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JAPANESE INDUSTRIAL STANDARD

Seat Belt Assemblies and Anchorage for Earth-moving Machineries

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Seat Belt Assemblies and Anchorage for
Earth-moving MachineriesA 8911-1979
(Reaffirmed: 1984)1. Scope

This Japanese Industrial Standard specifies the seat belt assemblies for earth-moving machineries of single operator, hereinafter referred to as the "seat belts", and anchorages which are used in combination with the protective structures specified in JIS A 8910.

Remark: In this Standard, the units and numerical values given in { } are in accordance with the International System of Units (SI), and are appended for informative reference.

2. Definitions

For the purposes of this Standard the following definitions apply.

- (1) webbing That belt shaped to strap made of a textile material.
- (2) buckle A device which links or releases the webbing of the seat belt.
- (3) length adjusting device That device for adjusting the length of webbing in order to fit an operator. It may be contained in the buckle, attachment fittings, retractor and the like.
- (4) attachment fitting The device for attaching the seat belt to the seat or vehicle body. The attachment fitting for the shoulder belt shall be called as the upper attachment fitting and that for the lap belt shall be called as the lower attachment fitting.
- (5) sewing thread That thread to be used for sewing the buckle, attachment fitting and others on the webbing for fixing.
- (6) seat belt An assembly of respective components of (1) to (5).
- (7) retractor A component of the seat belt, which retracts the webbing.
- (8) lap belt That seat belt which restrains the pelvic region of the operator to the seat.
- (9) shoulder belt That belt which prevents upper body from falling forward.
- (10) intermediate guide A device for changing the direction of the shoulder belt.

- (11) anchorage That part on the vehicle side when a seat belt assembly is to be fitted.
- (12) body anchorage system A system in which the entire parts of a set of seat belt are to be attached to the vehicle body.
- (13) seat built-in system A system in which a part or entire parts of the anchorage of a set of the seat belt are to be installed in a seat.
- (14) seat belt attaching point (hereinafter, referred to as the "attaching point".) The central point on the attaching face of the threaded holes or bolt holes of the anchorage.
- (15) lower anchorage The anchorage of the lap belt.
- (16) upper anchorage The anchorage on the vehicle side of the shoulder belt of a three-point seat belt.
- (17) hip point A point determined by using the manikin defined in JIS D 4607.
- (18) extension belt A belt which links the anchorage of the seat with the anchorage of the vehicle body. This is used mainly in the case where a suspension seat is used.
- (19) gross mass of seat The gross mass of a seat assembly.

3. Types

The types of the seat belts shall be 2 types as given in Table 1.

Table 1

Type	Symbol	Remark
2-point system	II	For the purpose of restricting pelvic region of an operator, that of 2-point supporting system of a seat belt being weared across the both ends of waist to the belly.
3-point system	III	For the purpose of restricting pelvic region and upper body of an operator, that of 3-point supporting system of a seat belt being weared in a combination of a lap belt and a shoulder belt which passes across the shoulder to the chest diagonally (including the seat belt of which lap belt and shoulder belt are connected).

4. Performances

4.1 Webbing The webbing shall be as given in the following:

- (1) Tensile Strength When the webbing has been tested by the method given in 7.1 (1), the tensile strength shall be 2720 kgf {26.66 kN} or over.

- (2) Width The width of the webbing which is in touch with the human body, under a tensile load of 2 kgf {19.6 N}, shall be 46 mm or over.
- (3) Elongation When the webbing has been tested by the method given in 7.1 (2), the elongation percentage shall be 15 % or under.
- (4) Abrasion Resistance When the webbing has been tested by the method given in 7.1 (3), the tensile strength shall be 75 % or over the value before the test.
- (5) Cold Resistance When the webbing has been tested by the method given in 7.2 (1), the tensile strength shall be 80 % or over the value before the test.
- (6) Weather Fastness When the webbing has been tested by the method given in 7.2 (2), the tensile strength shall be 60 % or over the value before the test.
- (7) Colour Fastness for Light When the webbing has been tested by the method given in 7.2 (3), the colour fastness shall be grade 2 or superior in the change in colour specified in JIS L 0801.
- (8) Colour Fastness for Rubbing When the webbing has been tested by the method given in 7.2 (4), the colour fastness shall be grade 3 or superior both in dryness and in wetness specified in JIS L 0849.
- (9) Colour Fastness for Perspiration When the webbing has been tested by the method given in 7.2 (5), the colour fastness shall be grade 3 or superior in change in colour and grade 4 or superior in stain of the Method A specified in JIS L 0848.

4.2 Buckle The buckle shall be as given in the following:

- (1) Corrosion Resistance When the effective surfaces of metallic parts of buckle, particularly processed with plating or coating, have been tested by the method given in 7.3.1, results shall conform to the criterion specified in 8.3 of JIS D 0201 or 9.3 of JIS D 0202. However, the salt spraying time shall be 24 h.
- (2) Heat Resistance When the plastic parts of the buckle have been tested by the method given in 7.3.2, there shall not be warping and damage which are impedimental to performances.
- (3) Buckle Latch When the buckle latch has been tested by the method given in 7.3.3 (1), there shall be no such damage and wearing that prevent the buckle from normal engaging and disengaging.
Furthermore, in the case of an incomplete engagement, it shall be released by the force of 2.3 kgf {22.5 N} or under.
- (4) Dissociation Force The force (dissociation force) required to dissociate the buckle, when tested by the method given in 7.3.3 (2), shall be 14 kgf {137.2 N} or under.

4.3 Length Adjusting Device The length adjusting device shall be as given in the following:

- (1) Length Adjustment The adjusting force, when tested by the method given in 7.3.4, shall be 5 kgf {49.0 N} or under.
- (2) Tilt Lock Adjustment In the tilt-locking-system length adjustor, when tested by the method given in 7.3.5, the angle between the bottom face of length adjustor and the webbing shall be 30° or over.
- (3) Corrosion Resistance The corrosion resistance shall be in accordance with 4.2 (1).
- (4) Heat Resistance The heat resistance shall be in accordance with 4.2 (2).

4.4 Attachment Fitting The attachment fitting shall be as given in the following:

- (1) The bolts of the attachment fitting, when tested by the method given in 7.3.6, shall withstand the tensile load of 2270 kgf {22.25 kN}.
- (2) In the case of a hook provided with supporting fixture, which is a connecting fixture with an eyebolt, when tested by the method given in 7.3.7, the supporting fixture shall not move 2 mm or over in vertical and horizontal directions.
- (3) Corrosion Resistance The corrosion resistance shall be in accordance with 4.2 (1). However, the salt spraying time shall be 48 h for that of being attached to the floor, and be 24 h for that other than this.
- (4) Heat Resistance The heat resistance shall be in accordance with 4.2 (2).

4.5 Retractor The retractor shall be the non-locking retractor and emergency locking retractor specified in JIS D 4603.

4.6 Seat Belts The seat belts shall be as given in the following:

- (1) The strength of the seat belts, when tested by the method given in 7.4.1, shall withstand the load, and also shall not cause any damage, fissure and injurious deformation on the attachment fittings.
- (2) The displacements of the seat belts, when tested by the method given in 7.4.2, shall be as given in Table 2.

Table 2

Type of seat belt	Lap belt	Shoulder belt
2-point system	180 mm max.	—
3-point system	250 mm max.	250 mm max.
Tensile strength	2270 kgf {22.25 kN}	1360 kgf {13.33 kN}

4.7 Anchorage The anchorages shall be as given in the following:

- (1) The strength of the anchorages for 2-point seat belt, when tested by the method given in 7.5, shall withstand the load of 2270 kgf {22.25 kN}.
- (2) The strength of the anchorages for 3-point seat belt, when tested by the method given in 7.5, shall withstand the load of 1360 kgf {13.33 kN}, respectively at the same time.
- (3) The strength of the anchorages for the vehicle body attaching system shall sufficiently withstand the load specified in 4.7 (1) or 4.7 (2), and be free from any breakage. However, the permanent deformations of the anchorages or their peripheral parts shall not be considered to be breakage.
- (4) The strength of the attaching part of the seat with the floor or the anchorage of the extension belt for the seat built-in system (a case where the lower anchorage is provided on the seat suspension is also included) shall withstand the load specified in 4.7 (1) or 4.7 (2) and, at the same time, the load of 20 times the gross mass of seat, and shall be free from any breakage. After the load test the seat adjusting mechanism may be allowed to cause malfunction, however, any breakage and separation shall not be found. However, the permanent deformations of the anchorage including the seat mechanism and the periphery of the anchorage shall not be considered to be breakage.
- (5) The corrosion resistance shall be in accordance with 4.2 (1). However, the salt spraying time shall be 48 h, in all cases.

5. Construction

5.1 Construction in General The seat belt shall be composed of the webbing, buckle, length adjustor and attachment fittings, and be provided with the retractor and others, as required.

5.2 Webbing The webbing shall be the narrow width textile being soft, durable and flexible, and shall satisfy the following items:

- (1) The surface shall be smooth, soft to the touch and be free from uneven weaving and flaws.

- (2) In order to minimize the ropiness in woof direction, any method of weaving or treatment shall be processed to maintain necessary stiffness.
- (3) Length adjustment at -40°C shall be capable of being carried out.
- (4) The colour shall be that of least influence from ultraviolet rays and direct rays of the sun.
- (5) Fray-prevention shall be processed on extreme ends, and shall be so constructed that the webbing shall not get out from the length adjustor at the time of the maximum adjusting length.

5.3 Buckle The buckle shall be subjected to careful processing and assembling using suitable materials in strength, and its working shall be reliable and it shall satisfy the following respective items:

- (1) It shall be so designed that it is capable of preventing dissociation as far as possible in such an event as falling down.
- (2) The surface shall be flat and smooth, and be free from any sharp corner and play.
- (3) Coatings and surface treatments on respective parts shall be excellent, and these shall be those which are not liable to cause discolouration and peeling easily.
- (4) It shall be so designed that dissociation can be made easily by one operation even by hands wearing protective gloves for operation.
- (5) It shall be so designed that wearing can be made easily even by hands wearing protective gloves for operation.
- (6) It shall be so designed that it is capable of being operated reliably even under intrusion of muds and sands.
- (7) In the case where any buckle which is smaller than the webbing in width is to be used, a pad shall be attached. The pad shall cover the entire body of the buckle, and be larger than the width of the webbing and be attached permanently.
- (8) The shape shall neither give unpleasantness nor damage to the operator.
- (9) It shall be capable of being detached by the operator with single hand, and, in the event of emergency it shall be so positioned that a third person can detach it with ease.

5.4 Length Adjustor The length adjustor, which adjusts the length of the webbing to fit to the body of the operator, shall satisfy the following respective items.

Furthermore, it may be integrated with the buckle, attachment fittings or retractor.