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Machinery for forestry — Operator protective structures — Laboratory tests and performance requirements

Machines forestières — Structures de protection de l'opérateur — Essais de laboratoire et exigences de performance

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8084 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 15, *Machinery for forestry*.

This second edition cancels and replaces the first edition (ISO 8084:1993), which has been technically revised.

Machinery for forestry — Operator protective structures — Laboratory tests and performance requirements

1 Scope

This International Standard establishes a laboratory test method and performance requirements for operator protective structures (OPS) on forestry machines. It is applicable to mobile forestry machines as defined in ISO 6814 engaged in felling, processing, forwarding and skidding. The OPS are designed to provide reasonable protection from penetrating objects such as saplings, branches, broken winch lines and poking hazards in forestry work, but not from small, thrown objects such as chain teeth. Those OPS meeting the performance criteria will not provide complete operator protection under all conceivable circumstances, but are expected to minimize the possibility of operator injury in normal operational situations.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3164, *Earth-moving machinery — Laboratory evaluations of protective structures — Specifications for deflection-limiting volume*

ISO 6814, *Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification*

3 Terms and definitions

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

3.1
operator protective structure
OPS
system of structural members arranged in such a way as to minimize the possibility of operator injury from penetrating objects (such as whipping saplings, branches and broken winch lines)

3.2
roll-over protective structure
ROPS
system of structural members whose primary purpose is to reduce the possibility of a seat-belted operator being crushed should the machine roll over

NOTE These 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 exclude mounting provisions that are integral with the machine frame.

3.3
falling-object protective structure
FOPS
system of structural members arranged in such a way as to provide operators with reasonable protection from falling objects (e.g. trees, rocks)

3.4
deflection-limiting volume
DLV
orthogonal approximation of a large, seated, male operator as defined in ISO 3411 wearing normal clothing and a protective helmet

4 Laboratory tests

CAUTION — Some of the tests specified in this International Standard involve the use of processes which could lead to a hazardous situation.

4.1 Apparatus

4.1.1 Material, equipment and tie-down means adequate for ensuring that the OPS and its machine structure resist the applied force.

4.1.2 Apparatus necessary for pushing a test object into each surface tested, consisting of a steel hemispherical rod-end of 90 mm diameter. For testing glass or polycarbonate, a non-metallic pad, of rubber or synthetic compound, shall be used. The pad shall be of homogenous construction and uniform density, 20 mm thick, 90 mm in diameter and with a Shore type-A hardness value of 90.

4.1.3 Instrumentation for measuring the force applied to the OPS and the deflection of the structure, to an accuracy in accordance with Table 1.

Table 1 — Instrumentation accuracy requirements

Parameter	Tolerance
Measured dimensions	± 5 % of maximum dimensions
Measured force	± 5 % of maximum force required

4.2 Preparation

4.2.1 The deflection-limiting volume (DLV) and its location shall be in accordance with ISO 3164. The DLV shall be secured firmly to the same part of the machine to which the operator's seat is fixed, and shall remain there during the entire test period. On machines equipped with more than one seat position, the tests shall be conducted with the seat in the position that brings the DLV closest to the OPS for each surface tested.

4.2.2 The OPS shall be attached to the machine frame as it would be on an operating machine. A complete machine is not required; however, the machine frame and OPS mounting shall represent an operating installation.

4.2.3 All detachable windows and panels that are not part of the OPS and which might be removed from an operating machine shall be removed so that they do not contribute to the strength of the OPS.

4.2.4 Glazing material that does not contribute to the structural performance of the OPS may be removed for the test.

4.2.5 Where the same structure is used for multiple tests, panels weakened or deformed by previous tests may be replaced.

4.2.6 If the OPS is mounted on a complete machine, the machine frame shall be secured so that the test energy is absorbed by the OPS structure alone.

4.3 Procedure

4.3.1 Slowly apply the force (5 mm/s max., to approximate static loading) from the test object normal to the exterior surface under test until this applied force attains a value of 17 800 N. Sustain the force at this value for 1 min before releasing it.

4.3.2 In the case of open-mesh material, apply the loading such that the projection of the line of force passes through the centre of the mesh opening.

4.3.3 Perform five loadings on the opening at the following locations:

— the centre;

— mid-way along the longest side;

— mid-way along the shortest side;

— at the sharpest corner;

— at the dullest corner.

When testing the sides, the loading shall be 50 mm from the edge.

5 Performance requirements

5.1 Test acceptance

When the test is performed anywhere on the OPS, the DLV, in accordance with ISO 3164, shall not be entered by any part of the OPS or the test object, and the major diameter of the test object shall not pass through the surface under test.

5.2 Constructional requirements

5.2.1 The operator station shall be completely enclosed with solid material, by a screen or with glazing, including full doors.

5.2.2 No opening in an OPS surface shall allow a straight, rigid bar, 48 mm in diameter, to freely enter the OPS.

5.2.3 Protective screens shall have a maximum opening of 45 mm × 45 mm, with 6 mm woven wire mesh or equivalent construction.

5.2.4 Glazing material meeting requirements may be used anywhere on the machine, including the front windscreen. If wipers are to be used, the glazing surface shall be hard-coated.

5.2.5 Guards or screens provided for OPS window protection shall be designed to allow manual cleaning of the windows.

5.2.6 The OPS should be designed to minimize any adverse effects on operator visibility, comfort and protection against hazards generally.

5.2.7 The OPS may be attached to, or form part of, a ROPS/FOPS, provided that such attachment does not adversely affect the function or performance of the ROPS or FOPS.

5.2.8 Provision shall be made on the OPS for two means of egress, each on a different surface of the OPS, in order to provide an emergency exit.