

1948

# MINIMUM STANDARDS FOR SCHOOL BUSES

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1948 Revised Edition



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NATIONAL COMMISSION ON SAFETY EDUCATION

National Education Association

1201 Sixteenth Street, N. W.

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1949

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*The color of this cover is National School Bus Chrome, adopted by the Conference for all school buses in the United States. (For Federal Specifications of the National Bureau of Standards, write National Bureau of Standards, Washington 25, D. C.)*

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# MINIMUM STANDARDS FOR SCHOOL BUSES

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1948 Revised Edition

Recommendations of  
NATIONAL CONFERENCE ON SCHOOL TRANSPORTATION

Sponsored by

National Council of Chief State School Officers  
American Association of School Administrators, NEA  
Department of Rural Education, NEA  
U. S. Office of Education

Administered by

NATIONAL COMMISSION ON SAFETY EDUCATION  
National Education Association  
1201 Sixteenth Street, N.W.  
Washington 6, D. C.

1949

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National*

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*Developed and Approved by*  
**REPRESENTATIVES OF STATE DEPARTMENTS  
OF EDUCATION**

In National Conference  
October 3-7, 1948  
Jackson's Mill, West Virginia

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## FOREWORD

Nearly a decade of development and use is now behind the minimum uniform standards for school bus construction originally formulated in the National Conference on School Bus Standards in 1939 by official representatives of the forty-eight states. In the second Conference in 1945, these standards were revised where experience or new developments had demonstrated the need for modification. They were also expanded to cover the small vehicle used in sparsely populated areas.

This report presents the standards as modified by the work of the 1948 National Conference on School Transportation. The fact that the pioneer standards developed in 1939 still constitute the basic structure of the 1948 standards testifies to their fundamental soundness. Probably the most significant change in 1948 was the adoption of flashing stop lights to operate when school buses are loading and unloading pupils. These together with the Conference-approved provision of the *Uniform Vehicle Code* which requires traffic to stop and remain stopped while the signal lights are flashing should, when adopted by all states, add substantially to the safety of transporting children.

The process by which the standards have been developed and revised is a significant achievement representing cooperative nationwide action of the states on common problems. Preliminary consultation with each state, preparation of pertinent data in advance of the Conference, formulation of the standards and their revisions by the state representatives in Conference, together with cooperation and advice of engineers of the automotive industry and others thruout the three conferences, were elements vital to the development of sound standards and to their subsequent adoption and enforcement in the various states.

These standards, cooperatively developed but administered by the individual states, have already resulted in greater safety for trans-

ported children and substantial savings in the procurement of school buses. They have also demonstrated the strength of state departments of education when they unite to solve problems of nationwide concern and then return to put the recommendations into practice in their respective states.

Adoption of these revised standards in each of the forty-eight states will result in safer vehicles, assist the public in protecting the lives of school children, and effect savings for both schools and industry thru standardizing the manufacture of school buses.

The sponsors of the 1948 National Conference on School Transportation express appreciation to the National Commission on Safety Education of the National Education Association for holding the Conference, to the Automotive Safety Foundation for financial assistance, and to the many governmental and private agencies whose representatives contributed invaluable counsel and advice during Conference sessions.

Clyde A. Erwin, *Chairman*,  
National Conference on School Transportation

John H. Bosshart, *President*,  
National Council of Chief State School Officers

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## OBJECTIVES AND GUIDING PRINCIPLES

Following are the objectives and guiding principles for making decisions on standards which were developed in the 1939 Conference and revised in the 1945 and 1948 Conferences. The continuous emphasis thruout these Conferences on the two major objectives of *safety* and *economy* was a vital factor in arriving at sound and common agreement.

### Objectives

State regulations governing school bus construction should insure safe and economical vehicles in which children can be transported in safety and comfort:

**SAFETY** means the safe conduct of pupils to and from school under normal conditions, and in cases of emergency. It includes the time the pupil is on the bus, and the time consumed in entering and leaving the bus. It refers to the prevention of both major and minor accidents. It also refers to the health of the pupils as affected by bus construction.

**ECONOMY** means the construction, procurement, operation, and maintenance of school buses at the lowest possible cost of pupil transportation consistent with safety. Since schools serve and are responsible for the whole public they cannot foster luxurious transportation; neither can they afford to apportion an undue amount of the educational budget to an activity which in itself is not primarily educational but merely a means of making education available. Uniform state standards, therefore, should discourage unnecessary luxury.

### Guiding Principles

1. Uniform state regulations should:
  - a. Provide minimum standards
  - b. Eliminate the construction of unsafe buses

- 
- c. Eliminate conflicting standards between states where such conflicts increase the cost of production, and
  - d. Specify exact spatial dimensions where this will further efficient volume production.
2. Adaptations of the minimum standards should be made by the states only where they will permit desirable adjustments to local needs, provided these adaptations do not:
    - a. Conflict with uniform standards, or
    - b. Otherwise unduly increase the cost of production.
  3. The primary function of uniform state regulations is to specify the *results desired* in terms of safety and economy. The results desired must be defined when this is necessary to make enforceable regulations.
  4. Uniform state regulations should be subject to periodic review and revision, when necessary, thru cooperation of the states.
  5. Uniform state standards should permit the widest possible opportunity for the use of new inventions and improvements which will insure greater efficiency, and should be consistent with the formulation of enforceable regulations.
  6. Uniform state standards should usually provide limits within which sound construction is possible by permitting that degree of flexibility which is necessary to accommodate the various manufacturers. The actual designing of buses is a responsibility of the manufacturers.
  7. Existing national standards are considered in full force and effect and changed only where evidence indicates that change is needed.

## USING THE STANDARDS

In order to put the national uniform minimum standards for school bus construction into operation, each of the state legislatures should confer upon the proper regulatory agency the general obligation of setting up statewide rules and regulations governing school bus chassis, bodies, and equipment. In no instances should detailed bus specifications be written into the state law.

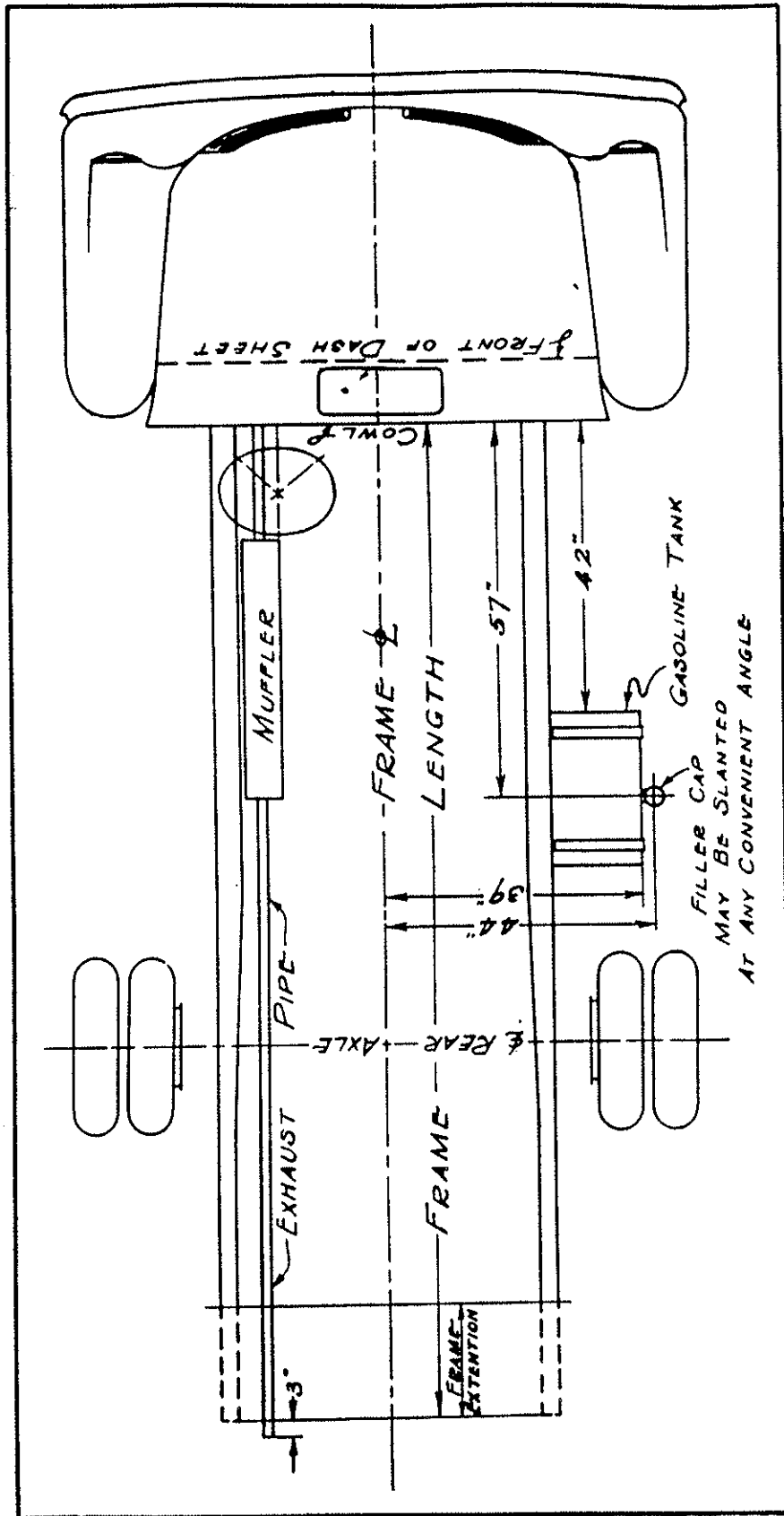
The standards for school bus construction in this report must be officially adopted by a state to become legally effective within it.

The standards for school bus construction in this report are intended to apply primarily to new equipment purchased after their adoption. Any state considering application of such standards to equipment previously purchased must give careful consideration to the economic effects of such retroactive action.

These standards are intended to apply to every type of school bus including the large vehicle of 30 or more pupil capacity and the small vehicle of 18 or fewer pupil capacity. It was decided that when vehicles of greater than 18 capacity were needed, there would be no economy in purchasing one of less than 30 passengers; therefore, no standards were developed for a vehicle of more than 18 but less than 30 capacity.

These standards are not intended to apply to buses used primarily as public carriers which also transport pupils to school.

These standards should be put into effect as soon as possible.



CHASSIS PLAN

## THE LARGE VEHICLE

—30 Passenger or Over—

### The Bus Chassis

*Air Cleaner*—Each school bus chassis shall be equipped with an adequate oil-bath type air cleaner.

#### *Axle*—

1. Front axle shall have a gross weight rating at the ground according to the chassis manufacturer's rating, equal to or exceeding that portion of the total load which is supported by the front axle.
2. Rear axle shall be of full-floating type and have a gross weight rating at the ground according to the chassis manufacturer's rating, equal to or exceeding that portion of the total load which is supported by the rear axle.
3. The chassis manufacturer's rating for each axle on each model used in school buses shall be furnished in duplicate by the chassis manufacturer to each state department of education.

*Battery*—Storage battery, as established by the manufacturer's rating, shall be of sufficient capacity to care for starting, lighting, signal devices, heater, and other electrical equipment. No bus shall be equipped with a battery of less than 120 ampere-hours measured at a twenty-hour rate. Battery shall be mounted outside body shell preferably under hood in an adequate carrier and readily accessible for servicing and removal from above or outside.

*Brakes*—Four-wheel brakes, adequate at all times to control the bus when fully loaded, shall be provided.

1. Foot or service brake shall be capable of stopping the complete unit (i. e., wet chassis weight\*, plus body weight,

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\* Wet chassis weight is a chassis with a full tank of gasoline, oil, and water.

plus driver's weight, without pupils) from the initial brake application within 22 feet when driven at a speed of 20 miles per hour over a dry level road having approximately .6 coefficient of friction and whose surface is free from loose materials. This stopping ability shall be determined by test with an approved decelerometer or other instrument which indicates brake effectiveness in units that are convertible into rate of deceleration.

2. Hand or emergency brake shall be of the hand lever type and shall be manually operated. It shall be provided in addition to the service brake, or shall be an entirely separate mechanical operating mechanism to be connected at least to the rear service brake shoes. It shall be capable of stopping the complete unit (i. e., wet chassis weight, plus body weight, plus driver's weight, without pupils) from the initial brake application within 50 feet when driven at a speed of 20 miles per hour over a dry level road having approximately .6 coefficient of friction and whose surface is free from loose materials. This stopping ability shall be determined by test with an approved decelerometer or other instrument which indicates brake effectiveness in units that are convertible into rate of deceleration.
3. In the event that a school bus shall be equipped with air or vacuum actuated power or assistor type brakes:
  - a. Any such installation must be made by an authorized representative of chassis or brake manufacturer and must be in conformance with the recommendation of that manufacturer.
  - b. Hydraulic line pressure may not exceed recommendation of chassis manufacturer.
  - c. Every vacuum booster or air system must be equipped with a reserve tank of at least 1000 cubic inches capacity.

*Bumpers—*

1. Front bumper shall be furnished by the chassis manufacturer as part of the chassis. The front bumper must be of sufficient strength to permit the pushing of a vehicle of equal gross vehicle weight without permanent distortion to bumper, chassis, or body.

2. Rear bumper shall be furnished and secured to rear chassis frame by body manufacturer and so designed as to prevent hitching-to or riding-on the rear bumper. The rear bumper shall be of sufficient strength to permit the fully loaded vehicle being pushed without permanent distortion to bumper, chassis, or body.

*Drive Shaft*—Torque capacity of the drive shaft assembly shall at least equal maximum engine torque as developed thru lowest transmission gear reduction.

Each drive shaft shall be equipped with protective metal guard or guards to prevent whipping thru floor or dropping to ground when broken.

*Exhaust Pipe*—Exhaust pipe, muffler, and tail pipe shall be outside the bus body and attached to the chassis frame. The exhaust tail pipe shall be deflected slightly downward at the rear end and extend at least three inches beyond the chassis frame but not beyond the rear bumper.

The exhaust pipe shall be properly insulated from the gasoline tank and connections thereof by a metal shield at any point where it is 12 inches or less from tank or connections.

*Fenders, Front*—

1. The rear end of front fender should stop approximately one inch ahead of the back face of the cowl.
2. The front fender should be properly braced and free from any body attachment.

*Frame*—

1. Each frame side member should be of one-piece construction. If the frame side members are extended, such extension shall be designed and furnished by the chassis manufacturer with his guarantee and the installation shall be made by either the chassis or body manufacturer and guaranteed by the company making the installation. Extensions of frame lengths are permissible only when such alterations are behind the rear hanger of the rear spring.
2. No additional holes not provided in the original chassis frame shall be permitted in the top or bottom flanges of the frame side

rails. There shall be no welding to the frame side rails except by the chassis or body manufacturer.

3. Frames or the equivalent shall be of such design as to correspond at least to standard practice for trucks of the same general load characteristics used for severe service.

*Gasoline Tank—*

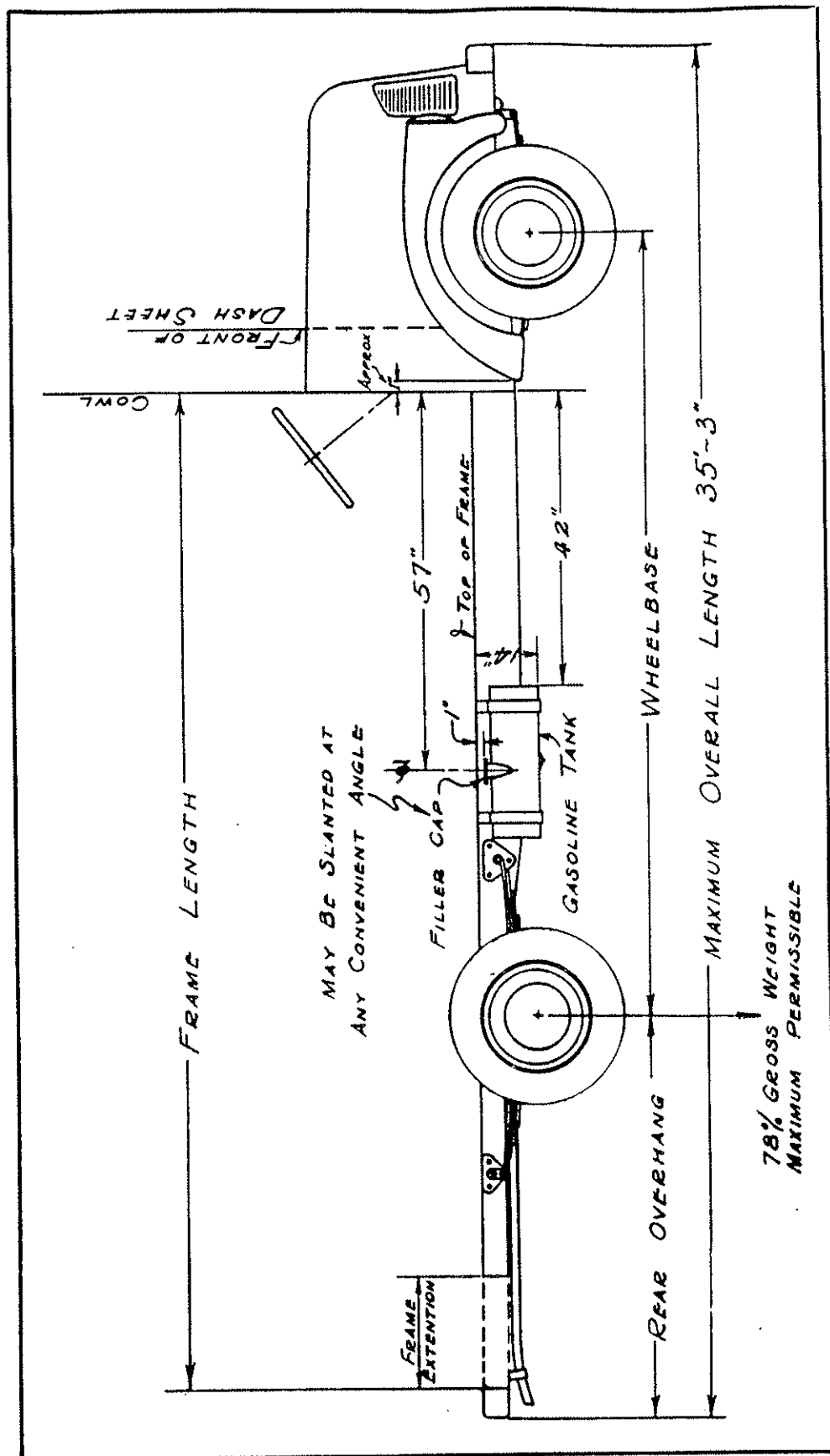
1. The gasoline tank shall have minimum capacity of 30 gallons and be made of 18-gauge terneplate or equivalent and mounted directly on the right side of the chassis frame entirely outside the body. A flexible gasoline and oil-proof connection shall be provided at the engine end of the gasoline feed line. The tank shall be equipped with adequate baffles.
2. The tank shall not extend in height above the side member of the chassis.
3. The distance from the center line of the chassis to the outside of the tank shall not be more than 39 inches.
4. The bottom of the tank shall not be more than 14 inches below the top of the frame.
5. The distance from the cowl to the front of the tank shall be 42 inches minimum.
6. The distance from the cowl to the center of the filler cap shall be 57 inches.
7. The distance from the center line of the chassis to the center of the filler cap shall be 44 inches with a plus or minus tolerance of  $\frac{1}{2}$  inch permitted.
8. The center of the filler cap shall be 1 inch below the top of the frame with a tolerance of  $\frac{1}{4}$  inch permitted.
9. Engine supply line shall be taken from the top of the tank. There shall be a drain plug  $\frac{1}{4}$  inch in diameter located in the center of the bottom of the tank.
10. The gas tank should have approval of Underwriters' Laboratories, Inc. (See Appendix, page 47.)

*Generator—*The generator shall have a maximum output of at least 25 amperes. It shall be voltage and current controlled, and be capable of delivering 25 amperes from a speed of 20 miles per hour or more.

*Governor—*Governors are permissible and where used they shall be approved by the chassis manufacturer.



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CHASSIS ELEVATION

*Horn*—There shall be a horn or horns of standard make capable of producing a sound level of 110 decibels at a point on the axis of the horn 3 feet from the exit opening. The sound level meter used must comply with American Standards Association specification (Z 243-1944). Measurement shall be made with the flat response. (See page 46.)

If an extra loud horn is desired it shall be capable of producing a sound level of 120 decibels under the conditions specified above. Obstructions in the sound path reduce the effectiveness of a horn. For this reason there is an advantage in mounting the horn outside the hood.

*Instrument Panel*—The instrument panel shall be equipped with speedometer showing speed and odometer giving accrued mileage, ammeter, oil pressure gauge, water temperature indicator, and gasoline gauge. The instrument panel shall have light of sufficient candle power to illuminate all instruments, and all instruments shall be maintained in good working order.

*Oil Filter*—Oil filter of the replaceable element or cartridge type shall be provided, and shall be connected by flexible oil lines if it is not of the built-in design.

*Over-all Length*—The over-all length of the bus shall not exceed 35¼ feet.

*Passenger Load*—The gross weight of the vehicle when fully loaded (i.e., wet weight, plus driver's weight, plus weight of maximum pupil load) shall not exceed the maximum gross vehicle weight rating of the vehicle as established by the manufacturer. These ratings shall be furnished in duplicate by the manufacturer to all state departments of education.

*Power or Grade Ability*—Bus must be so geared and powered as to be capable of surmounting a 3 percent grade at 20 miles per hour with full load on continuous pull.

To meet the above specifications, the loaded gross weight of the bus shall not exceed 400 pounds per certified net horsepower. To compute the performance ability the formulas recommended by the Society of Automotive Engineers\* shall be used.

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\* See Appendix, page 47.

## ABILITY FORMULAS

In the following ability formulas, a value of 1.2 pounds per 100 pounds of gross weight is used for rolling resistance. Power lost in overcoming friction between the clutch and the driving wheels is taken as 0.1 of the power delivered to the clutch by the engine and an efficiency factor of 0.9 has been incorporated in the formulas.

GVW—Gross weight of vehicle (or combination) in pounds.

S—Road speed, in miles per hour.

HP—Horsepower delivered to clutch at road speed S in particular transmission ratio being used.

G—Grade in percent.

$$1. G = \frac{33,750 \times HP}{GVW \times S} - 1.2$$

### Speed Formulas

S—Road speed in miles per hour

RPM—Engine speed in revolutions per minute

r—Tire rolling radius in inches

R—Total gear reduction=Rear axle ratio x Transmission ratio

$$2. S = \frac{RPM \times r}{168 \times R}$$

$$3. RPM = \frac{168 \times R \times S}{r}$$

*Springs*—Springs shall be of ample resiliency under all load conditions and of adequate strength to sustain the loaded bus without evidence of overload.

Rear springs shall be of the progressive type.

Front springs' stationary eyes shall be protected by a wrapper leaf in addition to the main leaf.

Chassis design shall be such that dual chains may be used on rear dual wheels where chains are required.

*Steering Gear*—Steering gear shall be approved by the manufacturer and designed to assure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed. The mechanism must provide for easy adjustment

for lost motion. No changes shall be made in the steering apparatus which are not approved by the chassis manufacturer.

*Tires and Rims—*

1. Tire and rim sizes, based upon current standards of the Tire and Rim Association,\* as shown in the following table, shall be required.

Tire	Maximum recommended load	Rims Permissible practice					
		Advanced		Interim		Flat base	
Size and ply rating	Load and inflation in lbs.	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate
6.50-20-6	1700 @ 50	5.0	.....	5.00R	.....	4.33R	.....
6.50-20-8	1950 @ 65	5.0	.....	5.00R	.....	4.33R	.....
7.00-20-8	2000 @ 55	5.5	5.0	5.50S	5.00R	5.00S	4.33R
7.00-20-10	2250 @ 70	5.5	5.0	5.50S	5.00R	5.00S	4.33R
7.50-20-8	2375 @ 60	6.0	5.5	6.00S	5.50S	5.00S	6.00T
7.50-20-10	2700 @ 75	6.0	5.5	6.00S	5.50S	5.00S	6.00T
8.25-20-10	2900 @ 65	6.5	6.0	6.50T	6.00S	6.00T	5.00S
8.25-20-12	3150 @ 75	6.5	6.0	6.50T	6.00S	6.00T	5.00S
9.00-20-10	3450 @ 65	7.0	6.5	7.00T	6.50T	6.00T	7.33V
9.00-20-12	3850 @ 80	7.0	6.5	7.00T	6.50T	6.00T	7.33V
10.00-20-12	4000 @ 70	7.5	7.0	7.50V	7.00T	7.33V	.....

2. In order to allow for a reasonable tolerance, the total weight imposed on any tire shall not be greater than 10 percent more than the ratings shown in the above table.
3. Dual rear tires shall be provided on all vehicles. Spare tire, if required, shall be suitably mounted in an accessible location. All tires on a given vehicle shall be of the same size and ply rating.

\* These are the standards adopted for 1949 by the Tire and Rim Association, 2001 First-Central Tower, Akron 8, Ohio. The Association does not recommend flat base rims for use in the design of new vehicles. Any later revisions adopted by the Association shall become effective upon adoption. Current specifications may be obtained from the Association or from tire manufacturers.

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 table, shall

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Flat base

Pre-ferred	Alter-nate
33R	.....
33R	.....
4.33R	.....
4.33R	.....
6.00S	.....
6.00S	.....
6.00S	.....
6.00S	.....
5.00T	.....
5.00T	.....
5.00T	.....
5.00T	.....
7.33V	.....
7.33V	.....
7.33V	.....

total weight  
 percent more

Spare tire, if  
 sole location.  
 size and ply

Association, 2001  
 and flat base  
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 may be obtained

*Weight Distribution*—Weight distribution shall be such that not more than 78 percent of the gross vehicle weight shall be on the rear tires on a level surface.

**The Bus Body**

*Aisle*—The minimum clearance of all aisles, including the aisle leading to the emergency door, shall be 12 inches.

*Body sizes*—The purchase of bus bodies shall be limited to the following lengths. However, adoption of these lengths shall impose no restrictions as to type of seat arrangement.

These sizes are based upon 25-inch spacings between rows of forward-facing seats, an outside width of 96 inches, a center aisle of 12 inches in width, and an average rump width of 13 inches. Body lengths are measured from the back of the cowl to the rear of the body at floor level.

Basic pupil load	Range of body length in feet (with tolerance of ± 8 inches)
30	15
36	17
42	19
48	21
54	23½
60	26
66	28

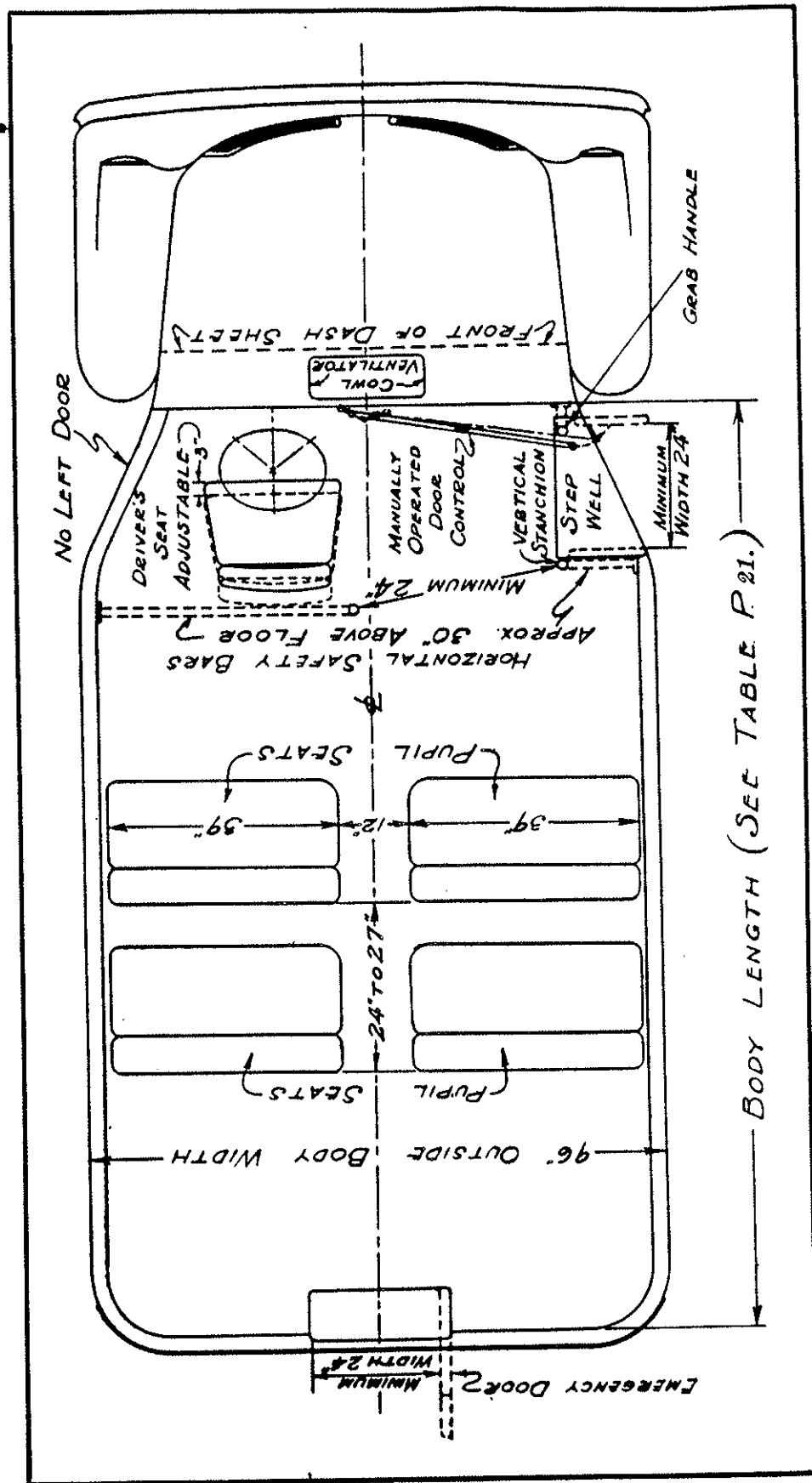
Note: It is recommended that the 60 and 66 basic pupil load buses be used only on all-weather roads which are free of grades, curves, or other hazards that would endanger safety of pupils transported on such buses.

*Book Racks*—Book racks, if installed, shall be provided above side windows from front cross-seat to rear body wall. Racks shall be free of projections likely to cause injury.

*Ceiling*—Ceiling shall be free of all projections likely to cause injury to pupils. This standard is not intended in any way to require the use of an inner lining beneath the roof bows.

*Color*—See identification, page 25.

*Construction*—Construction shall be all-steel or of other metal with a strength at least equivalent to all-steel as certified by the bus body manufacturer. Suitable insulation material may be used.



BODY PLAN

Body Length (See Table P. 21.)

The bus body shall be of sufficient strength to support the entire weight of a fully loaded bus on its top or side if overturned. Construction must provide a reasonably dustproof and water-tight unit.

*Defrosters*—Defrosters, if required, must be of sufficient capacity to keep the windshield clear of fog, ice, and snow. This may be done by using fans or by taking heat directly from an approved heater.

*Doors*—

1. Service Door:

- a. Service door shall be manually operated and of the hand lever type, under the control of the driver and so designed as to prevent accidental opening.
- b. Service door shall be located on right side near the front of the bus. At least two-thirds of its opening width shall be ahead of a point opposite the back of the driver's seat.
- c. Service door shall have a minimum horizontal opening of 24 inches clearance.
- d. Service door shall be of folding type. If one leaf opens in and the other out, the front leaf shall open outward.
- e. Lower panels as well as upper panels shall be of safety glass to permit driver to see children who are waiting to enter bus, and the ground where children step off.
- f. Vertical closing edges of door shall be equipped with rubber or rubberized materials to protect children's fingers.
- g. There shall be no door at the left of the driver.

2. Emergency Door:

- a. Emergency door shall be located in center of rear of the bus.
- b. Emergency door shall have a minimum horizontal clearance of 24 inches, a minimum vertical height of 48 inches, and shall be marked "EMERGENCY DOOR" on the inside.
- c. Emergency door shall be equipped with a fastening device which may be quickly released, but so designed as to offer protection against accidental release. Control from driver's seat shall not be permitted. Provision for opening from the outside shall consist of a nondetachable device of such design as to prevent "hitching" but permit opening when necessary.

BODY PLAN

BODY LENGTH (SEE TABLE P. 21.)

- d. Emergency door shall be hinged on the right side of the body, shall open outward, and shall be designed to open from both inside and outside of the bus.
- e. There shall be no steps leading to the emergency door.
- f. Glass used in the emergency door shall be safety glass.
- g. No seat or other object shall be so placed in the bus as to restrict the passage to the emergency door to less than 12 inches.

*Fire Extinguishers*—Each bus shall be equipped with a fire extinguisher listed as approved under the B-2, C-2 Classification of the Underwriters' Laboratories, Inc.,\* mounted in an accessible place in full view, and kept properly filled and in satisfactory operating condition at all times.

*First-Aid Kit*—Each bus shall carry a dustproof first-aid kit mounted in an accessible place in full view and approved by the proper state authority, and the driver shall be instructed in its use. The kit shall be kept fully equipped and in good condition.

*Floor*—Floor shall be of metal at least equal in strength to 14-gauge steel and so constructed that exhaust gases cannot enter the bus. Floor shall be of nonskid metal or a fire-resistant, nonslipping surface may be applied to the metal floor. All closures between the bus body and the engine compartment shall be fitted with gaskets which will effectively prevent gas from entering the body.

*Heaters*—Where heaters are required, the heater shall be of the hot water or combustion type. Such installations which are in constant use during the winter season shall be of the fresh-air type. Hot water heaters used only occasionally may be of the circulating type.† All combustion-type heaters shall be approved by Underwriters' Laboratories, Inc. Combustion-type heaters shall be installed on new buses by body manufacturers, and on buses now in operation by authorized dealers or by authorized garages.‡

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\* Specifications for fire extinguishers are available from Underwriters' Laboratories, Inc. See Appendix, page 47.

† The Underwriters' Laboratories, Inc., do not prepare specifications for this type of heater since no fire hazard is involved.

‡ The Interstate Commerce Commission, Washington 25, D. C., has specifications available on the installation of combustion-type heaters.



Heaters shall be capable of maintaining an inside temperature of 50° Fahrenheit at average minimum January temperatures as established by the United States Weather Bureau.

*Identification—*

1. With the exception of fenders and trim, school bus bodies including hood, cowl, and roof shall be painted a uniform color, National School Bus Chrome, according to National Bureau of Standards specifications.\*
2. The fenders and body trim, if used, shall be black.
3. School bus bodies shall bear the words "SCHOOL BUS" in black letters at least four inches high on both the front and rear of the body or on sign attached thereto.
4. "STOP ON SIGNAL" may be painted on the rear of the bus. The word "STOP" by itself shall not be used.

*Inside Height—*The minimum inside body height shall be 66 inches measured at the longitudinal center line from the back of the first row of seats to back of next to the last row of seats.

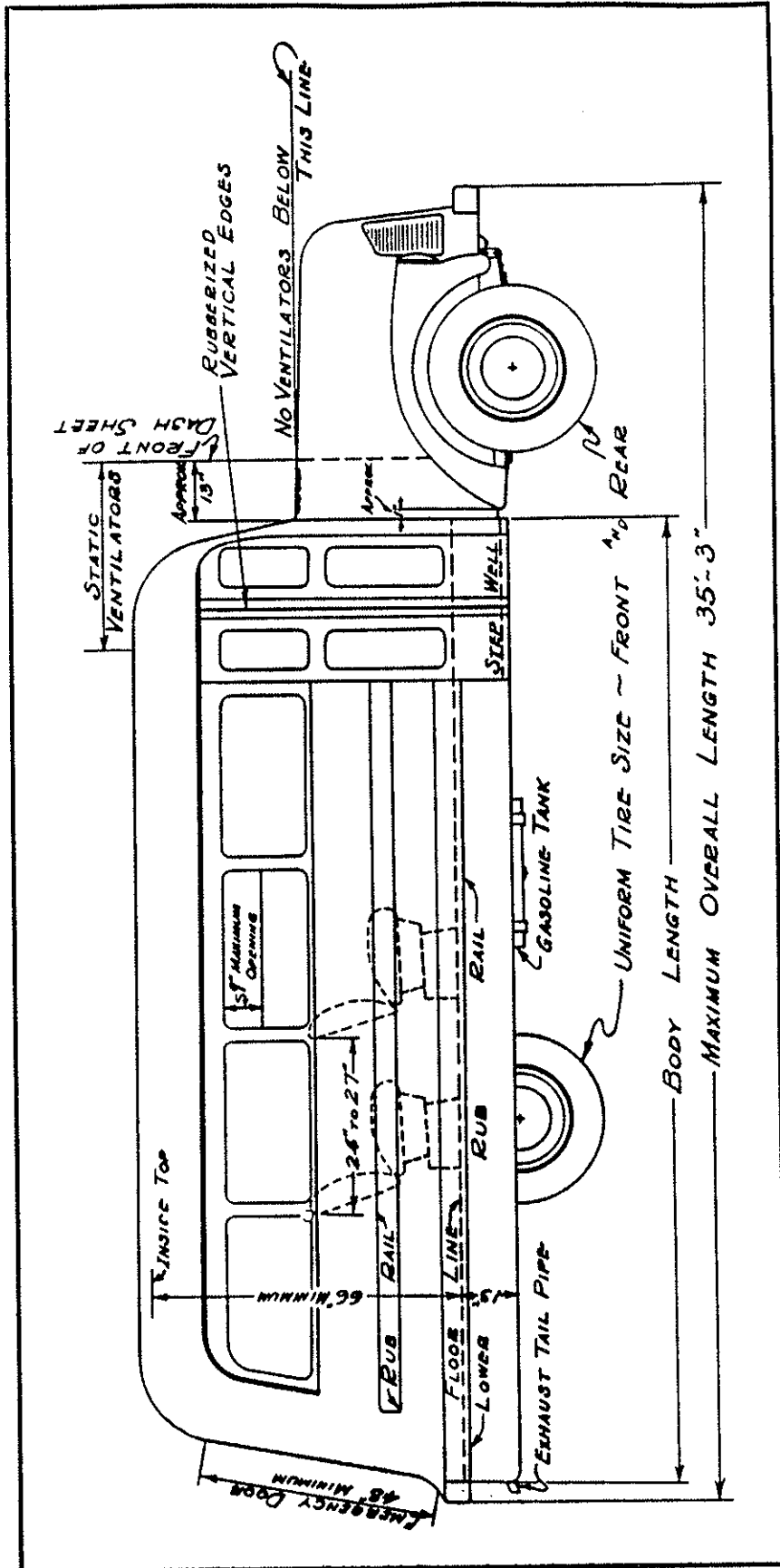
*Instrument Panel—*See Instrument Panel in chassis standards, page 18.

*Insulation—*If the body is lined, the ceiling and walls shall be insulated with proper materials to deaden sounds and vibrations and to reduce heat transfer.

*Lights and Signals—*

1. Headlights: Each bus shall be equipped with headlights, extra bulbs, and fuses as required by state law. Lights shall be of proper intensity and adjustment to meet standards of National Bureau of Standards.
2. Clearance Lights: Body shall be equipped with two red clearance lights in the rear and two amber clearance lights at the front, mounted at the highest and widest portions of the permanent body.
3. Tail and Stop Lights: Each bus shall be equipped with two combination tail and stop lights emitting a red light plainly

\*Specifications on file at National Bureau of Standards, Washington 25, D. C



BODY ELEVATION

visible from a distance of 500 feet to the rear and mounted not less than 6 inches or more than 20 inches from rear edge of body and not less than 30 or more than 45 inches from surface on which the vehicle stands.

4. Interior Lights: Interior lights shall be provided which adequately illuminate interior aisles and step-wells.
5. Flashing Stop Lights: Each bus shall be equipped with two alternately-flashing red stop lights on the rear of the vehicle and two alternately-flashing red or amber stop lights on the front of the vehicle.

Lamps shall be controlled by an automatic door-operated switch and by a manually-operated switch.

Where there is no conflict of function, turn signals may be combined with flashing stop-light lamps.

Flashing stop lights shall meet the following specifications of the Society of Automotive Engineers:\*

- a. Definition: An electric school bus warning signal system is an equipment intended to identify the vehicle as a school bus and to inform other users of the highway that such a vehicle is about to stop, or is stopped, to take on or discharge school children. Warning signals may be combined with other lamps where functions do not conflict or interfere.

Note:† The signal system defined in this specification provides for giving the desired indication by two alternately-flashing lights mounted at the same horizontal level on each side of the rear of the vehicle and, similarly, two alternately-flashing lights mounted on each side of the front of the vehicle.

Samples for Test—See Section B—General Requirements.

Lamp Bulbs—See Section C—General Requirements.

Laboratory Facilities—See Section D—General Requirements.

Vibration Test—See Section E—General Requirements.

Moisture Test—See Section F—General Requirements.

\* These specifications were established by the Society of Automotive Engineers in 1948.

† The general requirements of the Society of Automotive Engineers listed here may be obtained from their offices. See Appendix, page 47.

Dust Test—See Section G—General Requirements.

Corrosion Test—See Section H—General Requirements.

Color Test—See SAE Standard, Color Specifications for Electric Lamps.

- b. Tell-Tale: There should be a visible or audible means of giving a clear and unmistakable indication to the driver when the signaling system is turned on.
- c. Flashing Rate: Each lamp shall flash at a rate of from 60 to 120 cycles per minute. The two lamps on the front of the vehicle shall flash alternately. The two lamps mounted on the rear of the vehicle shall flash alternately.
- d. Photometric Tests: All beam candlepower measurements shall be made with the filament of the lamp at a distance of 10 feet from the photometer screen. The lamp axis shall be taken as the horizontal line thru the light source parallel to what would be the longitudinal axis of the vehicle if the lamp were mounted in its normal position on the vehicle. These results should be obtained with a 21 candlepower filament or source of equivalent current draw. The effective illuminated area shall not be less than 12 square inches.

Minimum Beam Intensity

Position in degrees	Candlepower minimum	
	Red	Amber
Horizontal-Vertical (beam center) . . . . .	100	400
5 up to 5 down and 10 right to 10 left . . . .	25	100
5 up to 5 down and 20 right to 20 left . . . .	10	40

- e. Installation Recommendations: The signal lamps should be mounted with their axes substantially parallel to the longitudinal axis of the vehicle. Front and rear signal lamps should be spaced as far apart laterally as practicable, but in no case should the spacing be less than three feet. The location of front signal lamps

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should be such that they can be clearly distinguished when the headlamps are lighted on the lower beam. Warning signal lamps should be mounted as high as possible, but in no case should the center of the lamp be lower than six inches below the bottom line of the windows. Vision of front signals to the front and of rear signals to the rear shall be unobstructed by any part of the vehicle 10° above to 10° below the horizontal and from 20° to the right to 20° to the left of the center line of the vehicle. The signaling system should be actuated by an automatic switch operated by opening the door; also by a spring-return manual switch which will enable the operator to operate the signal lamps when the door is closed. In addition, a manually-operated master switch should be provided to disconnect the complete signal system.

- 6. Directional Signals: Each bus shall be equipped with directional signals that meet the specifications of the Society of Automotive Engineers. These signals may be independent units mounted to conform to state law, or may be combined with the flashing stop lights as specified above.
- 7. Flags and Flares:
  - a. Each school bus shall carry at all times three red flags and means for mounting for use in warning traffic in the event of prolonged stops on the highway.
  - b. Buses that are operated at night must carry at least two oil-burning or electric flares, or two reflectors to be displayed according to law of the state in event of prolonged stop. Oil-burning flares must be carried in leakproof metal box or carried outside body compartment.
  - c. All flags and flares shall be approved by the state.

*Mounting—*

- 1. Body manufacturers, when installing body on frame, shall insert between the body and the frame a spacer at every point of contact between the body and the frame of such form that shearing stresses shall not be put upon rivet heads.
- 2. The chassis frame shall extend to rear of the rear body cross member.

*Overhang*—Body shall be mounted so that not more than 78 percent of the gross vehicle weight shall be on the rear tires on a level surface.

*Posts*—The front corner posts shall be so designed and placed as to afford minimum obstruction to the driver's view of the road. The strength of all posts and the roof shall be sufficient to support the entire weight of the loaded vehicle if overturned.

*Rear Vision*—

1. An interior rear-view mirror designed to minimize glare and large enough (at least 4 inches by 15 inches) to afford a good view of the road to the rear, as well as of pupils, shall be required. It shall have rounded corners and protected edges.
2. There shall be an exterior rear-view mirror, designed to minimize glare, provided to the left of the driver. The area of the mirror shall be not less than 50 square inches. The mirror shall be firmly supported and set to give the driver a clear view toward the left rear of the bus.

*Rub Rails*—Two rub rails of ample strength to resist impact and to prevent body crushing shall be provided on each side of the body. They shall be applied the full length of the body on the outside of the body, on the left side from the windshield post to the rear corner radius, and on the right side from the service door to the rear corner radius. One rail shall be located approximately at the seat line and the other approximately at the floor line. Pressed-in rub rails do not satisfy this requirement.

*Seats*—

1. Thirteen inches shall be the allowable average rump width in determining the seating capacity of the bus.
2. All seats shall be securely fastened with bolts or rivets to that part or parts of the school bus which support them; no bus shall be equipped with jump seats or portable seats.
3. No seat on the right side of the bus shall be placed ahead of the forwardmost pupil seat on the left side of the bus.
4. Seat back centers on forward-facing seats shall be within the range of from 24 to 27 inches, inclusive. This 24- to 27-inch spacing also applies to distance between rearmost position of driver's seat and the first cross-seat.

5. All seats shall be covered with suitable padding material.
6. The minimum distance between the steering wheel and the back rest of the driver's seat shall be 12 inches. The driver's seat shall have a fore and aft adjustment of not less than 3 inches, and shall be strongly attached.
7. Driver's Stanchion and Guard Rail: A vertical stanchion shall be installed to the right rear corner of the driver's seat in such a position as not to interfere with adjustment of driver's seat and not to obstruct the 12-inch aisle. A guard rail so placed that it will not interfere with adjustment fore and aft of driver's seat shall extend from vertical stanchion to the left-hand wall behind the driver's seat approximately 30 inches above the floor. Stanchion and guard rail shall be a minimum of one inch outside diameter of metal tubing.
8. A stanchion shall be required at the rear of the entrance step-well from roof to floor. Placement shall not restrict passage-way to less than 24 inches.
9. A safety bar shall be installed from the stanchion to the wall at a height of approximately 30 inches to prevent children in front seat from being thrown into step-well in case of sudden stop.

*Skid Chains*—Each state shall formulate its own rules, regulations, and/or standards governing skid chains where needed. (See last item under Springs, page 19.)

*Steps*—

1. The riser of the upper step at the service door shall be not less than 13 inches and not more than 15 inches. When more than two steps are used, the upper two steps may have a riser of less than 13 inches, but these risers must be of equal height.
2. The steps shall be enclosed to prevent the accumulation of ice and snow.
3. Steps shall not protrude beyond the side body line.
4. A grab handle of not less than 10 inches in length shall be provided inside doorway and to the right upon entering, to assist pupils in getting on and off the bus.

*Sun Shield*—The school bus shall be equipped with an interior adjustable sun visor not less than 5 by 13 inches in size.

*Tools*—Bus shall have a tool compartment and carry such tools as may be necessary to make minor emergency repairs while the bus is en route.

*Ventilators*—Body shall be equipped with a suitable, controlled ventilating system of sufficient capacity to maintain the proper quantity of air under operating conditions without the opening of windows except in extremely warm weather. No intake ventilators in the front bus corner below the top of the engine hood line shall be used. Static-type exhaust roof ventilators shall be installed in the low-pressure area of the front roof panel.

*Wheel Clearance*—The body shall clear the wheels sufficiently to allow for load and chains.

*Width*—Ninety-six inches shall be the standard outside width of school bus bodies.

*Windshield and Windows*—

1. All glass in windshield, windows, and doors shall be of safety glass approved by the laws of the states,\* and so mounted that permanent mark is visible, such glass to be of sufficient quality to prevent distortion of view in any direction.
2. The windshield shall be slanted to prevent glare and large enough to permit the driver to see the road clearly.
3. All full side windows shall provide an unobstructed emergency opening of at least 9 inches in height by 22 inches in width obtained either by lowering the window or by knock-out type split-sash window. A guard which will definitely restrain pupils from extending their arms and heads out of the window and at the same time permit the use of the emergency opening shall be provided unless the lower part of the window shall be protected with safety glass in such a manner as to definitely restrain pupils from extending their arms and heads out of

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\* It is general practice among the various states to approve glass which conforms to the test code of the American Standards Association called *Safety Code for Safety Glass for Glazing Motor Vehicles Operating on Land-Highways Z.26.1—1938*. Tests for such conformance with the Code of the American Standards Association are made by the National Bureau of Standards. The address of American Standards Association is given on page 46.



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*Windshield Wipers*—There shall be two windshield wipers of  
vacuum or electric type.

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*Wiring*—

width of

1. The wiring shall be arranged in at least five regular circuits as follows: (a) dome lights, (b) step, clearance, and marker lights, (c) starting, (d) ignition, (e) head, tail, stop, and dash lights.
2. Where desired there shall be three auxiliary circuits as follows: (a) direction lights, (b) heaters, defroster, etc., (c) auxiliary stop lights.
3. Each circuit, except starter and ignition, shall have a separate fuse.
4. All wires shall be insulated and protected by a covering of fibrous loom (or equivalent) which will protect them from external damage and which will eliminate dangers from short circuits.
5. Wires shall be fastened securely to body and/or chassis at intervals of not more than 24 inches. All joints shall be soldered or joined by equally effective connectors.

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## THE SMALL VEHICLE

### The Conversion Plan

—10 to 18 Passengers or Less—

#### The Bus Chassis

*Air Cleaner*—Each school bus chassis shall be equipped with an adequate oil-bath type air cleaner.

#### *Axle*—

1. Front axle shall have a gross weight rating at the ground according to the chassis manufacturer's rating equal to or exceeding that portion of the total load which is supported by the front axle.
2. Rear axle shall have a gross weight rating at the ground according to the chassis manufacturer's rating equal to or exceeding that portion of the total load which is supported by the rear axle.
3. The chassis manufacturer's rating for each axle on each model used in school buses shall be furnished in duplicate by the chassis manufacturer to each state department of education.

*Battery*—Storage battery, as established by the manufacturer's rating, shall be of sufficient capacity to care for starting, lighting, signal devices, heater, and other electrical equipment. No bus shall be equipped with a battery of less than 90 ampere-hours measured at a 20-hour rate. Battery shall be mounted outside body shell preferably under hood in an adequate carrier and readily accessible for servicing and removal from above or outside.

*Brakes*—Four-wheel brakes, adequate at all times to control the bus when fully loaded, shall be provided.

1. Foot or service brake shall be capable of stopping the complete unit (i.e., wet chassis weight, plus body weight, plus

driver's weight, without pupils) from the initial brake application within 22 feet when driven at a speed of 20 miles per hour over a dry level road having approximately .6 coefficient of friction and whose surface is free from loose materials. This stopping ability shall be determined by test with an approved decelerometer or other instrument which indicates brake effectiveness in units that are convertible into rate of deceleration.

2. Hand or emergency brake shall be of the hand lever type and shall be manually operated. It shall be provided in addition to the service brake, or shall be an entirely separate mechanical operating mechanism to be connected at least to the rear service brake shoes. It shall be capable of stopping the complete unit (i. e., wet chassis weight, plus body weight, plus driver's weight, without pupils) from the initial brake application within 50 feet when driven at a speed of 20 miles per hour over a dry level road having approximately .6 coefficient of friction and whose surface is free from loose materials. This stopping ability shall be determined by test with an approved decelerometer or other instrument which indicates brake effectiveness in units that are convertible into rate of deceleration.

*Bumpers*—Front and rear bumpers shall be furnished by the chassis manufacturer as part of the chassis. The front bumper must be of sufficient strength to permit the pushing of a vehicle of equal gross vehicle weight and the rear bumper of being pushed without permanent distortion to bumpers, chassis, or body.

*Exhaust Pipe*—Exhaust pipe, muffler, and tail pipe shall be outside the bus body attached to the chassis frame. The exhaust tail pipe shall be deflected slightly downward at the rear end and extend three inches beyond the chassis frame. Manufacturers shall see that the tail pipe extends beyond the end of the bus body, but not beyond the rear bumper.

*Gasoline Tank*—The gasoline tank shall be mounted, filled, and vented outside the body.

*Generator*—The generator shall have at least 25 amperes maximum output, be voltage and current controlled, and be capable of delivering 25 amperes from a speed of 20 miles per hour or more.

*Horn*—There shall be a horn or horns of standard make capable of producing a sound level of 110 decibels at a point on the axis of the horn 3 feet from the exit opening. The sound level meter used must comply with American Standards Association specification (Z 243-1944). Measurement shall be made with the flat response. (See page 46.)

If an extra loud horn is desired it shall be capable of producing a sound level of 120 decibels under conditions specified above.

Obstructions in the sound path reduce the effectiveness of a horn. For this reason there is an advantage in mounting the horn outside the hood.

*Instrument Panel*—The instrument panel shall be equipped with speedometer showing speed and odometer giving the accrued mileage, ammeter, oil pressure gauge, water temperature indicator, and gasoline gauge. The instrument panel shall have light of sufficient candle power to illuminate all instruments, and all instruments shall be maintained in good working order.

*Oil Filter*—Oil filter shall be provided, shall be of the replaceable element or cartridge type, and shall be connected by flexible oil lines if it is not of the built-in design.

*Passenger Load*—The gross weight of the vehicle when fully loaded (i.e., wet weight, plus driver's weight, plus weight of maximum pupil load) shall not exceed the maximum gross vehicle weight rating of the vehicle as established by the manufacturer. These ratings shall be furnished in duplicate by the manufacturer to all state departments of education.

*Power or Grade Ability*—Bus must be so geared and powered as to be capable of surmounting a 3 percent grade at 20 miles per hour with full load on continuous pull.

The loaded gross weight of the bus shall not exceed 400 pounds per certified net horsepower.

For the purpose of computing the performance ability of a vehicle refer to the Society of Automotive Engineers' formulas for the Large Vehicle, page 19.

*Tires and Rims*—The tires and rims shall conform to standards of

the Tire and Rim Association (see page 20) for the gross vehicle weight to be accommodated, provided that a 10 percent tolerance may be allowed.

## The Bus Body

*Aisle*—The aisle shall be 12 inches for forward-facing seats.

### *Body Sizes*—

Note: The small vehicle may vary in capacity from 10 to 18 pupils, is narrower in width than the large bus, and the body is converted from a body originally manufactured for other purposes. Specifications for inside height and width follow in alphabetical order.

*Color*—See Identification, page 39.

*Construction*—The body shall be of steel panel construction. It shall be of sufficient strength to support the entire weight of a fully loaded bus on its top or side if overturned.

*Defrosters*—Defrosters, if required, shall be of sufficient capacity to keep the windshield clear of fog, ice, and snow. This may be done by using fans or by taking heat directly from an approved heater.

### *Doors*—

1. Service door shall be located at the right of the driver and shall be manually controlled from the driver's seat by an over-center control.
2. Emergency door:
  - a. Emergency door shall be located in the center of the rear of the bus and equipped with a fastening device for opening from the inside and outside of the body, which may be quickly released, but is designed to provide protection against accidental release. A metal guard shall be placed over the door control on the inside. Control from the driver's seat shall not be permitted. Provision for opening from the outside shall consist of a device of such design as to prevent "hitching" but permit opening when necessary.
  - b. The door shall open either vertically or horizontally. When

- vertical type door is used, there shall be an unobstructed aisle at least 10 inches wide.
- c. Emergency door shall be marked "EMERGENCY DOOR" on the inside.
  - d. There shall be no steps leading to emergency door.
  - e. No seat or other object shall be so placed in the bus as to restrict the passage to the emergency door to less than 18 inches.

*Fire Extinguishers*—Each bus shall be equipped with a fire extinguisher listed as approved under the B-2, C-2 Classification of the Underwriters' Laboratories, Inc.,\* mounted in an accessible place in full view and kept properly filled and in satisfactory operating condition at all times.

*First-Aid Kit*—Each bus shall carry a dustproof first-aid kit mounted in an accessible place in full view and approved by the proper state authority and the driver shall be instructed in its use. The kit shall be kept fully equipped and in good condition.

*Floor*—The floor of the body shall be covered with nonskid material and shall be gastight.

*Heaters*—Where heaters are required, the heater shall be of the hot water or combustion type. Such installations which are in constant use during the winter season shall be of the fresh-air type. Hot water heaters used only occasionally may be of the circulating type.† All combustion-type heaters shall be approved by Underwriters' Laboratories, Inc. Combustion-type heaters shall be installed on new buses by body manufacturers, and on buses now in operation by authorized dealers or by authorized garages.‡ Heaters shall be capable of maintaining an inside temperature of 50° Fahrenheit at average minimum January temperatures as established by the United States Weather Bureau.

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\* Specifications for fire extinguishers are available from Underwriters' Laboratories, Inc. See Appendix, page 47.

† The Underwriters' Laboratories, Inc., do not prepare specifications for this type of heater since no fire hazard is involved.

‡ The Interstate Commerce Commission, Washington 25, D. C., has specifications available on the installation of combustion-type heaters.

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*Identification—*

1. School bus bodies, including hood, cowl, and roof shall be painted a uniform color, National School Bus Chrome, according to specifications of the National Bureau of Standards\* with the exception of front fenders and running board.
2. The front fenders shall be black, and the body trim, if used, shall be of the same color.
3. School bus bodies shall bear the words "SCHOOL BUS" in black letters at least 4 inches high on both the front and rear of the body or on signs attached thereto.
4. "STOP ON SIGNAL" may be painted on the rear of the bus. The word "STOP" by itself shall not be used.

*Inside Height—*The minimum inside body height shall be not less than 50 inches.

*Instrument Panel—*See Instrument Panel in chassis standards, page 36.

*Lights—*Lights shall be standard equipment for the type of vehicle being converted.

*Rear Vision—*Inside and outside rear-view mirrors, designed to minimize glare, in sizes 4 inches by 5 inches for inside, and 4 inches in diameter for outside, shall be required.

*Seats—*

1. All seats shall be securely fastened to the body of the vehicle. They shall be covered with suitable padding material and comfortably upholstered with adequate padding.
2. Jump or portable seats shall not be used. The seat beside the driver, if regular equipment, or installed by the vehicle manufacturer, may be used. If the vehicle is equipped with a movable seat beside the driver, it shall not be occupied by more than one pupil. It shall be securely fastened to the body and shall be so constructed as not to interfere with the pupils entering or leaving the vehicle.
3. Thirteen inches shall be the allowable rump width in determining seating capacity of bus.

\* Specifications on file at National Bureau of Standards, Washington 25, D. C.

4. All seats shall be 14 inches in depth over-all. The distance from the top of the undepressed seat cushion to the floor at the front of the seat shall be 12 to 14 inches and at the back of seat cushion  $10\frac{1}{2}$  to  $12\frac{1}{2}$  inches from the floor.
5. If forward-facing seats are used, they shall be so placed that the distance from center to center measured at the top center of the backs shall be not less than 24 inches.
6. If longitudinal seats are used, only two shall be installed.
7. The back rest for longitudinal seats shall be at least 8 inches in vertical width and shall extend at least 12 inches in height above the seat.

*Skid Chains*—Each state shall formulate its own rules, regulations, and/or standards governing skid chains if needed.

*Sun Shield*—Sun glare shield approved by chassis manufacturer as standard shall be provided when needed.

*Width*—The inside width shall be not less than 51 inches measured at the seat line.

*Windshield and Windows*—Each bus shall have at least one window placed in each side. Each window shall consist of not less than 250 square inches of glass. Windows shall provide a glass area at least one-seventh the area of the floor. Each window shall be set in a metal frame glazed with felt or rubber channels in such manner as will make it secure and noiseless when the bus is in operation. All window openings cut in the framework shall have rounded edges and welded corners. The windows shall afford adequate protection against wind and rain.

All glass in the windshield, windows, and doors shall be of safety glass approved by the laws of the states,\* and such glass shall be of sufficient quality to prevent distortion of view in any direction.

*Windshield Wipers*—There shall be two windshield wipers of vacuum or electric type.

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\* See note on page 32.



## UNIFORM TRAFFIC REGULATIONS

The 1945 Conference recommended uniform traffic regulations as related to pupil transportation, and proposed a change in that section of the *Uniform Vehicle Code* dealing with overtaking and passing school buses. The National Committee on Uniform Traffic Laws and Ordinances\* reviewed this proposed change and suggested a further revision of the pertinent section of the *Uniform Vehicle Code*. The 1948 Conference studied the suggested revision and approved it.

Section 109.5 of Act V (*Uniform Act Regulating Traffic on Highways*) of the *Uniform Vehicle Code* now reads as follows:

*Overtaking and passing school bus.*—(a) The driver of a vehicle upon a highway outside of a business or residence district upon meeting or overtaking from either direction any school bus which has stopped on the highway for the purpose of receiving or discharging any school children shall stop the vehicle before reaching such school bus and shall not proceed until such school bus resumes motion, or until signalled by the driver to proceed.

(b) Every bus used for the transportation of school children shall bear upon the front and rear thereon a plainly visible sign containing the words "school bus" in letters not less than 8 inches in height. When a school bus is being operated upon a highway for purposes other than the actual transportation of children either to or from school all markings thereon indicating "school bus" shall be covered or concealed.

(c) The driver of a vehicle upon a highway with separate roadways need not stop upon meeting or passing a school bus which is on a different roadway or when upon a limited or controlled access highway and the school bus is stopped in a loading zone which is a part of or adjacent to such highway and where pedestrians are not permitted to cross the roadway.

In recognition of the recommendation of the 1948 National Conference on School Transportation that flashing stop lights

\* Formerly the National Conference on Street and Highway Safety.

be used on school buses, the National Committee on Uniform Traffic Laws and Ordinances amended Act V of the *Uniform Vehicle Code* early in 1949 by (1) adding Section 109.6 which reads as follows:

*Special lighting equipment on school busses.*—(a) The (commissioner of motor vehicles) is authorized to adopt standards and specifications applicable to lighting equipment on and special warning devices to be carried by school busses consistent with the provisions of this act, but supplemental thereto, and except that such standards and specifications may designate and permit the use of flashing warning signal lights on school busses for the purpose of indicating when children are boarding or alighting from any said bus. Such standards and specifications shall correlate with and, so far as possible, conform to the specifications then current as approved by the Society of Automotive Engineers.

(b) It shall be unlawful to operate any flashing warning signal light on any school bus except when any said school bus is stopped on a highway for the purpose of permitting school children to board or alight from said school bus.

and by (2) revising paragraphs (b) and (c) of Section 146 (*Special restrictions on lamps*) to read as follows:

(b) No person shall drive or move any vehicle or equipment upon any highway with any lamp or device thereon displaying a red light visible from directly in front of the center thereof. This section shall not apply to any vehicle upon which a red light visible from the front is expressly authorized or required by this code.

(c) Flashing lights are prohibited on motor vehicles, except on an authorized emergency vehicle, school bus, snow removal equipment, or on any vehicle as a means for indicating a right or left turn.

## APPENDIX

### *Development of National Standards for School Bus Construction*

The National Conference on School Bus Standards, sponsored by the National Council of Chief State School Officers and held at Columbia University in 1939 under the direction of Frank W. Cyr, pioneered in the development of standards for the construction of school buses. During the war period some of the minimum standards adopted at this conference were necessarily modified. At the close of the war in 1945 a National Conference on School Bus Standards, sponsored by the National Council of Chief State School Officers and administered by the National Commission on Safety Education of the National Education Association, was held at Jackson's Mill, West Virginia, to revise certain existing standards and develop others which were felt to be essential. The general policies for this Conference were worked out with the Chief State School Officers under the direction of a planning committee headed by Frank W. Cyr. In addition to revising the standards developed earlier, the 1945 Conference set up standards for small vehicles to meet the needs of schools in sparsely settled areas.

### *The 1948 National Conference on School Transportation*

The primary purpose of the 1948 Conference was to develop standards for the selection and training of school bus drivers. On the advice of state transportation officials and school bus manufacturers, however, it was decided that one day of the Conference would be devoted to revising certain sections of the 1945 *School Bus Standards*. Information on sections of the standards to be revised was compiled under the direction of Frank W. Cyr by A. C. Bock and D. P. Culp, graduate students at Teachers College, Columbia University.

A significant revision of school bus standards at the 1948 Conference was the adoption of flashing stop lights in preference to the stop signal arm. A special committee of transportation officials

worked jointly with the Society of Automotive Engineers on the specifications for the flashing lights. Several other adjustments and revisions were made in other parts of the school bus standards.

The achievements of the 1948 National Conference on School Transportation were made possible by the cooperation of many individuals and national agencies interested in highway transportation. In addition to participation by forty-four state departments of education, local school officials, and manufacturers of school buses, representatives of governmental and private agencies gave generously of their time to assist with the Conference.

### *National School Bus Chrome*

National School Bus Chrome was adopted by the 1939 Conference on School Bus Standards as the uniform color for all school buses thruout the United States. The first consideration in adopting a uniform color was to provide the safety which will accrue when, thruout the United States, a school bus is recognized by its color. The second consideration was economy since manufacturers are forced to make an additional charge for special colors.

Scientists of the National Bureau of Standards, Washington 25, D. C., prepared the samples and provided technical advice upon which the choice was made for specifications.

The cover of this report represents National School Bus Chrome. Exact specifications for National School Bus Chrome may be obtained free from the National Bureau of Standards.

### *The Enactment of Proper Statutory Provision for School Transportation*

The function of legislative statutes should be to authorize the state education department or some other state agency to make necessary regulations governing school bus construction and equipment. Such regulations should not be incorporated in the statute itself. States in which proper statutory provisions do not exist should give careful consideration to the following statements:

1. The large number of pupils being transported is adequate evidence of the need for state regulations governing the construction and equipment of school buses. State regulations for school buses constitute the best assurance that pupils will be transported in safety and with reasonable economy.

2. Both educational theory and the experience of a majority of the states indicate that the agency best qualified to establish such regulations is the state department of education or a committee of the state authorities directly concerned with safe school transportation with the chief state school officer as executive officer.
3. The responsibility of the state department of education to establish rules and regulations governing school bus construction and school bus equipment should be fixed thru a single statutory provision which confers broad powers upon the department.

Following are two examples of desirable types of laws which are reproduced as suggestions to states desiring to enact an effective statute:

- a. California: ". . . The State Board of Education shall have the power to adopt reasonable regulations relating to the construction, design, operation, equipment, and color of school buses. No regulations relating to the construction, design, or color of school buses shall apply to buses purchased prior to the effective date of this section, except that any school bus repainted after the effective date of this section shall, regardless of the date when purchased, be painted to conform to all the regulations relating to the color of school buses. Such regulations, if approved by the Chief of the California Highway Patrol, shall be enforced by the California Highway Patrol. The State Board of Education shall have the authority to issue an order prohibiting the operation on public streets and highways of any school bus which does not comply with such regulations, and any such order shall be enforced by the California Highway Patrol. . . ." State of California School Code, Article 3, Section 191.
- b. Pennsylvania: "All vehicles hereafter purchased or placed in use for the transportation of pupils, whether owned or hired by the school district, shall conform to standards prescribed by the State Council of Education. Such standards when promulgated by the State Council of Education, may be revised not oftener than once each year, and whenever new requirements are made, they shall be published at least six months before they shall become effective, and shall

apply only to vehicles thereafter purchased or put in use.”  
School Laws of Pennsylvania, Article XIV, Section 1406.

4. State departments of education, in those states which have not already placed upon some state department the responsibility of setting up state rules and regulations for school buses, should use the first opportunity to request their legislatures to place this responsibility upon the state department of education.

*Offers for Granting Special Rights Under the Standards to Public Schools*

The 1945 National Conference on School Bus Standards expressed the appreciation of the schools to Hicks Body Company, Lebanon, Indiana, and to the Evans Products Company, Detroit, Michigan, for waiving all royalties in connection with the installation of certain patented equipment in all school buses constructed in the United States for the life of the patents. These actions were taken by the two companies in consideration of the fact that they had exclusive rights on the above-mentioned equipment.

*Excerpt from Letter Waiving Patent Rights*

“All school bus body builders in the United States are hereby granted royalty-free licenses to manufacture and install the Evans Roof Exhaust or combined Roof Exhaust and Intake Ventilation System in school buses only, under the following U. S. Patents owned by us: 1,862,058; 1,958,056; 1,961,978; 1,969,934; 1,969,935; 2,036,485; and 2,073,159.

“In addition Evans Products Company will furnish builders without charge, technical data, blueprints, and any other information we may have immediately available for the manufacture and installation of same in school bus bodies.”

A communication supplying this information is on file in the offices of the National Education Association, 1201 Sixteenth Street, N. W., Washington 6, D. C.

*Americans Standards Association, 70 E. 45th Street, New York 17, New York.*

This organization brings together manufacturers, technical specialists, and representatives of the Government and the general

public to develop and formulate nationally acceptable standards in the fields of civil, mechanical, chemical, electrical, mining, and metallurgical engineering and in paper, wood, and other industries.

*Society of Automotive Engineers, 29 W. 39th Street, New York 18, New York.*

The object of the Society is to promote the arts and sciences and standards and engineering practices connected with the design, construction and utilization of automotive apparatus, all forms of self-propelled or mechanically-propelled mediums for the transportation of passengers or freight, and internal-combustion prime-movers. Standards and recommended practices for motor-vehicle lighting devices, developed by the Society, for many years have been used by the administrators of practically all states as a basis for their official approval of these devices.

*Underwriters' Laboratories, Inc., 207 E. Ohio Street, Chicago 11, Illinois.*

Underwriters' Laboratories, Inc., is chartered as a nonprofit organization without capital stock under the laws of the state of Delaware, to establish, maintain, and operate laboratories for the examination and testing of devices, systems, and materials. Founded in 1894, the enterprise is sponsored by the National Board of Fire Underwriters, and is operated for service, not for profit.

Its purpose is to determine—by scientific investigation, study, experiments, and tests—the relation of various materials, devices, constructions, and methods to life, fire, and casualty hazards; and to ascertain, define, and publish standards, classifications, and specifications for materials, devices, constructions, and methods affecting such hazards, and other information tending to reduce and prevent loss of life and property from fire, crime, and casualty.

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