

1945

# SCHOOL BUS STANDARDS

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1945 Revised Edition



National Council of Chief State School Officers  
National Commission on Safety Education

020580

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**MINIMUM STANDARDS**  
For  
**SCHOOL BUSES**

*pted by  
Federal  
United*

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

1946

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

In National Conference  
October 29—November 3, 1945  
Jackson's Mill, West Virginia

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## FOREWORD

The 1939 Conference, sponsored by the National Council of Chief State School Officers, produced certain minimum uniform standards for safety and economy in school bus construction. The standards, adopted by many states, resulted in greater safety to transported pupils and tremendous savings in costs in the procurement of new school buses.

The National Conference on School Bus Standards held in 1939 pioneered in the development of standards needed in school bus construction. During the war period some of the minimum standards adopted as a result of this Conference were necessarily modified. Since then others have been found in need of revision. To meet this situation, the National Council of Chief State School Officers sponsored a 1945 Conference on School Bus Standards, the specific purpose of which was to revise the existing standards and to develop necessary additional standards.

The 1945 standards, as in 1939, have been developed thru the cooperative efforts of representatives of the state departments of education with the advice of engineers of the automotive industry and consultants of institutions, agencies, and organizations interested in safety and school bus standards. Representatives of the state departments of education, after careful study and consultation, agreed upon the standards set forth in this publication. These standards are the results of the best thinking in the field of school transportation. Their adoption and enforcement by the states will further safety in school bus transportation thruout the nation. Uniformity of standards for school buses assures safety in construction, makes possible mass production, and results in lower costs.

The appreciation of the Council is expressed to each individual agency and organization that participated in the Conference. It feels particularly indebted to the National Commission on Safety Education of the National Education Association and its special

subcommittee headed by Frank W. Cyr for planning the Conference; to the Automotive Safety Foundation for financial support; to W. W. Trent of our Council for facilitating arrangements at Jackson's Mill; and most important of all, to representatives of state departments of education and school bus manufacturers for their cooperation and diligent work.

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National Council of Chief State School Officers  
and State Superintendent of Schools,  
Baltimore, Maryland

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## GUIDING PRINCIPLES FOR THE 1945 CONFERENCE ON SCHOOL BUS STANDARDS

On the first day of the 1945 Conference, the guiding principles of the 1939 Conference on School Bus Standards were reviewed and revised in terms of existing conditions. Revised principles which were adopted to guide the deliberations and decisions of the Conference were:

1. Existing national standards are considered in full force and effect and changed only where evidence indicates that change is needed.
2. State regulations governing school bus construction should insure safe and economical vehicles in which children can be transported in safety and comfort.
  - a. 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 or leaving the bus. It refers to both major and minor accidents and the prevention of accidents. It also refers to the health of the pupils as affected by bus construction.
  - b. 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 to 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.
3. 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
  - d. Specify exact spacial dimensions so far as this will further efficient volume production.
4. Adaptations of the minimum standards should be made by the states only so far as they will permit desirable adjustments to local needs; provided these adaptations:
    - a. Do not conflict with uniform standards, or
    - b. Otherwise unduly increase the cost of production.
  5. The primary function of uniform state regulations is to specify the *result desired* in terms of safety and economy. The results desired must be defined when this is necessary to make enforceable regulations.
  6. Uniform state regulations should be subject to periodic review and to revision when necessary thru cooperation of the states.
  7. 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.
  8. 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.

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## USING THE STANDARDS

In order to put the national uniform minimum standards for school bus construction into operation, each of the legislatures should confer upon the proper state regulatory agency the general obligation of setting up statewide rules and regulations governing the 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.

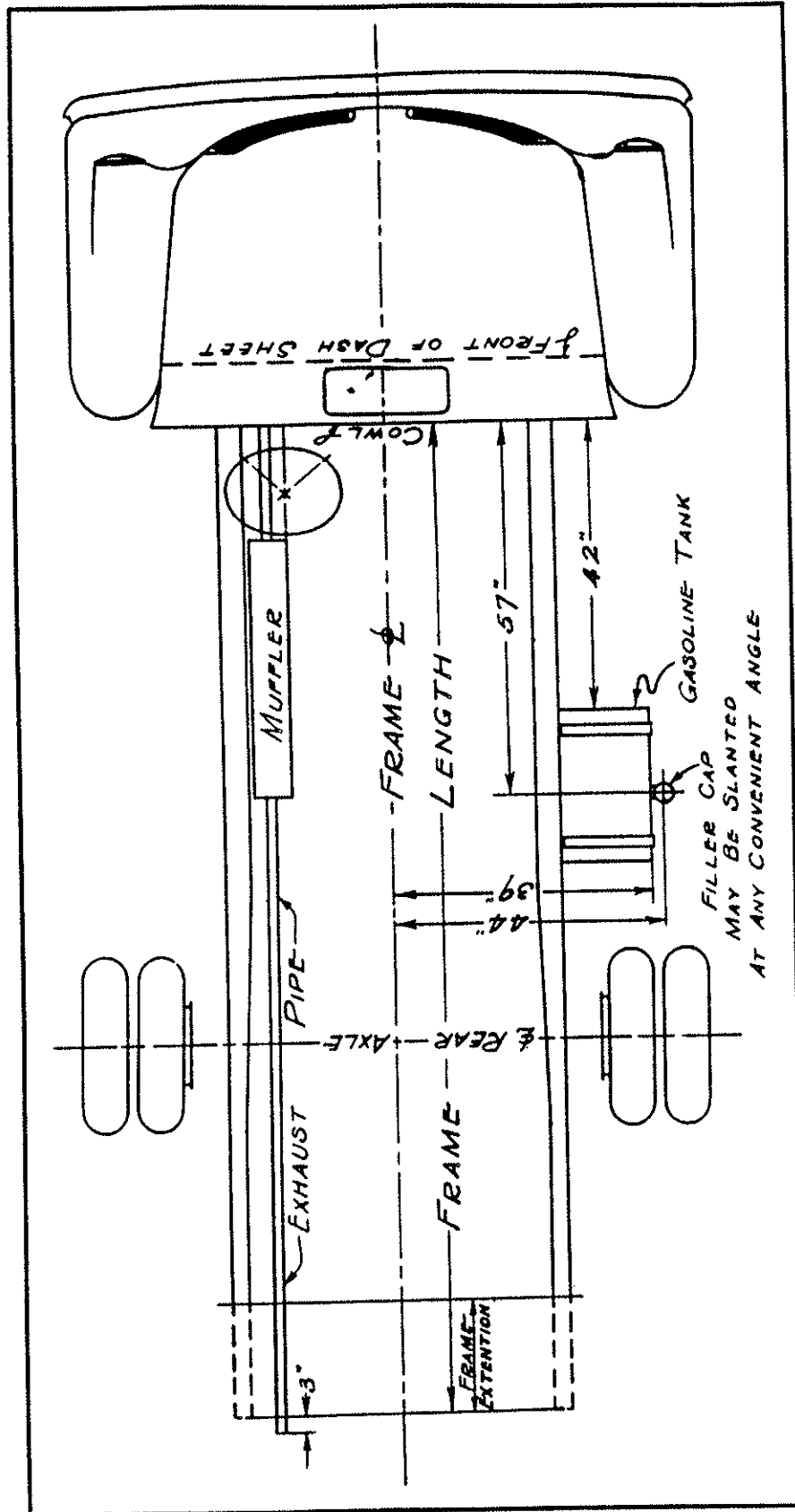
The standards for school bus construction in this report are intended to apply primarily to new equipment purchased after their adoption. Any state considering application of such standards to equipment previously purchased must give careful consideration to the economic effects of such retroactive action.

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 but not later than January 1, 1947.

It should be recognized that equipment to meet some of the newly specified standards, such as those governing the gasoline tank, the reserve tank for brake systems, and the stop signal arm, may not be available until January 1, 1947.



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*—The axle specifications shall be as follows:

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, plus driver's weight, without pupils) from the initial brake

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

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 to 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 is determined by testing 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 not less than 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 of rides and obtaining a tow hold. 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*—The frame specifications shall be as follows:

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 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. Flexible gasoline and oil-proof connections shall be provided at both ends 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 shall have approval of Underwriters' Laboratories, Inc. (See Appendix, page 50.)

*Generator*—The generator shall have a maximum output of ~~not~~ <sup>at</sup> ~~less than~~ 25 amperes. It shall be voltage and current controlled, and ~~shall~~ 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.



*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 ASA specification (Z 243-1944). Measurement shall be made with the flat response. (See page 50.)

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 whenever it is of the built-in design.

*Overall Length*—The overall length of the bus shall not exceed 35¼ feet.

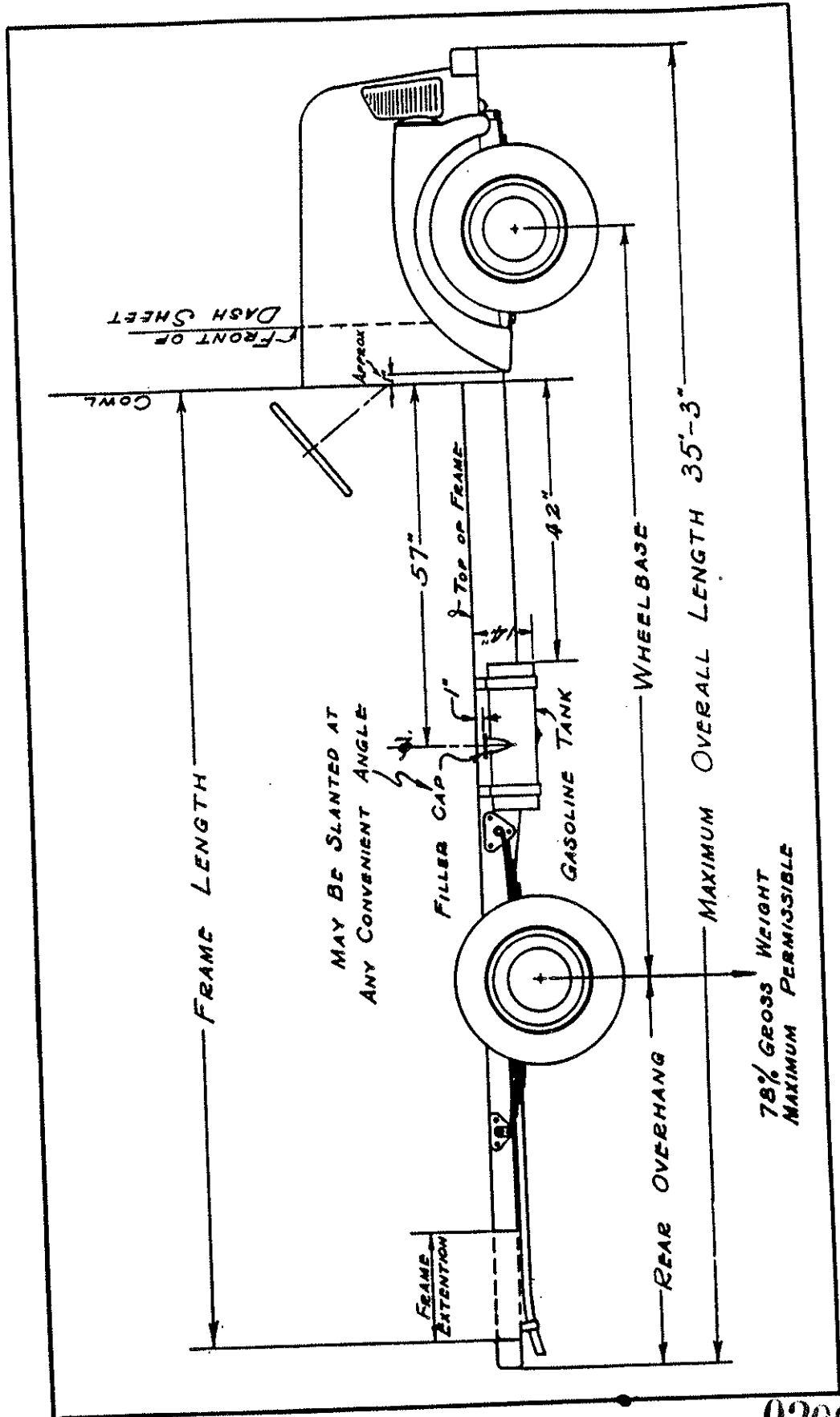
*Passenger Load*—The gross weight of the vehicle when fully loaded (i.e., wet weight, plus driver's weight, plus weight of maximum pupil load) shall not exceed the maximum gross vehicle weight rating of the vehicle as established by the manufacturer's rating. These ratings shall be furnished in duplicate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

For the purpose of computing the performance ability the following formulas recommended by the Society of Automotive Engineers\* shall be used:

\*See Appendix, page 50.



CHASSIS ELEVATION

## ABILITY FORMULAS

GVW—Gross weight of vehicle (or combination), lb.

S—Road speed, mph.

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

G—Grade, %.

In the following ability formulas, a value of 1.2 lb. per 100 lbs. 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.

$$1. \text{GVW} = \frac{33,750 \times \text{HP}}{S(\text{G plus } 1.2)}$$

$$2. \frac{\text{GVW}}{\text{HP}} = \frac{33,750}{S(\text{G plus } 1.2)} = \text{Lb. per HP}$$

$$3. S = \frac{33,750 \times \text{HP}}{\text{GVW} (\text{G plus } 1.2)}$$

$$4. G = \frac{33,750 \times \text{HP}}{\text{GVW} \times S} = 1.2 \text{ (This is the formula most commonly used.)}$$

### Speed Formulas

S—Road speed, mph

RPM—Engine speed in revolutions per minute

r—Tire rolling radius, in.

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

$$5. S = \frac{\text{RPM} \times r}{168 \times R}$$

$$6. \text{RPM} = \frac{168 \times R \times S}{r}$$

*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*—The minimum tire specifications shall be as follows:

1. The following tire and rim sizes, based upon the recommendation of the Tire and Rim Association, Akron, Ohio, shall be required. 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 following ratings:

Tire		Rim Size	
Size and Ply Rating	Load and Inflation in Lbs.	Present	Advanced
6.50-20-6	1700 @ 50	3.75P	5.0
6.50-20-8	1950 @ 65	3.75P	5.0
7.00-20-8	1950 @ 55	4.33R	5.0 or 5.5
7.00-20-10	2250 @ 70	4.33R	5.0 or 5.5
7.50-20-8	2250 @ 55	5.00S	5.5 or 6.0
7.50-20-10	2700 @ 75	5.00S	5.5 or 6.0
8.25-20-10	2750 @ 60	5.00S	6.0 or 6.5
8.25-20-12	3150 @ 75	5.00S	6.0 or 6.5
9.00-20-10	3450 @ 65	6.00T	6.5 or 7.0
9.00-20-12	3850 @ 80	6.00T	6.5 or 7.0

2. Dual rear tires shall be provided on all vehicles. Spare tire, if required, shall be suitably mounted in an accessible location. All tires on given vehicle shall be interchangeable.

*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 aisle specifications shall be as follows:

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

*Body sizes*—The following standards shall govern the sizes of school bus bodies.

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 Lengths (With Tolerance of $\pm 8$ )
30	15'
36	17'
42	19'
48	21'
54	23' 6"
60	26'
66	28'

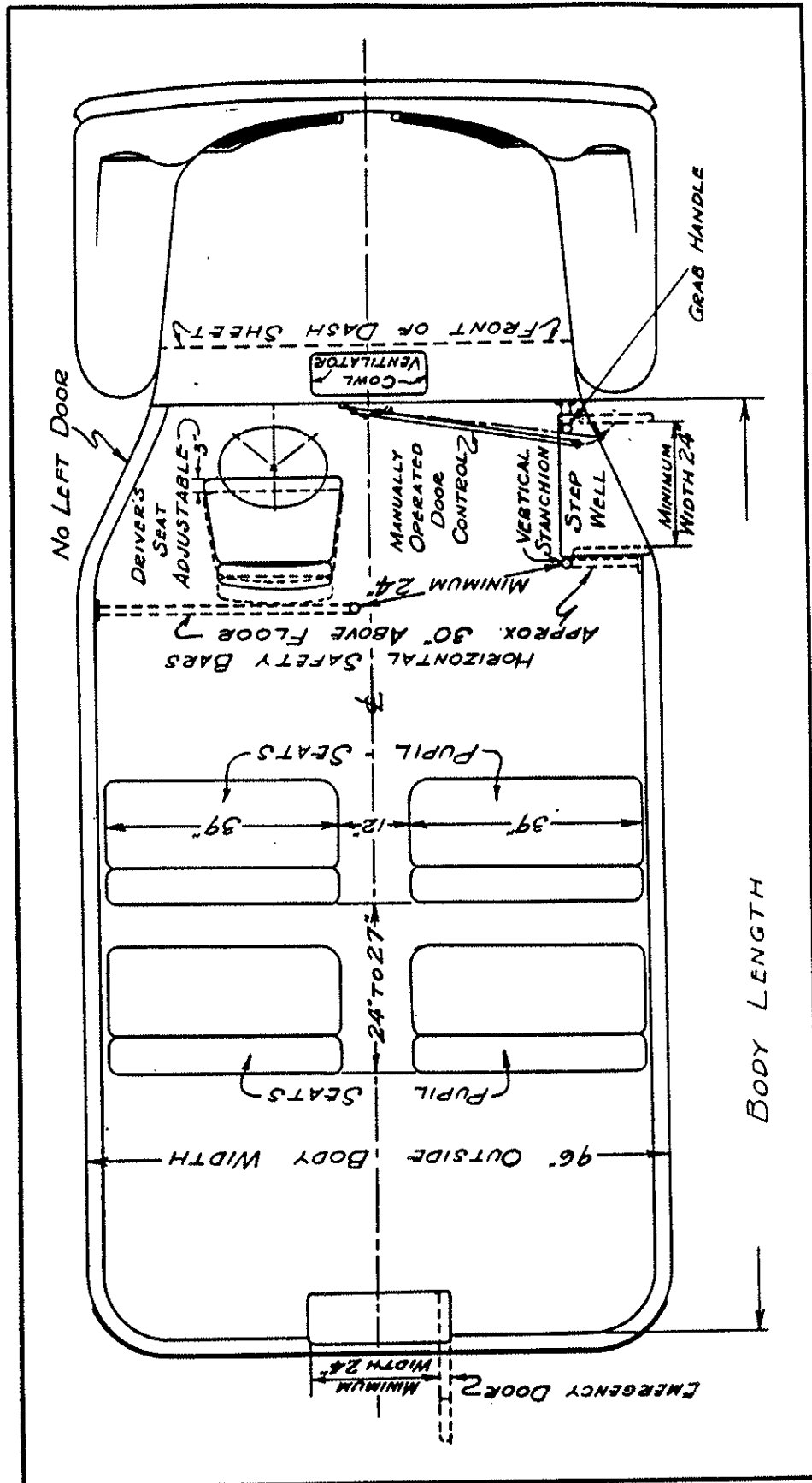
Note: It is recommended that the 60 and 66 basic pupil load buses be used only on all-weather roads which are free of grades, curves, or other hazards that would endanger safety of pupils transported on such buses.

*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 24.

*Construction*—Construction shall be all-steel or of other metal with



BODY PLAN

a strength at least equivalent to all-steel as certified by the bus body manufacturer. Suitable insulation material may be used. 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 the use of fans or may take heat directly from an approved heater.

*Doors*—The following specifications shall apply to 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.
- 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 18 inches.

*Fire Extinguishers*—Each bus shall be equipped with a fire extinguisher of a type and size approved by Underwriters' Laboratories, Inc.,\* mounted in an accessible place with 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 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. 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*—For purposes of identification:

- i. With the exception of fenders and trim, school bus bodies including hood, cowl, and roof shall be painted a uniform

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\* See Appendix, page 50.



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.

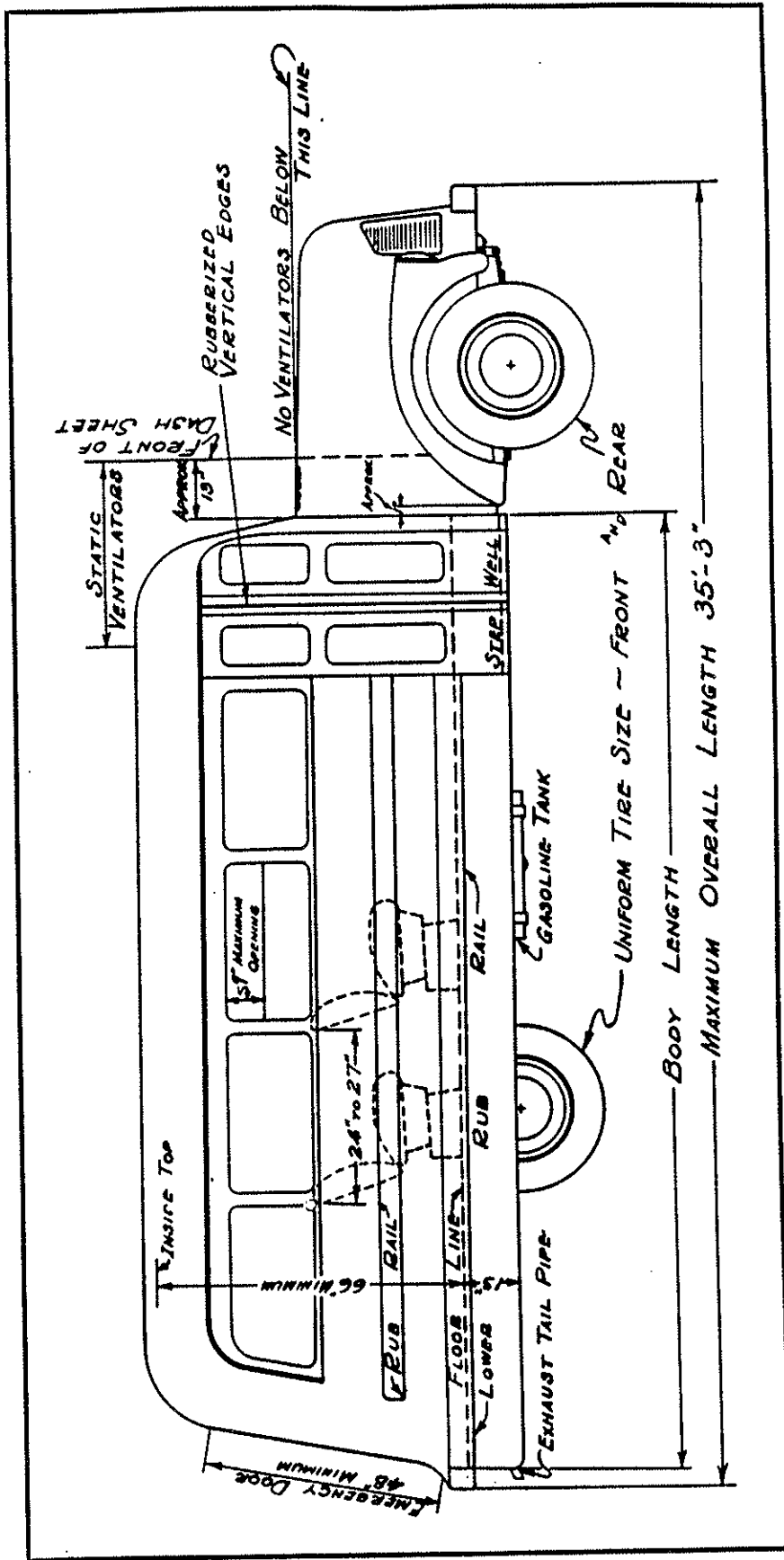
*Instrument Panel*—See Instrumental Panel in Chassis Standards, page 17.

*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 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. **Directional Signals:** Each bus should be equipped with directional signals that meet the Society of Automotive Engineers' specifications and signify intention and direction of turn.

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



BODY ELEVATION

Signal must be given continuously during at least the last 100 feet before turn is made.

6. Stop Lights: Flashing stop lights are recommended.
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.
8. Stop Signal Arm: Each bus shall be equipped with a stop signal arm constructed of substantial material and so designed as to facilitate operation by the bus driver while driving the bus. The stop signal arm shall be of the semaphore type, shall be mounted on the left side of the bus, and shall be so designed as to be seen readily by motorists approaching the bus from either the front or the rear. The color of the stop signal arm shall be National School Bus Chrome with the letters "STOP" in 6-inch black letters on both sides. (See page 41 for use of stop signal arm.)

The letters in the word "STOP" shall contain red reflector elements making the word visible at night when illuminated by legal headlights from a distance of approximately 200 feet. All signal devices used shall be approved by the state as meeting its requirements.

*Mounting*—The mounting of body shall be as follows:

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 vision 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. A nonglare interior rear-view mirror large enough (at least 4 inches x 15 inches) to afford a good view of the road to the rear, as well as of the pupils, shall be required. It shall have rounded corners and protected edges.
2. There shall be an exterior nonglare rear-view mirror 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 vision 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 room to floor. Placement shall not restrict passageway 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 20.)

**Steps**—The following regulations shall apply to the construction and design of bus steps at the service door:

1. The riser of the upper step 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 Underwriters' Laboratories, Inc., 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 the windows and at the same time permit use of the emergency opening.

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

*Wiring*—

1. The wiring shall be arranged in at least five regular circuits as follows: (a) dome lights, (b) step, clearance, and marker

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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 be separately fused.
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.

## 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*—The axle specifications shall be as follows:

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 the state departments 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 brakes: 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 <sup>at least</sup> not less than 25 amperes maximum output, shall be voltage and current controlled, and shall 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 ASA specification (Z 243-1944). Measurement shall be made with the flat response. (See page 50.)

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.

*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's rating. 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 lbs. per certified net horsepower.

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

*Tires and Rims*—The tires and rims shall conform to standards of the Tire and Rim Association (Akron, Ohio) 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 37.

*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 the use of fans or may take 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 of a type and size approved by 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 type. 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*—For purposes of 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.

\* See Appendix, page 50.

*Instrument Panel*—See Instrument Panel in Chassis Standards.

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

*Rear Vision*—Inside and outside rear view mirror in sizes 4 inches by 5 inches for inside, and 4 inches in diameter for outside.

*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.
4. All seats shall be 14 inches in depth overall. 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 10½ to 12½ 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.

*Stop Signal Arm*—Each bus shall be equipped with a stop signal arm constructed of substantial material and so designed as to facilitate operation by the bus driver while driving. The stop signal arm shall be of the semaphore type, shall be mounted on the left side of the bus and be so designed as to be seen readily

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by motorists approaching the bus from either the front or the rear. The color of the stop sign shall be National School Bus Chrome with the letters "STOP" in 6-inch black letters on both sides.

The letters in the word "STOP" shall contain red reflector elements making the word visible at night when illuminated by legal headlights from a distance of approximately 200 feet.

*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 Underwriters' Laboratories, Inc.;\* 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.

\* See Appendix, page 50.

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to the side of the road and the warning stop light shall be used to signify intention to stop. Pupils shall enter or leave the bus promptly.

When pupils are to cross the road the driver shall pull well over to the side of the road and the warning stop light will signify intention to stop. The driver will then extend the stop signal arm. The Safety Patrol will accompany pupil or pupils to the front of the bus and on the driver's signal pupils shall cross the road in front of the bus. The Safety Patrol may then reenter the bus. The driver then retracts the stop signal arm. When pupils must cross the road to board the bus after it has arrived at the loading point, the driver should follow the same procedure as above while the Safety Patrol will be waiting at the bus entrance to assist pupils in boarding.



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## APPENDIX

### *Background of the National Conference on School Bus Standards*

School transportation has become a major phase in the administration of public education. From 1930 to 1940 it expanded until there were nearly four million children riding to and from school daily in 86,000 school buses which travelled one and a quarter million miles of school bus routes daily. The annual budget for school transportation was \$66,000,000 and the annual investment for new vehicles was estimated at \$20,000,000.

The war made serious inroads in school transportation. The efforts would have been vastly more harmful but for the 1942 conference of federal and state officials that worked out a wartime program for saving critical war materials, transporting war workers, and at the same time keeping children in school. This conservation program was put into operation by the Office of Defense Transportation and state departments of education. During the first year this cooperation successfully reduced by 20 percent the use of critical materials and manpower in school transportation without denying children education because of a breakdown in school bus service. The major adjustments thus made, plus the almost complete cessation of school bus manufacturing in favor of war equipment, temporarily stopped school transportation expansion and piled up the need for new vehicles.

### *The 1945 Conference*

Recognizing the need to revise the uniform nationwide standards set up in 1939 in the light of wartime developments and the importance of strong up-to-date uniform standards to govern post-war production, the National Commission on Safety Education of the National Education Association unanimously approved the following resolution on May 24, 1944:

That the Commission begin immediately the necessary preparations

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for holding at the strategic time in cooperation with the National Council of Chief State School Officers and other agencies, particularly the School Transportation Division of the Rural Department of the National Education Association and the U. S. Office of Education, a second conference of official representatives of the forty-eight states for reviewing and revising the national school bus standards to secure safer and more economical school buses.

Action to sponsor such a conference on school bus standards was taken by the National Council of Chief State School Officers, at their annual meeting in Baltimore in December 1944, which passed the following resolution:

The Council recognizes the contributions made by the 1939 National Conference on School Bus Standards to safety and economy in school transportation. The Council sponsors a similar conference to be held through the help of the National Commission on Safety Education of the National Education Association in the fall of 1945 and to be attended by representatives of each of the 48 state education departments and such consultants as may be helpful in reviewing and revising the 1939 standards in the light of experience, research findings, and postwar school transportation needs.

General policies for the conference were worked out with the chief state school officers. The actual planning and operation of the conference were carried out by the National Commission on Safety Education thru its Subcommittee on School Bus Standards which included also the members of the Committee on Transportation of the National Council of Chief State School Officers.

The foundation work for this report was done in seven regional conferences called by the United States Commissioner of Education where chief state school officers and their representatives, transportation officials, and others interested in the problem of school transportation spent a full day in each conference presenting issues and discussing problems of transportation. Materials were collected from the forty-eight state departments of education, National Highway Users Conference, Interstate Commerce Commission, American Automobile Association, Underwriters' Laboratories, Inc., Society of Automotive Engineers, American Standards Association, United States Weather Bureau, National Bureau of Standards, and other organizations, and from many automobile manufacturers. Numerous conferences were held with engineers, represent-

atives from organizations such as National Bureau of Standards, Underwriters' Laboratories, Inc., and Society of Automotive Engineers. Field trips were made for the purpose of observing buses in operation and studying the types of buses in use.

Robert W. Eaves, secretary to the Commission on Safety Education, National Education Association, and Frank W. Hubbard, director of research, National Education Association, assisted in making arrangements and formulating general policies for the conference. Belmont Farley, National Education Association's director of publicity, handled the conference publicity. Clarence S. Bruce, automotive engineer, National Bureau of Standards, was the official consulting engineer. Dr. K. S. Gibson, scientist, National Bureau of Standards, was consulted on the National School Bus Chrome. Elizabeth W. Robinson and Alice Still of the Commission staff assisted in preparation and editing of the publication. Elinore M. Darland of the office staff, Teachers College, Columbia University, recorded the specifications as they were formulated by the conference. Arthur G. Upton, superintendent of schools, Clarksburg, West Virginia, and his staff assisted in conference arrangements.

The task of preparing suggested standards and of assembling and organizing the various state standards and other pertinent materials into a workbook for use before and during the conference was performed by Research Consultant H. D. Nelson of Heflin, Alabama, in connection with his graduate studies at Teachers College, Columbia University. This work involved the analysis of state standards and reports of various organizations, interviews with numerous specialists, field trips into various states, and attendance at regional conferences in Boston, St. Paul, and Washington.

The project for revision of school bus standards had the hearty approval of the Automotive Safety Foundation thru whose financial assistance such activities of the National Commission on Safety Education are made possible.

Three months before the conference all manufacturers of school bus bodies and chassis were invited to attend a meeting with state representatives to discuss some of the preliminary problems of setting up standards. Thru both meetings the engineers of the automotive industry rendered invaluable service in providing technical advice.

### *The 1939 Conference*

The recent conference for revision of nationwide school bus standards grew out of the work of a similar conference held at Teachers College, Columbia University, in 1939. This conference was attended by representatives of the 48 states, by engineers representing the major manufacturers, and by representatives of cooperating agencies interested in school transportation.

Directly responsible for calling of the earlier conference was a two-year study of pupil traffic conditions reported by M. C. S. Noble, Jr., in *Pupil Transportation in the United States*. The study graphically revealed the serious handicaps to efficient and economical production of buses which existed at that time due to conflicting standards among the various states.

Sponsored by the National Council of Chief State School Officers and financed by the General Education Board, the 1939 conference resulted in the first effective cooperation of the 48 states in setting up uniform school bus standards.

Procedures for preparing and carrying out the work, developed at the time, were substantially followed by the conference of 1945.

Procedures followed in both conferences included (a) working to carry out general policies adopted by the National Council of Chief State School Officers, (b) obtaining from the states their chief problems and directions in which solutions lay, (c) securing sound technical advice, (d) setting up the two major objectives of sound standards, safety, and economy of school transportation, (e) preparing a workbook showing all existing state regulations and suggested standards, and (f) during the conference, providing full and free discussion of each standard before entire conference of state representatives and advisers.

### *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 panel on the front cover of this report represents the medium chrome (hue) included in the specifications for National School Bus Chrome.

Exact specifications for National School Bus Chrome are on file at the National Bureau of Standards. Copies may be obtained free upon request.

### *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.

#### *Manufacturer's Uniform Reporting Forms*

Waste, inefficiency, and confusion result from differences in the types of reports which the various states require from manufacturers. To overcome this situation the conference authorized a committee to prepare a set of uniform report forms which manufacturers can use in reporting to all states the information required in the enforcement of the uniform bus standards. When this committee has developed acceptable forms, they will be made available for use by all the states.

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

The Conference on National 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.

*Excerpts from Letters Waiving Patent Rights*

**Stop Arm Signal:**

"All school bus body builders or school corporations or authorities in the United States are hereby granted royalty-free licenses to manufacture and install the Hicks' Safety Stop Arm signal device in school buses only, under United States Patent No. 1864018, the property of and under contract to Earl M. Hicks and Hicks Body Company, Inc.

"In addition, Earl M. Hicks and Hicks Body Company, Inc., will furnish builders or school corporations or authorities, without charge, such technical data, blueprints and other information as they may have immediately available for the manufacture and installation of Hicks' Safety Stop Arm signal devices in school bus bodies only."

**Roof Exhaust:**

"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."

Communications supplying this information are on file in the

offices of the National Education Association, 1201 Sixteenth Street, N. W., Washington 6, D. C.

*American Standards Association, (ASA), 29 W. 39th Street, New York City.*

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 City.*

*Underwriters' Laboratories, Incorporated, 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.

"By scientific investigation, study, experiments, and tests, to determine 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, construction, and methods affecting such hazards, and other information tending to reduce and prevent loss of life and property from fire, crime, and casualty." *Testing for Safety, pages 6 and 7.*



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