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Protective Enclosures for Agricultural Tractors - Test Procedures and Performance Requirements - SAE J168a

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**SAE STANDARD
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PROTECTIVE ENCLOSURES FOR AGRICULTURAL TRACTORS—TEST PROCEDURES AND PERFORMANCE REQUIREMENTS—SAE J168a SAE Standard

Report of Tractor Technical Committee approved July 1970 and last revised February 1974.

1. Purpose—The purpose of this standard is to establish the test and performance requirements of a protective enclosure designed for wheel-type agricultural tractors to minimize the frequency and severity of operator injury resulting from accidental upset during normal operations. General requirements for the protection of operators are specified in SAE J333.

2. Scope

2.1 Fulfillment of the intended purpose requires testing as follows:

2.1.1 A laboratory test, either static or dynamic, under repeatable and controlled loading, to permit analysis of the protective enclosure for compliance with the performance requirements of this standard.

2.1.2 A field upset test under reasonably controlled conditions, both to the side and rear, to verify effectiveness of the protective system under actual dynamic conditions. If the protective enclosure laboratory energy absorption test (static or dynamic) results indicate compliance of 115% or more, the field upset test (paragraph 5.4) may be omitted. Compliance of at least 115% input energy level is to be determined on the basis of paragraph 5.2.2 or 5.3.2.

2.2 The test procedures and performance requirements outlined in this standard are based on currently available engineering data.

3. Definitions

3.1 An agricultural tractor is defined in paragraph 2.1 of SAE J333.

3.2 The weight of the tractor includes the protective enclosure, all fuels, and other components required for normal use of the tractor. Ballast shall be added as necessary to achieve a minimum total weight of 110 lb (50.0 kg) per maximum power takeoff horsepower (watts) at rated engine speed or the maximum gross vehicle weight specified by the manufacturer, whichever is the greatest. Front end weight shall be at least 25% of the tractor test weight. (In case power takeoff horsepower is not available, use 95% of net engine flywheel horsepower.)

4. Description—The protective enclosure to which this standard applies is a structure generally comprising a frame and/or enclosure

mounted to the tractor and conforming generally to Fig. 1 and paragraph 6.1.6 exit requirements.

5. Test Procedures

5.1 General

5.1.1 The tractor weight used shall be that of the tractor model with the maximum weight on which the protective enclosure is to be used (paragraph 3.2).

5.1.2 A new protective enclosure (structural members of cab) and mounting connections of the same design shall be used for conducting each test as described in paragraphs 5.2, 5.3, and 5.4.

5.1.3 Instantaneous deflection shall be measured and recorded for each segment of test. Minimum dimensions during test are specified for each test. The instantaneous deflection shall not violate the minimum dimensions specified in paragraph 6.1.1.

5.1.4 Seat reference point (SRP in Figs. 2 and 3) is that point where the vertical line tangent to the most forward point at the longitudinal seat centerline of the seat back, and the horizontal line tangent to the highest point of the seat cushion intersect in the longitudinal seat section. The SRP is to be determined with the seat unloaded and adjusted to the highest and most rearward position provided for seated operation of the tractor.

5.1.5 In case of an offset seat, the protective enclosure loading shall be on the side with least space between the centerline of the seat and the protective structure.

5.1.6 Low temperature characteristics of the protective enclosure or its material shall be demonstrated as specified in paragraph 6.1.2.

5.1.7 Rear input energy tests (static, dynamic, or field upset) need not be performed on enclosures applied to tractors having four driven wheels and more than one-half their unballasted weight on the front wheels, since this type of vehicle is not prone to rearward upset.

5.1.8 Accuracy table:

Means to Measure	Accuracy
Deflection of enclosure, in (mm)	±5% of deflection measured
Vehicle weight, lb (kg)	±5% of weight measured
Force applied to frame, lbf (N)	±5% of force measured
Dimensions of critical zone, in (mm)	± 0.5 in (12.5 mm)

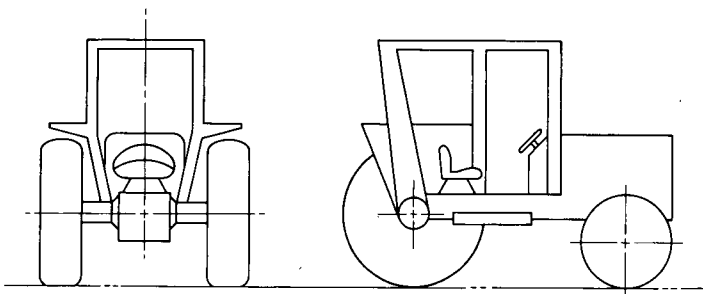


FIG. 1—TRACTOR WITH TYPICAL PROTECTIVE ENCLOSURE

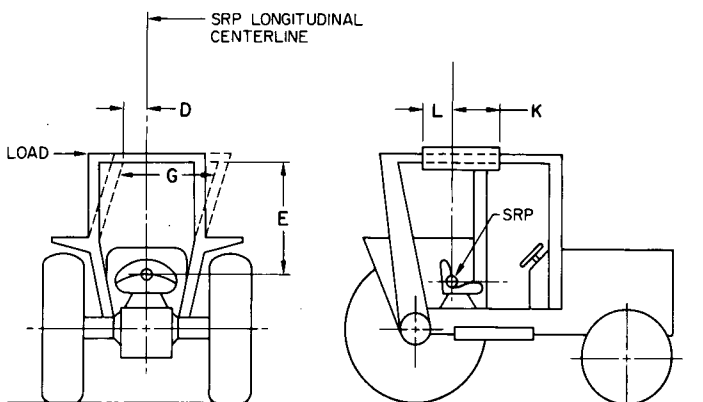


FIG. 2—SIDE LOAD APPLICATION

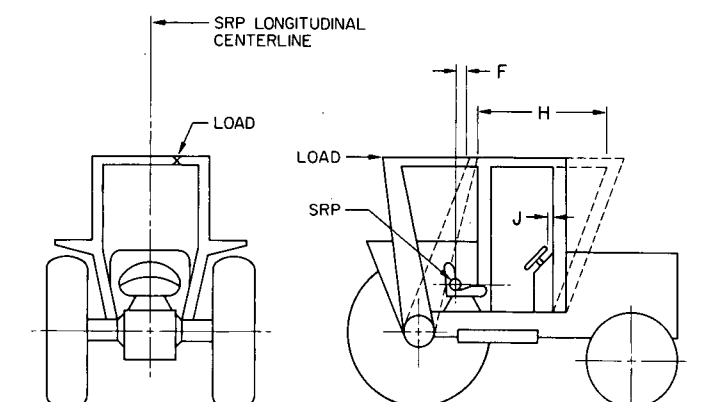


FIG. 3—REAR LOAD APPLICATION

5.1.9 Where movable or normally removable portions of the enclosure add to structural strength, they shall be placed in configurations that contribute least to the structural strength during the test.

5.2 Static Test Procedure (optional to paragraph 5.3)

5.2.1 TEST CONDITIONS

5.2.1.1 The laboratory mounting base shall be the tractor chassis or the equivalent for which the protective enclosure is designed to assure the integrity of the entire system.

5.2.1.2 The protective enclosure shall be instrumented with the neces-