الهيئة السعودية للمواصفات والمقاييس والجودة

Saudi Standards, Metrology and Quality Org. (SASO)

Final Draft Standard

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School buses – Rear crash test using moving barrier

ICS: 43.020

This document is a draft Saudi Standard circulated for comments. It is, therefore, subject to alteration and modification and may not be referred to as a Saudi Standard until approved by SASO.

Contents

School buses – Rear crash test using moving barrier

1- Scope and field of the application

This standard specifies the technical requirements for the integrity of school buses fuel system by rear crash test using the moving barrier.

This standard applies to school buses with gross vehicle weight rating (GVWR) greater than 4500 kg.

2- Complementary references

2.1 ASTM D235 "Standard Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)".

2.2 ASTM E274/E274M "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire".

3- Terms and definitions

For the purposes of this standard, the following terms and definitions are applied:

3.1 School bus

A specially constructed vehicle that is designed to carry more than ten persons to and from school, university or related events.

3.2 Fuel spillage

The fall, flow, or run of fuel from the vehicle but does not include wetness resulting from capillary action.

3.3 Gross vehicle weight rating (GVWR)

The value specified by the vehicle manufacturer as the load- carrying capacity of a single vehicle, as measured at the tire-ground interfaces.

4- Test conditions

The following conditions apply to test:

4.1 Test vehicle

4.1.1 The fuel tank is filled to any level from 90 to 95 % of capacity with Stoddard solvent, having the physical and chemical properties of type (1) solvent, Table I of ASTM D235.

4.1.2 The fuel system other than the fuel tank is filled with Stoddard solvent to its normal operating level.

4.1.3 The parking brake is set and the transmission is in neutral.

4.1.4 Tires are inflated to manufacturer's specifications.

4.1.5 A school bus with a GVWR greater than 4,500 kg is loaded to its unloaded vehicle weight, plus 54 kg of unsecured mass at each designated seating position.

4.2 Moving barrier

4.2.1 The moving barrier shall be mounted on a carriage and rigid construction, symmetrical about a vertical longitudinal plane as specified in Figure (1).

4.2.2 The moving barrier has a solid non steerable front axle and fixed rear axle attached directly to the frame rails with no spring or other type of suspension system on any wheel.

4.2.3 The moving barrier is equipped with a braking device capable of stopping its motion.

4.2.4 The barrier assembly is released from the guidance mechanism immediately prior to impact with the vehicle.

4.2.5 The total weight shall not exceed 1,814 ± 23 kg distributed so its front and rear axles so that their loadings are:

At each front wheel: 499 ±11 kg

At each rear wheel: 408 ±11 kg

4.2.6 The height of the impact surface of the barrier shall be 629 mm and its width 1,981 mm, as specified in Figure (2).

4.2.7 The center of gravity is 1,372 ± 38 mm rearward of the front wheel axis, in the vertical longitudinal plane of symmetry, 401 ± 13 mm above the ground.

4.2.8 The ground clearance to the lower edge of the impact surface is 133 ± 13 mm.

4.2.9 The wheelbase is 3,048 ± 50 mm.

4.2.10 The barrier assembly is released from the guidance mechanism immediately prior to impact with the vehicle.

4.2.11 The moving barrier is equipped with P 205/75 R 15 pneumatic tires inflated to 200 ±21 kPa.

4.3 Test site

4.3.1 The test site shall be of sufficient area to provide for accommodation of the instruments, and for the attaining of the desired velocity by the moving barrier.

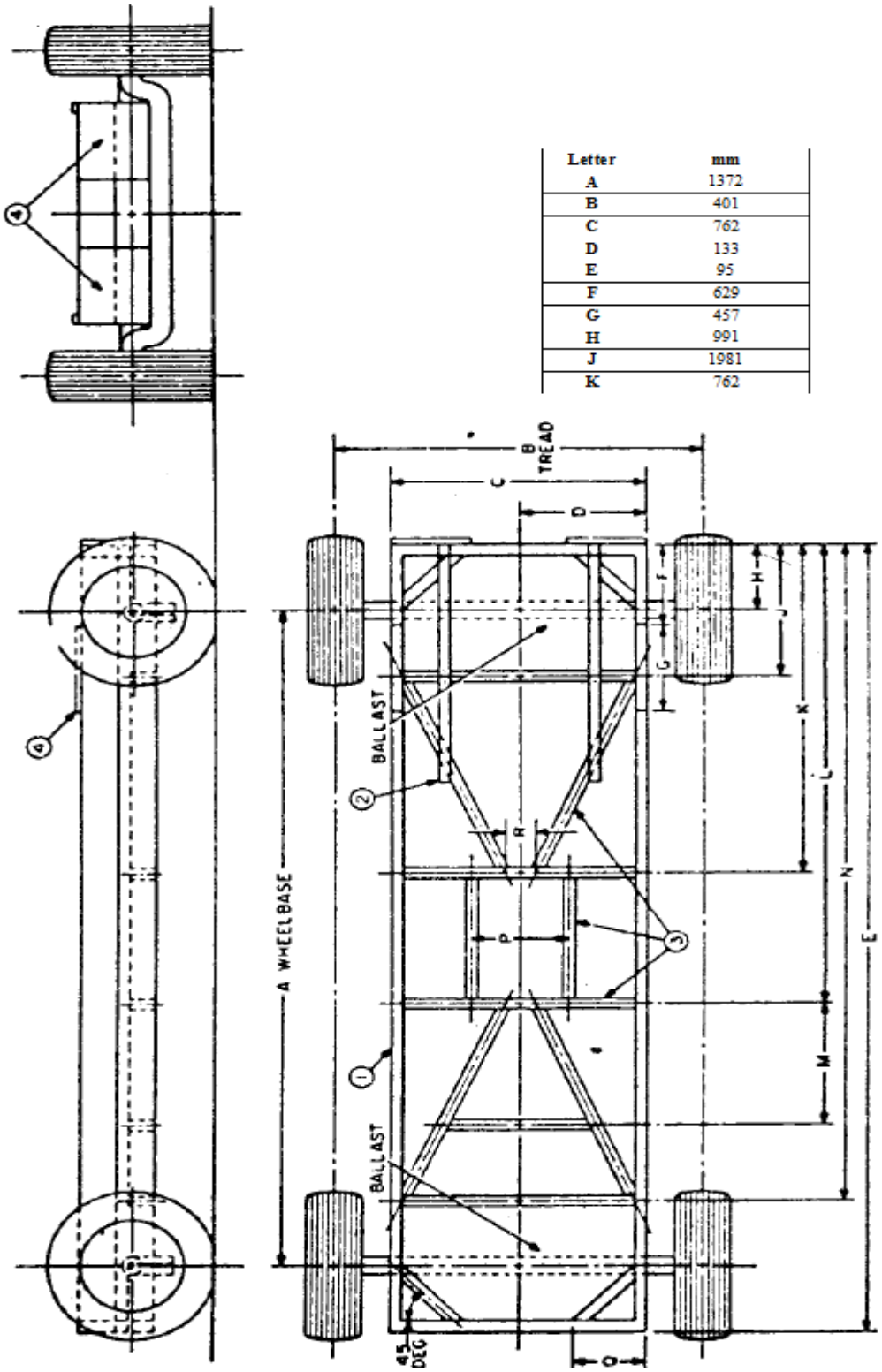
4.3.2 The concrete surface upon which the vehicle is tested is level, rigid, and of uniform construction, with a skid number of 75 when measured in accordance with ASTM E274/E274M and at least 15 m long, and shall not slope from the horizontal by more than 3° over any one-meter length of the path of the moving barrier.

5- Technical requirements

5.1 Fuel spillage in any moving barrier crash test shall not exceed 28 g from impact until motion of the vehicle has ceased, and shall not exceed a total of 142 g in the 5-minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1-minute interval shall not exceed 28 g.

6- Test requirements

6.1 Fuel spillage shall not exceed the limits of 5.1 when the moving barrier traveling longitudinally forward at any speed up to and including 48 km/h impacts the test vehicle at any point and angle, under the applicable conditions of 4.



Letter	mm
A	1372
B	401
C	762
D	133
E	95
F	629
G	457
H	991
J	1981
K	762

NOTES:

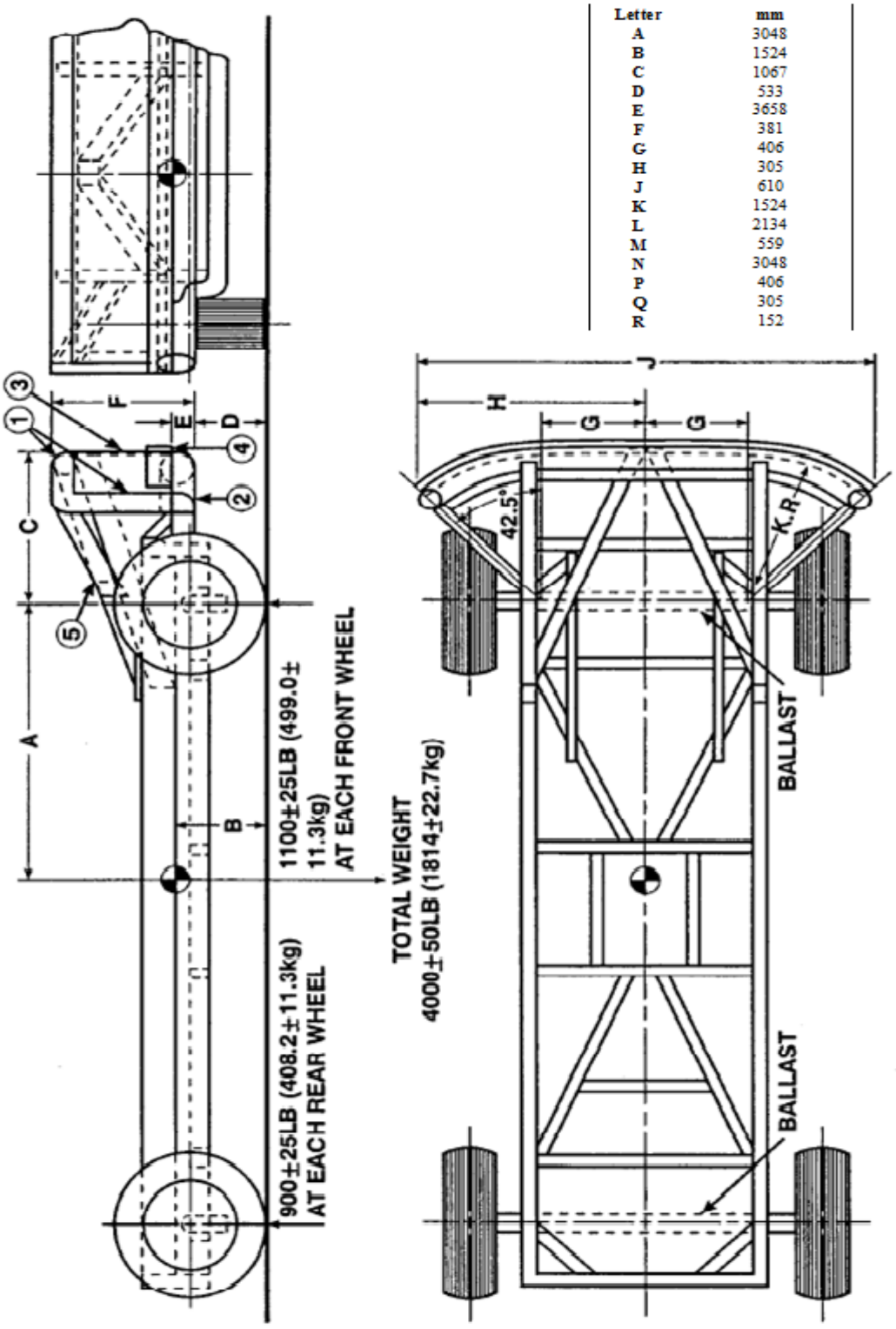
1- Outer frame (152 × 51 × 5 mm) steel tubing. two pieces welded together for (305 mm) height.

2- Ballast tie downs.

3- All inner reinforcements and frame cusses of (102 × 51 × 5 mm) steel tubing.

4- Reinforced areas for bolting on face plates.

Figure (1) – Common carriage for moving barriers



NOTES:

1- Upper frame (102 DIA × 6 mm wall) steel tubing (three sides).

2- Lower frame (152 DIA × 13 mm wall) steel tubing.

3- Face plate (19 mm) thick cold rolled steel.

4- Leading edge (25 × 102 mm wall) steel band, sharp edges broken.

5- All inner reinforcements (102 × 51 × 5 mm) steel tubing.

Figure (2) – Common carriage with impact surface attached

Bibliography

- The main reference:
[1] 49 Subtitle B-Chapter V-Part 571-Subpart B Section 301
(FMVSS 571.301) "Fuel system integrity".