
International Standard



3164

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Earth-moving machinery — Laboratory evaluations of roll-over and falling-object protective structures — Specifications for the deflection-limiting volume

Engins de terrassement — Études en laboratoire des structures de protection au retournement et contre les chutes d'objets — Spécifications pour le volume limite de déformation

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Ref. No. ISO 3164-1979 (E)

Descriptors : earth-moving equipment, safety devices, accident prevention, falling-bodies protection, overturning (vehicles), tests, laboratory tests, deformation.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3164 was developed by Technical Committee ISO/TC 127, *Earth-moving machinery*, and was circulated to the member bodies in September 1978.

It has been approved by the member bodies of the following countries:

Australia	Germany, F. R.	Spain
Austria	Italy	Sweden
Belgium	Japan	United Kingdom
Czechoslovakia	Korea, Rep. of	USA
Egypt, Arab Rep. of	Mexico	USSR
Finland	Poland	Yugoslavia
France	South Africa, Rep. of	

The member body of the following country expressed disapproval of the document on technical grounds :

3rd

Bulgaria

2nd

This second edition cancels and replaces the first edition (i.e. ISO 3164-1976).

Earth-moving machinery — Laboratory evaluations of roll-over and falling-object protective structures — Specifications for the deflection-limiting volume

1 Scope

This International Standard specifies the deflection-limiting volume to be used in laboratory evaluations of roll-over and falling-object protective structures. It relates to ISO 3471, dealing with roll-over protective structures, and to ISO 3449, dealing with falling-object protective structures. The dimensioning of the deflection-limiting volume takes into account the large operator (see ISO 3411).

2 Field of application

This International Standard shall be used when performing laboratory evaluations of roll-over protective structures set forth in ISO 3471 and falling-object protective structures set forth in ISO 3449.

3 References

ISO 3411, *Earth-moving machinery — Human physical dimensions of operators and minimum operator space envelope*.

ISO 3449, *Earth-moving machinery — Falling object protective structures — Laboratory tests and performance requirements*.

ISO 3471, *Earth-moving machinery — Roll-over protective structures — Laboratory tests and performance requirements*.

4 Definitions and abbreviations

For the purpose of this International Standard, the following definitions apply :

see amendment
4.1 roll-over protective structure (ROPS) : A system of structural members, arranged on a machine in such a way as to reduce the possibility of the machine crushing the operator in the event of an accidental overturn.

4.2 falling-object protective structure (FOPS) : A system of structural members arranged in such a way as to provide operators with reasonable protection from falling objects (for example trees, rocks).

4.3 deflection-limiting volume (DLV) : That volume, related to the operator, which serves to set limits and deflections permissible when performing laboratory evaluations of ROPS and FOPS. The volume, an approximation, is based on the seated dimensions of the large operator.

4.4 locating point (LP) (see figure 2) : A point in the middle vertical longitudinal plane of the seat that is parallel to the longitudinal axis of the seat and at the intersection of the following two lines in this plane :

— HH : The horizontal line that is tangential to the highest point of the seat cushion in this plane;

— VV : The vertical line that is tangential to the most forward point of the seat back in this plane.

This point is defined to establish a practical definitive location for the DLV (4.3) regardless of morphological characteristics or mass of operator.

4.5 location axis (LA) (see figure 1) : That line which is perpendicular to the middle vertical longitudinal plane of the seat and intersects that plane at the locating point (LP) defined in 4.4.

5 Apparatus

A volume as shown in figure 1. Accuracy of the lengths : ± 13 mm (0.5 in).

6 Positioning of deflection-limiting volume (DLV)

6.1 The seat shall be adjusted to the rearmost position first and then to the lowest position.

The position of seats with suspension systems shall include that static deflection of the suspension system which a seated operator as defined in 4.3 would impose on the suspension system (all mechanical, hydraulic, or gas elements to be at the manufacturer's recommended settings for this size of operator).

6.2 Any seat having rotational adjustment for work operations about a transverse or vertical axis shall be at the middle or central position when determining the LP.

6.3 A locating point (LP) and a locating axis (LA) shall be located as follows :

- a) the LP shall be in the middle vertical longitudinal plane of the seat that is parallel to the longitudinal axis of the seat;
- b) the LP shall be at the intersection of the two lines in this plane (see 4.4 and figure 2);
- c) the LA shall be that line which is perpendicular to the middle vertical longitudinal plane of the seat and intersects that plane at the LP defined in 4.4 and 6.3 a) and 6.3 b).

6.4 The DLV, figure 1, shall be positioned so that its LA coincides with the LA defined in 6.3 c). The DLV shall be centred

transversely in the seat and the principal axes of the DLV shall be parallel to lines HH and VV of figure 2. This positioning takes into account the nominal compression of 50 mm (2 in) of the seat cushion and back. Accuracy shall be ± 13 mm (0.5 in).

6.5 The location of the DLV shall remain coincidental with the LA even though that line may move during any or all of the laboratory loadings.

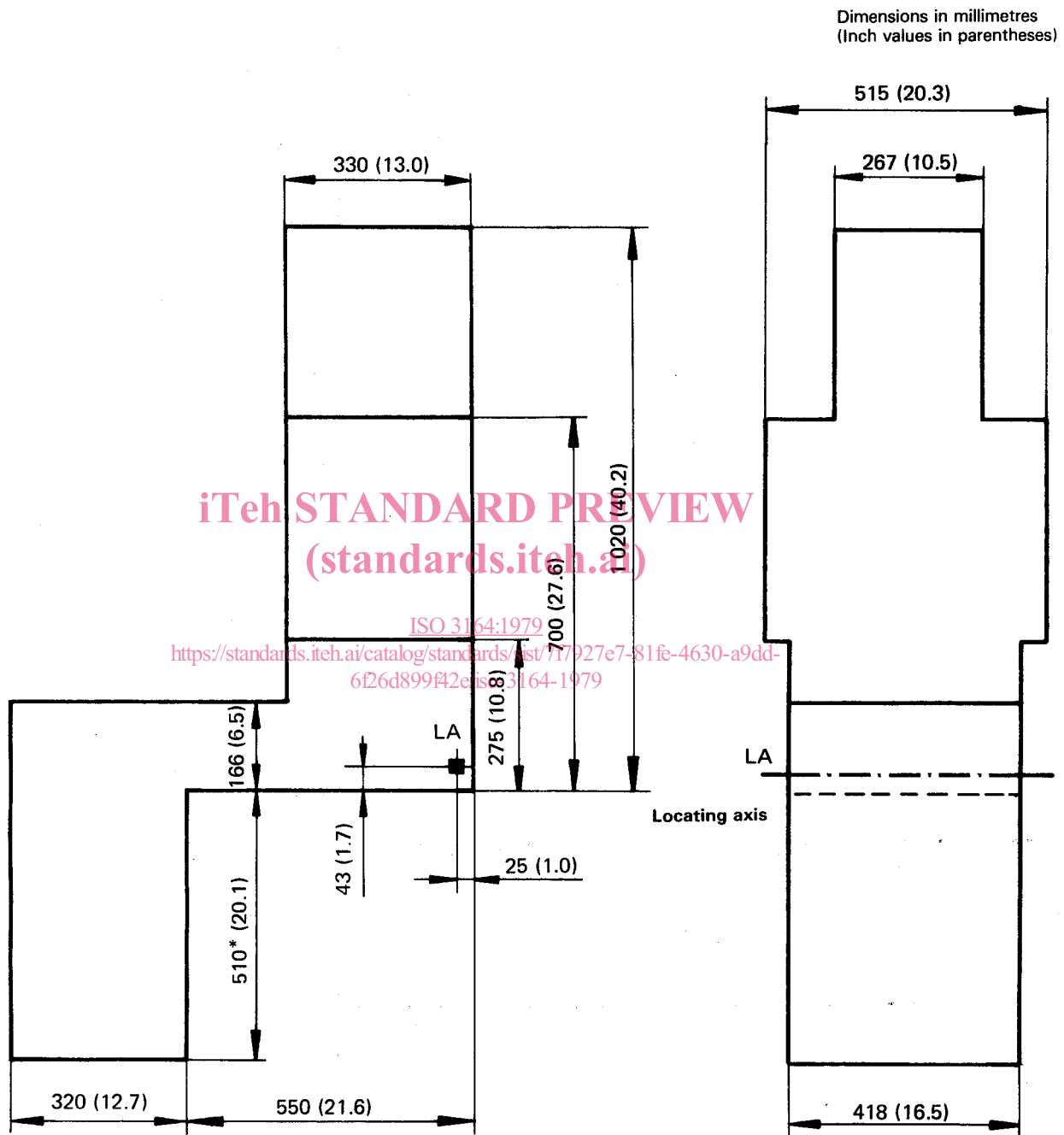
7 Application

For the application of the DLV see ISO 3449 and ISO 3471.

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* But not below the floor plates.

Figure 1 — Deflection-limiting volume (DLV)

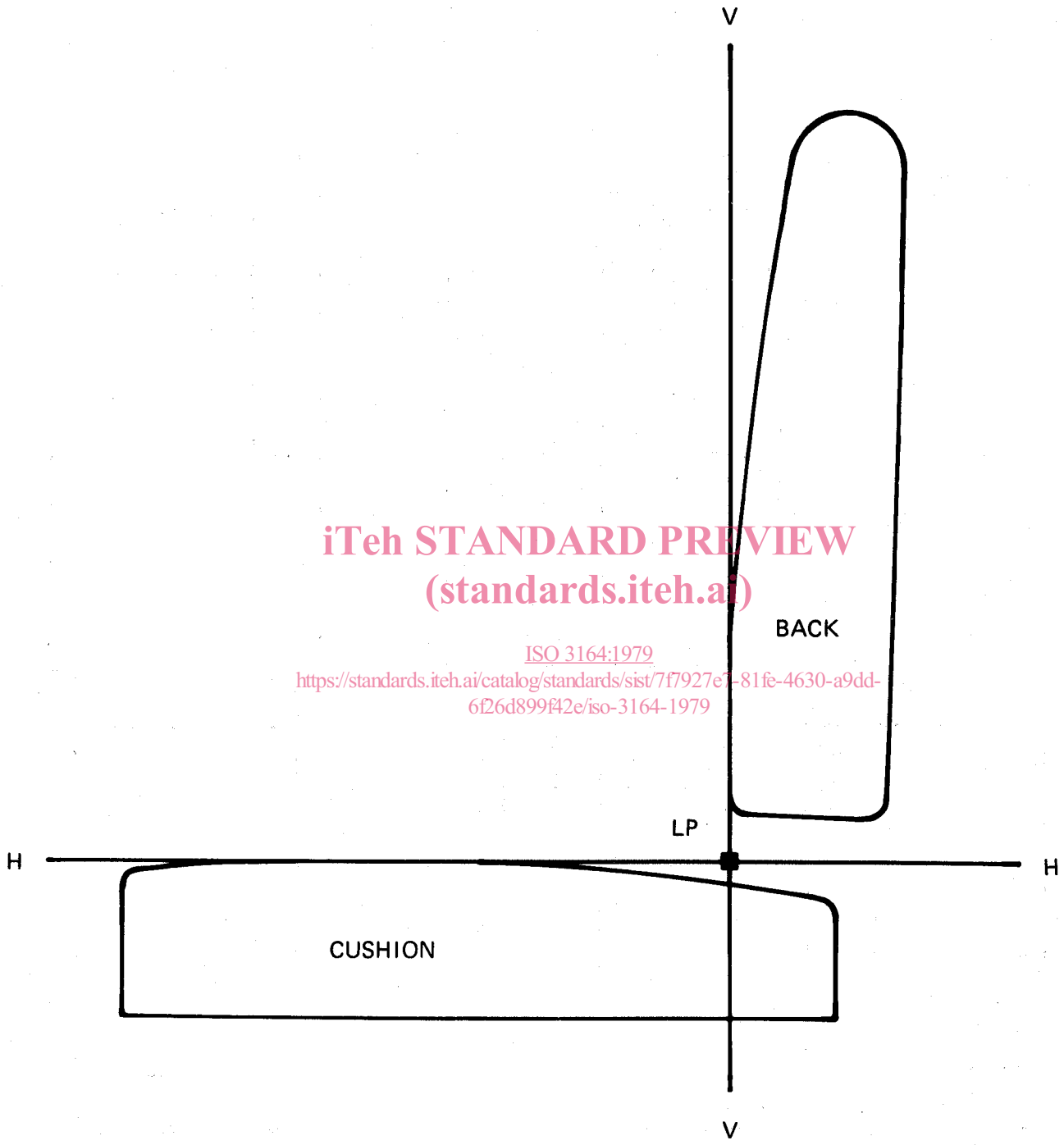


Figure 2 — Deflection-limiting volume locating point (LP)

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Earth-moving machinery — Laboratory evaluations of roll-over and falling-object protective structures — Specifications for the deflection-limiting volume

AMENDMENT 1

Amendment 1 to International Standard ISO 3164-1979 was drawn up by Technical Committee ISO/TC 127, *Earth moving machinery*. It was submitted directly to the ISO Council in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO.

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Page 1 :

Sub-clause 4.1, replace the definition by the following :

“roll-over protective structure (ROPS) : System of structural members arranged on a machine in such a way as to accomplish its primary purpose to reduce the possibility of an operator, when wearing a seat belt, from being crushed should his machine roll over. Structural members include any subframe, bracket, mounting, socket, bolt, pin suspension or flexible shock absorber used to secure the system to the machine frame but excludes mounting provisions which are integral with the machine frame.”

UDC 624.132.3 : 621.879-74/-78 : 620.1

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