INTERNATIONAL STANDARD

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Tractors and machinery for agriculture — Seat belts —

Part 2: Anchorage strength requirements

Tracteurs et matériels agricoles — Ceintures de sécurité —

Partie 2: Exigences relatives à la résistance des ancrages

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests*.

This second edition cancels and replaces the first edition (ISO 3776-2:2007), which has been technically revised for the technical harmonization with those sections of OECD Code 4: July 2012, OECD Code 6: July 2012, and OECD Code 7: July 2012 relating to seat belt anchorage strength testing.

ISO 3776 consists of the following parts, under the general title *Tractors and machinery for agriculture — Seat belts*:

— *Part 1: Anchorage location requirements*

— *Part 2: Anchorage strength requirements*

— *Part 3: Requirements for assemblies*

Introduction

Seat belts are used on agricultural machinery to restrain the operator in the seat during normal operation and use. When used on agricultural tractors, seat belts also serve to restrain the operator within the protective zone of the protective structure in the event of an upset. This part of ISO 3776 specifies the minimum seat belt anchorage strength requirements to meet these purposes.

This part of ISO 3776 specifies technical performance requirements, associated test procedures, and performance test report information. Technical harmonization with OECD is ensured by the Maintenance Agency operating as specified in Annex B.

Tractors and machinery for agriculture — Seat belts —

Part 2: Anchorage strength requirements

1 Scope

This part of ISO 3776 specifies the strength requirements of the anchorages for pelvic restraint (seat) belts intended to be used by the operators of agricultural tractors and self-propelled machinery.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
anchorage
provision to transfer forces applied to the seat belt assembly to the structure of the tractor or the machine

2.2
seat belt assembly
belt, including any buckle, length adjustor, retractor, and means for securing to an anchorage, that fastens across the pelvic area to provide pelvic restraint during operation and roll-over conditions

2.3
seat belt system
seat belt assembly with anchorages

2.4
seat mounting
all intermediary fittings (slides, etc.) used to secure the seat to the appropriate part of the tractor

2.5
applicable seat components
all components of the seat whose mass could contribute to loading of the seat mounting (to the vehicle structure) during a roll-over event

3 Anchorage testing

3.1 Test procedure type

Only static tests for the anchorages are given in this procedure.

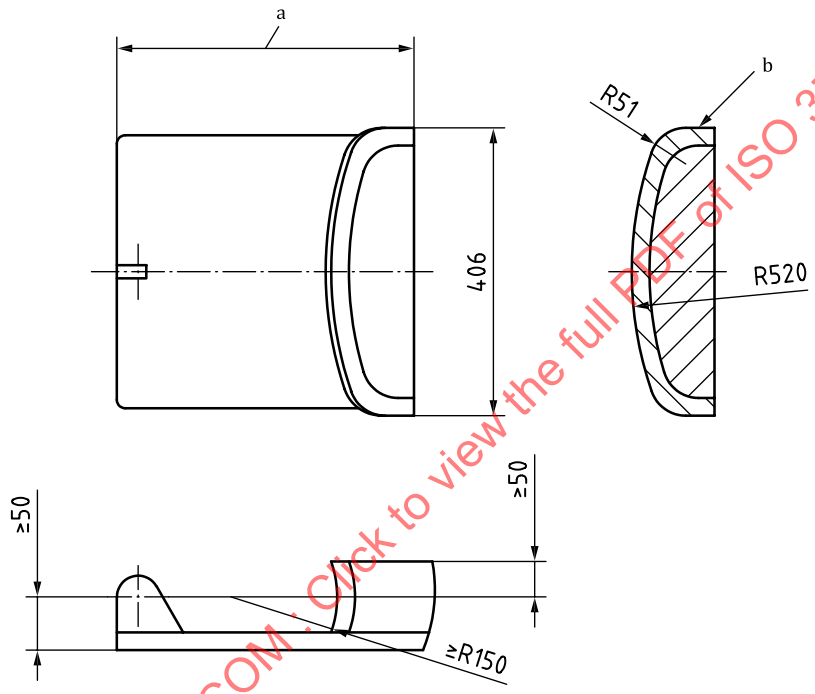
3.2 General

3.2.1 If, for a given protective structure, a manufacturer provides more than one seat with identical components which transfer the load from the seat belt anchorage to the seat mounting on the ROPS floor or tractor chassis, the testing station is authorised to test only one configuration, corresponding to the heaviest seat.

3.2.2 The seat shall be in position during the tests, fixed to the mounting points on the tractor using all intermediary fittings (such as suspension, slides, etc.) specified for the complete tractor. No additional non-standard fittings contributing to the strength of construction shall be used.

3.2.3 The anchorages shall be capable of withstanding the loads applied to the seat belt system using a device as shown in Figure 1. The seat belt anchorages shall be capable of these test loads applied with the seat adjusted in the worst position of longitudinal adjustment to ensure that the test condition is met. If a worst position among the possible seat adjustments is not recognised by the testing station, the test loads shall be applied with the seat in the mid-position of longitudinal adjustment. For a suspended seat, the seat shall be set to the midpoint of the suspension travel, unless this is contradictory to a clearly stated instruction by the seat manufacturer. Where special instructions exist for the seat setting, these shall be observed and specified in the report.

Dimensions in millimetres



Key

a This dimension is optional.

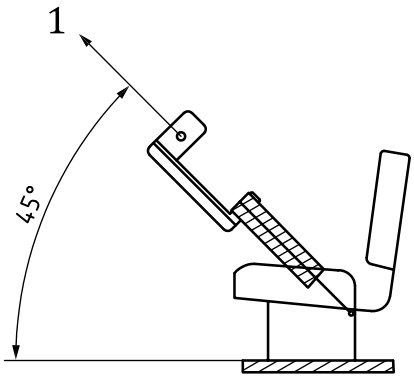
b Medium density foam rubber, 25 mm thick (canvas covered).

Figure 1 — Traction device

3.2.4 After the load is applied to the seat system, the load application device shall not be repositioned to compensate for any changes that could occur to the load application angle. The horizontal distance between the point at which the load generation apparatus is attached to the test rig and the nearest seat belt anchorage shall not be less than 1 000 mm.

3.3 Forward loading

A tensile force shall be applied in a forward and upward direction at an angle of 45° ± 2° to the horizontal, as shown in Figure 2. The seat belt anchorages shall be capable of withstanding a force of 4 450 N. In the event that the force applied to the seat belt assembly is transferred to the vehicle chassis by means of the seat, the seat mounting shall be capable of withstanding this force plus an additional force equal to four times the weight of all applicable seat components applied 45° ± 2° to the horizontal in a forward and upward direction, as shown in Figure 2.



Key

1 test load

Figure 2 — Load application in the upward and forward direction

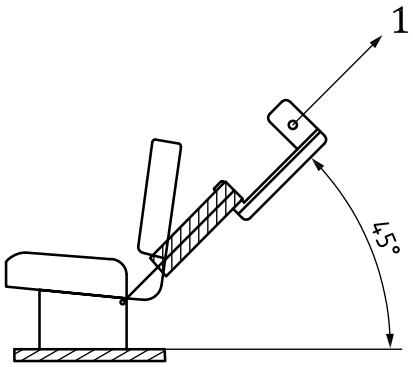
3.4 Rearward loading

A tensile force shall be applied in a rearward and upward direction at an angle of 45° ± 2° to the horizontal, as shown in Figure 3. The seat belt anchorages shall be capable of withstanding a force of 2 225 N. In the event that the force applied to the seat belt assembly is transferred to the vehicle chassis by means of the seat, the seat mounting shall be capable of withstanding this force plus an additional force equal to two times the weight of all applicable seat components applied 45° ± 2° to the horizontal in a rearward and upward direction, as shown in Figure 3.

Both tensile forces shall be equally divided between the anchorages.

3.5 Seat belt buckle release force

At the request of the manufacturer, measure the force required to open the seat belt buckle. The seat belt buckle shall open with a maximum force of 140 N following the load applications. This requirement is fulfilled for seat belt assemblies that satisfy the requirements of ECE-R16[1] or 77/541/EEC[2] as last amended.



Key

1 test load

Figure 3 — Load application in the upward and rearward direction

4 Acceptance conditions

Permanent deformation of any system component and anchorage area is acceptable under the action of the forces specified in 3.3 and 3.4. However, there shall be no failure allowing release of the seat belt system, seat belt assembly, or the seat adjustment locking mechanism.

NOTE The seat adjuster or locking device need not be operable after application of the test load.

5 Test report

5.1 A test report shall be prepared. Annex A provides an acceptable test report format. Should a different test report format be used, it shall, at a minimum, contain the information required in Annex A.

5.2 The results of a test performed on an identical "operator restraint system" may be included in more than one test report provided that this system is fitted exactly in the same conditions.

Annex A
(informative)

Test report for seat-belt anchorage strength

A.1 Anchorage performance

A.1.1 Loading in the forward and upward direction

Driver seat>	**Make/Model/Type**	
Gravity force (F_g = seat mass × 9.81) N	Required force (4 450 + 4 F_g) N	Applied force N

A.1.2 Loading in the rearward and upward direction

Driver seat	**Make/Model/Type**	
Gravity force (F_g = seat mass × 9.81) N	Required force (2 225 + 2 F_g) N	Applied force N

A.1.3 Curves, drawings, and photos

A copy of the force/deflection curves derived during the tests shall be included.

Drawings and/or photos of the seat mounting and anchorages have to be added.

A.1.4 Statement (if necessary)

The testing station certifies that the tested seat is the worst variant among the seats listed below that are identical regarding the make, range, and fixing on the protective structure.

Statement:

During the test, no structural failure or release of seat, seat adjuster mechanism, or other locking service occurred. The seat and safety belt anchorage tested fulfill the requirement of ISO 3776-2:2013.