

Submitted for recognition as an American National Standard

Discriminating Back-Up Alarm System Standard

Foreword—This document is intended for use as a test procedure, to enable qualification of a Discriminating Back-Up Alarm System installed on an off-road, self-propelled, work machine, as defined by SAE J1116, limited to categories: (a) Construction, and (b) General purpose industrial.

The systems described within are intended to supplement the machine's warning equipment and operating procedures and not replace them.

1. Scope—This SAE Standard describes methods for evaluating the performance of the systems detection device, the minimum detection areas behind the machine, the visual and audible information presented to the operator and ground personnel, and the systems fault detection requirements. Also included are operator system function tests and maintenance procedures.

1.1 Purpose—The purpose of this document is to establish performance requirements for a Discriminating Back-Up Alarm System.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-001.

SAE J833—Human Physical Dimensions

SAE J994—Alarm—Backup—Electric Laboratory Performance Testing

SAE J1116—Categories of Off-Road Self-Propelled Work Machines

SAE J1446—On-Machine Alarm Test and Evaluation Procedure for Construction and General Purpose Industrial Machinery

2.1.2 FEDERAL PUBLICATION—U. S. Government, DOD SSP, Subscription Service Division, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

Federal Register CFR 30 Part 77.410—Mobile Equipment—Automatic Warning Devices

2.1.3 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 5006—Earth-moving machinery—Operator's field of view

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2.2 Related Publication—The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 9533—Earth-moving machinery—Machine-mounted forward and reverse audible warning alarm—
Sound test method

3. Definitions

3.1 Detection Time—Time required for discriminating back-up alarm system to detect an object or person in the detection zone and activate all warning systems.

3.2 Discriminating Back-Up Alarm System—A system which causes a back-up alarm to sound only if an object or person is within the detection zone.

3.3 Free-Field—A level area with no vertical reflecting surface within the detection zone being tested.

3.4 Hazard Zone—(Danger Zone) includes Operator Masked Zone and Detection Zone, see Figure 1.

3.5 Machine Width—Maximum width of machine including wheels or tracks and rear-mounted attachments.

3.6 Object—Solid body similar in size or larger than test body.

3.7 Operator Masked Zone(s)—Area to the rear of the machine which is obscured by part(s) of the machine from the operator's view including the use of rear view mirrors. (As defined in ISO 5006.) Operator's size being small as defined by SAE J833.

3.8 Detection Zone—Area to the rear of the machine within which an object or person moving or stationary will be detected by the discriminating back-up alarm system, see Figure 1.

3.9 Sensor—A device which senses the presence of a person or object within the detection zone.

3.10 Test Body—Person or object that will provide equivalent results, not exceeding dimensions in Figure 2, dressed in long sleeve shirt and long pants of heavy felt cloth, sitting. (See Figure 2.)

3.11 Travel Mode—Mode when machine exceeds 15 km/h.

3.12 Zone Depth—Length of detection zone, measured from rear of machine on zero axis.

4. General Comments

4.1 The sensing system must be capable of meeting the requirements of this document under all anticipated environmental conditions (e.g., rain, snow, dust, high wind, etc.). Sensing method must not pose health hazards to the ground worker or test person.

5. Detection of Zone Type Selection

5.1 Selection—The selection of the correct zone for a machine type will be made based on the depth of the operator masked zone, maximum rearward speed of the machine, intended use of the equipment, or any combination of these and other equipment specific factors. Note that in some cases, the operator masked zone may extend out to infinity. In these cases, the maximum depth detection ZONE 4 must be used to allow for the maximum possible advance warning.

DETECTION ZONE PARAMETERS

REFERENCE CHART TO ASSIST IN PLOTTING
OF 5 DEGREE FAN DIMENSIONS

MACHINE WIDTH (W)	ZONE1 WIDTH AT 2m	ZONE2 WIDTH AT 4m	ZONE3 WIDTH AT 8m	ZONE4 WIDTH AT 16m
2.00	2.35	2.70	3.40	4.80
2.25	2.60	2.95	3.65	5.05
2.50	2.85	3.20	3.90	5.30
2.75	3.10	3.45	4.15	5.55
3.00	3.35	3.70	4.40	5.80
3.25	3.60	3.95	4.65	6.05
3.50	3.85	4.20	4.90	6.30
2.75	4.10	4.45	5.15	6.55
4.00	4.35	4.70	5.40	6.80

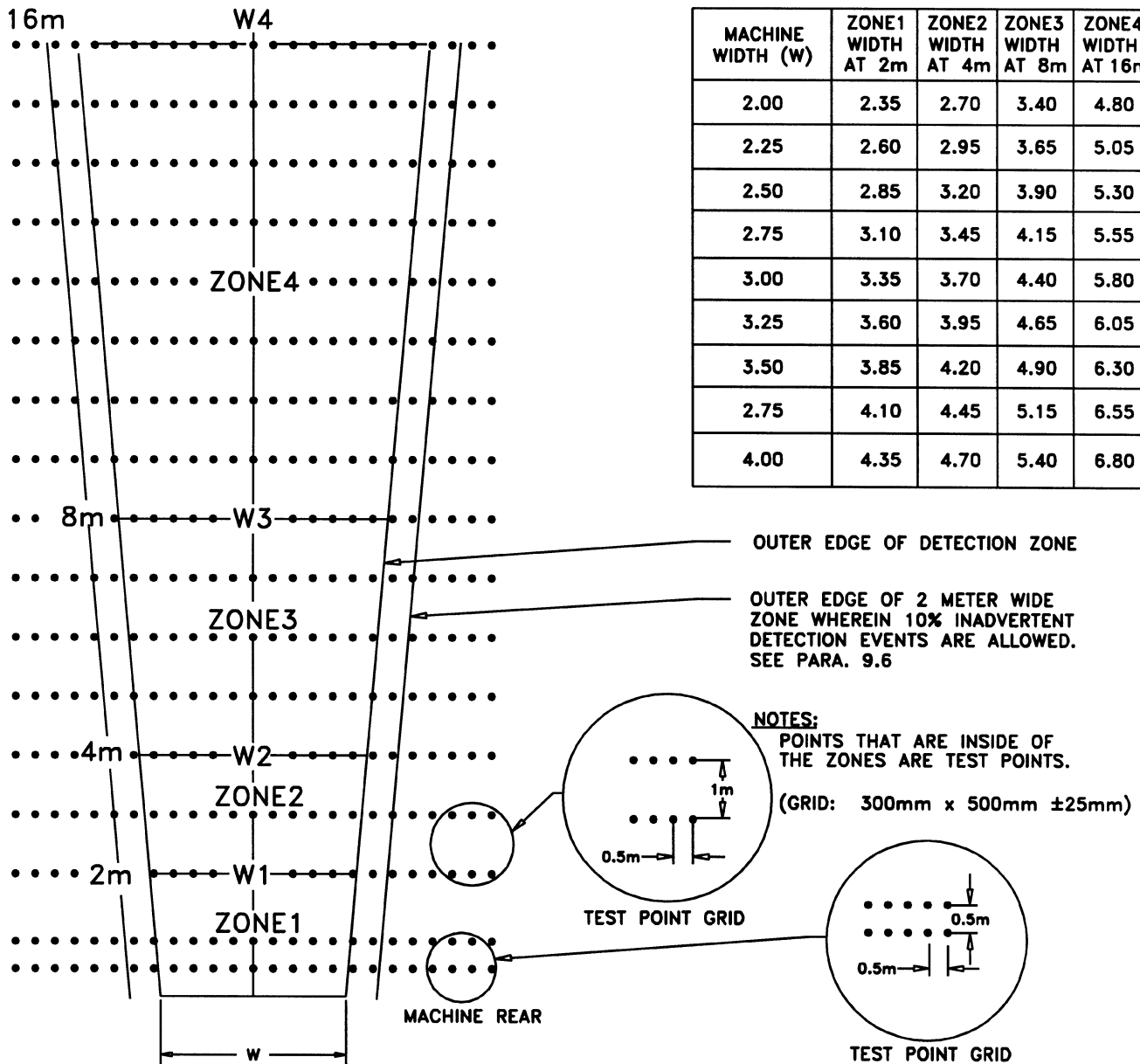


FIGURE 1—DETECTION ZONES