL DISPLAY THE WORDS "EMERGENCY EXIT" IN LETTERS AT LEAST TWO INCHES HIGH BOTH INSIDE AND OUTSIDE THE WINDOW. WORDS SHALL BE PLACED NO MORE THAN THREE INCHES DIRECTLY ABOVE WINDOW.**

(d) EMERGENCY WINDOWS SHALL ACTIVATE EMERGENCY DOOR BUZZER IN THE DRIVER'S COMPARTMENT AND ALL DOME LIGHTS WHEN NOT FULLY LATCHED, DRIVER DOME LIGHT EXCLUDED. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON", "OFF" OR "ACCESSORY" POSITION.

(e) OPERATION INSTRUCTIONS FOR OPENING WINDOWS SHALL BE LETTERED OR DECALED ON THE INSIDE BELOW THE WINDOW.

(4) ROOF ESCAPE HATCH/VENT SHALL BE ADJUSTABLE AND OF SUFFICIENT CAPACITY TO PROVIDE ADEQUATE FRESH AIR UNDER OPERATING CONDITIONS WITHOUT THE OPENING OF WINDOWS, EXCEPT IN EXTREMELY WARM WEATHER. THIS VENT SHALL HAVE MULTI-POSITIONS AND SHALL BE STATIC-TYPE WITH EXHAUST VENT. THE VENT SHALL HAVE A RELEASE HANDLE OR HANDLES PERMITTING OPERATING AS AN EMERGENCY EXIT WHICH CAN BE OPENED FROM INSIDE OR OUTSIDE THE SCHOOL BUS. ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHTS EXCLUDED) AND EMERGENCY DOOR BUZZER LOCATED IN DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHEN A ROOF HATCH IS OPENED PAST THE VENT POSITION. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN ON-OFF OR ACCESSORY POSITIONS. POWER FOR EMERGENCY LIGHTING AND BUZZER SHALL BE SUPPLIED BY A TWELVE-VOLT SUPPLY LINE GOING TO THE BODY CONTINUOUS DUTY SOLENOID. THE SYSTEM SHALL BE PROTECTED BY A CIRCUIT BREAKER.

BUSES RATED LESS THAN FIFTY DESIGNED MAXIMUM CAPACITY SHALL HAVE ONE COMBINATION UNIT LOCATED IN THE MIDDLE OF THE BUS.

EACH BUS SHALL BE EQUIPPED WITH AT LEAST ONE ROOF HATCH TYPE EMERGENCY EXIT/VENT, SPECIFIED AS FOLLOWS:

(a) EMERGENCY ROOF EXITS SHALL MEET ALL REQUIREMENTS OF FMVSS 571.217

(b) HINGE(S) SHALL BE LOCATED ON FORWARD SIDE OF HATCH.

(c) EMERGENCY ROOF EXITS SHALL BE EQUIPPED WITH RELEASE INSIDE AND OUTSIDE AND SHALL BE LABELED WITH INSTRUCTIONS FOR RELEASE INSIDE AND OUTSIDE.

(H) EMERGENCY EQUIPMENT SHALL BE MOUNTED IN THE DRIVER'S COMPARTMENT AREA IN AN EASILY ACCESSIBLE LOCATION.

(1) BUS SHALL BE EQUIPPED WITH AT LEAST ONE DRY-CHEMICAL TYPE FIRE EXTINGUISHER OF AT LEAST FIVE-POUND CAPACITY, 3A 40 BC RATING, MOUNTED IN A QUICK RELEASE BRACKET EASILY ACCESSIBLE TO THE DRIVER'S COMPARTMENT. THE EXTINGUISHER IS TO BE EQUIPPED WITH A DIAL-TYPE, GRADUATED GAUGE WHICH INDICATES LOSS OF PRESSURE. FIRE EXTINGUISHER SHALL BE OF THE TYPE THAT PERMITS THE DRY CHEMICAL CASE TO BE REFILLED BY ORDINARY PROCEDURES. FIRE EXTINGUISHER SHALL BE EQUIPPED WITH A METAL HEAD.

(2) FIRST-AID KITS SHALL BE DUST PROOF, PLAINLY LABELED AND MOUNTED IN A LOCATION EASILY ACCESSIBLE TO THE DRIVER. MINIMUM UNITS FOR THE FIRST-AID KIT SHALL BE AS FOLLOWS:

SIXTEEN UNIT KIT:

3 UNITS - 1 INCH ADHESIVE COMPRESS

2 UNITS - 2 INCH BANDAGE COMPRESS

1 UNIT - 3 INCH BANDAGE COMPRESS

1 UNIT - 4 INCH BANDAGE COMPRESS

1 UNIT - 3 INCH X 3 INCH PLAIN GAUZE PADS

1 UNIT - 4 INCH GAUZE ROLLER BANDAGE

2 UNITS - PLAIN ABSORBENT GAUZE - 1/2 SQUARE YARD

2 UNITS - PLAIN ABSORBENT GAUZE - 24 INCH X 72 INCH

3 UNITS - TRIANGULAR BANDAGE

(3) THREE TRIANGLE REFLECTORS MEETING FMVSS 571.125 WITH WEIGHTED STANDS ENCASED FOR EASY STORAGE SHALL BE PROVIDED. SIX FUSEE, THIRTY-MINUTE TYPE SHALL BE ENCASED WITH THE TRIANGLE REFLECTORS. REFLECTORS AND FUSEES SHALL BE ENCASED IN A HEAVY-DUTY CONTAINER AND BE SECURED IN A LOCKABLE METAL BRACKET. THE BRACKET SHALL BE MOUNTED WITHIN EASY ACCESS OF THE DRIVER.

(4) ONE BODY FLUID KIT SHALL BE REQUIRED. BODY FLUID KITS SHALL MEET ALL APPLICABLE STATE AND FEDERAL REGULATIONS. THE KIT SHALL CONTAIN THE FOLLOWING ITEMS:

- (a) EFFECTIVE CHLORINE ABSORBENT DEODORANT.
- (b) EFFECTIVE GERMICIDAL DETERGENT (IF DETERGENT CONTAINS ALCOHOL, NO MORE THAN ONE FLUID OUNCE OF ALCOHOL IN A SINGLE USE DISPOSABLE CONTAINER).
- (c) SINGLE USE DISPOSAL BAG.
- (d) SINGLE USE DISPOSABLE SCRAPER.
- (e) MINIMUM OF ONE PAIR OF DISPOSABLE, SINGLE USE EFFECTIVE PROTECTIVE GLOVES.
- (f) EFFECTIVE HAND RINSE. IF HAND RINSE CONTAINS ALCOHOL, NO MORE THAN ONE-HALF FLUID OUNCE IS PERMITTED IN A SINGLE USE DISPOSABLE CONTAINER.
- (g) THE BODY FLUID CLEAN-UP KIT SHALL BE EASILY ACCESSIBLE TO THE DRIVER IN THE AREA OF THE FIRST AID KIT, AND SHALL BE SECURELY MOUNTED IN A METAL OR PLASTIC CONTAINER.
- (h) IF ALCOHOL IS INCLUDED, THE BODY FLUID CLEAN-UP KIT SHALL NOT CONTAIN MORE THAN ONE AND ONE-HALF FLUID OUNCES OF ALCOHOL.

(I) FLOOR COVERING

- (1) ALL FLOOR COVERING SHALL BE PERMANENTLY BONDED TO THE FLOOR AND MUST NOT CRACK OR LOSE ITS ADHESIVE POWER WHEN VEHICLE IS SUBJECTED TO SUDDEN CHANGES IN TEMPERATURE. BONDING OR ADHESIVE MATERIAL SHALL BE WATERPROOF AND RECOMMENDED BY THE MANUFACTURER OF THE FLOOR COVERING MATERIAL.

- (2) UNDERNEATH AREAS SHALL HAVE A SMOOTH FIRE-RESISTANT FLOOR COVERING HAVING MINIMUM OVERALL THICKNESS OF ONE-EIGHTH INCH. THE ENTIRE JOINT BETWEEN THE FLOOR COVERING AND THE WALL OF THE SCHOOL BUS BODY SHALL BE COVERED WITH A CURVED, FITTED, RUST-FREE METAL MOLDING OR PRE-FORMED INTERIOR PANEL.
- (3) DRIVER'S COMPARTMENT FLOOR AREA SHALL BE THE CHASSIS MANUFACTURER'S STANDARD. IT SHALL BE PERMANENTLY BONDED TO THE FLOOR. A FLOOR MAT IS NOT ACCEPTABLE.
- (4) CENTER AISLE COVERING SHALL BE FIRE-RESISTANT MATERIAL, NON-SKID, WEAR-RESISTANT AND RIBBED. MINIMUM THICKNESS SHALL BE ONE HUNDRED EIGHTY-SEVEN THOUSANDTHS INCH MEASURED FROM THE TOP OF THE RIBS.
- (5) BRAKE, GEARSHIFT, AND ACCELERATOR BOOTS SHALL BE SUPPLIED BY THE CHASSIS MANUFACTURER AND INSTALLED BY THE BUS BODY MANUFACTURER.
- (6) METAL OR COMPOSITE MOLDING OR NON-METAL WELDING IS ACCEPTABLE.
 - (a) METAL MOLDING OR NON-METAL WELDING SHALL COVER ALL FLOOR COVERING JOINTS BETWEEN THE RIBBED CENTER AISLE AND SMOOTH UNDERNEATH FLOOR COVERING.
 - (b) COVE MOLDING IS REQUIRED AT THE JUNCTION OF THE FLOOR COVERING AND SIDE WALL. MOLDING MAY BE FORMED TO THE SIDE WALL PANEL OR SEPARATE COVE BASE.
 - (c) MOLDING AROUND THE WHEEL-WELL AND FLOOR COVERING SHALL BE PROVIDED TO SEAL FLOOR COVERING WITH THE WHEEL-WELL.

(J) HEATERS

- (1) SCHOOL BUS HEATING SYSTEMS SHALL PROVIDE EVENLY DISTRIBUTED HEAT THROUGHOUT THE BUS BODY AND PROVIDE DEFROSTING FOR WINDSHIELD AND ENTRANCE DOOR.

(2) HEATERS SHALL HAVE THE CAPABILITY OF PROVIDING EVENLY DISTRIBUTED HEAT CREATING A TEMPERATURE RISE TO FIFTY DEGREES FAHRENHEIT INSIDE BODY SHELL WHEN SOAKED IN AMBIENT TEMPERATURE OF ZERO DEGREE FAHRENHEIT FOR FIFTEEN HOURS.

(3) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH TWO OR MORE HOT WATER HEATERS CAPABLE OF MAINTAINING INSIDE TEMPERATURE OF FIFTY DEGREES FAHRENHEIT WITH ONE HUNDRED FIFTY DEGREE FAHRENHEIT OF WATER BEING DELIVERED TO THE SYSTEM AT A RATE OF SIX GALLONS PER MINUTE USING AN AMBIENT TEMPERATURE OF ZERO DEGREES TO TEN DEGREES FAHRENHEIT.

(4) CONVENTIONAL BUSES SHALL BE EQUIPPED WITH RIGHT AND LEFT FRONT HEATERS, AN INTEGRATED DEFROSTER SYSTEM WITH THE CAPACITY TO PROVIDE HEAT FOR THE FRONT PART OF THE BUS DRIVER'S COMPARTMENT TO KEEP THE WINDSHIELD AREA, SERVICE DOOR GLASS, DRIVER'S LEFT GLASS AREA AND STEPWELL CLEAR OF MOISTURE, ICE AND SNOW, SHALL BE PROVIDED.

(5) TYPE D TRANSIT-BUSES SHALL BE EQUIPPED WITH FRONT HEATER(S). AN INTEGRATED DEFROSTER SYSTEM WITH THE CAPACITY TO PROVIDE HEAT FOR THE FRONT PART OF THE BUS AND THE DRIVER'S COMPARTMENT, TO KEEP WINDSHIELD AREA, DRIVER'S LEFT GLASS AREA, SERVICE DOOR GLASS AREA AND STEPWELL CLEAR OF MOISTURE, ICE AND SNOW, SHALL BE PROVIDED.

(6) HOT WATER HEATERS SHALL DISPLAY THE NAME PLATE RATING IN ACCORDANCE WITH THE STANDARD CODE FOR TESTING AND RATING AUTOMOTIVE BUS HOT WATER HEATER AND VENTILATING EQUIPMENT.

(7) TWO-SPEED SWITCHES SHALL OPERATE ALL HEATER FANS INDEPENDENTLY.

(8) ALL HOT WATER LINES SHALL BE A MINIMUM OF ONE INCH INSIDE DIAMETER AND SHALL BE ENCLOSED.

(9) HEATER CORES AND FANS SHALL BE COMPLETELY ENCASED, BUT DESIGNED TO PERMIT SERVICING HEATING ASSEMBLY BY REMOVING ALL OR PART OF THE CASE.

(10) HEATER HOSE INSTALLATION IN THE ENGINE COMPARTMENT SHALL INCLUDE TWO BRASS SHUT-OFF VALVES ABLE TO SHUT OFF COOLANT COMPLETELY WHEN NECESSARY.

(a) ONE SHUT-OFF VALVE SHALL BE MOUNTED BETWEEN THE WATER PUMP INLET AND HEATER HOSE CONNECTION.

(b) ONE SHUT-OFF VALVE SHALL BE MOUNTED BETWEEN THE MOTOR BLOCK AND THE HEATER HOSE CONNECTION.

(11) THE BODY MANUFACTURER SHALL ADD THE REQUIRED AMOUNT OF PERMANENT ETHYLENE-GLYCOL BASE ANTI-FREEZE TO PROTECT THE COOLING SYSTEM TO MINUS TWENTY DEGREES FAHRENHEIT TESTED AT NORMAL ENGINE TEMPERATURE.

(12) THERE SHALL BE A HEATER WATER-FLOW REGULATING VALVE INSTALLED FOR CONVENIENT OPERATION WHEN THE DRIVER IS IN A NORMAL SEATED POSITION.

(13) HEATER CORES SHALL MEET THE FOLLOWING TEST STANDARDS:

(a) STATIC PRESSURE TEST OF ONE HUNDRED FIFTY POUNDS PER SQUARE INCH

(b) CYCLE TEST OF TWENTY TO FIFTY POUNDS PER SQUARE INCH HYDRAULIC SURGE PRESSURE, FOUR HUNDRED FIFTY THOUSAND CYCLES MINIMUM.

(K) BODY SHALL DISPLAY THE FOLLOWING IDENTIFICATION:

(1) "SCHOOL BUS" IN BLACK LETTERS AT LEAST EIGHT INCHES HIGH ON BOTH FRONT AND REAR OF BODY. LETTERING SHALL BE PLACED AS HIGH AS POSSIBLE WITHOUT IMPAIRMENT OF VISIBILITY. THE BACKGROUND FOR THE SCHOOL BUS LETTERING MAY BE REFLECTIVE GRADE FIVE OR EQUIVALENT YELLOW TAPE ON THE FRONT AND REAR OF THE SCHOOL BUS BODY.

(2) "STOP" ON THE REAR OF THE SCHOOL BUS IN LETTERS APPROXIMATELY TEN INCHES HIGH ON THE DOOR OR THE CENTER OF THE SCHOOL BUS.

- (3) NAME OF THE SCHOOL DISTRICT SHALL APPEAR ON BOTH SIDES OF THE VEHICLE AT THE BELT LINE AND BE AT LEAST FIVE INCHES HIGH.
- (4) COUNTY OF THE SCHOOL DISTRICT SHALL APPEAR ON BOTH SIDES OF THE VEHICLE IN FIVE-INCH LETTERS WITH THE SCHOOL DISTRICT NAME UNLESS THE NAME OF THE CITY OR EXEMPTED VILLAGE APPEARS AS A PART OF THE DISTRICT NAME.
- (5) OWNERSHIP OF THE VEHICLES SHALL APPEAR ON THE ENTRANCE DOOR SIDE IN TWO-INCH HIGH LETTERS.
- (6) LOCAL SCHOOL BUS NUMBERS SHALL BE FIVE INCHES HIGH AND SHALL BE LOCATED AS FOLLOWS:
 - (a) ON BODY ABOVE THE ENTRANCE DOOR;
 - (b) ON THE REAR IN THE AREA OF THE RIGHT SIDE OF THE TAIL LIGHT;
 - (c) ON THE LEFT SIDE IN THE VICINITY OF THE DRIVER'S WINDOW;
 - (d) ON THE FRONT IN THE AREA DESIGNATED BY-THE BUYER.
- (7) BUSES SHALL BE MARKED WITH REFLECTORIZED MATERIAL AS FOLLOWS:
 - (a) ALL REFLECTORIZED MATERIAL SHALL BE PRISMATIC RETRO-REFLECTIVE SUPER-HIGH INTENSITY GRADE FIVE OR EQUIVALENT. THE REFLECTORIZED MATERIAL SHALL MEET OR EXCEED THE INITIAL REFLECTIVE VALUES AS OUTLINED IN FEDERAL HIGHWAY ADMINISTRATION. (ASTMD4956-90). THE COLOR SPECIFICATION SHALL REQUIRE A MINIMUM REFLECTANCE OF FIFTEEN FOR WHITE-SILVER.
 - (b) ALL REFLECTIVE MATERIAL SHALL BE ABLE TO RETAIN AT LEAST FIFTY PER CENT OF THE REFLECTIVE VALUES FOR A MINIMUM OF SEVEN YEARS.

(c) ALL REFLECTIVE MATERIAL SHALL BE WARRANTED AGAINST PEELING, CRACKING, SEPARATION AND LIFTING DUE TO WEATHER CONDITIONS, PRESSURE, AND MECHANICAL WASHING FOR A MINIMUM OF SEVEN YEARS.

(d) REFLECTIVE YELLOW MATERIAL TWO INCHES (PLUS/MINUS ONE QUARTER INCH) IN WIDTH SHALL BE APPLIED TO BOTH CORNERS OF THE REAR OF THE BUS AND EXTEND FROM THE BUMPER VERTICALLY UP TO THE TOP OF THE REAR WINDOWS.

(e) THREE SEVEN BY FOURTEEN INCH WIDE WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED TO THE FRONT AND REAR OF THE BUS TO ACCOMMODATE THE STATE IDENTIFICATION AND LOCAL BUS NUMBERS, AS FOLLOWS:

(i) ONE SEVEN BY FOURTEEN INCH PIECE OF WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED AND CENTERED ON THE FRONT BUMPER. IF THE BUMPER IS MANUFACTURED WITH HOLES IN THE CENTER FOR TWO HOOKS, THE SEVEN BY FOURTEEN PIECE OF MATERIAL MAY BE LOCATED ON THE DRIVER'S SIDE OF THE BUMPER. IF THE BUMPER IS LESS THAN SIX INCHES IN HEIGHT, A SEVEN BY FOURTEEN INCH PLATE WILL BE PERMANENTLY ATTACHED TO THE BUMPER TO ACCOMMODATE THE SEVEN BY FOURTEEN INCH REFLECTIVE MATERIAL.

(ii) IN THE REAR, TWO SEVEN BY FOURTEEN INCH PIECES OF WHITE-SILVER REFLECTIVE MATERIAL SHALL BE APPLIED AND CENTERED ON THE FLAT SURFACE UNDER THE LEFT AND RIGHT LOWER TAIL LIGHTS.

(f) THE LOCAL BUS NUMBER SHALL BE APPLIED AND CENTERED BELOW THE RIGHT LOWER TAIL LIGHT IN FIVE INCH BLACK NUMBERS.

(g) ALL EMERGENCY DOORS, WINDOWS, AND ROOF ESCAPE HATCHES SHALL BE OUTLINED AROUND THE OUTSIDE PERIMETER WITH ONE INCH YELLOW REFLECTIVE MATERIAL.

(h) REFLECTIVE MATERIAL USED ON STOP SIGNS SHALL BE RED GRADE FIVE OR EQUIVALENT.

(L) INSIDE BODY HEIGHT SHALL BE SIXTY-EIGHT INCHES OR MORE MEASURED METAL-TO-METAL AT ANY POINT ON LONGITUDINAL CENTER LINE FROM FRONT VERTICAL BOW TO REAR VERTICAL BOW.

(M) INSULATION

(1) BUS BODY SHALL BE FULLY INSULATED IN THE ROOF AND ALL BODY PANELS TO DEADEN SOUND, REDUCE VIBRATIONS AND HEAT TRANSFER. INSULATION ONE-INCH MINIMUM THICKNESS IN ADDITION TO THE USUAL SPRAYED-ON MATERIAL SHALL BE A FIBERGLASS OR EQUAL AND FIRE-RESISTANT MATERIAL.

(2) A PLYWOOD FLOOR SHALL BE APPLIED ON TOP OF THE STEEL FLOOR. FLOOR COVERING SHALL BE APPLIED ON TOP OF THE PLYWOOD. PLYWOOD SHALL BE FIVE/EIGHTHS INCH FIVE PLY, CD EXTERIOR PLYWOOD. PLYWOOD SHALL BE SANDED AND VACUUMED BEFORE COVERING IS APPLIED. WATERPROOF SEALING MATERIAL SHALL BE APPLIED TO SEAM IN THE SECTIONS OF PLYWOOD FLOORS. PLYWOOD SHALL BE FOUR FEET BY EIGHT FEET SECTIONS, PIECED ONLY AS NECESSARY. DRAWINGS SHALL BE PROVIDED WHICH SHOW HOW THE PLYWOOD IS TO BE INSTALLED. WATERPROOF SEALING APPLIED ON TOP OF THE PLYWOOD TO HOLD THE FLOOR COVERING IS CONSIDERED AS ONE METHOD OF SEALING THE SEAMS IN THE PLYWOOD FLOOR. THIS METHOD IS ACCEPTABLE.

(N) INTERIOR

(1) INTERIOR OF THE SCHOOL BUS SHALL BE FREE OF ALL PROJECTIONS.

(2) ALL SCHOOL BUSES SHALL REQUIRE INNER LININGS ON CEILING AND WALLS AND SHALL INCLUDE ABATEMENT PACKAGE IN THE DRIVER AREA. THE INTERIOR SOUND LEVEL AT THE DRIVER'S SEATING POSITION SHALL NOT EXCEED NINETY DECIBELS (A) WHEN MEASURED IN ACCORDANCE WITH TEST PROCEDURES FOUND IN 49 CFR 393.94(C).

- (O) ALL LAMPS AND SIGNALS HEREIN LISTED AND THEIR INSTALLATION SHALL CONFORM TO CURRENT STANDARDS AND RECOMMENDATIONS OF THE SOCIETY OF AUTOMOTIVE ENGINEERS AND MEET FMVSS 571.108.

(I) CONSTRUCTION OF COMPONENTS

- (a) ALL LAMPS, REFLECTORS AND THEIR INSTALLATION SHALL CONFORM TO FMVSS WHERE APPLICABLE, SOCIETY OF AUTOMOTIVE ENGINEERS J887, AND NATIONAL STANDARDS FOR SCHOOL TRANSPORTATION WHEN NOT COVERED BY FEDERAL STANDARDS OR ADDITIONAL REQUIREMENTS STATED HEREIN.

- (b) DIRECTIONAL SIGNAL, STOP LIGHT, TAILLIGHT, MARKER LIGHT, CLEARANCE LIGHT, IDENTIFICATION LIGHT, BACKUP LIGHT AND REFLECTOR LENSES SHALL BE OF ACRYLIC PLASTIC. ALTERNATELY FLASHING RED AND AMBER SIGNAL LAMPS SHALL BE SEALED BEAM OF ACRYLIC PLASTIC LENS CONSTRUCTION. BODY-MOUNTED STOP LAMPS, DIRECTIONAL SIGNALS AND RED SIGNAL LAMPS SHALL BE VISIBLE THROUGHOUT ONE HUNDRED EIGHTY DEGREES.

- (c) ALL EXTERIOR LAMP SOCKETS SHALL BE ZINC-PLATED OR CHROMATED STEEL, OR OTHER SUITABLE NON-CORROSIVE MATERIALS SUCH AS PLASTIC OR STAINLESS STEEL.

- (d) ALTERNATELY FLASHING RED SIGNAL LAMPS, BODY-MOUNTED DIRECTIONAL SIGNALS AND STOP LAMPS SHALL BE GROUNDED BY ATTACHING A GROUND WIRE OR STRAP FROM THE LAMP SOCKET OR NEGATIVE SIDE OR THE BULB TO THE SCHOOL BUS BODY OR GROUND WIRE INCLUDED IN THE WIRING.

- (e) WIRING SHALL CONFORM TO CURRENT SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS. A BODY LOAD DISCONNECT SOLENOID OF ONE-HUNDRED AMPERE CONTINUOUS DUTY SHALL BE SUPPLIED AND INSTALLED SO THAT WHEN THE IGNITION SWITCH IS IN THE OFF POSITION ALL BODY ELECTRICAL CIRCUITS WILL BE INOPERATIVE EXCEPT THE DIRECTIONAL SIGNALS, HAZARD WARNING, STOP LIGHT, BACKUP LIGHT, MARKER, CLEARANCE, IDENTIFICATION, AND HEAD LAMP CIRCUITS.

(2) ADDITIONAL REQUIREMENTS

- (a) THE SERVICE DOOR STEP-WELL LIGHT SHALL BE WIRED WITH THE MARKER LIGHT CIRCUIT AND ACTIVATED BY A SWITCH CONTROLLED BY THE SERVICE DOOR. ON TYPE A BUS, THE LIGHT SHALL BE A MINIMUM OF SIX CANDLE POWER.

(3) PASSENGER DOME LIGHTS AND EMERGENCY LIGHTING.

- (a) PASSENGER DOME LIGHTS WHEN ACTIVATED SHALL ADEQUATELY AND UNIFORMLY ILLUMINATE AISLEWAY TO THREE TO FOUR FOOT CANDLES.

- (b) ALL DOME LIGHT BULBS SHALL HAVE A MINIMUM CANDLE POWER OF FIFTEEN.

- (c) ALL DOME LIGHTS SHALL BE EQUIPPED WITH SHATTER-PROOF, CLEAR PLASTIC OR POLYCARBONATED LENSES.

- (4) EMERGENCY DOME LIGHT OPERATION, EMERGENCY DOORS, ROOF ESCAPE HATCHES, PUSH-OUT WINDOWS, ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHT EXCLUDED) AND EMERGENCY DOOR BUZZERS LOCATED AT EMERGENCY DOOR AND DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHENEVER AN EMERGENCY DOOR HANDLE IS LIFTED TO BE OPENED. ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHTS EXCLUDED) AND THE EMERGENCY DOOR BUZZER LOCATED IN DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHENEVER AN EMERGENCY WINDOW HANDLE IS LIFTED TO BE OPENED OR WHEN A ROOF ESCAPE HATCH IS OPENED PAST THE VENT POSITION. BUZZERS AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON", "OFF", AND "ACCESSORY" POSITIONS.

POWER FOR EMERGENCY LIGHTING AND BUZZERS SHALL BE SUPPLIED BY THE TWELVE VOLT SUPPLY LINE GOING TO THE CONTINUOUS DUTY SOLENOID. THE SYSTEM SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(a) THE EMERGENCY LIGHTING SYSTEM SHALL BE WIRED SO THAT WHEN IT IS ACTIVATED WITH THE KEY IN THE "OFF" POSITION, IT WILL NOT ALLOW FOR AN ELECTRICAL FEED BACK THROUGH THE DOME LIGHT SWITCH OR TO POWER ANY ACCESSORIES THAT NORMALLY WOULD BE FED BY THE CONTINUOUS DUTY SOLENOID WHEN THE KEY IS IN THE "ON" OR "ACCESSORY" POSITION.

(5) PASSENGER DOME LIGHTS SHALL BE CONTROLLED BY A SINGLE SWITCH IN THE DRIVER'S CONSOLE. POWER SHALL BE PROVIDED BY THE SWITCHED SIDE OF THE CONTINUOUS DUTY SOLENOID WHEN KEY IS IN THE "ON" OR "AUXILIARY" POSITION AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(6) A SINGLE DRIVER DOME LIGHT SHALL BE PROVIDED AND CONTROLLED BY A SINGLE SWITCH IN THE DRIVER'S CONSOLE. POWER TO THE SWITCH SHALL BE PROVIDED BY THE SWITCHED SIDE OF THE CONTINUOUS DUTY SOLENOID WHEN THE IGNITION KEY IS IN THE "ON" OR "AUXILIARY" POSITION AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(7) EACH BUS SHALL BE EQUIPPED WITH TWO DOUBLE-OPTIC COMBINATION STOP AND DOUBLE OPTIC TAIL LAMPS WITH A DIAMETER OF NOT LESS THAN SEVEN INCHES WITH PLAIN RED LENS, EMITTING RED LIGHT PLAINLY VISIBLE FROM A DISTANCE OF FIVE HUNDRED FEET TO THE REAR. THESE LAMPS SHALL BE AS HIGH AS PRACTICAL BUT BELOW THE WINDOW LINE AND SPACED AS FAR APART Laterally AS PRACTICABLE, BUT NOT LESS THAN THREE FEET. MEASUREMENTS SHALL BE TAKEN FROM LAMP CENTERS. THE STOP LIGHTS ARE TO BE ACTIVATED BY THE BRAKE SWITCH.

(a) THESE LAMPS ARE TO USE DOUBLE-CONTACT BULBS.

(b) THESE LAMPS ARE TO HAVE LENSES APPROXIMATELY SEVEN INCHES IN DIAMETER.

- (c) **GROUNDING INSTRUCTIONS: THE SOCKET OF THESE STOP LAMPS SHALL BE GROUNDED SEPARATELY, EITHER BY USE OF A WIRE WITH ONE END PERMANENTLY AFFIXED TO THE SOCKET AND THE OTHER END AFFIXED TO THE LAMP BASE OR BUS BODY METAL OR BY THE USE OF A LAMP SOCKET FLANGE GROUNDED TO THE BUS BODY METAL BY A SCREW OR BOLT.**

(8) DIRECTIONAL SIGNALS

- (a) **SIDE AND REAR DIRECTIONAL SIGNALS SHALL BE WIRED TO OPERATE PROPERLY WITH THE FRONT DIRECTIONAL SIGNALS SUPPLIED BY THE CHASSIS MANUFACTURER.**
- (b) **SCHOOL BUS BODY MANUFACTURER SHALL INSTALL REQUIRED SIGNAL LAMPS TO THE DIRECTIONAL SIGNAL CONTROL SWITCH SO ALL DIRECTIONAL SIGNAL LAMPS SHALL BE OPERATIVE. THE DIRECTIONAL SIGNAL SYSTEM SHALL BE INSTALLED ON AN INTEGRAL PART OF THE HAZARD WARNING SIGNAL SWITCH ACTIVATED BY AN INDEPENDENT SWITCH FURNISHED BY THE CHASSIS MANUFACTURER.**
- (c) **COLOR OF LENSES SHALL BE AMBER. ALL REAR DIRECTIONAL SIGNALS INSTALLED BY THE BODY MANUFACTURER SHALL BE DOUBLE-OPTIC AND AT LEAST SEVEN INCHES IN DIAMETER. IF INSTALLED, SIDE DIRECTIONAL SIGNAL SHALL BE ARMOR PROTECTED.**
- (d) **TWO BACKUP LIGHTS ARE REQUIRED AND SHALL BE MOUNTED ON OR BELOW THE BELT LINE ON THE SCHOOL BUS BODY. BACKUP LIGHTS SHALL CONFORM WITH FMVSS 571.108. THESE LAMPS SHALL HAVE WHITE LENSES AT LEAST SEVEN INCHES MINIMUM IN DIAMETER AND SHALL BE THIRTY-TWO CANDLE POWER.**

(9) SCHOOL BUS ALTERNATELY FLASHING WARNING SIGNAL LAMP

- (a) **EACH SCHOOL BUS BODY SHALL BE EQUIPPED WITH A SYSTEM OF FOUR RED SIGNAL LAMPS AND FOUR AMBER SIGNAL LAMPS. BOTH RED AND AMBER LAMPS SHALL BE INSTALLED IN ACCORDANCE WITH SOCIETY OF AUTOMOTIVE ENGINEERS J887.**

- (i) EACH AMBER SIGNAL LAMP SHALL BE LOCATED NEAR EACH RED SIGNAL LAMP, AT THE SAME LEVEL BUT CLOSER TO THE VERTICAL CENTER LINE OF THE BUS.
 - (ii) THE SYSTEM SHALL BE WIRED SO THAT THE AMBER SIGNAL LAMPS ARE ACTIVATED ONLY BY A MANUAL SWITCH, AND IF ACTIVATED, ARE AUTOMATICALLY DEACTIVATED WHEN THE BUS ENTRANCE DOOR IS OPENED.
- (b) THESE LAMPS SHALL FLASH AT A DESIGNATED RATE FROM SIXTY TO ONE HUNDRED TWENTY CYCLES PER MINUTE.
- (c) OPERATION OF EIGHT LIGHT WARNING SYSTEM AND STOP ARM.
- (i) POWER FOR EIGHT LIGHT WARNING SYSTEM SHALL BE PROVIDED BY THE BODY CONTINUOUS DUTY SOLENOID WHEN KEY IS IN THE "ON" POSITION.
 - (ii) WITH THE KEY IN THE "ON" POSITION AND MASTER SWITCH ON, GREEN PILOT LIGHT SHALL ILLUMINATE TO INDICATE SYSTEM IS READY FOR OPERATION.
 - (iii) WITH ENTRANCE DOOR CLOSED AND THE MANUAL MOMENTARY (AMBER) START SWITCH ACTIVATED AND RELEASED, THE AMBER PILOT LIGHT AND AMBER WARNING LIGHTS SHALL FLASH.
 - (iv) WHEN THE ENTRANCE DOOR HANDLE IS MOVED TOWARD THE OPEN POSITION, THE AMBER PILOT AND AMBER WARNING LIGHTS SHALL GO OFF AND THE RED PILOT AND RED WARNING LIGHTS SHALL FLASH AND STOP ARM SHALL AUTOMATICALLY EXTEND AND LIGHTS ON THE STOP ARM SHALL FLASH.

- (v) WHEN ENTRANCE DOOR IS CLOSED, ALL LIGHTS SHALL GO OUT AND THE STOP ARM SHALL RETRACT AUTOMATICALLY. THE ENTRANCE DOOR SWITCH THAT ACTIVATED THE RED LIGHTS IN THE LIGHT SYSTEM SHALL BE LOCATED IN A POSITION BY A COVER OR GUARD THAT WILL PREVENT THE SWITCH FROM BEING ACTIVATED OR DEACTIVATED BY PUPILS BOARDING OR LEAVING THE BUS.
- (vi) WITH ENTRANCE DOOR OPEN AND THE MANUAL MOMENTARY (AMBER) START SWITCH ACTIVATED AND RELEASED, THE RED PILOT AND RED WARNING LIGHTS SHALL FLASH AND THE STOP ARM SHALL AUTOMATICALLY EXTEND, AND THE LIGHTS ON STOP ARM SHALL FLASH.
- (vii) AN EMERGENCY SYSTEM FOR EXTENDING THE STOP ARM AND FLASHING THE RED WARNING LIGHTS ON THE BUS BODY AND THE STOP ARM SHALL BE INSTALLED ON EACH BUS BODY.
- (viii) A RED EMERGENCY OVERRIDE ON/OFF SWITCH SHALL BE INSTALLED IN THE BUS BODY ELECTRICAL ACCESSORY PANEL IN AN AREA ISOLATED FROM THE OTHER SWITCHES. THIS SWITCH SHALL BE INSTALLED WITH A STANDARD SWITCH IDENTIFICATION DECAL WITH THE WORDS EMERGENCY WARNING LIGHTS.
- (ix) THE EMERGENCY OVERRIDE SYSTEM SHALL OPERATE THE RED PILOT LIGHT, THE RED WARNING LIGHTS AND AUTOMATICALLY EXTEND THE STOP ARM WITH LIGHTS FLASHING IN ANY DOOR POSITION. SYSTEM SHALL OPERATE WITH KEY IN THE ON/OFF OR ACCESSORY POSITION.
- (x) POWER FOR THE EMERGENCY OVERRIDE SYSTEM SHALL BE TAKEN OFF THE TWELVE VOLT SUPPLY LINE GOING TO THE BODY CONTINUOUS DUTY SOLENOID AND SHALL BE PROTECTED BY A CIRCUIT BREAKER.

(xi) THE MASTER AND MOMENTARY ACTIVATING SWITCHES AND PILOT LIGHTS SHALL BE IN A POSITION THAT IS CLEARLY ACCESSIBLE AND VISIBLE TO THE DRIVER. THE AMBER AND RED PILOT LIGHT LENSES SHALL BE APPROXIMATELY ONE-HALF INCH IN DIAMETER.

(xii) IF THE BUS IS EQUIPPED WITH A CROSSING GATE, IT SHALL EXTEND AND RETRACT IN THE SAME MANNER AS OUTLINED FOR THE STOP SIGN.

(P) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH MIRRORS MEETING THE REQUIREMENTS OF FMVSS 571.111. ALL MIRRORS SHALL BE HEATED AND FULLY ADJUSTABLE.

(1) INTERIOR REAR VIEW MIRROR SHALL BE A MINIMUM OF SIX BY THIRTY INCHES.

(2) MIRROR ASSEMBLIES MAY INCLUDE STAINLESS STEEL MATERIALS AS NECESSARY (INCLUDING MOUNTING BRACKETRY) AND BE WARRANTED ONE HUNDRED PER CENT REPLACEMENT COVERAGE FOR THIRTY-SIX MONTHS AGAINST RUST AND CORROSION, AND AGAINST ANY REDUCTION IN CLARITY OR VIEW DUE TO DISCOLORATION OR OTHER DETERIORATION OF THE LENS.

(Q) MOUNTING OF BODY ON CHASSIS.

(1) INSULATING MATERIAL SHALL BE PLACED BETWEEN ALL MAIN CROSS-SILL AND INTERMEDIATE MEMBERS. INSULATING MATERIAL SHALL BE AT LEAST ONE-FOURTH INCH THICK AND SHALL BE ATTACHED TO CHASSIS FRAME OR BODY MEMBERS SO THAT THE BODY WILL NOT MOVE UNDER SEVERE OPERATING CONDITIONS.

(2) CHASSIS FRAME SHALL EXTEND TO REAR EDGE OF REAR BODY CROSS MEMBER.

(3) BUS BODY SHALL BE ATTACHED TO CHASSIS FRAME IN SUCH A MANNER AS TO PREVENT SHIFTING OR SEPERATION OF THE BODY FROM THE CHASSIS UNDER SEVERE OPERATING CONDITIONS.

(4) BODY FRONT SHALL BE ATTACHED AND SEALED TO THE CHASSIS COWL IN SUCH A MANNER AS TO PREVENT ENTRY OF MOISTURE.

(R) ALL BUSES SHALL BE EQUIPPED WITH TWO FRONT FENDER MUD FLAPS AND TWO REAR MUD FLAPS.

(S) ALL OPENINGS CREATED IN MOUNTING OF BUS BODY TO CHASSIS SHALL BE SEALED BY BODY MANUFACTURER TO PREVENT ENTRANCE OF GASES, DUST OR MOISTURE INTO PASSENGER AND DRIVER'S COMPARTMENTS.

(T) OVERALL LENGTH OF THE SCHOOL BUS SHALL NOT EXCEED FORTY FEET.

(U) OVERALL WIDTH OF THE SCHOOL BUS SHALL NOT EXCEED ONE HUNDRED TWO INCHES, EXCLUDING MIRRORS.

(V) SEAT BELT AND UPPER TORSO RESTRAINT SYSTEM FOR DRIVER.

(1) A LOCKING RETRACTOR-TYPE SEAT BELT FOR DRIVER SHALL BE PROVIDED. THE BELT SHALL BE EQUIPPED WITH PROTECTIVE BOOTS OF SUFFICIENT QUALITY AND STRENGTH TO KEEP IT RETRACTED AND OFF THE FLOOR AND WITHIN EASY REACH OF THE DRIVER. THE BELT SHALL BE ADJUSTABLE ON ONE SIDE ONLY TO KEEP THE DRIVER FROM SLIDING SIDEWAYS UNDER THE BELT.

(2) BELT AND EMERGENCY LOCKING RETRACTOR UPPER TORSO RESTRAINT SHALL BE PROVIDED AND WORK IN UNISON WITH THE SEAT BELT.

(W) DRIVER'S SEATS.

(1) MINIMUM DISTANCE BETWEEN STEERING WHEEL AND BACK REST OF DRIVER'S SEAT SHALL BE ELEVEN INCHES. DRIVER'S SEAT SHALL HAVE VERTICAL ADJUSTMENT OF NOT LESS THAN FOUR INCHES AND HORIZONTAL ADJUSTMENT OF NOT LESS THAN FOUR INCHES.

(2) ALL SEWING ON CUSHIONS AND BACKS SHALL BE SINGLE-STITCHED, WITH A MINIMUM OF NUMBER TWELVE FOUR-PLY GLAZE FINISH THREAD OF THE BEST GRADE OR ITS APPROVED EQUIVALENT. SEAMS IN CUSHIONS AND SEAT BACKS SHALL BE FORTY-TWO OUNCES OR EQUIVALENT MATERIAL STRENGTH AS UPHOLSTERY.

- (3) THE DRIVER'S SEAT MUST BE COVERED WITH FLAME-BARRIER, FIRE-RETARDANT SEAT MATERIAL AND MUST PASS THE "SCHOOL BUS UPHOLSTERY FIRE BLOCK" TEST.

(X) PASSENGER SEATS.

- (1) ALL SEATING AND RESTRAINING BARRIER DESIGN AND CONSTRUCTION MUST MEET THE PROVISIONS OF FMVSS 571.222 (SCHOOL BUS SEATING AND CRASH PROTECTION). ALL SEAT BACK BARRIERS MUST BE A MINIMUM OF TWENTY-EIGHT INCHES IN HEIGHT, AS MEASURED FROM THE INTERSECTION OF THE FORWARD SURFACE OF THE SEAT BACK AND THE UNDEPRESSED SURFACE OF THE SEAT CUSHION. THE TOP SURFACE OF THE BARRIERS SHALL BE THE SAME HEIGHT AS THE TOP SURFACES OF THE SEAT BACKS.

- (2) ALL SEATS SHALL HAVE A MINIMUM DEPTH OF FIFTEEN INCHES.

- (3) ALL SEATS SHALL BE FORWARD-FACING.

- (4) SEATS SHALL BE MOUNTED SO AS TO PROVIDE A MINIMUM OF THIRTY-SIX INCH HEAD ROOM FOR SITTING POSITION ABOVE THE TOP OF UNDEPRESSED CUSHION LINE OF ALL SEATS. MEASUREMENT SHALL BE MADE VERTICALLY NOT MORE THAN SEVEN INCHES FROM SIDE WALL AT CUSHION HEIGHT AND AT FORE-AND-AFT CENTER OF CUSHION.

(5) SEAT CONSTRUCTION.

- (a) BACKS OF ALL SEATS SHALL BE THE SAME WIDTH AT THE TOP AND SAME HEIGHT FROM FLOOR, ALSO SLANTING AT THE SAME ANGLE WITH THE FLOOR.

- (b) SEAT, SEAT BACK CUSHION AND CRASH BARRIER SHALL BE COVERED WITH FLAME-BARRIER FIRE-RETARDANT SEATING MATERIAL. SUCH MATERIAL MUST PASS THE "FIRE BLOCK" TEST. FLAME-BARRIER FIRE-RETARDANT SEATING MATERIAL SHALL MEET THE FOLLOWING CRITERIA.

- (i) THE FLAMES SHALL NOT SPREAD TO SEAT BACK IN FRONT OF THE FIRE.
- (ii) THE FLAMES ON THE REAR SEAT SHALL SELF-EXTINGUISH.

(iii) THE FLAME BARRIER SEATING MATERIAL WILL SUCCESSFULLY PREVENT THE UNDERLYING PADDING MATERIAL FROM BEING EXPOSED TO THE FLAMES.

(c) ALL SEAT BACKS AND RAILS SHALL BE PADDED WITH ENERGY-ABSORBING MATERIAL AS REQUIRED BY FMVSS 571.222.

(d) A PASSENGER SEAT CUSHION RETENTION SYSTEM SHALL BE EMPLOYED TO PREVENT THE PASSENGER SEAT CUSHION FROM DISENGAGING FROM THE SEAT FRAME IN THE EVENT OF AN ACCIDENT. EACH SEAT CUSHION RETENTION SYSTEM SHALL BE CAPABLE OF WITHSTANDING A VERTICAL STATIC LOAD EQUAL TO A MINIMUM OF FIVE TIMES THE WEIGHT OF THE CUSHION. THE SYSTEM SHALL ALSO BE CAPABLE OF WITHSTANDING A FORWARD OR REARWARD STATIC LOAD EQUAL TO TWENTY TIMES THE WEIGHT OF THE CUSHION.

(e) A BARRIER/PADDED GUARD PANEL SHALL BE PLACED FORWARD OF ALL SEATS NOT HAVING ANOTHER PASSENGER SEAT IN FRONT OF IT.

(Y) SERVICE DOOR STEPS.

(1) THE FIRST STEP OF THE SERVICE DOOR SHALL BE NOT LESS THAN SIX INCHES AND NOT MORE THAN SIXTEEN INCHES FROM THE GROUND.

(2) STEPS SHALL BE ENCLOSED TO PREVENT ACCUMULATION OF ICE AND SNOW.

(3) STEPS SHALL NOT PROTRUDE BEYOND SIDE BODY LINE.

(4) GRAB HANDLES OF MAXIMUM LENGTH, BUT NOT LESS THAN TEN INCHES LONG SHALL BE INSTALLED ON BOTH SIDES OF THE INTERIOR STEP WELL AREA. THESE HANDLES SHALL BE STAINLESS STEEL CLAD. BOTH GRAB HANDLES SHALL BE SECURELY FASTENED AND DESIGNED SO AS TO PREVENT CLOTHING OR ANY OTHER ITEM FROM BEING CAUGHT.

(5) SURFACE OF STEPS SHALL BE OF NON-SKID MATERIAL.

- (a) STEPS SHALL BE COVERED WITH FIRST-QUALITY STEP-COVERING MATERIAL WHICH SHALL HAVE NON-SKID CHARACTERISTICS AND BE OF RIBBED OR CORRUGATED DESIGN. STEP COVERING SHALL HAVE A TURNED-DOWN NOSING OF A CONTRASTING COLOR OF EITHER WHITE, YELLOW, OR BRIGHT ORANGE.
- (b) STEP COVERING SHALL BE SECURELY FASTENED TO THE STEPS IN A MANNER THAT WILL MINIMIZE TRIPPING. THIS REQUIRES THAT THE HEAD OF MOUNTING SCREWS OR BOLTS BE BELOW THE TOP SURFACE OF THE STEP TREAD.

(Z) SUN VISOR SHALL BE MANUFACTURER'S STANDARD.

(AA) WHEEL-HOUSING

- (1) WHEEL-HOUSE SHALL BE ATTACHED TO FLOOR COMPONENTS IN SUCH A MANNER TO PREVENT WATER, DUST OR FUMES FROM ENTERING THE BUS BODY.
- (2) WHEEL-HOUSE OPENING SHALL ALLOW FOR EASY TIRE REMOVAL AND SERVICE.
- (3) INSIDE HEIGHT OF WHEEL-HOUSING ABOVE FLOOR LINE SHALL NOT EXCEED TEN INCHES.
- (4) WHEEL-HOUSING SHALL PROVIDE CLEARANCE FOR DUAL WHEELS AS ESTABLISHED BY THE NATIONAL ASSOCIATION OF CHAIN MANUFACTURERS.

(BB) WINDSHIELD AND WINDOWS MUST MEET FMVSS 571.205.

- (1) ALL GLASS IN THE WINDSHIELD SHALL BE APPROVED SAFETY GLASS WITH A RATING OF ONE OR BETTER, AS SPECIFIED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE.
- (2) GLASS IN WINDSHIELD SHALL BE HEAT-ABSORBENT, LAMINATED PLATE. WINDSHIELD SHALL BE LARGE ENOUGH TO PERMIT THE DRIVER TO SEE THE ROADWAY CLEARLY, INSTALLED TO REDUCE GLARE, AND BE INSTALLED BETWEEN FRONT CORNER POSTS THAT ARE DESIGNED AND PLACED TO PROVIDE MAXIMUM VISIBILITY FOR THE DRIVER.

- (3) WINDOW(S) AT THE LEFT AND RIGHT OF THE DRIVER SHALL BE AMERICAN NATIONAL STANDARDS-TWO OR BETTER.
- (4) WINDSHIELD SHALL HAVE HORIZONTAL GRADIENT BAND STARTING SLIGHTLY ABOVE LINE OF DRIVER'S VISION AND GRADUALLY DECREASING IN LIGHT TRANSMISSION TO TWENTY PER CENT OR LESS AT THE TOP OF THE WINDSHIELD. WINDSHIELD MAY BE FULLY TINTED IN LIEU OF ABOVE. WINDSHIELD AND WINDOWS TO THE IMMEDIATE LEFT AND RIGHT OF THE DRIVER MUST HAVE A MINIMUM OF SEVENTY PER CENT LIGHT TRANSMITTANCE.
- (5) GLASS IN ALL SIDE WINDOWS AND DOORS SHALL BE OF AS-TWO OR AS-THREE TEMPERED GLASS OR BETTER.
- (6) EACH SIDE WINDOW SHALL BE DOUBLE SASH AND PROVIDE UNOBSTRUCTED EMERGENCY OPENING AT LEAST NINE INCHES HIGH AND TWENTY-TWO INCHES WIDE OBTAINED BY LOWERING THE UPPER SASH. ALL EXPOSED EDGES OF GLASS SHALL BE BANDED.
- (7) INDIVIDUAL WINDOWS SHALL NOT HAVE A VERTICAL OPENING GREATER THAN TWELVE INCHES. STOPS SHALL BE INSTALLED WHERE NEEDED TO OBTAIN THIS DIMENSION.

(CC) WINDSHIELD WIPERS

- (1) WINDSHIELD WIPERS SHALL BE CONTROLLED WITH ONE SWITCH. THE SWITCH SHALL PROVIDE TWO-SPEED OPERATION AND SHALL INCORPORATE AN INTERMITTENT POSITION.
- (2) THE WINDSHIELD WIPER MOTOR OR MOTORS SHALL HAVE SUFFICIENT POWER AND THE WIPER ARMS AND BLADES SHALL BE OF SUFFICIENT LENGTH TO PROVIDE THE LARGEST CLEANING AREA POSSIBLE.
- (3) WIPER BLADES SHALL BE A MINIMUM OF SIXTEEN INCHES IN LENGTH. THESE BLADE HOLDERS SHALL BE THE TYPE THAT REQUIRE ONLY THE REPLACEMENT OF THE RUBBER BLADE.

- (4) THE LEFT-SIDE WINDSHIELD WIPER SHALL BE SO POSITIONED THAT THE APPROXIMATE CENTER OF THE WIPED AREA WILL BE DIRECTLY IN FRONT OF THE DRIVER IN A NORMAL SEATED POSITION. THE RIGHT-SIDE WINDSHIELD WIPER SHALL BE SO POSITIONED THAT THE WIPED AREA WILL PROVIDE THE DRIVER WITH MAXIMUM VISION TO THE RIGHT IN A NORMAL SEATED POSITION.

(DD) WINDSHIELD WASHERS

- (1) THE SCHOOL BUS BODY SHALL BE EQUIPPED WITH AN ELECTRICALLY OPERATED WINDSHIELD WASHER BY WHICH A STREAM OF WASHING FLUID IS DIRECTED TO BOTH SIDES OF THE WINDSHIELD IN THE APPROXIMATE CENTER OF THE WIPED AREA.
- (2) THE WINDSHIELD WASHER FLUID RESERVOIR SHALL HAVE A MINIMUM CAPACITY OF TWO QUARTS IN A RIGID PLASTIC CONTAINER MOUNTED IN THE ENGINE COMPARTMENT. IT SHALL BE MOUNTED IN A POSITION READILY ACCESSIBLE FOR REFILLING.

(EE) WIRING

- (1) ALL WIRING SHALL CONFORM TO CURRENT SOCIETY OF AUTOMOTIVE ENGINEERS STANDARDS. ALL WIRES SHALL BE CODED AND NUMBERED AS REQUIRED BY THE NATIONAL SCHOOL BUS MINIMUM STANDARD. WIRING DIAGRAMS MUST BE MADE AVAILABLE TO SCHOOL BUS OWNERS.
- (2) THERE SHALL BE NO LESS THAN EIGHT REGULAR CIRCUITS, AS FOLLOWS:
 - (a) HEAD, TAIL, STOP (BRAKE), AND INSTRUMENT PANEL LAMPS
 - (b) CLEARANCE AND STEP WELL LAMPS
 - (c) DOME
 - (d) STARTER MOTOR
 - (e) IGNITION AND EMERGENCY DOOR SIGNAL
 - (f) TURN SIGNAL LAMPS

(g) ALTERNATELY FLASHING RED AND AMBER SIGNAL LAMPS

(h) HORN

(3) ANY OF THE ABOVE COMBINATION CIRCUITS MAY BE SUBDIVIDED INTO ADDITIONAL INDEPENDENT CIRCUITS.

(3) WHENEVER HEATERS AND DEFROSTERS ARE USED, AT LEAST ONE ADDITIONAL CIRCUIT SHALL BE INSTALLED.

(4) WHENEVER POSSIBLE, ALL OTHER ELECTRICAL FUNCTIONS, SUCH AS SANDERS AND ELECTRIC-TYPE WINDSHIELD WIPERS, SHALL BE PROVIDED WITH INDEPENDENT AND PROPERLY PROTECTED CIRCUITS.

(5) EACH BODY CIRCUIT SHALL BE COLOR-CODED AND A DIAGRAM OF THE CIRCUITS SHALL BE ATTACHED TO THE BODY IN A READILY ACCESSIBLE LOCATION.

(6) A SEPARATE FUSE OR CIRCUIT BREAKER SHALL BE PROVIDED FOR EACH CIRCUIT EXCEPT STARTER MOTOR AND IGNITION CIRCUITS.

(7) ALL WIRES WITHIN THE BODY SHALL BE INSULATED AND PROTECTED BY COVERING WHICH WILL PROTECT THEM FROM EXTERNAL DAMAGE AND MINIMIZE DANGERS FROM SHORT CIRCUITS. WHENEVER WIRES PASS THROUGH BODY MEMBERS, ADDITIONAL PROTECTION IN THE FORM OF APPROPRIATE TYPE OF INSERT SHALL BE PROVIDED.

(8) WIRES NOT ENCLOSED WITHIN BODY SHELL SHALL BE FASTENED SECURELY AT INTERVALS OF NOT MORE THAN TWENTY-FOUR INCHES. ALL JOINTS SHALL BE SOLDERED OR JOINED BY EQUALLY EFFECTIVE CONNECTORS.

(FF) STOP ARM SIGN-SPECIFICATIONS

(1) ALL SCHOOL BUSES SHALL BE EQUIPPED WITH AN OCTAGONAL "STOP" SIGN. THE BACKGROUND SHALL BE A MINIMUM OF EIGHTEEN INCHES IN HEIGHT AND EIGHTEEN INCHES IN WIDTH AND SHALL BE REFLECTIVE MATERIAL RED IN COLOR WITH WHITE LETTERING. THE SIGN SHALL BE SO MOUNTED AS TO NOT INTERFERE WITH THE DRIVER'S VISION TO THE REAR WHEN THE SIGN IS EXTENDED. THE STANDARD OCTAGONAL SIGN SHALL CONTAIN TWO FLASHING RED LAMPS WHICH ARE VISIBLE FROM BOTH SIDES OF THE EXTENDED SIGN. RED STROBE LIGHTS MAY BE USED IN PLACE OF THE FLASHING LIGHTS.

(2) THE WORD "STOP" SHALL BE IN REFLECTIVE WHITE LETTERS ON BOTH SIDES OF THE SIGN. THE SIGN SHALL BE VACUUM, ELECTRIC OR AIR CONTROLLED AND SO CONSTRUCTED AS TO LOCK IN AN EXTENDED AND CLOSED POSITION.

(3) THE STOP ARM SHALL OPERATE WHEN THE SERVICE DOOR IS OPENED AND WHEN THE RED FLASHING WARNING LIGHTS COME ON DURING THE WARNING LIGHT CYCLE.

(4) REFLECTIVE MATERIAL FOR STOP SIGN SHALL BE HIGH INTENSITY RETRO-REFLECTIVE SHEETING, GRADE FIVE OR EQUIVALENT.

REPLACES: 3301-87-06

EFFECTIVE: _____

CERTIFICATION

**MITCHELL J. BROWN
DIRECTOR**

DATE

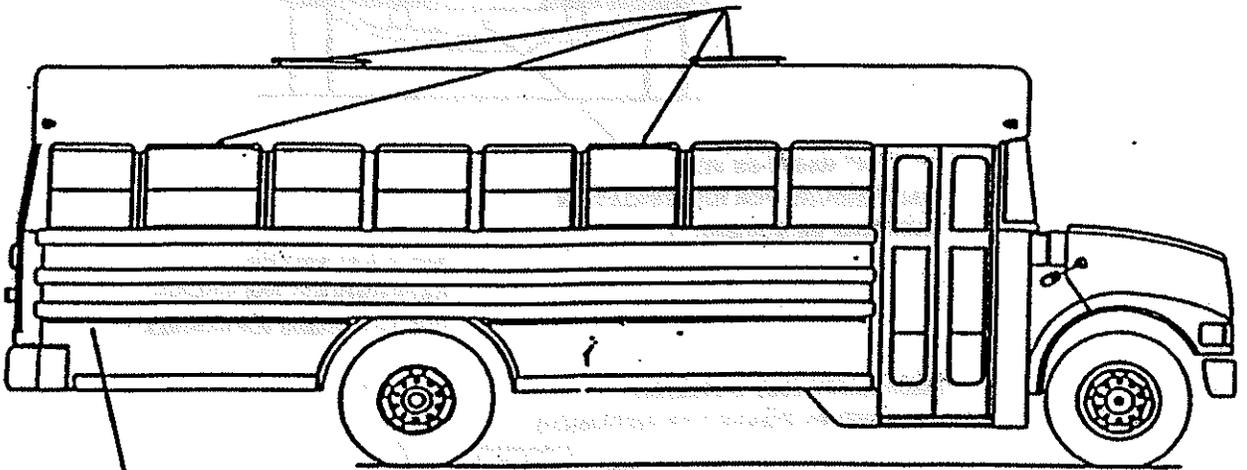
**PROMULGATED UNDER R.C. CHAPTER 119
RULE AUTHORIZED BY R.C. SECTION 4511.76
RULE AMPLIFIES: R.C. SECTION 4511.76
119.032 REVIEW DATE: _____
PRIOR EFFECTIVE DATES: 11/01/71**

- 04/01/78
- 07/01/88
- 01/01/90

APPENDIX A

REFLECTIVE MARKINGS

EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).

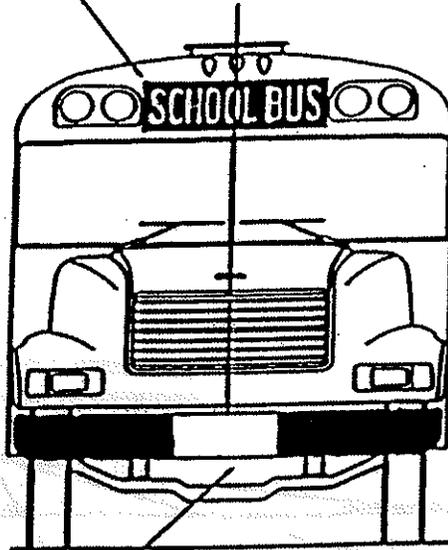


YELLOW REFLECTIVE MATERIAL TWO INCHES IN WIDTH MAY BE APPLIED TO BOTH SIDES OF THE BUS. THE REFLECTIVE MATERIAL SHALL RUN PARALLEL TO AND THE SAME DISTANCE AS THE LOWER RUB RAIL AND SHALL NOT EXCEED FORTY INCHES IN HEIGHT FROM THE GROUND (OPTIONAL).

APPENDIX A

REFLECTIVE MARKINGS

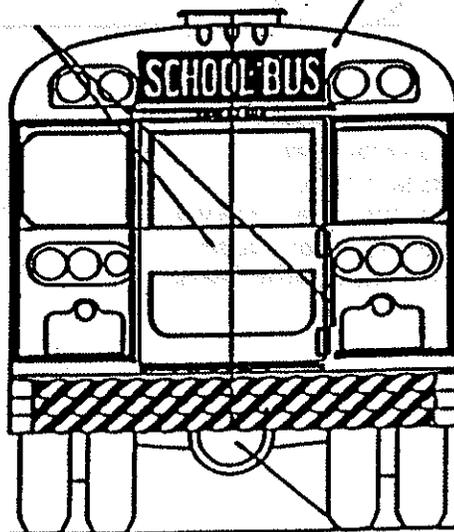
10" X 44" YELLOW
BACKGROUND FOR SCHOOL
BUS LETTERING (OPTIONAL).



7" X 14" WHITE-SILVER
BACKGROUND FOR IDENTIFICATION
NUMBERS (REQUIRED).

10" X 44" YELLOW
BACKGROUND FOR SCHOOL
BUS LETTERING (OPTIONAL).

EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).



TWO INCH YELLOW STRIPS
OUTLINING REAR OF BUS
(REQUIRED).

7" X 14" WHITE-SILVER BACKGROUND
FOR IDENTIFICATION AND LOCAL BUS
NUMBERS (REQUIRED).

TWO INCH WIDE YELLOW STRIPS
APPLIED DIAGONALLY AT A FORTY-FIVE
DEGREE ANGLE ON REAR BUMPER (OPTIONAL).

"STAY BACK TEN FEET" IN FOUR INCH ITALICIZED WHITE-SILVER LETTERS MAY BE APPLIED TO
FRONT AND REAR BUMPERS (OPTIONAL).

4501-5-07 TYPE A VAN CONVERSION SCHOOL BUS BODY.

TYPE A VAN CONVERSION SCHOOL BUS BODY USING CHASSIS MANUFACTURER'S EXISTING BODY COMPONENTS SHALL MEET ALL THE REQUIREMENTS OF RULE 4501-5-06 OF OHIO ADMINISTRATIVE CODE TYPE A WITH THE FOLLOWING EXCEPTIONS.

- (A) REAR BUMPER SHALL BE CHASSIS MANUFACTURER'S STANDARD.**
- (B) DOORS**
 - (1) SEDAN TYPE DOOR IS ACCEPTABLE**
 - (a) IF SEDAN-TYPE DOOR IS NOT USED, THE SERVICE DOOR SHALL BE OUTWARD OPENING SPLIT TYPE. SERVICE DOOR SHALL BE AIR, ELECTRIC, OR MANUALLY OPERATED. DOOR SHALL BE UNDER THE CONTROL OF THE DRIVER AND DESIGNED TO AFFORD EASY RELEASE AND PREVENT ACCIDENTAL OPENING. WHEN A MANUAL LEVER IS USED, NO PARTS SHALL COME TOGETHER SO AS TO SHEAR OR CRUSH FINGERS. LEVER SHALL BE EQUIPPED WITH AN APPROVED SAFETY LATCH TO PREVENT ACCIDENTAL OPENING WHICH WILL LOCK IN THE OVER-CENTER POSITION WHEN DOOR IS FULLY OPENED. MANUALLY OPERATED DOORS SHALL REQUIRE NO MORE THAN TWENTY-FIVE POUNDS OF PULL TO CLOSE AND MAY BE HYDRAULICALLY ASSISTED.**
 - (b) MANUAL DOOR CONTROL SHALL BE HEAVY-DUTY BEARING TYPE, ADJUSTABLE FOR WEAR, NON-CORROSIVE ANODIZED STEEL OR EQUIVALENT.**
 - (c) SERVICE DOOR SHALL BE LOCATED ON THE SIDE OF THE BUS OPPOSITE THE DRIVER AND WITHIN THE DRIVER'S DIRECT VIEW.**
 - (d) THERE SHALL BE A HEAD BUMPER PAD INSTALLED ON THE INSIDE OF THE BUS BODY AT THE TOP OF THE ENTRANCE DOOR. THIS PAD SHALL BE APPROXIMATELY FOUR INCHES IN WIDTH AND EXTEND ACROSS THE ENTIRE TOP OF THE ENTRANCE DOOR OPENING.**
 - (e) GLASS IN SEDAN-TYPE ENTRANCE DOORS SHALL BE CHASSIS MANUFACTURER'S STANDARD.**

- (C) REAR EMERGENCY DOORS SHALL MEET FMVSS 571.217 AND SHALL BE DESIGNED TO BE OPENED FROM THE INSIDE AND OUTSIDE OF THE BUS AND BE EQUIPPED WITH A THREE-POINT FASTENING DEVICE WHICH MAY BE QUICKLY RELEASED, AND IS DESIGNED TO OFFER PROTECTION AGAINST ACCIDENTAL RELEASE. IF DOUBLE DOORS ARE USED, THEY SHALL BE HINGED ON THE OUTSIDE EDGE.

EMERGENCY DOOR SHALL DISPLAY THE WORDS "EMERGENCY DOOR" BOTH INSIDE AND OUTSIDE IN LETTERS AT LEAST TWO INCHES HIGH. WORDS SHALL BE PLACED DIRECTLY ABOVE EMERGENCY DOOR OR ON UPPER PORTION OF THE DOOR.

THERE SHALL BE A HEAD BUMPER PAD INSTALLED OVER THE EMERGENCY DOOR ON THE INSIDE OF THE SCHOOL BUS BODY. THIS PAD SHALL BE APPROXIMATELY FOUR INCHES IN WIDTH AND COVER THE ENTIRE WIDTH OF THE DOOR(S) OPENING. PADDING SHALL BE SAME MATERIAL AS PADDING USED OVER SERVICE DOOR.

- (D) TAIL LIGHTS AND BACK-UP LIGHTS SHALL BE MANUFACTURER'S STANDARD.
- (E) MUD FLAPS ARE NOT REQUIRED.
- (F) SEAT BELT AND UPPER TORSO RESTRAINT SYSTEMS ARE REQUIRED FOR ALL SEATING POSITIONS.
- (G) RUNNING BOARD TYPE STEP WITH NON-SLIP SURFACE IS ACCEPTABLE.
- (H) WHEEL-HOUSINGS
- (1) WHEEL-HOUSE SHALL BE ATTACHED TO FLOOR COMPONENTS IN SUCH A MANNER AS TO PREVENT WATER, DUST OR FUMES FROM ENTERING THE BUS BODY.
 - (2) WHEEL-HOUSE OPENING SHALL ALLOW FOR EASY TIRE REMOVAL AND SERVICE.
 - (3) INSIDE HEIGHT OF WHEEL-HOUSING ABOVE FLOOR LINE SHALL NOT EXCEED TEN INCHES.
- (I) WINDSHIELD WIPERS SHALL BE MANUFACTURER'S STANDARD WITH TWO-SPEED OPERATION AND AN INTERMITTENT POSITION.
- (J) WINDSHIELD WASHERS SHALL BE MANUFACTURER'S STANDARD.

REPLACES: RULE 3301-87-07

EFFECTIVE: SEPTEMBER 1, 1998

CERTIFICATION
MITCHELL J. BROWN
DIRECTOR

JANUARY 15, 1998
DATE

PROMULGATED UNDER R.C. CHAPTER 119
RULE AUTHORIZED BY R.C. SECTION 4511.76
RULE AMPLIFIES: R.C. SECTION 4511.76
119.032 REVIEW DATE: 3/9/03
PRIOR EFFECTIVE DATES: 11/01/71,
4/01/78,
7/01/88,
1/01/90

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 551
LECTURE 10

LECTURE 10
STATISTICAL MECHANICS

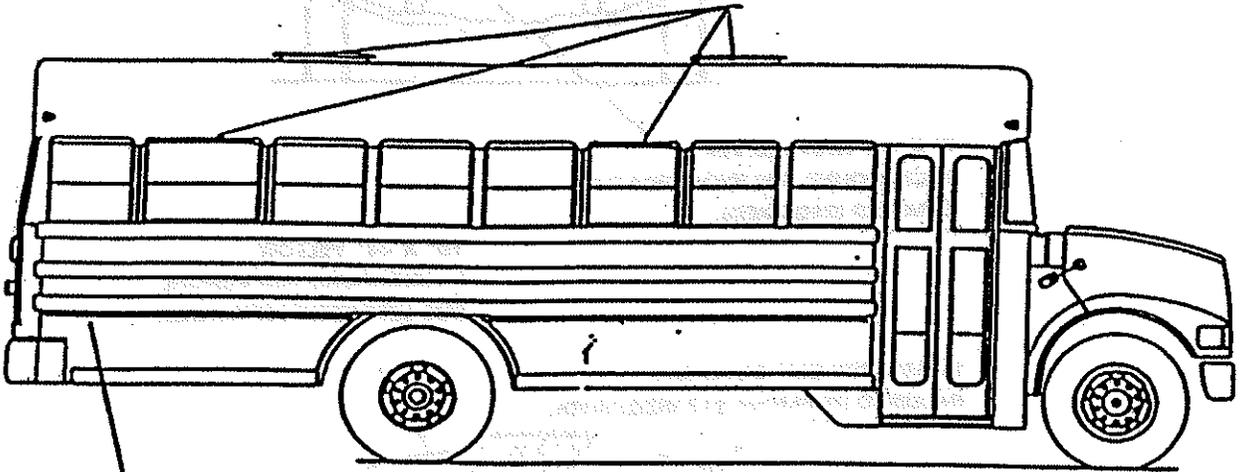
THE PARTITION FUNCTION
AND THE THERMODYNAMIC
LIMIT

THE PARTITION FUNCTION
AND THE THERMODYNAMIC
LIMIT

APPENDIX A

REFLECTIVE MARKINGS

EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).



**YELLOW REFLECTIVE MATERIAL TWO INCHES
IN WIDTH MAY BE APPLIED TO BOTH SIDES
OF THE BUS. THE REFLECTIVE MATERIAL
SHALL RUN PARALLEL TO AND THE SAME DISTANCE
AS THE LOWER RUB RAIL AND SHALL NOT EXCEED
FORTY INCHES IN HEIGHT FROM THE GROUND (OPTIONAL).**

APPENDIX A

REFLECTIVE MARKINGS

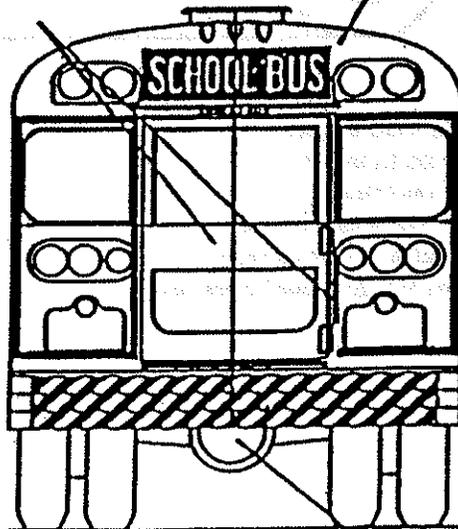
10" X 44" YELLOW
BACKGROUND FOR SCHOOL
BUS LETTERING (OPTIONAL).



7" X 14" WHITE-SILVER
BACKGROUND FOR IDENTIFICATION
NUMBERS (REQUIRED).

10" X 44" YELLOW
BACKGROUND FOR SCHOOL
BUS LETTERING (OPTIONAL).

EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).



TWO INCH YELLOW STRIPS
OUTLINING REAR OF BUS
(REQUIRED).

7" X 14" WHITE-SILVER BACKGROUND
FOR IDENTIFICATION AND LOCAL BUS
NUMBERS (REQUIRED).

TWO INCH WIDE YELLOW STRIPS
APPLIED DIAGONALLY AT A FORTY-FIVE
DEGREE ANGLE ON REAR BUMPER (OPTIONAL).

"STAY BACK TEN FEET" IN FOUR INCH ITALICIZED WHITE-SILVER LETTERS MAY BE APPLIED TO
FRONT AND REAR BUMPERS (OPTIONAL).

4501-5-08 SCHOOL BUSES USED TO TRANSPORT PUPILS WITH DISABILITIES.**(A) GENERAL REQUIREMENTS.**

- (1) ALL SCHOOL BUSES DESIGNED OR USED FOR TRANSPORTING PUPILS WITH SPECIAL TRANSPORTATION NEEDS SHALL COMPLY WITH RULES 4501-5-01 TO 4501-5-10 OF THE OHIO ADMINISTRATIVE CODE, WHEN APPLICABLE.**
- (2) ALL SCHOOL BUSES DESIGNED OR USED FOR TRANSPORTING PUPILS HAVING SPECIAL TRANSPORTATION NEEDS SHALL COMPLY WITH SCHOOL BUS FMVSS AS APPLICABLE TO THEIR GROSS VEHICLE WEIGHT RATING CATEGORY.**
- (3) ANY SCHOOL BUS THAT IS USED FOR THE TRANSPORTATION OF PUPILS WITH DISABILITIES THAT REQUIRE A WHEELCHAIR AND/OR OTHER MOBILE SEATING DEVICES WHICH PROHIBIT USE OF THE REGULAR SERVICE ENTRANCE SHALL BE EQUIPPED WITH A POWER LIFT.**
- (4) THE LIFT SHALL BE LOCATED ON THE RIGHT SIDE OF THE BODY, IN NO WAY ATTACHED TO THE EXTERIOR SIDES OF THE BUS. WHEN NOT EXTENDED, THE LIFT SHALL BE CONFINED WITHIN THE PERIMETER OF THE SCHOOL BUS BODY. BUSES EQUIPPED WITH A LIFT SHALL NOT HAVE PASSENGER SEATS INSTALLED DIRECTLY ACROSS THE AISLEWAY FROM THE LIFT.**
- (5) ALL SCHOOL BUSES TRANSPORTING PUPILS WITH DISABILITIES SHALL BE EQUIPPED WITH AN ELECTRONIC VOICE COMMUNICATION SYSTEM. THE ELECTRONIC VOICE COMMUNICATION SYSTEM SHALL BE CAPABLE OF CONSTANT CONTACT WITH THE SCHOOL OR DISPATCH POINT. THIS EQUIPMENT MAY BE EXCLUDED FROM THE BUS MANUFACTURER'S BID AND PURCHASED SEPARATELY.**
- (6) ELECTRIC-POWERED WHEELCHAIRS OR OTHER MOBILE SEATING DEVICES TRANSPORTED ON SCHOOL BUSES SHALL BE EQUIPPED WITH BATTERIES CONTAINING DRY OR GEL-TYPE ELECTROLYTE. BATTERIES SHALL BE EFFECTIVELY SECURED TO THE MOBILE SEATING DEVICE.**

(7) **BODY FLUID CLEAN-UP KITS SHALL MEET ALL APPLICABLE STATE AND FEDERAL REGULATIONS. THE KIT SHALL CONTAIN THE FOLLOWING ITEMS:**

- (a) **EFFECTIVE CHLORINE ABSORBENT DEODORANT.**
- (b) **EFFECTIVE GERMICIDAL DETERGENT. IF DETERGENT CONTAINS ALCOHOL, NO MORE THAN ONE FLUID OUNCE IS PERMITTED IN A SINGLE-USE DISPOSABLE CONTAINER.**
- (c) **SINGLE-USE DISPOSAL BAG.**
- (d) **SINGLE-USE DISPOSABLE SCRAPER.**
- (e) **MINIMUM OF ONE PAIR OF DISPOSABLE, SINGLE-USE, EFFECTIVE PROTECTIVE GLOVES.**
- (f) **EFFECTIVE HAND RINSE. IF HAND RINSE CONTAINS ALCOHOL, NO MORE THAN ONE-HALF FLUID OUNCE IS PERMITTED IN A SINGLE-USE DISPOSABLE CONTAINER.**
- (g) **THE BODY FLUID CLEAN-UP KIT SHALL BE EASILY ACCESSIBLE TO THE DRIVER IN THE AREA OF THE FIRST AID KIT AND SHALL BE SECURELY MOUNTED IN A METAL OR PLASTIC CONTAINER.**
- (h) **IF ALCOHOL IS INCLUDED, THE BODY FLUID CLEAN-UP KIT SHALL NOT CONTAIN MORE THAN ONE AND ONE-HALF FLUID OUNCES OF ALCOHOL.**

(B) **ALL AISLES LEADING FROM THE WHEELCHAIR AREA TO THE REAR EMERGENCY DOOR SHALL BE A MINIMUM OF THIRTY INCHES IN WIDTH TO PERMIT PASSAGE OF A WHEELCHAIR/MOBILE SEATING DEVICE OR MOBILITY AID. AISLE LEADING TO THE LEFT SIDE EMERGENCY DOOR SHALL BE A MINIMUM OF THIRTY INCHES IN WIDTH.**

(C) SCHOOL BUSES DESIGNED FOR THE TRANSPORTATION OF PUPILS WITH DISABILITIES IN THE STATE OF OHIO, AFTER THE EFFECTIVE DATE OF THIS RULE, SHALL HAVE MOBILE SEATING DEVICES AND WHEELCHAIR/OCCUPANT RESTRAINT SYSTEMS INSTALLED. THE ORIGINAL EQUIPMENT MANUFACTURER SHALL INSTALL A SECUREMENT/OCCUPANT RESTRAINT SYSTEM THAT MEETS OR EXCEEDS A DYNAMIC SLED TEST OF THIRTY MILES PER HOUR/TWENTY UNITS OF ACCELERATION EQUAL TO THE ACCELERATION OF GRAVITY. THE ORIGINAL EQUIPMENT MANUFACTURER SHALL CERTIFY THAT THE SECUREMENT/OCCUPANT RESTRAINT SYSTEM MEETS OR EXCEEDS THE STATIC LOAD REQUIREMENTS AT THE GIVEN ANGLES FOR THE BELTS, HARDWARE, AND ATTACHING POINTS AS SPECIFIED IN FMVSS 571.222, SECTIONS 5.4 THROUGH 25.4.4 (B).

(D) SECUREMENT SYSTEM FOR MOBILE SEATING DEVICE AND OCCUPANT.

- (1) THE DESIGNATED AREA FOR THE WHEELCHAIR/MOBILE SEATING DEVICES SHALL BE A MINIMUM OF FIFTY INCHES LONGITUDINALLY BY THIRTY INCHES Laterally. THE DESIGNATED AREA SHALL BE FREE OF ALL OBSTRUCTIONS FROM THE FLOOR TO CEILING PURSUANT TO FMVSS.
- (2) ALL SEATS, WHEELCHAIRS, OR MOBILE SEATING DEVICES SHALL BE FORWARD FACING. SECUREMENT SYSTEM HARDWARE AND ATTACHMENT POINTS FOR THE FORWARD-FACING SYSTEM SHALL BE PROVIDED.
- (3) WHEELCHAIR AND MOBILE SEATING DEVICE SECUREMENT SYSTEMS SHALL UTILIZE FOUR-POINT TIE-DOWNS, WITH A MINIMUM OF TWO BODY FLOOR ATTACHMENT POINTS LOCATED AT THE REAR OF THE SPACE DESIGNATED FOR THE WHEELCHAIR OR MOBILE SEATING DEVICE AND A MINIMUM OF TWO BODY FLOOR ATTACHMENT POINTS AT THE FRONT OF AIM SPACE.
- (4) A TYPE TWO OCCUPANT SECUREMENT SYSTEM SHALL PROVIDE FOR SECUREMENT OF THE OCCUPANT'S PELVIC LAP AREA AND UPPER TORSO AREA.

(5) THE MOBILE SEATING DEVICE/OCCUPANT SECUREMENT SYSTEM SHALL BE SUCCESSFULLY DYNAMICALLY SLED TESTED AT A MINIMUM IMPACT SPEED/FORCE OF THIRTY MILES PER HOUR/TWENTY UNITS OF ACCELERATION EQUAL TO THE ACCELERATION OF GRAVITY. THE DYNAMIC TEST SHALL BE PERFORMED USING SYSTEM COMPONENTS AND HARDWARE INCLUDING ATTACHMENT HARDWARE, WHICH ARE IDENTICAL TO THE FINAL INSTALLATION IN TYPE, CONFIGURATION AND POSITIONING. THE BODY STRUCTURE AT THE ATTACHMENT POINTS MAY BE SIMULATED FOR THE PURPOSE OF THE SLED TEST, BUT THE SIMULATED STRUCTURE USED TO PASS THE SLED TEST MAY NOT EXCEED THE STRENGTH OF THE ATTACHMENT STRUCTURE TO BE USED IN THE FINAL BODY INSTALLATION. THE MOBILE SEATING DEVICE USED FOR TEST PURPOSES SHALL BE A ONE HUNDRED FIFTY POUND POWERED WHEELCHAIR AND THE OCCUPANT SHALL BE A FIFTIETH PERCENTILE MALE TEST DUMMY AS SPECIFIED IN FMVSS PART 571.208. MEASUREMENTS SHALL BE MADE ON THE TEST DUMMY DURING THE TEST FOR HEAD ACCELERATION, UPPER THORAX ACCELERATION, AND UPPER LEG COMPRESSIVE FORCE. THESE MEASUREMENTS SHALL NOT EXCEED THE UPPER LIMITS SET FORTH IN FMVSS PART 571.208, §6.1.2, 6.1.3, AND 6.1.4. THE TEST DUMMY SHALL BE RETAINED WITHIN THE SECUREMENT SYSTEM THROUGHOUT THE TEST AND FORWARD EXCURSION SHALL BE SUCH THAT NO PORTION OF THE TEST DUMMY'S HEAD OR KNEE PIVOT POINTS PASSES THROUGH A VERTICAL TRANSVERSE PLANE INTERSECTING THE FORWARD-MOST POINT OF THIS FLOOR SPACE DESIGNATED FOR THE MOBILE SEATING DEVICE. ALL HARDWARE SHALL REMAIN POSITIVELY ATTACHED THROUGHOUT THE TEST AND THERE SHALL BE NO FAILURE OF ANY COMPONENT. EACH MOBILE SEATING DEVICE BELT ASSEMBLY INCLUDING ATTACHMENT HARDWARE AND ANCHORAGES SHALL COMPLY TO ALL APPLICABLE FMVSS PERTAINING TO THE SECUREMENT OF WHEELCHAIRS AND MOBILE SEATING DEVICES.

(a) THE BELT MATERIALS AT EACH SPACE DESIGNATED FOR THE MOBILE SEATING DEVICE AND THE OCCUPANT RESTRAINT SYSTEM SHALL BE SIMILAR IN SIZE AND FABRIC.

- (b) ALL BUSES EQUIPPED WITH ATTACHMENT POINTS SECUREMENT DEVICES AND/OR WHEELCHAIR SECUREMENT SYSTEMS SHALL ALSO BE EQUIPPED WITH A DURABLE WEBBING CUTTER HAVING A FULL WIDTH HAND-GRIP AND PROTECTED BLADE. THE CUTTER MUST BE APPROPRIATELY STORED IN THE DRIVER'S COMPARTMENT TO THE LEFT OF THE DRIVER.
- (6) WHEELCHAIR/MOBILE SEATING DEVICE SECUREMENT SYSTEMS AND OCCUPANT RESTRAINT SYSTEMS, INCLUDING ATTACHING HARDWARE AND ANCHOR POINTS, SHALL BE CERTIFIED TO MEET THE REQUIREMENTS OF FMVSS 571.222, 571.209, AND 571.210.
- (7) THE OCCUPANT SECUREMENT SYSTEM MUST BE DESIGNED TO BE ATTACHED TO THE BUS BODY EITHER DIRECTLY OR IN COMBINATION WITH THE MOBILE SEATING DEVICE SECUREMENT SYSTEM BY A METHOD WHICH PROHIBITS THE TRANSFER OF WEIGHT OR FORCE FROM THE MOBILE SEATING DEVICE TO THE OCCUPANT IN THE EVENT OF AN IMPACT.
- (8) ALL SECUREMENT SYSTEM ATTACHMENTS OR COUPLING HARDWARE NOT PERMANENTLY ATTACHED SHALL BE A "POSITIVE LATCH" TYPE TO PROHIBIT ACCIDENTAL DISCONNECTING.
- (9) ALL ATTACHMENT OR COUPLING SYSTEMS DESIGNED TO BE CONNECTED OR DISCONNECTED FREQUENTLY SHALL BE ACCESSIBLE AND OPERABLE WITHOUT THE USE OF TOOLS OR OTHER MECHANICAL ASSISTANCE.
- (10) NO MOBILE SEATING DEVICE SECUREMENT SYSTEM HARDWARE SHALL BE PLACED SO THAT A MOBILE SEATING DEVICE CAN BE PLACED BLOCKING ACCESS TO LIFT DOOR OR EMERGENCY DOOR(S).
- (11) DETAILED INSTRUCTIONS, INCLUDING A PARTS LIST, REGARDING INSTALLATION AND USE OF THE SYSTEM SHALL BE PROVIDED WITH EACH VEHICLE EQUIPPED WITH AN OCCUPANT SECUREMENT SYSTEM.
- (12) DETAILED INSTRUCTION, INCLUDING A DIAGRAM REGARDING THE PROPER PLACEMENT AND POSITION OF THE SYSTEM INCLUDING CORRECT BELT ANGLES, SHALL BE PROVIDED WITH EACH VEHICLE EQUIPPED WITH AN OCCUPANT SECUREMENT SYSTEM.

(E) WINDOWS MAY BE TINTED. SUCH TINTING SHALL MEET THE PROVISIONS OF SECTION 4513.241 OF THE OHIO REVISED CODE.

(F) ADDITIONAL HEATER(S) MAY BE INSTALLED IN THE BUS. EXPOSED HEATERS WHICH POSE A HAZARD TO PASSENGERS SHALL HAVE PADDED COVERS. THE PADDED COVER SHALL BE OF THE SAME MATERIAL USED IN THE CONSTRUCTION OF THE PASSENGER SEATS. THE HEATER OR PADDED COVER SHALL HAVE A CAUTIONARY LABEL AFFIXED TO THE UNIT STATING, "NOT FOR SEATING".

(G) BUSES WITH WHEELCHAIR LIFTS USED FOR TRANSPORTING CHILDREN WITH PHYSICAL DISABILITIES MAY DISPLAY UNIVERSAL HANDICAP SYMBOLS LOCATED ON THE FRONT AND REAR OF THE VEHICLE BELOW THE WINDOW LINE. SUCH EMBLEMS SHALL BE WHITE ON BLUE, SHALL NOT EXCEED TWELVE INCHES IN SIZE, AND MAY BE REFLECTIVE.

(H) REGULAR SERVICE ENTRANCE.

(1) BUSES SHALL BE EQUIPPED WITH THREE STEP RISERS OF APPROXIMATELY EQUAL HEIGHT IN THE ENTRANCE WELL. THE STEPS SHALL EXTEND THE FULL WIDTH OF THE STEP WELL.

(2) AN ADDITIONAL FOLD-OUT STEP MAY BE PROVIDED WHICH WILL PROVIDE FOR THE STEP LEVEL TO BE NO MORE THAN SIX INCHES TO GROUND LEVEL. THE FOLD-OUT STEP MAY BE POWER ACTIVATED OR MANUALLY OPERATED.

(3) SCHOOL BUSES USED TO TRANSPORT PUPILS WITH DISABILITIES SHALL HAVE GRAB HANDLES OF MAXIMUM LENGTH, BUT NOT LESS THAN TEN INCHES INSTALLED ON BOTH SIDES OF THE INTERIOR STEP-WELL AREA. THESE GRAB HANDLES SHALL BE SECURELY FASTENED AND DESIGNED TO PREVENT CLOTHING OR ANY OTHER ARTICLE FROM BEING CAUGHT IN THE HANDLE. GRAB HANDLES SHALL NOT BE SECURED TO THE ENTRANCE DOORS.

(I) ROOF ESCAPE HATCHES/VENTS SHALL BE ADJUSTABLE AND OF SUFFICIENT CAPACITY TO PROVIDE ADEQUATE FRESH AIR UNDER OPERATING CONDITIONS WITHOUT THE OPENING OF WINDOWS, EXCEPT IN EXTREMELY WARM WEATHER. THIS VENT SHALL HAVE MULTI-POSITIONS AND SHALL BE STATIC-TYPE WITH EXHAUST VENT. THE VENT SHALL HAVE A RELEASE HANDLE OR HANDLES PERMITTING OPERATING AS AN EMERGENCY EXIT WHICH CAN BE OPENED FROM INSIDE OR OUTSIDE THE SCHOOL BUS. A BUZZER SHALL SOUND WHEN THE VENT IS OPENED IN THE ESCAPE POSITION. ALL INTERIOR DOME LIGHTS (DRIVER DOME LIGHTS EXCLUDED) AND EMERGENCY DOOR BUZZER LOCATED IN DRIVER'S COMPARTMENT SHALL BE ACTIVATED WHEN THE ROOF HATCH IS OPEN PAST THE VENT POSITION. BUZZER AND DOME LIGHTS SHALL BE OPERATIONAL WITH KEY IN "ON-OFF" OR ACCESSORY POSITIONS. POWER FOR EMERGENCY LIGHTING AND BUZZER SHALL BE SUPPLIED BY TWELVE VOLT SUPPLY LINE GOING TO THE BODY CONTINUOUS DUTY SOLENOID. THE SYSTEM SHALL BE PROTECTED BY A CIRCUIT BREAKER. BUSES WITH LESS THAN FIFTY PASSENGER DESIGNED CAPACITY SHALL HAVE ONE COMBINATION UNIT LOCATED IN THE MIDDLE OF THE BUS. BUSES WITH FIFTY PASSENGER DESIGNED MAXIMUM CAPACITY, OR GREATER, SHALL HAVE TWO COMBINATION VENTS INSTALLED IN THE BUS. THE MULTI-FUNCTIONAL ROOF VENTS/EMERGENCY EXITS MUST MEET ALL REQUIREMENTS OF FMVSS 571.217.

(J) FLEXIBILITY IN SEAT SPACING AND FLOOR PLAN LAYOUT TO ACCOMMODATE SPECIAL DEVICES SHALL BE PERMITTED. VEHICLES ALTERED ARE REQUIRED TO MEET ALL FEDERAL AND STATE STANDARDS APPLICABLE TO THE GROSS VEHICLE WEIGHT CATEGORY AND DESIGNED MAXIMUM CAPACITY.

(K) SPECIAL SERVICE ENTRANCE.

(1) THE SPECIAL SERVICE ENTRANCE DOOR(S) SHALL BE AT ANY CONVENIENT POINT ON THE RIGHT CURB SIDE OF THE BUS. WHEN THE SPECIAL SERVICE ENTRANCE IS LOCATED FORWARD OF THE REAR WHEELS, THE SPECIAL SERVICE ENTRANCE DOOR(S), IN THE OPEN POSITION, SHALL NOT OBSTRUCT THE REGULAR SERVICE ENTRANCE.

(2) THE OPENING MAY EXTEND BELOW THE FLOOR THROUGH THE BOTTOM OF THE BODY SKIRT. IF SUCH AN OPENING IS USED, REINFORCEMENTS SHALL BE INSTALLED AT THE FRONT AND REAR OF THE FLOOR OPENING TO SUPPORT THE FLOOR AND GIVE THE SAME STRENGTH AS OTHER FLOOR OPENINGS.

(3) THE OPENING, WITH DOORS OPEN, SHALL BE OF SUFFICIENT WIDTH AND DEPTH TO ALLOW THE PASSAGE OF WHEELCHAIRS/MOBILE SEATING DEVICES AND MOBILITY AIDS. THE MINIMUM CLEAR OPENING SHALL BE FIFTY-SIX INCHES IN HEIGHT. THE WIDTH OF THE FINISHED DOOR OPENING SHALL NOT EXCEED FORTY-FIVE INCHES FOR A SINGLE DOOR INSTALLATION.

(4) A DRIP MOLDING SHALL BE INSTALLED ABOVE THE OPENING TO EFFECTIVELY DIVERT WATER FROM THE OPENING. DOOR POSTS AND HEADERS FOR THE SPECIAL SERVICE ENTRANCE SHALL BE REINFORCED SUFFICIENTLY TO PROVIDE SUPPORT AND STRENGTH EQUIVALENT TO THE AREAS OF THE SIDE OF THE BUS NOT USED FOR SERVICE DOORS. A HEAD BUMPER PAD SHALL BE INSTALLED ABOVE THE SPECIAL SERVICE ENTRANCE AND/OR ON THE LIFT FRAME.

(L) SPECIAL SERVICE ENTRANCE DOORS.

(1) A SINGLE DOOR MAY BE USED IF THE FINISHED CLEAR OPENING DOES NOT EXCEED FORTY-FIVE INCHES. DUAL DOORS SHALL BE USED WHEN THE FINISHED CLEAR OPENING EXCEEDS FORTY-FIVE INCHES IN WIDTH.

(2) ALL DOORS SHALL OPEN OUTWARDLY. THE SPECIAL SERVICE ENTRANCE DOORS SHALL HAVE A CABLE AND SNAP HOOK TO HOLD DOORS IN THE OPEN POSITION AND DOOR BUMPERS TO PREVENT DOOR-TO-BODY CONTACT.

(3) ALL DOORS SHALL BE WEATHER-SEALED. BUSES WITH DOUBLE DOORS SHALL BE SO CONSTRUCTED THAT A FLANGE ON THE FORWARD DOOR OVERLAPS THE EDGE OF THE REAR DOOR WHEN CLOSED. IF OPTIONAL POWER DOORS ARE INSTALLED, THE DESIGN SHALL PERMIT RELEASE OF THE DOORS FOR OPENING AND CLOSING BY THE ATTENDANT FROM INSIDE-THE BUS.

(4) WHEN MANUALLY OPERATED DUAL DOORS ARE PROVIDED, THE REAR DOOR SHALL HAVE AT LEAST A ONE-POINT FASTENING DEVICE TO THE HEADER. THE FORWARD MOUNTED DOOR SHALL HAVE AT LEAST THREE-POINT FASTENING DEVICES. ONE SHALL BE TO THE HEADER, ONE TO THE FLOOR LINE OF THE BODY, AND THE OTHER SHALL BE INTO THE REAR DOOR. THESE LOCKING DEVICES SHALL AFFORD MAXIMUM SAFETY WHEN THE DOORS ARE IN THE CLOSED POSITION.

(5) THE DOOR AND HINGE MECHANISM SHALL BE OF A STRENGTH THAT IS GREATER THAN, OR EQUIVALENT TO, THE EMERGENCY DOOR EXIT. DOOR MATERIALS, PANELS, AND STRUCTURAL STRENGTH SHALL BE EQUIVALENT TO THE CONVENTIONAL SERVICE AND EMERGENCY DOORS. COLOR, RUB RAIL EXTENSIONS, LETTERING, AND OTHER EXTERIOR FEATURES SHALL MATCH ADJACENT SECTIONS OF THE BODY.

(6) EACH DOOR SHALL HAVE A WINDOW SET IN RUBBER, COMPATIBLE WITHIN ONE INCH OF THE LOWER LINE OF ADJACENT SASH.

(7) THE SPECIAL SERVICE ENTRANCE SHALL BE EQUIPPED WITH A DEVICE THAT WILL ACTUATE A GREEN FLASHING VISIBLE SIGNAL LOCATED IN THE DRIVER'S COMPARTMENT WHEN THE DOOR OR DOORS ARE NOT SECURELY CLOSED AND THE IGNITION IS IN "ON" POSITION.

(M) ADEQUATE LIGHTING SHALL BE PROVIDED TO ILLUMINATE THE INTERIOR AND EXTERIOR OF THE LIFT AREA. THERE SHALL BE A LIGHT INSTALLED ABOVE THE LIFT THAT WILL PROVIDE A MINIMUM OF TWO FOOT-CANDLES OF ILLUMINATION AT FLOOR LEVEL IN THE AREA OF THE LIFT. THE LIGHTS SHALL REMAIN ILLUMINATED UNTIL THE LIFT DOOR IS SECURELY CLOSED. THERE SHALL BE A LIGHT(S) THAT WILL PROVIDE A MINIMUM OF TWO FOOT-CANDLES OF ILLUMINATION ON THE LIFT PLATFORM WHEN THE LIFT IS BEING OPERATED. THERE SHALL BE A LIGHT(S) THAT WILL PROVIDE A MINIMUM OF TWO FOOT-CANDLES OF ILLUMINATION FOR A DISTANCE OF THREE FEET PERPENDICULAR FROM ANY POINT OF THE OUTER EDGE OF THE LIFT OPENING.

(N) THE LIGHT(S) USED TO ILLUMINATE THE INTERIOR AND EXTERIOR OF THE LIFT AREA SHALL BE ACTIVATED WHEN THE LIFT DOOR IS OPEN.

(O) POWER LIFT.**(1) DESIGN**

- (a) THE DESIGN LOAD OF THE LIFT SHALL BE AT LEAST SIX HUNDRED POUNDS. WORKING PARTS, SUCH AS CABLE, PULLEYS, AND SHAFTS, WHICH CAN BE EXPECTED TO WEAR AND UPON WHICH THE LIFT DEPENDS FOR SUPPORT OF THE LOAD, SHALL HAVE A SAFETY FACTOR OF AT LEAST SIX BASED ON THE ULTIMATE STRENGTH OF THE MATERIAL. NON-WORKING PARTS, SUCH AS PLATFORM, FRAME, AND ATTACHMENT HARDWARE, WHICH WOULD NOT BE EXPECTED TO WEAR, SHALL HAVE A SAFETY FACTOR OF AT LEAST THREE, BASED ON THE ULTIMATE STRENGTH OF THE MATERIAL.**
- (b) THE LIFTING MECHANISM AND PLATFORM SHALL BE ABLE TO LIFT A MINIMUM PAYLOAD OF EIGHT HUNDRED POUNDS.**
- (c) LIFTS INSTALLED IN ALL SCHOOL BUSES SHALL BE FULLY AUTOMATIC, INCLUDING FOLDING AND UNFOLDING OF THE PLATFORM.**
- (2) CONTROLS SHALL BE PROVIDED THAT ENABLE THE OPERATOR TO ACTIVATE THE LIFT MECHANISM FROM EITHER INSIDE OR OUTSIDE OF THE BUS.**
- (3) THE LIFT SHALL INCORPORATE AN EMERGENCY METHOD OF DEPLOYING AND LOWERING TO GROUND LEVEL WITH A LIFT OCCUPANT, AND RAISING AND STOWING THE EMPTY LIFT IF THE POWER TO THE LIFT FAILS. NO EMERGENCY METHOD, MANUAL OR OTHERWISE, SHALL BE CAPABLE OF BEING OPERATED IN A MANNER THAT COULD BE HAZARDOUS TO THE LIFT OCCUPANT OR TO THE OPERATOR, WHEN OPERATED ACCORDING TO MANUFACTURER'S INSTRUCTIONS, AND SHALL NOT PERMIT THE PLATFORM TO BE STOWED OR FOLDED WHEN OCCUPIED, UNLESS THE LIFT IS A ROTARY LIFT AND IS INTENDED TO BE STOWED WHILE OCCUPIED. NO MANUAL EMERGENCY OPERATION SHALL REQUIRE MORE THAN TWO MINUTES TO LOWER AN OCCUPIED WHEELCHAIR TO GROUND LEVEL.**

(4) PLATFORMS STOWED IN A VERTICAL POSITION, AND DEPLOYED PLATFORMS WHEN OCCUPIED, SHALL HAVE PROVISIONS TO PREVENT THEIR DEPLOYING, FALLING OR FOLDING ANY FASTER THAN TWELVE INCHES PER SECOND OR THEIR DROPPING OF AN OCCUPANT IN THE EVENT OF A SINGLE FAILURE OF ANY LOAD CARRYING COMPONENT.

(5) ELECTRICALLY POWERED LIFTS SHALL HAVE A CIRCUIT BREAKER INSTALLED WITHIN TWENTY-FOUR INCHES OF THE POWER SOURCE. THE AMPERE RATING SHALL BE SPECIFIED BY THE LIFT MANUFACTURER.

(6) THE LIFT PLATFORM SHALL BE EQUIPPED WITH BARRIERS TO PREVENT ANY OF THE WHEELS OF A WHEELCHAIR OR MOBILITY AID FROM ROLLING OFF THE PLATFORM DURING ITS OPERATION. A MOVABLE BARRIER OR INHERENT DESIGN FEATURE SHALL PREVENT A WHEELCHAIR OR MOBILITY AID FROM ROLLING OFF THE EDGE CLOSEST TO THE VEHICLE UNTIL THE PLATFORM IS IN ITS FULLY RAISED POSITION. EACH SIDE OF THE LIFT PLATFORM WHICH EXTENDS BEYOND THE VEHICLE IN ITS RAISED POSITION, SHALL HAVE A BARRIER OF A MINIMUM OF ONE AND ONE-HALF INCHES HIGH. SUCH BARRIERS SHALL NOT INTERFERE WITH MANEUVERING INTO OR OUT OF THE AISLE. THE LOADING-EDGE BARRIER, OUTER BARRIER, WHICH FUNCTIONS AS A LOADING RAMP WHEN THE LIFT IS AT GROUND LEVEL, SHALL BE SUFFICIENT WHEN RAISED OR CLOSED, OR A SUPPLEMENTARY SYSTEM BE PROVIDED TO PREVENT A POWER WHEELCHAIR OR MOBILITY AID FROM RIDING OVER OR DEFEATING IT. THE OUTER BARRIER OF THE LIFT SHALL AUTOMATICALLY RAISE OR CLOSE, OR A SUPPLEMENTARY SYSTEM SHALL AUTOMATICALLY ENGAGE, AND REMAIN RAISED, CLOSED, OR ENGAGED AT ALL TIMES THAT THE PLATFORM IS MORE THAN THREE INCHES ABOVE THE ROADWAY OR SIDEWALK AND THE PLATFORM IS OCCUPIED. ALTERNATIVELY, A BARRIER OR SYSTEM MAY BE RAISED, LOWERED, OPENED, CLOSED, ENGAGED, OR DISENGAGED BY THE LIFT OPERATOR, PROVIDED AN INTERLOCK OR INHERENT DESIGN FEATURE PREVENTS THE LIFT FROM RISING, UNLESS THE BARRIER IS RAISED OR CLOSED OR THE SUPPLEMENTARY SYSTEM IS ENGAGED.

(7) THE LIFT MECHANISM SHALL BE EQUIPPED WITH ADJUSTABLE LIMIT SWITCHES AND/OR BY-PASS VALVES TO PREVENT EXCESSIVE PRESSURE FROM BUILDING IN THE HYDRAULIC SYSTEM WHEN THE PLATFORM REACHES THE FULL UP POSITION OR FULL DOWN POSITION.

(8) THE PLATFORM SURFACE SHALL BE FREE OF ANY PROTRUSIONS OVER ONE-FOURTH INCH HIGH AND SHALL BE SLIP RESISTANT. THE PLATFORM SHALL HAVE A MINIMUM CLEAR WIDTH OF TWENTY-EIGHT AND ONE-HALF INCHES AT THE PLATFORM, A MINIMUM CLEAR WIDTH OF THIRTY INCHES MEASURED FROM TWO INCHES ABOVE THE PLATFORM SURFACE TO THIRTY INCHES ABOVE THE PLATFORM, AND A MINIMUM CLEAR LENGTH OF FORTY-EIGHT INCHES MEASURED FROM TWO INCHES ABOVE THE SURFACE OF THE PLATFORM.

(9) ANY OPENINGS BETWEEN THE PLATFORM SURFACE AND THE RAISED BARRIERS SHALL NOT EXCEED FIVE-EIGHTHS INCH IN WIDTH. WHEN THE PLATFORM IS AT VEHICLE FLOOR HEIGHT WITH THE INNER BARRIER, IF APPLICABLE, DOWN OR DETRACTED, GAPS BETWEEN THE FORWARD LIFT PLATFORM EDGE AND THE VEHICLE FLOOR SHALL NOT EXCEED ONE-HALF INCH HORIZONTALLY AND FIVE-EIGHTHS INCH VERTICALLY. PLATFORMS ON SEMIAUTOMATIC LIFTS MAY HAVE A HAND HOLD NOT EXCEEDING ONE AND ONE-HALF INCHES BY FOUR AND ONE-HALF INCHES LOCATED BETWEEN THE EDGE BARRIERS.

(10) THE ENTRANCE RAMP, OR LOADING-EDGE BARRIER USED AS A RAMP, SHALL NOT EXCEED A SLOPE OF ONE TO EIGHT, MEASURED ON LEVEL GROUND, FOR A MAXIMUM RISE OF THREE INCHES AND THE TRANSITION FROM ROADWAY TO SIDEWALK TO RAMP MAY BE VERTICAL WITHOUT EDGE TREATMENT UP TO ONE-FOURTH INCH. THRESHOLDS BETWEEN ONE-FOURTH INCH AND ONE-HALF INCH HIGH SHALL BE BEVELED WITH A SLOPE NO GREATER THAN ONE TO TWO.

(11) THE LIFT PLATFORM, NOT INCLUDING THE ENTRANCE RAMP, SHALL NOT DEFLECT MORE THAN THREE DEGREES, EXCLUSIVE OF VEHICLE ROLL OR PITCH IN ANY DIRECTION BETWEEN ITS UNLOADED POSITION AND ITS POSITION WHEN LOADED WITH SIX HUNDRED POUNDS APPLIED THROUGH A TWENTY-SIX INCH BY TWENTY-SIX INCH TEST PALLET AT THE CENTROID OF THE PLATFORM.

- (12) NO PART OF THE PLATFORM SHALL MOVE AT A RATE EXCEEDING SIX INCHES PER SECOND DURING LOWERING AND LIFTING AN OCCUPANT, AND SHALL NOT EXCEED TWELVE INCHES PER SECOND DURING DEPLOYING OR STOWING. THIS REQUIREMENT DOES NOT APPLY TO THE DEPLOYMENT OR STOWAGE CYCLES OF LIFTS THAT ARE MANUALLY DEPLOYED OR STOWED. THE MAXIMUM PLATFORM HORIZONTAL AND VERTICAL ACCELERATION WHEN OCCUPIED SHALL BE 0.3G.
- (13) THE LIFT SHALL PERMIT BOTH INBOARD AND OUTBOARD FACING OF WHEELCHAIR AND MOBILITY AID USERS. LIFTS SHALL ACCOMMODATE PERSONS USING WALKERS, CRUTCHES, CANES, OR BRACES, OR WHO OTHERWISE HAVE DIFFICULTY USING STEPS. THE PLATFORM MAY BE MARKED TO INDICATE A PREFERRED STANDING POSITION.
- (14) PLATFORMS ON LIFTS SHALL BE EQUIPPED WITH HANDRAILS ON TWO SIDES, WHICH MOVE IN TANDEM WITH THE LIFT, AND WHICH SHALL BE GRASPABLE AND PROVIDE SUPPORT TO STANDEES THROUGH THE ENTIRE LIFT OPERATION. HANDRAILS SHALL HAVE A USABLE COMPONENT AT LEAST EIGHT INCHES LONG, WITH THE LOWEST PORTION A MINIMUM THIRTY INCHES ABOVE THE PLATFORM AND THE HIGHEST PORTION A MAXIMUM THIRTY-EIGHT INCHES ABOVE THE PLATFORM. THE HANDRAILS SHALL BE CAPABLE OF WITHSTANDING A FORCE OF ONE HUNDRED POUNDS CONCENTRATED AT ANY POINT ON THE HANDRAIL WITHOUT PERMANENT DEFORMATION OF THE RAIL OR ITS SUPPORTING STRUCTURE. THE HANDRAIL SHALL HAVE A CROSS-SECTIONAL DIAMETER BETWEEN ONE AND ONE-FOURTH INCHES AND ONE AND ONE-HALF INCHES OR SHALL PROVIDE AN EQUIVALENT GRASPING SURFACE AND HAVE EASED EDGES WITH CORNER RADII OF NOT LESS THAN ONE-EIGHTH INCH. HANDRAILS SHALL BE PLACED TO PROVIDE A MINIMUM ONE AND ONE-HALF INCH KNUCKLE CLEARANCE FROM THE NEAREST ADJACENT SURFACE. HANDRAILS SHALL NOT INTERFERE WITH WHEELCHAIR OR MOBILITY AID MANEUVERABILITY WHEN ENTERING OR LEAVING THE VEHICLE.
- (15) A SWITCH ACTIVATED BY THE LIFT DOOR(S) SHALL BE INSTALLED IN THE CIRCUIT TO PREVENT THE LIFT MECHANISM FROM OPERATING WHEN THE DOOR(S) ARE CLOSED.

- (16) SCHOOL BUSES FOR THE TRANSPORTATION OF CHILDREN WITH DISABILITIES DELIVERED TO THE STATE OF OHIO AFTER THE EFFECTIVE DATE OF THIS RULE SHALL HAVE THE LIFT INSTALLED BY THE BODY MANUFACTURER OR AUTHORIZED DEALER. THE INSTALLATION SHALL BE CERTIFIED AND THE DOCUMENTATION SHALL BE PROVIDED BY THE INSTALLER. IT SHALL BE THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THE LEVELNESS OF THE VEHICLE AFTER INSTALLATION. THE LOCATION OF THE LIFT SHALL NOT ADVERSELY AFFECT THE LEGAL AXLE LOADING, THE MANEUVERABILITY, STRUCTURAL, OR THE SAFE OPERATION OF THE VEHICLE IN WHICH IT IS INSTALLED.

SCHOOL BUSES ALTERED AFTER PRODUCTION, TO ACCOMMODATE THE SPECIAL SERVICE DOOR AND A POWER LIFT SHALL MEET CURRENT FEDERAL AND STATE STANDARDS.

- (17) WHEN THE SPECIAL SERVICE ENTRANCE IS INSTALLED ADJACENT TO THE STEPWELL OR HAS A SEAT OR WHEELCHAIR POSITION DIRECTLY IN FRONT OF OR BEHIND THE SPECIAL SERVICE ENTRANCE, A BARRIER PANEL SHALL BE INSTALLED. THE BARRIER PANEL SHALL PREVENT THE POSSIBILITY OF A BODY LIMB FROM BECOMING ENTAILED IN THE LIFT MECHANISM. THE BARRIER PANEL MAY BE FLUSH TO THE OUTSIDE WALL OF THE BUS OR AT A DIMENSION THAT WILL PROHIBIT A PASSENGER FROM COMING IN CONTACT WITH THE LIFT MECHANISM. THE PANEL MAY BE CONSTRUCTED OF ALUMINUM OR POLYCARBONATE. THE END OF THE BARRIER PANEL EXPOSED TO THE PASSENGER COMPARTMENT SHALL BE SECURED TO A PADDED STANCHION EXTENDING FROM THE FLOOR TO THE CEILING. THE STANCHION SHALL BE ATTACHED TO THE ROOF BOW OR A REINFORCED PANEL IN THE CEILING. IF THE BARRIER PANEL IS USED IN CONJUNCTION WITH A PADDED STANCHION AND MODESTY PANEL, IT SHALL EXTEND APPROXIMATELY SIX INCHES ABOVE THE LIFT PLATFORM AND EXTEND BEYOND THE STATIONARY FRAME OR THE MOST INNER PART OF THE LIFT EXPOSED TO THE PASSENGER COMPARTMENT. IF THE BARRIER PANEL IS A SEPARATE INSTALLATION, IT SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND EXTEND FROM THE FLOOR TO APPROXIMATELY SIX INCHES ABOVE THE LIFT PLATFORM AND EXTEND BEYOND THE STATIONARY FRAME OR THE MOST INNER PART OF THE LIFT EXPOSED TO THE PASSENGER COMPARTMENT. THE BARRIER PANEL SHALL BE IN COMPLIANCE WITH FMVSS 571.302 AND 571.222.

(P) MODIFICATIONS

- (1) BATTERY BOX AND FUEL TANK MAY BE RELOCATED BY THE MANUFACTURER TO PROVIDE EQUAL WEIGHT DISTRIBUTION TO COMPENSATE FOR POWER LIFT WEIGHT.**

REPLACES: RULE 3301-87-08

EFFECTIVE: SEPTEMBER 1, 1998

**CERTIFICATION
MITCHELL J. BROWN
DIRECTOR**

**JANUARY 15, 1998
DATE**

**PROMULGATED UNDER R.C. CHAPTER 119
RULE AUTHORIZED BY R.C. SECTION 4511.76
RULE AMPLIFIES: R.C. SECTION 4511.76
119.032 REVIEW DATE: 3/9/03
PRIOR EFFECTIVE DATES: 4/01/78
7/01/88
1/01/90**

4501-5-09 POLICY FOR EVALUATION OF NEW EQUIPMENT OR CHANGES TO EXISTING EQUIPMENT ON SCHOOL BUSES.

(A) PERMISSION - PRIOR TO THE INSTALLATION OF NEW OR ADDITIONAL EQUIPMENT OR PRODUCTS, OR CHANGES TO ANY EXISTING EQUIPMENT ON A SCHOOL BUS, THE SCHOOL BUS OWNER SHALL REQUEST PERMISSION, IN WRITING, FROM THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY. THIS REQUEST FOR PERMISSION TO FIELD TEST SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING:

(1) A COMPLETE DESCRIPTION OF THE ITEM TO BE TESTED OR CHANGED, INCLUDING:

(a) PHOTOGRAPH(S) OR ILLUSTRATION(S)

(b) DIAGRAMS AND/OR INFORMATIONAL PAMPHLETS

(c) SCHEMATICS, TECHNICAL DATA, SPECIFICATIONS, DIMENSIONS

(d) RESULTS OF TESTING BY AN INDEPENDENT TESTING FACILITY OR LABORATORY SPECIFIC TO THE PRODUCT BEING TESTED.

(2) IF PRACTICAL, ACTUAL SAMPLES OR MODELS SHOULD BE SUBMITTED

(3) COMPLETE COST ESTIMATES FOR THE NEW PRODUCT, EQUIPMENT, OR CHANGE (INITIAL, INSTALLATION, LABOR, MAINTENANCE, AND CONTINUED USE)

(4) AN EXPLANATION AS TO THE EXPECTED BENEFITS

(5) A STATEMENT AS TO THE EFFECT, POSITIVELY OR NEGATIVELY, THIS PRODUCT, EQUIPMENT, OR CHANGE WILL HAVE UPON OTHER CONSTRUCTION STANDARDS CONTAINED HEREIN, AS WELL AS THE "OHIO PUPIL TRANSPORTATION OPERATION AND SAFETY RULES"

(6) DEPENDING UPON SEVERAL FACTORS, SUCH AS COMPLEXITY OR COST OF THE PRODUCT, EQUIPMENT, OR CHANGE, OR THE ANTICIPATED IMPACT UPON PUPIL TRANSPORTATION SAFETY, A FIELD TEST MAY BE REQUIRED OF MORE THAN ONE SCHOOL BUS OWNER. IN ANY EVENT, NEW PRODUCTS, EQUIPMENT, OR CHANGES WILL BE TESTED AND EVALUATED ON NO LESS THAN THREE (3) SCHOOL BUSES.

(7) DURING EVALUATION PERIOD, THE MANUFACTURER WILL BE EXPECTED TO MAINTAIN, ADJUST AND MODIFY THE PRODUCT AT NO COST TO THE SCHOOL BUS OWNER. THE OWNERSHIP OF THE PRODUCT, EXCEPT BUS, REMAINS WITH THE MANUFACTURER. IT CANNOT BE PURCHASED BY THE SCHOOL BUS OWNER NOR CAN THE MANUFACTURER MAKE A REDUCED PRICE OFFER DURING THE EVALUATION PERIOD.

(B) **ADVISORY COMMITTEE** - "THE OHIO SCHOOL BUS CONSTRUCTION STANDARDS ADVISORY COMMITTEE" WILL REVIEW EACH REQUEST FOR PERMISSION TO FIELD TEST UPON THE NEXT SCHEDULED QUARTERLY MEETING OF THE COMMITTEE. THE COMMITTEE MAY REQUEST ADDITIONAL INFORMATION PRIOR TO MAKING THEIR RECOMMENDATION.

(1) THE RECOMMENDATION OF THE ADVISORY COMMITTEE WILL BE CONSIDERED IN THE FINAL DECISION BY THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY.

(C) **NOTICE TO OWNER** - THE SCHOOL BUS OWNER WILL BE NOTIFIED IN WRITING OF THE DECISION BY THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY.

(1) **APPEAL** - A PERSONAL APPEARANCE BEFORE THE ADVISORY COMMITTEE MAY BE REQUESTED IN WRITING IN ORDER TO APPEAL A DECISION. THIS APPEARANCE WILL BE DURING A REGULARLY SCHEDULED ADVISORY COMMITTEE MEETING. THE FINAL DECISION, HOWEVER, WILL REMAIN WITH THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY.

(D) WITHIN FORTY-FIVE (45) DAYS OF THE DATE OF NOTICE OF APPROVAL TO FIELD TEST, AN EVALUATION SHALL BE SUBMITTED TO THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY. THIS EVALUATION WILL BE COMPLETED ON AN APPROVED FORM WHICH WILL BE PROVIDED WITH THE APPROVAL LETTER.

(1) AN EVALUATION FORM MUST BE SUBMITTED BY NO LESS THAN THREE (3) SCHOOL BUS DRIVERS, A SCHOOL BUS MECHANIC, AND A TRANSPORTATION DIRECTOR.

- (2) FAILURE TO SUBMIT EVALUATIONS MAY RESULT IN IMMEDIATE TERMINATION OF APPROVAL TO FIELD TEST.

- (E) THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY WILL THEN DETERMINE IF THE EQUIPMENT OR CHANGE WILL BE RECOMMENDED FOR INCLUSION IN THE LIST OF APPROVED OPTIONS OR IF IT IS TO BE DELETED FROM SERVICE.
 - (1) ANY ITEM DELETED FROM SERVICE SHALL BE REMOVED FROM THE BUS, UNLESS WRITTEN PERMISSION TO RETAIN IS GIVEN BY THE DIRECTOR OF THE DEPARTMENT OF PUBLIC SAFETY.

 - (2) ANY ITEM WHICH, AT ANY TIME, IS DETERMINED TO PRESENT A POTENTIAL HAZARD TO OCCUPANTS OF THE SCHOOL BUS OR OTHER PERSONS OR PROPERTY, SHALL BE IMMEDIATELY REMOVED FROM THE SCHOOL BUS AND THE FIELD TEST TERMINATED.

REPLACES: RULE 3301-87-09

EFFECTIVE: SEPTEMBER 1, 1998

CERTIFICATION
 MITCHELL J. BROWN
 DIRECTOR

JANUARY 15, 1998
 DATE

PROMULGATED UNDER R.C. CHAPTER 119
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 RULE AMPLIFIES: R.C. SECTION 4511.76
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 4/01/78
 7/01/88
 1/01/90

STANDARD OF CARE AND MAINTENANCE OF THE FACILITY (A) (1)

THEY SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE FACILITY AND THE
CONTENTS THEREIN AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE
FACILITY AND THE CONTENTS THEREIN FROM DAMAGE AND LOSS.

THEY SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE FACILITY AND THE
CONTENTS THEREIN AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE
FACILITY AND THE CONTENTS THEREIN FROM DAMAGE AND LOSS.

A PERSON WHO IS RESPONSIBLE FOR THE MAINTENANCE OF THE FACILITY AND THE
CONTENTS THEREIN AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE
FACILITY AND THE CONTENTS THEREIN FROM DAMAGE AND LOSS.

SECTION 101.01

SECTION 101.02

SECTION 101.03

SECTION 101.04

SECTION 101.05

4501-5-10 APPROVED OPTIONS

APPROVED OPTIONS ARE THOSE APPROVED FOR USE BY SCHOOL BUS OWNERS.

- (A) FOUR CHANNEL ANTI-LOCK BRAKE SYSTEMS MEETING FMVSS 571.121 MAY BE USED.
- (1) THE ANTI-LOCK BRAKE SYSTEM SHALL BE PROVIDED WITH A LIGHT ON THE DASHBOARD OR SWITCH PANEL THAT LIGHTS IN THE EVENT OF A FAILURE. LIGHT WILL ALSO PROVIDE DIAGNOSTIC CODE INFORMATION TO HELP IDENTIFY FAILED ANTI-LOCK BRAKE SYSTEM COMPONENTS SUCH AS WHEEL SPEED SENSORS, SOLENOID VALVES AND WIRING.
- (2) AIR APPLIED, MECHANICALLY HELD PARKING BRAKE SYSTEMS THAT MEET FMVSS 571.121 ARE ACCEPTABLE.
- (B) AIR CONDITIONING IS PERMITTED. UNITS CANNOT PROTRUDE INTO THE HEAD IMPACT ZONE OF ANY PASSENGER SEAT.
- (C) AIR SUSPENSION SYSTEMS ARE PERMITTED. SUCH SYSTEMS SHALL EQUAL THE AXLE WEIGHT RATING REQUIRED FOR THE REAR SUSPENSION CAPACITY OF THE VEHICLE.
- (D) PRESSURIZED AUTOMATIC LUBRICATION SYSTEMS ARE PERMITTED. SUCH SYSTEMS SHALL APPLY LUBRICATION TO SPECIFIC COMPONENTS AT A PREDETERMINED MILEAGE INTERVAL.
- (E) AUTOMATIC RADIATOR SHUTTERS ARE PERMITTED ON DIESEL OR GASOLINE ENGINES.
- (F) POWER-OPERATED AUTOMATIC TIRE CHAINS ARE PERMITTED, BUT MUST BE CONTROLLED FROM THE DRIVER COMPARTMENT.
- (G) AUXILIARY FUEL-FIRED HEATERS ARE PERMITTED. THESE AUXILIARY HEATERS SHOULD BE SPECIFIED TO USE THE SAME FUEL AS THE ENGINE IS DESIGNED TO USE. THESE HEATERS CAN BE EITHER DIRECT HOT AIR SYSTEMS OR CONNECTED TO THE ENGINE'S COOLANT SYSTEM. WHEN CONNECTED TO THE ENGINE, THE HEATERS CAN BE USED TO PREHEAT THE ENGINE FOR STARTING, OR TO PREHEAT AND ADD SUPPLEMENTARY HEAT TO THE BUS'S HEATING SYSTEM. THESE HEATERS MUST BE INSTALLED PURSUANT TO MANUFACTURERS' RECOMMENDATIONS SO AS NOT TO EXHAUST IN A MANNER WHICH WILL ENDANGER PASSENGERS. THE HEATER SHOULD NOT NEED TO BE ADJUSTED IF FUEL IS BEING CHANGED FROM "DIESEL-1" TO "DIESEL-2" OR A BLEND, AND SHOULD BE EQUIPPED WITH LOW VOLTAGE PROTECTION. THESE HEATERS MUST MEET ALL APPLICABLE FEDERAL AND SOCIETY OF AUTOMOTIVE ENGINEERS TESTS.

(H) RECTANGULAR BACKUP LIGHTS ARE PERMITTED.

(I) BATTERY EMERGENCY DISCONNECT SWITCH SHALL BE OF WATERPROOF CORROSION RESISTANT DESIGN. MOISTURE-PROOF IS NOT ACCEPTABLE. IT SHALL BE RATED AT TWO HUNDRED AND FIFTY AMPERES CONTINUOUS AMPERES CAPACITY AND SHALL BE ABLE TO WITHSTAND A MINIMUM ONE THOUSAND AMPERE SURGE FOR TEN SECONDS AND WITHSTAND A MINIMUM TWO THOUSAND AMPERE SURGE FOR FIVE SECONDS. IT SHALL BE WIRED TO THE GROUND SIDE OF THE BATTERY.

A MINIMUM OF "00" CABLE SHALL BE USED A BATTERY DISCONNECT SWITCH IS INSTALLED. IF VEHICLE IS EQUIPPED WITH BATTERY CABLES LARGER THAN "00", THE BATTERY DISCONNECT SWITCH SHALL BE INSTALLED WITH EQUAL OR LARGER SIZE CABLE.

IF LOCATED IN PASSENGER OR DRIVER COMPARTMENT, SWITCH SHALL BE FAIL/SAFE TYPE THAT DOES NOT DISCONNECT POWER WHILE ENGINE IS RUNNING.

CABLE TO AND FROM BATTERY DISCONNECT SWITCH SHALL BE PROTECTED BY INSULATED GROMMETS WHEREVER IT PASSES THROUGH THE FLOOR, FIRE-WALL, OR SWITCH PANELS TO PREVENT CUTTING OR CHAFING OF INSULATION. THE CABLE TO AND FROM BATTERY DISCONNECT SWITCH SHALL BE ROUTED AND SECURELY MOUNTED IN A NEAT AND ORDERLY MANNER WITH INSULATED FASTENERS.

TERMINALS AND CABLES TO THE BATTERY DISCONNECT SWITCH SHALL NOT BE EXPOSED TO THE DRIVER OR PASSENGERS.

(J) BRIGHT METAL INTERIOR BODY PANELS AND EXTERIOR ALUMINUM SIDE PANELS WHICH MEET FMVSS 571.221 JOINT STRENGTH REQUIREMENTS ARE PERMITTED.

(K) CELLULAR TELEPHONES ARE PERMITTED.

(L) AN AUDIBLE WARNING ALARM MAY BE LOCATED ON THE FIREWALL OR THE FRONT OF THE BUS, TO WORK IN CONJUNCTION WITH THE WARNING LIGHT SYSTEM TO SOUND WHEN THE RED WARNING LIGHTS GO OFF AFTER THE ENTRANCE DOOR HAS BEEN CLOSED. THE ALARM SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

(M) DIESEL ENGINE STARTING SYSTEMS ARE PERMITTED.

(N) DISC TYPE WHEELS, TWO OR FIVE HANDHOLDS, ARE PERMITTED.

- (O) A DRAIN VALVE CONTROL INSIDE DRIVER COMPARTMENT IS PERMITTED.
- (P) DRIVE WHEEL SANDERS ARE PERMITTED.
- (Q) A DUAL TIRE AIR PRESSURE EQUALIZING SYSTEM, WHEREBY THE TIRE PRESSURE IN EACH SET OF REAR DUAL WHEELS ON A SCHOOL BUS CAN BE EQUALIZED, IS PERMITTED.
- (R) ELECTRONIC SENSORS FOR DETECTING PERSONS OR OBJECT(S) IN BLIND SPOTS ARE PERMISSIBLE. SUCH SENSOR DEVICES MUST HAVE AN AUDIBLE ALARM INSIDE AND OUTSIDE THE BUS. THEY SHALL BE ACTIVATED AUTOMATICALLY WITH THE INITIATION OF THE RED WARNING LIGHTS AND COVER THE AREA KNOWN AS THE "DANGER ZONE". APPROPRIATE-TRAINING FOR STUDENTS AND BUS DRIVERS MUST BE PROVIDED.

THESE DEVICES MUST MEET ALL FEDERAL AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION TESTS.

- (S) A PRISM WHICH MOUNTS TO THE UPPER WINDOW OF THE REAR EMERGENCY DOOR DESIGNED TO GIVE THE DRIVER A WIDE ANGLE VIEW OF THE AREA IMMEDIATELY BEHIND THE SCHOOL BUS MAY BE INSTALLED.
- (T) AN EMERGENCY EQUIPMENT CABINET MAY BE INSTALLED IN THE DRIVER'S COMPARTMENT TO INCLUDE THE BODY FLUID CLEANUP KIT, FIRE EXTINGUISHER, FIRST AID KIT, AND THE HIGHWAY WARNING KIT. THIS CABINET, IF INSTALLED, SHALL BE LABELED IN CONTRASTING COLORED LETTERS AT LEAST TWO INCHES HIGH AND IDENTIFY THE CONTENTS WITHIN AND SHALL NOT PROTRUDE INTO THE DRIVER OR PASSENGER IMPACT ZONES AS ESTABLISHED IN FMVSS 571.222.
- (U) ENGINE HEATER OF ONE THOUSAND WATTS IS PERMITTED.
- (V) ENGINE HOUR METER IS PERMITTED.
- (W) ENGINE MONITORING SYSTEMS ARE PERMITTED. THESE SYSTEMS SHALL WARN THE DRIVER, BY USE OF A LIGHT OR AUDIBLE SIGNAL, THAT THE ENGINE IS IN NEED OF ATTENTION. SUCH SYSTEMS MAY NOT AUTOMATICALLY SHUT OFF THE ENGINE.
- (X) THE TAILPIPE MAY EXTEND THROUGH THE REAR BUMPER ON TYPE D BUSES.
- (Y) RED EXIT LIGHTS AT INTERNAL EXITS ARE PERMITTED PURSUANT TO FEDERAL MOTOR CARRIER SAFETY REGULATION 393.92.

- (Z) FIBERGLASS REPLACEMENT FENDERS AND COWL PIECES ARE PERMITTED.
- (AA) FLAT FLOORS ARE PERMITTED.
- (BB) AIR HORN IS PERMITTED.
- (CC) HOSES COMPRISED OF SILICONE ARE PERMITTED.
- (DD) ONE INTERIOR OBSERVATION MIRROR MOUNTED AT THE REAR OF THE SCHOOL BUS ABOVE THE EMERGENCY DOOR IS PERMITTED. THIS MIRROR MUST BE MADE OF SHATTERPROOF HIGH-STRESS PLEXIGLAS OR EQUIVALENT. THE EDGES OF MIRROR MUST BE PROTECTED WITH HEAVY VINYL COATING. THIS MIRROR SHALL NOT EXCEED EIGHTEEN BY TWENTY-FOUR INCHES AND SHALL HAVE DUAL-MOUNTING BRACKETS.
- (EE) A LAMP MONITORING SYSTEM IS PERMITTED.
- (FF) A MAXIMUM OF TWO FOG LAMPS AMBER IN COLOR ARE PERMITTED.
- (GG) DAYTIME RUNNING LIGHTS ARE PERMITTED.
- (HH) AN ENTRANCE SERVICE DOOR LOCK IS PERMITTED. REAR EMERGENCY DOOR LOCK IS PERMITTED ONLY IF THE BUS ENGINE WILL NOT START WHEN THE DOOR IS LOCKED; (STARTER INTERLOCK).
- (II) HEAVY DUTY MARKER AND CLEARANCE LIGHTS ARE PERMITTED. CLEARANCE LIGHTS MEETING THE REQUIREMENTS OF FMVSS 571.108 MAY BE RECESSED INTO BODY PANELS IN LIEU OF ARMOR PROTECTION.
- (JJ) OIL-LUBRICATED WHEEL BEARINGS ARE PERMITTED.
- (KK) PADDED INTERIOR SIDE RAILS ARE PERMITTED.
- (LL) IMRON OR EQUIVALENT SPECIAL PAINT IS PERMITTED.
- (MM) A PUBLIC ADDRESS SYSTEM IS PERMITTED.
- (NN) FREQUENCY MODULATION RADIO, TWO-WAY, OUTSIDE SPEAKER IS PERMITTED. IF USED, IT SHALL BE YELLOW OR GRAY IN COLOR.

(OO) A RAMP DEVICE MAY BE INSTALLED FOR TYPE A, B AND C TO LOAD AND UNLOAD STUDENTS.

RAMPS SHALL BE OF SUFFICIENT STRENGTH AND RIGIDITY TO SUPPORT THE SPECIAL DEVICE, OCCUPANT, AND ATTENDANT(S). IT SHALL BE EQUIPPED WITH A PROTECTIVE FLANGE ON EACH LONGITUDINAL SIDE TO KEEP SPECIAL DEVICE ON THE RAMP.

FLOOR OF RAMP SHALL BE OF NONSKID CONSTRUCTION. RAMP SHALL BE OF WEIGHT AND DESIGN, AND EQUIPPED WITH HANDLE(S), TO PERMIT ONE PERSON TO PUT RAMP IN PLACE AND RETURN IT TO ITS STORAGE PLACE. RAMP STORAGE MUST PROTECT RAMP FROM DIRT AND WEATHER.

(PP) A REAR WINDOW AIR DAM, DIRECTING WIND DOWN ACROSS THE BACK OF THE BUS TO KEEP WINDOW CLEAN, IS PERMITTED.

(QQ) ADDITIONAL REFLECTIVE MARKINGS ARE PERMITTED AS FOLLOWS:

NOTE: IF INSTALLED, ITEMS (1) AND (2) MUST BE INSTALLED AS A PACKAGE. IF ITEMS (3) AND (4) ARE INSTALLED, THEY MUST BE INSTALLED AS A PACKAGE WITH ITEMS (1) AND (2).

(1) "SCHOOL BUS" IN BLACK LETTERS AT LEAST EIGHT INCHES IN HEIGHT MAY BE APPLIED AND CENTERED ON TWO PIECES OF TEN INCHES BY FORTY-FOUR INCHES YELLOW REFLECTIVE MATERIAL. THE TWO PIECES OF YELLOW REFLECTIVE MATERIAL WILL THEN BE APPLIED AND CENTERED AS HIGH AS POSSIBLE BETWEEN THE WARNING LIGHTS IN THE FRONT AND REAR OF THE BUS.

(2) REFLECTIVE YELLOW MATERIAL TWO INCHES IN WIDTH MAY BE APPLIED TO BOTH SIDES OF THE BUS. THE REFLECTIVE MATERIAL SHALL RUN PARALLEL TO AND THE SAME DISTANCE AS THE LOWER RUB RAIL AND SHALL NOT EXCEED FORTY INCHES IN HEIGHT FROM THE GROUND.

(3) "STAY BACK 10 FEET" IN FOUR INCH WHITE-SILVER MATERIAL MAY BE APPLIED AND CENTERED TO THE FRONT AND REAR BUMPERS. LETTERS SHALL BE ITALICIZED AND BE OF THE HELVETICA TYPE STYLE.

(4) REAR BUMPER MAY BE MARKED DIAGONALLY FORTY-FIVE DEGREES WITH TWO INCH WIDE STRIPS OF YELLOW GRADE FIVE MATERIAL TWO INCHES APART.

- (RR) REMOTE-CONTROLLED MIRRORS WHICH PERMIT THE MIRROR TO SWIVEL FROM RIGHT TO LEFT ARE PERMITTED. THESE MIRRORS MUST BE CONTROLLED FROM THE DRIVER COMPARTMENT AND MAY INCLUDE THE DAY/NIGHT OPTION.
- (SS) ROUTE NUMBER OR MARKER BRACKET BESIDE ENTRANCE DOOR IS PERMITTED.
- (TT) RUBBER FENDER EXTENSIONS ARE PERMITTED.
- (UU) THE USE OF SAFETY LUGS AND CLAMPS ARE PERMITTED ON WHEELS THAT USE MULTI-PIECE RIMS.
- (VV) SCHOOL BUS CROSSING CONTROL ARMS/GATES ARE PERMITTED. GATES SHALL BE ACTIVATED AUTOMATICALLY WITH THE INITIATION OF THE RED WARNING LIGHTS.
- (WW) THE DRIVER'S SEAT MAY BE ADJUSTABLE AIR, SIX-WAY, OR EIGHT-WAY.
- (XX) CHILD RESTRAINT SEATS BUILT INTO REGULAR SCHOOL BUS SEATS ARE PERMITTED AND SHALL MEET FMVSS 571.213.
- (YY) PASSENGER SEATS MAY BE INSTALLED IN A THREE-TWO ARRANGEMENT.
- (ZZ) LIGHTED SCHOOL BUS SIGNS ARE PERMITTED.
- (AAA) A SOUND ABATEMENT PACKAGE IS PERMITTED FOR THE OVERALL LENGTH OF THE BUS.
- (BBB) SPARE TIRE AND RIM ARE PERMITTED AND SHALL BE SECURELY MOUNTED UNDERNEATH THE VEHICLE.
- (CCC) A SYSTEM FOR SUPPRESSING FLYING SPRAY ON A WET SURFACE IS PERMITTED. SUCH A SYSTEM SHALL CONSIST OF FILAMENT-TYPE PLASTIC WHICH IS INSTALLED AROUND THE FRONT FENDER WELLS. REAR INSTALLATION SHALL INCLUDE A FULL WIDTH FILAMENT-TYPE PLASTIC SKIRT.
- (DDD) THE STOP ARM MAY BE EQUIPPED WITH TWO RED FLASHING STROBE LIGHTS. STROBE LIGHTS SHALL BE SIX TO TEN JOULES. LIGHT EMITTING DIODE "STOP" SIGN IS PERMITTED. ADDITIONAL STOP ARM ON REAR DRIVER'S SIDE IS PERMITTED. IF INSTALLED, MUST BE MARKED STOP AND HAVE LIGHTS VISIBLE FROM BOTH SIDES.
- (EEE) STORAGE COMPARTMENTS ARE PERMITTED OUTSIDE THE SCHOOL BUS UNDER THE FLOOR AND BEHIND THE SKIRT SIDE PANELS.

- (FFF) A SINGLE WHITE STROBE LIGHT, MINIMUM OF TEN JOULES WITH DOUBLE FLASH, SEVENTY-TWO FREQUENCY PER MINUTE, IS PERMITTED. STROBE LIGHT SHALL BE INSTALLED ON THE TOP CENTER OF THE BUS TOWARD THE REAR.
- (GGG) TACHOGRAPH IS PERMITTED.
- (HHH) TILT STEERING WHEEL OR TILT TELESCOPING WHEEL IS PERMITTED.
- (III) TINTED WINDOWS ARE PERMITTED ON SCHOOL BUSES FOR CHILDREN WITH DISABILITIES PURSUANT TO OHIO REVISED CODE SECTION 4513.241.
- (JJJ) AN ENCLOSED TOOL COMPARTMENT IS PERMITTED OUTSIDE THE BUS BODY. CONTENTS MUST BE SECURED.
- (KKK) FRONT TOW HOOKS ARE PERMITTED.
- (LLL) A TWENTY CANDLEPOWER, UNDER-HOOD LIGHT, ACTIVATED BY A SWITCH IN THE DRIVER AREA, IS PERMITTED.
- (MMM) THE USE OF VARIOUS TYPES OF MONITORING DEVICES TO RECORD VEHICLE MOVEMENT, SPEED, REVOLUTION PER MINUTE, AND OTHER MEASUREMENTS ARE PERMITTED.
- (NNN) A POWER VENTILATOR IS PERMITTED.
- (OOO) A VIDEO CAMERA OR SIMILAR TECHNOLOGY INSIDE AND OUTSIDE THE BUS TO MONITOR SAFETY SITUATIONS IS PERMITTED.
- (PPP) VINYL STICK-ON LETTERING IS PERMITTED IN LIEU OF PAINTED-ON LETTERS, EITHER ON ORIGINAL EQUIPMENT OR AS REPLACEMENT LETTERS.
- (QQQ) THERMAL PANE WINDOWS ARE PERMITTED. WINDOW FRAME SHALL NOT PROTRUDE INTO PASSENGER COMPARTMENT.
- (RRR) OPTIONAL SPECIAL EQUIPMENT FOR BUSES.
- (1) SEAT BELT SEATS OR SEAT BELT READY SEATS MAY BE INSTALLED IN A SCHOOL BUS. SEAT BELT SEATS AND SEAT BELT READY SEATS SHALL MEET ALL APPLICABLE FMVSS.
 - (2) THE FOLLOWING ADDITIONAL EQUIPMENT MAY BE INSTALLED IN A SCHOOL BUS WITHOUT A LETTER OF AUTHORIZATION: BROOM, SNOW BRUSH, ICE SCRAPER, AND TRASH CONTAINER. ALL EQUIPMENT MUST BE PROPERLY SECURED IN THE DRIVER'S AREA.

(3) TO PREVENT HEAD INJURY TO SELF-ABUSIVE CHILDREN, SPECIAL FOAM COVERED PANELS MAY BE INSTALLED ON THE INTERIOR WALLS OF THE BUS OR THE BUS SEAT(S). THE PADDED PANELS SHALL BE CONSTRUCTED OF THE SAME MATERIALS USED IN THE CONSTRUCTION OF THE BUS SEAT(S). THE SPECIAL PANEL MAY COVER THE WINDOW. THE PANEL(S) SHALL BE ATTACHED TO THE SIDE WALL OF THE BUS. THE PANELS SHALL NOT OBSTRUCT ANY PORTION OF AN EMERGENCY WINDOW OR EXIT. MATERIALS USED IN THE CONSTRUCTION OF THE SPECIAL PANELS SHALL COMPLY WITH FMVSS 571.302.

(4) FIREPROOF STORAGE POUCH, SECURED TO THE BARRIER BEHIND THE DRIVER'S SEAT IS PERMITTED.

(SSS) LIGHT EMITTING DIODE LAMPS WHICH MEET APPLICABLE REQUIREMENTS OF FMVSS 571.108 ARE PERMITTED.

(ITT) ADDITIONAL LIGHTING AS APPROVED BY THE AMERICAN WITH DISABILITIES ACT AND INSTALLED BY THE SCHOOL BUS MANUFACTURER IS PERMITTED.

(UUU) DRAWSTRING ALARM SYSTEM IN THE ENTRANCE DOOR IS PERMITTED.

(VVV) CRUISE CONTROL INSTALLED BY SCHOOL BUS MANUFACTURER OR AUTHORIZED DEALER IS PERMITTED.

REPLACES: RULE 3301-87-10

EFFECTIVE: _____

CERTIFICATION
MITCHELL J. BROWN
DIRECTOR

DATE

PROMULGATED UNDER R.C. CHAPTER 119

RULE AUTHORIZED BY R.C. SECTION 4511.76

RULE AMPLIFIES: R.C. SECTION 4511.76

119.032 REVIEW DATE: _____

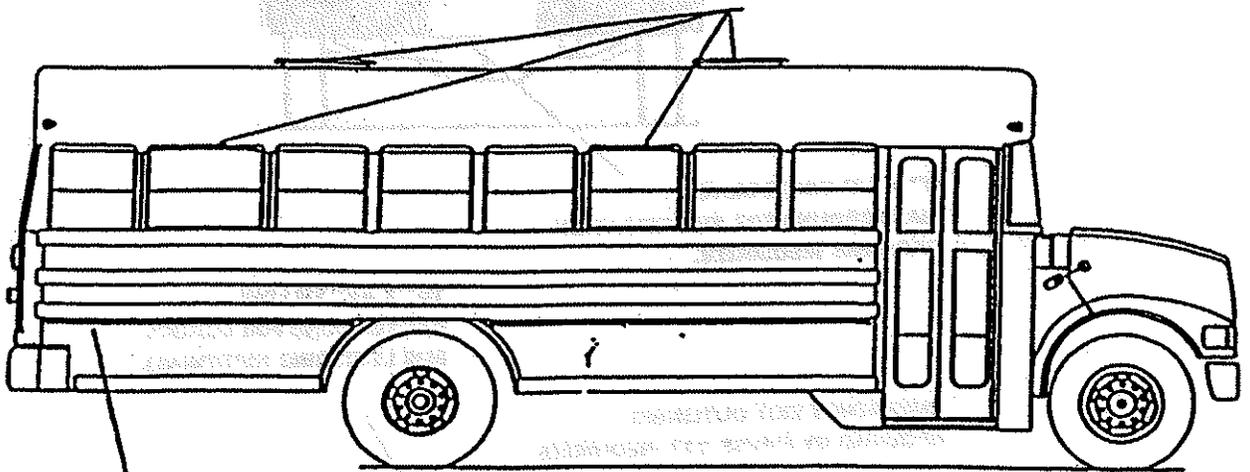
PRIOR EFFECTIVE DATES: 4/01/78

7/01/88

1/01/90

REFLECTIVE MARKINGS

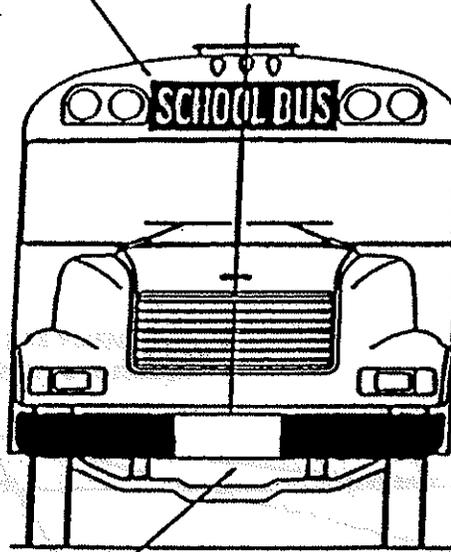
EMERGENCY EXIT OUTLINING
REQUIRED BY FMVSS 217 (REQUIRED).



YELLOW REFLECTIVE MATERIAL TWO INCHES
IN WIDTH MAY BE APPLIED TO BOTH SIDES
OF THE BUS. THE REFLECTIVE MATERIAL
SHALL RUN PARALLEL TO AND THE SAME DISTANCE
AS THE LOWER RUB RAIL AND SHALL NOT EXCEED
FORTY INCHES IN HEIGHT FROM THE GROUND (OPTIONAL).

REFLECTIVE MARKINGS

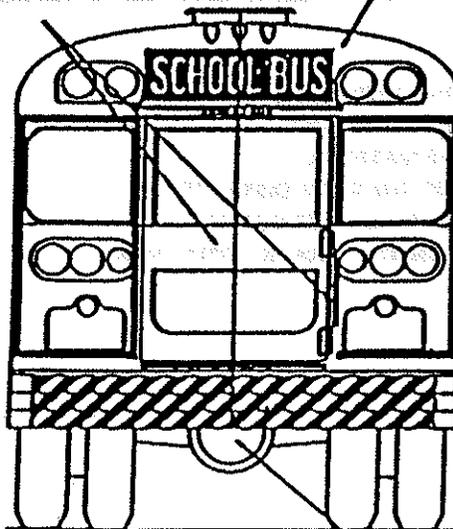
10" X 44" YELLOW BACKGROUND FOR SCHOOL BUS LETTERING (OPTIONAL).



7" X 14" WHITE-SILVER BACKGROUND FOR IDENTIFICATION NUMBERS (REQUIRED).

10" X 44" YELLOW BACKGROUND FOR SCHOOL BUS LETTERING (OPTIONAL).

EMERGENCY EXIT OUTLINING REQUIRED BY FMVSS 217 (REQUIRED).



TWO INCH YELLOW STRIPS OUTLINING REAR OF BUS (REQUIRED).

7" X 14" WHITE-SILVER BACKGROUND FOR IDENTIFICATION AND LOCAL BUS NUMBERS (REQUIRED).

TWO INCH WIDE YELLOW STRIPS APPLIED DIAGONALLY AT A FORTY-FIVE DEGREE ANGLE ON REAR BUMPER (OPTIONAL).

"STAY BACK TEN FEET" IN FOUR INCH ITALICIZED WHITE-SILVER LETTERS MAY BE APPLIED TO FRONT AND REAR BUMPERS (OPTIONAL).

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