

Protective Frame for Agricultural Tractors - Test Procedures and Performance Requirements - SAE J334b

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**SAE STANDARD
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PROTECTIVE FRAME FOR AGRICULTURAL TRACTORS—TEST PROCEDURES AND PERFORMANCE REQUIREMENTS—SAE J334b SAE Standard

Report of Tractor Technical Committee approved April 1968 and last revised February 1974.

1. Purpose—The purpose of this standard is to establish the test and performance requirements of a protective frame designed for wheel-type agricultural tractors to minimize the frequency and severity of operator injury resulting from accidental upsets during normal operation. General systems 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 frame 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 analysis of the protective frame 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 frame, 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

4.1 Protective Frame—The protective frame to which this standard applies is a structure generally comprised of uprights mounted to the

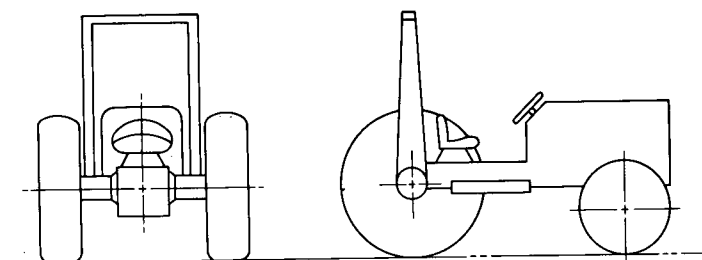


FIG. 1—TRACTOR WITH TYPICAL PROTECTIVE FRAME

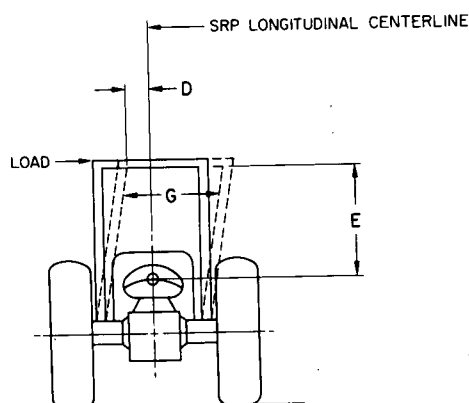


FIG. 2—SIDE LOAD APPLICATION

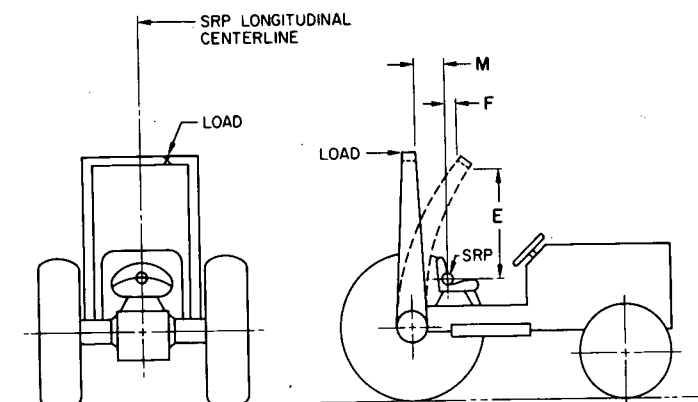


FIG. 3—REAR LOAD APPLICATION

tractor, extending above the operator's seat. A typical two-post frame is shown in Fig. 1.

4.2 Overhead Weather Shield—If an overhead weather shield is available for attachment to the protective frame, it may be in place during tests, providing it does not contribute to the strength of the protective frame.

4.3 Overhead Falling Object Protection—If an overhead falling object protection device is available for attachment to the protective frame, it may be in place during tests provided it does not contribute to the strength of the protective frame. (See SAE J167.)

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 frame is to be used (paragraph 3.2).

5.1.2 A new protective frame 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 the test. Minimum dimensions during test are specified for each segment of 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 the case of an offset seat, the frame loading shall be on the side with the least space between centerline of seat and protective frame.

5.1.6 Low temperature characteristics of the protective frame 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 frames applied to tractors having four driven wheels and more than one-half the 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 frame, 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)

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