

COMMISSION DELEGATED REGULATION (EU) 2018/830**of 9 March 2018****amending Annex I to Regulation (EU) No 167/2013 of the European Parliament and of the Council and Commission Delegated Regulation (EU) No 1322/2014 as regards the adaptation of the vehicle construction and general requirements for the approval of agricultural and forestry vehicles**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) No 167/2013 of the European Parliament and of the Council of 5 February 2013 on the approval and market surveillance of agricultural and forestry vehicles ⁽¹⁾, and in particular Article 18(4) and Article 49(3) thereof,

Whereas:

- (1) Several entries of Annex I to Regulation (EU) No 167/2013 should be amended to permit laying down requirements for additional vehicle categories in accordance with the latest versions of certain standard Codes for the official testing of agricultural and forestry tractors of the Organisation for Economic Cooperation and Development (OECD standard Codes) ⁽²⁾.
- (2) UNECE regulations which apply on a compulsory basis set out in Annex I to Commission Delegated Regulation (EU) No 1322/2014 ⁽³⁾ are updated frequently. In that regard, the list should be complemented with an explanatory note clarifying that manufacturers are allowed to use subsequent supplements of the applicable series of amendments of those UNECE regulations, even if they are not published in the *Official Journal of the European Union*.
- (3) To make clear that certain requirements of Union legislation are equivalent and fully aligned with the requirements set out in the OECD standard Codes, the text of the requirements and the numbering set out in certain Annexes to Delegated Regulation (EU) No 1322/2014 should be adapted to make them identical with the text and numbering of the corresponding OECD standard Code.
- (4) To reduce the number of injuries and fatal accidents caused by the failure to raise the rear – mounted foldable roll-over protection structure on narrow-track tractors in potentially dangerous situations, ergonomic requirements should be made compulsory to facilitate and encourage the raising of the roll-over protection structure when needed.
- (5) The list of test reports issued on the basis of the OECD standard Codes and recognised for the purposes of EU type approval as an alternative to the test reports issued on the basis of Delegated Regulation (EU) No 1322/2014 should be brought up to date.
- (6) For the purposes of clarifying and improving certain test procedures, additional minor amendments should be made to the test method for the driver's seat and to the requirements on access to the driving position, on the minimum strength of control devices and on the burning rate of cab material set out in Delegated Regulation (EU) No 1322/2014.
- (7) Regulation (EU) No 167/2013 and Delegated Regulation (EU) No 1322/2014 should therefore be amended accordingly,

HAS ADOPTED THIS REGULATION:

*Article 1***Amendment to Annex I to Regulation (EU) No 167/2013**

In Annex I to Regulation (EU) No 167/2013, in row No 38, in the columns for vehicle categories Ca and Cb, 'NA' is replaced by 'X'.

⁽¹⁾ OJ L 60, 2.3.2013, p. 1.⁽²⁾ <http://www.oecd.org/tad/code/oecd-standard-codes-official-testing-agricultural-forestry-tractors.htm>⁽³⁾ Commission Delegated Regulation (EU) No 1322/2014 of 19 September 2014 supplementing and amending Regulation (EU) No 167/2013 of the European Parliament and of the Council with regard to vehicle construction and general requirements for the approval of agricultural and forestry vehicles (OJ L 364, 18.12.2014, p. 1).

Article 2

Amendments to Delegated Regulation (EU) No 1322/2014

Delegated Regulation (EU) No 1322/2014 is amended as follows:

- (1) in Article 12, the words ‘for vehicles of categories T2, T3 and T4.3’ are replaced by the words ‘for vehicles of categories T2/C2, T3/C3 and T4.3/C4.3’;
- (2) in Chapter V, the following Article 35a is inserted:

‘Article 35a

Transitional provisions

1. Until 26 June 2018, national authorities shall continue to grant type-approvals to agricultural and forestry vehicle types, or types of systems, components or separate technical units in accordance with this Regulation, in its version applicable on 25 June 2018.
 2. Until 31 December 2018, the Member States shall permit the placing on the market, registration or entry into service of agricultural and forestry vehicles, systems, components or separate technical units based on a type approved in accordance with this Regulation, in its version applicable on 25 June 2018.’;
- (3) in Annex I, in the text under the heading ‘Explanatory note’, the following paragraphs are added:

‘The transitional provisions of the UNECE regulations listed in this table shall apply, except where specific alternative dates are provided for in this Regulation. Compliance with prescriptions in accordance with subsequent amendments to those listed in this table shall also be accepted.’;

- (4) Annex II is amended in accordance with Annex I to this Regulation;

- (5) Annex VI is amended as follows:

- (a) Point B is amended as follows:

- (a) in point 3.8.2., the first paragraph is replaced by the following

‘When applicable, cold weather embrittlement properties shall be verified either in accordance with the requirements in points 3.8.2.1. to 3.8.2.7., or with the requirements in point 3.8.3.’;

- (b) the following point 3.8.3. is inserted:

‘3.8.3. Resistance to cold weather embrittlement may be demonstrated by applying the rules and directions of Section 3 of this Point B at a reduced temperature of – 18 °C or colder. Prior to dynamic testing the protective structure and all mounting hardware shall be cooled to – 18 °C or colder.’;

- (6) in the Explanatory notes to Annex VI, explanatory note (1) is replaced by the following:

‘(1) Unless otherwise stated, the text of the requirements and the numbering set out in point B are identical with the text and numbering of the OECD standard Code for the official testing of protective structures on agricultural and forestry tractors (dynamic test), OECD standard Code 3, Edition 2017 of February 2017.’;

- (7) in Annex VII, in the Explanatory notes to Annex VII, explanatory note (1) is replaced by the following:

‘(1) Unless otherwise stated, the text of the requirements and the numbering set out in point B are identical with the text and numbering of the OECD standard Code for the official testing of protective structures on agricultural and forestry track-laying tractors, OECD standard Code 8, Edition 2017 of February 2017.’;

- (8) Annex VIII is amended as follows:

- (a) in point B, point 3.11.2. is replaced by the following:

‘3.11.2. Where applicable, cold weather embrittlement properties shall be verified in accordance with the requirements given in 3.11.2.1 to 3.11.2.7’;

(b) in the Explanatory notes to Annex VIII, explanatory note (1) is replaced by the following:

‘(1) Unless otherwise stated, the text of the requirements and the numbering set out in point B are identical with the text and numbering of the OECD standard Code for the official testing of protective structures on agricultural and forestry tractors (static test), OECD standard Code 4, Edition 2017 of February 2017.’;

(9) Annex IX is amended in accordance with Annex II to this Regulation;

(10) Annex X is amended in accordance with Annex III to this Regulation;

(11) Annex XI is amended in accordance with Annex IV to this Regulation;

(12) Annex XIII is amended as follows:

(a) in point 3.1.3., the following paragraph is added:

‘At the discretion of the manufacturer, an additional optional noise measurement may be made with the engine stopped and auxiliaries such as ventilating fans, defrosters and other electrical facilities working at maximum settings.’;

(b) the following point 3.2.2.2.2. is inserted:

‘3.2.2.2.2. During the optional third series of measurements the engine shall be stopped and auxiliaries such as ventilating fans, defrosters and other electrical facilities shall be working at maximum settings.’;

(13) Annex XIV is amended in accordance with Annex V to this Regulation;

(14) In Annex XV, point 3.3.2., is replaced by the following:

‘3.3.2. The upper step or rung must be easily identifiable and accessible for a person leaving the vehicle. The vertical distance between successive steps or rungs shall be equal. However, a tolerance of 20 mm is allowed.’;

(15) in Annex XVIII, in the Explanatory notes to Annex XVIII, explanatory note (1) is replaced by the following:

‘(1) Unless the numbering, the requirements set out in point B are identical with the text of the OECD standard Code for the official testing of for the official testing of protective structures on agricultural and forestry tractors (static test), OECD standard Code 4, Edition 2017 of February 2017.’;

(16) in Annex XXII, point 4 is replaced by the following:

‘4. Noise declaration

The operator’s manual shall give the values of the noise at the operator’s ear for each testing condition set out in Annex XIII, or alternatively the results of sound level test of OECD standard Code 5 in accordance with point 4 of its specimen test report.’;

(17) in Annex XXIII, point 1.2.1. is replaced by the following:

‘1.2.1. Control devices such as steering wheels or steering levers, gear levers, control levers, cranks, pedals and switches shall be chosen, designed, constructed and arranged so that their actuating forces, displacement, locations, methods of operation and colour coding are in accordance with the standard ISO 15077:2008, including the provisions set out in Annexes A and C of that standard.’;

(18) in Annex XXVII, point 2 is replaced by the following:

‘2. Burning rate of cab material

The burning rate of cab interior material such as the seat covering, wall, floor and headliner coverings when provided shall not exceed the maximum rate of 150 mm/min when tested in accordance with the standard ISO 3795:1989 or the standard FMVSS302.’.

Article 3

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 9 March 2018.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX I

In Annex II to Delegated Regulation (EU) No 1322/2014, the table is replaced by the following:

Test report on the basis of OECD standard Code No	Subject	Edition	Applicability	Alternative to the EU test report on the basis of
3	Official testing of protective structures on agricultural and forestry tractors (dynamic test)	Edition 2017 -February 2017-	T1, T4.2 and T4.3	Annex VI Annex XVIII (if the seat-belt anchorages have been tested)
4	Official testing of protective structures on agricultural and forestry tractors (static test)	Edition 2017 -February 2017-	T1/C1, T4.2/C4.2 and T4.3/C4.3	Annex VIII and Annex XVIII (if the seat-belt anchorages have been tested)
5	Official measurement of noise at the driving position(s) on agricultural and forestry tractors	Edition 2017 -February 2017-	T and C	Annex XIII
6	Official testing of front mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors	Edition 2017 -February 2017-	T2/C2, T3/C3 and T4.3/C4.3	Annex IX (if the performance requirements for foldable roll-over protection structures have been tested and met) and Annex XVIII (if the seat-belt anchorages have been tested)
7	Official testing of rear mounted roll-over protective structure on narrow-track wheeled agricultural and forestry tractors	Edition 2017 -February 2017-	T2/C2, T3/C3 and T4.3/C4.3	Annex X (if the performance requirements for foldable roll-over protection structures have been tested and met) and Annex XVIII (if the seat-belt anchorages have been tested)
8	Official testing of protective structures on agricultural and forestry track-laying tractors	Edition 2017 -February 2017-	C1, C2, C4.2 and C4.3	Annex VII and Annex XVIII (if the seat-belt anchorages have been tested)
10	Official testing of falling object protective structures on agricultural and forestry tractors	Edition 2017 -February 2017-	T and C	Annex XI Part C.

ANNEX II

Annex IX to Delegated Regulation (EU) No 1322/2014 is amended as follows:

(1) Point B is amended as follows:

(a) point 1.3.1. is replaced by the following:

‘1.3.1. Preliminary definition: median plane of the wheel or track

The median plane of the wheel or track is equidistant from the two planes containing the periphery of the rims or tracks at their outer edges.’;

(b) in point 1.3.2., the following sentence is added:

‘For tracklaying tractors, the track is the distance between the median planes of the tracks.’;

(c) in point 1.4., the following sentence is added:

‘For tractors fitted with tracks: the distance between the vertical planes perpendicular to the median longitudinal plane of the tractor passing through the axles of the driving wheels.’;

(d) points 2.1.2. and 2.1.3. are replaced by the following:

‘2.1.2. fixed or adjustable minimum track width with one of the axles less than 1 150 mm fitted with tyres or tracks of a larger size. It is assumed that the axle mounted with the wider tyres or tracks is set at a track width of not more than 1 150 mm. It must be possible to set the track width of the other axle in such a way that the outer edges of the narrower tyres or tracks do not go beyond the outer edges of the tyres or tracks of the other axle. Where the two axles are fitted with rims and tyres or tracks of the same size, the fixed or adjustable track width of the two axles must be less than 1 150 mm;

2.1.3. mass greater than 400 kg but less than 3 500 kg, corresponding to the unladen mass of the tractor, including the roll-over protective structure and tyres or tracks of the largest size recommended by the manufacturer. The maximum permissible mass shall not exceed 5 250 kg and the Mass Ratio (Maximum Permissible Mass/Reference Mass) must not be greater than 1,75’;

(e) in point 3.1.2.3., the following sentence is added:

‘In case of tractor fitted with tracks, the manufacturer shall define the tracks setting.’;

(f) in point 3.1.3.2., the second and third sentence are replaced by the following:

‘This angle must be at least 38° at the moment when the tractor is resting in a state of unstable equilibrium on the wheels or tracks touching the ground. Perform the test once with the steering wheel turned to full right lock and once with the steering wheel turned to full left lock.’;

(g) point 3.1.4.3.1. is amended as follows:

(i) the line for tractor characteristic B_0 is replaced by the following:

B_0 (m) Rear tyre or track width;’;

(ii) the lines for tractor characteristics D_2 and D_3 are replaced by the following:

D_2 (m) Height of front tyres or tracks under full axle load;

D_3 (m) Height of rear tyres or tracks under full axle load;’;

(iii) in the line for tractor characteristic S, the words ‘The sum of the track (S) and tyre (B_0) widths must be greater than the width B_0 of the protective structure.’ are replaced by the words ‘The sum of the rear track width (S) and tyre or track (B_0) widths must be greater than the width B_0 of the protective structure.’;

(h) point 3.1.4.3.2.2. is replaced by the following:

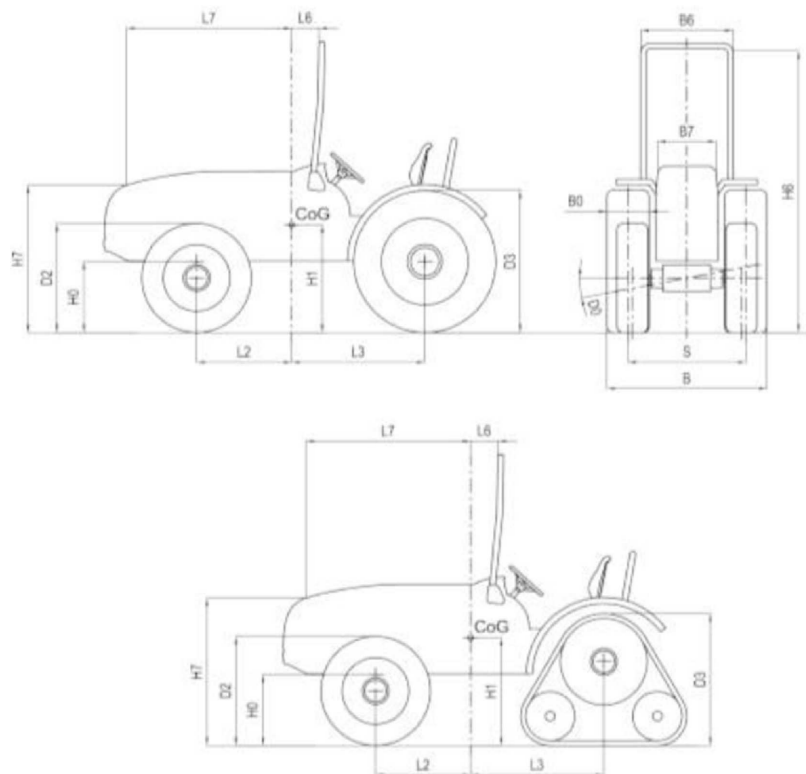
‘3.1.4.3.2.2. the axis of rotation is parallel to the tractor’s longitudinal axis and passes through the centre of the contact surfaces of the downhill front and rear wheel or track;’;

- (i) in point 3.1.5.1., the last paragraph is replaced by the following:
'The distances between the centre of gravity and the rear axle (L_1) or the front axle (L_2) shall be calculated from the mass distribution of the tractor between the rear and the front wheels or tracks.'
- (j) point 3.1.5.2. is replaced by the following:
'3.1.5.2. Heights of rear (D_1) and front (D_2) tyres or tracks
The distance from the highest point of the tyre or tracks to the ground plane shall be measured (Figure 6.5), and the same method shall be used for the front and rear tyres or tracks.'
- (k) in point 3.1.5.4., the last paragraph is replaced by the following:
'The point of impact is defined by the plane tangent to the protective structure passing through the line made by the top outer points of the front and rear tyres or tracks (Figure 6.7).'
- (l) in point 3.1.5.6., the last paragraph is replaced by the following:
'The point of impact is defined by the plane tangent to the engine bonnet and the protective structure passing through the top outer points of the front tyre or track (Figure 6.7). The measurement shall be made on both sides of the engine bonnet.'
- (m) in point 3.1.5.9., the first and second paragraph under the heading 'Height of the front-axle pivot point (H_0)' are replaced by the following:
'The vertical distance between the centre of the front-axle pivot point to the centre of axle of the front tyres or tracks (H_{01}) shall be included in the manufacturer's technical report and shall be checked.
The vertical distance from the centre of the front tyres or tracks axle to the ground plane (H_{02}) shall be measured (Figure 6.8).'
- (n) points 3.1.5.10. and 3.1.5.11. are replaced by the following:
'3.1.5.10. Rear track width (S)
The minimum rear track width fitted with tyres or tracks of the largest size, as specified by the manufacturer, shall be measured (Figure 6.9).
3.1.5.11. Rear tyre or track width (B_0)
The distance between the outer and the inner vertical planes of a rear tyre or track in its upper part shall be measured (Figure 6.9).'
- (o) point 3.2.1.3.4. is replaced by the following:
'3.2.1.3.4. The track width must be adjusted so that the protective structure will, as far as possible, not be supported by the tyres or tracks during the strength tests. If these tests are conducted in accordance with the static procedure, the wheels or tracks may be removed.'
- (p) point 3.2.2.2.4. is replaced by the following:
'3.2.2.2.4. If the tractor is fitted with a suspension system between the tractor body and the wheels or tracks, it shall be blocked during the tests.'
- (q) point 3.2.5.4. is replaced by the following:
'3.2.5.4. Crushing rig
A rig as shown in Figure 6.10 shall be capable of exerting a downward force on a protective structure through a rigid beam approximately 250 mm wide, connected to the load-applying mechanism by means of universal joints. Suitable axle stands must be provided so that the tractor tyres or tracks do not bear the crushing force.'
- (r) in point 3.3.2.2., the last sentence of the last paragraph is replaced by the following:
'For estimating this, the front and rear tyres or tracks and track width setting shall be the smallest standard fitting specified by the manufacturer.'

- (s) figure 6.5 is replaced by the following:

‘Figure 6.5

Data required for calculating the overturn of a tractor with triaxial rolling behaviour



Note: D2 and D3 should be measured under full axle load.;

- (t) in point 5.3.1., in the last paragraph, the following sentence is added:

‘In the case of a tractor fitted with tracks, the manufacturer shall define the tracks setting.’;

- (u) in section B4 (‘Requirements for virtual testing’), the following paragraph is added:

‘For tractor fitted with tracks, the following lines have to be substituted in the original model:

520 LOCATE 12, 40: PRINT ‘HEIGHT OF THE REAR TRACKS D3=’

*540 PRINT ‘HEIGHT OF THE FRT TRACKS D2=’: LOCATE 13, 29: PRINT “

650 LOCATE 17, 40: PRINT ‘REAR TRACKS WIDTH B0=’

970 LPRINT TAB(40); ‘HEIGHT OF THE REAR TRACKS D3=’;

*980 LPRINT ‘HEIGHT OF THE FRT TRACKS D2=’;

1160 LPRINT TAB(40); ‘REAR TRACK WIDTH B0=’;

1390 W2 = SQR(H0 * H0 + L0 * L0): S1 = S/2 + B0/2

1530 F2 = 2 * ATN(- L0/D3 + SQR((L0/D3) ^ 2 - (D2/D3) + 1))

1590 X(1, 5) = D3

1660 Y(1, 5) = -L3

* if applicable’;

- (2) in the Explanatory notes to Annex IX, explanatory note (1) is replaced by the following:

‘(1) Unless the numbering of sections B2 and B3 which has been harmonised with the whole Annex, the text of the requirements and the numbering set out in point B are identical with the text and numbering of the OECD standard Code for the official testing of front mounted roll-over protective structures on narrow-track agricultural and forestry tractors, OECD standard Code 6, Edition 2017 of February 2017.’.

ANNEX III

Annex X to Delegated Regulation (EU) No 1322/2014 is amended as follows:

(1) in Point A, the following point 3 is added:

'3. In addition to the requirements set out in point 2, the performance requirements for foldable roll-over protective structures (ROPS) set out in section B3 shall be met.:'

(2) Point B is amended as follows:

(1) point 3.1.2.2.5 is replaced by the following:

'3.1.2.2.5. The side chosen for application of the first load on the rear of the structure shall be that which, in the opinion of the testing authorities, will result in the application of the series of loads under the most unfavourable conditions for the structure. The lateral load shall be applied to the opposite side of the median plane of the tractor than the longitudinal load. The front load shall be applied on the same side of the longitudinal median plane of the protective structure as the lateral load.:'

(2) the following section B3 is added:

'B3 PERFORMANCE REQUIREMENTS FOR FOLDABLE ROLL-OVER PROTECTION STRUCTURES

5.1. Scope

This Section provides minimum performance and tests requirements for rear mounted foldable ROPS which are raised and/or lowered manually by a standing operator (with or without partial assistance) and locked manually or automatically.

5.2. For the purposes of this section, the following definitions shall apply:

5.2.1. '*hand-operated foldable ROPS*' is a rear-mounted dual pillar protective structure with hand raising/lowering directly managed by the operator (with or without partial assistance);

5.2.2. '*automatic foldable ROPS*' is a rear-mounted dual pillar protective structure with full assisted raising/lowering operations;

5.2.3. '*locking system*' is a device fitted to lock, by hand or automatically, the ROPS in the raised or lowered positions;

5.2.4. '*grasping area*' is an area defined by the manufacturer as a portion of the ROPS and/or additional handle fitted to the ROPS where the operator is allowed to carry out the raising/lowering operations;

5.2.5. '*accessible part of the grasping area*' is the area where the ROPS is handled by the operator during the raising/lowering operations; this area shall be defined with regard to the geometric centre of cross sections of the grasping area;

5.2.6. '*accessible zone*' is the volume where a standing operator can apply a force in order to raise/lower the ROPS;

5.2.7. '*pinching point*' is a point where parts move in relation to each other or to fixed parts in such a way as may cause persons or certain parts of their bodies to be pinched;

5.2.8. '*shear point*' is a point where parts move along each other or along other parts in such a way as may cause persons or certain parts of their bodies to be pinched or shorn;

5.2.9. '*place to stand*' is a place on the tractor platform accessible from the driving position main access with sufficient space for a standing operator.

5.3. Hand-operated foldable ROPS

5.3.1. Prior conditions for the test

5.3.1.1. Grasping area

The manual handling shall be done by a standing operator with one or more grasps on grasping area of the roll-bar.

The roll-bar can be handled from the ground or from a place to stand on the platform (Figures 7.8a and 7.8b).

The operator can handle the roll-bar in parallel with or in front of its trajectory.

A multiple step process with multiple operator positions and multiple defined grasping areas is allowed.

The grasping area shall be clearly and permanently identified (Figure 7.9).

This area has to be designed without sharp edges, sharp angles and rough surfaces likely to cause injury to the operator.

This area could be on one or both sides of the tractor and could be a structural part of the roll-bar or additional handles. In this grasping area the manual handling to raise or lower the roll-bar shall not create shearing, pinching or uncontrollable movement hazards to the operator.

5.3.1.2. Accessible zones

Three accessible zones with different amount of allowed force are defined with respect to horizontal plane of the ground and the vertical planes tangent to the outer parts of the tractor that limit the position or the displacement of the operator (Figure 7.10).

Zone I: comfort zone

Zone II: accessible zone without forward leaning of the body

Zone III: accessible zone with forward leaning of the body

Handling of the roll-bar in parallel with its trajectory

The position and the movement of the operator are limited by obstacles. These are parts of the tractor and are defined by vertical planes tangent to the external edges of the obstacle.

If the operator needs to move the feet during the manual handling of the roll-bar a displacement is allowed either within a parallel plane to the roll-bar trajectory or within just one more parallel plane to the previous one so as to overcome an obstacle. The overall displacement shall be considered as a combination of straight lines parallel and perpendicular to the roll-bar trajectory. A perpendicular displacement is accepted provided that the operator comes closer to the roll-bar. The accessible area shall be considered as the envelope of the different accessible zones (Figure 7.11).

Handling of the roll-bar in front of its trajectory:

Only for handling of the roll-bar in front of its trajectory are considered as accessible extensions of the zone II and zone III (Figure 7.12). In these extensions the acceptable actuation forces are the same ones as respectively in zone II and in the zone III.

If the operator needs to move during the manual handling of the roll-bar it must be done so by a displacement without any obstacle within a plane parallel to the roll-bar trajectory.

In this case the accessible area shall be considered as the envelope of the different accessible zones.

5.3.1.3. Place to stand

Any place to stand on the platform declared by the manufacturer shall be accessible from the main access to the driving position and fulfil the following requirements:

- A place provided for standing shall have sufficient space for both of the operator's feet, be flat and have a slip-resistant surface. Depending on the machine configuration, it may consist of two separate surfaces and may use machine components. It shall be positioned so that the operator can maintain stability while carrying out the service required and be on the same height level with a tolerance of ± 50 mm.
- Handhold(s) and/or railings shall be provided in order to allow three-point contact. Parts of the machine can be considered to fulfil this requirement.

It is considered that a place for standing has sufficient space if its surface is at least a square in cross section of 400 mm per side (Figure 7.13).

Alternatively the place to stand requirement may be met by providing sufficient space for one foot on a flat surface and one knee on the seat.

5.3.1.4. Test conditions

The tractor must be fitted with tyres having the greatest diameter indicated by the manufacturer and the smallest cross-section for tyres of that diameter. The tyres must be inflated to the pressure recommended for field work.

The rear wheels must be set to the narrowest track width; the front wheels must be set as closely as possible to the same track width. If it is possible to have two front track settings which differ equally from the narrowest rear track setting, the wider of these two front track settings must be selected.

5.3.2. Test procedure

The aim of the test is to measure the force necessary to raise or lower the roll-bar. The test will be carried out in static condition: no initial movement of the roll-bar. Each measurement of the force necessary to raise or lower the roll-bar shall be made in a direction tangent to the trajectory of the roll-bar and passing through the geometric centre of cross sections of the grasping area.

The grasping area is considered accessible when located within the accessible zones or the envelope of different accessible zones (Figure 7.14).

The force necessary to raise and lower the roll-bar shall be measured in different points that are within the accessible part of the grasping area (Figure 7.15).

The first measure is carried out at the extremity of the accessible part of the grasping area when the roll-bar is fully lowered (Point 1 in Figure 7.15).

The second measure is defined according to the position of Point 1 after rotation of the roll-bar up to the point where the perpendicular to the trajectory of the roll-bar is vertical (Point 2 in Figure 7.15).

The third measure is carried out after rotation of the roll-bar up to the top of the accessible part of the grasping area (Point 3 in Figure 7.15).

If in this third measure the roll-bar is not fully raised, a point shall be measured at the extremity of the accessible part of the grasping area when the roll bar is fully raised (Point 4 in Figure 7.15).

If between point 1 and point 3 the trajectory of extremity of the accessible part of the grasping area crosses the limit between Zone I and Zone II an additional measurement shall be made at this point (Figure 7.16).

The maximum forces in these points shall not exceed the acceptable force of the zone (I, II or III).

In order to measure the force in the required points, it is possible either to measure directly the value or to measure the torque needed to raise or lower the roll-bar so as to calculate the force.

5.3.3. Condition of acceptance

5.3.3.1. Force requirement

The force acceptable for the actuation of the ROPS depends on the accessible zone as shown in Table 7.2.

Table 7.2

Allowed forces

Zone	I	II	III
Acceptable force (N)	100	75	50

An increase of no more than 25 % of these acceptable forces is allowed when the roll-bar is fully lowered and fully raised.

An increase of no more than 25 % of these acceptable forces is allowed if the roll-bar is handled in front of its trajectory.

An increase of no more than 50 % of these acceptable forces is allowed in the lowering operation.

5.3.3.2. Additional requirements

The manual handling to raise or lower the roll-bar shall not create shearing, pinching or uncontrollable movement hazards to the operator.

A pinching point is not considered dangerous for the operator hands part if in the grasping area the safety distances between the roll-bar and fixed parts of the tractor are no less than 100 mm for hand, wrist, fist and 25 mm for finger (ISO 13854:1996). The safety distances shall be checked with respect to the mode of handling foreseen by the manufacturer in the operator's manual.

5.4. Hand locking system

The device fitted to lock the ROPS in the upright/lowered position must be designed:

- to be handled by one standing operator and located in one of the accessible zones;
- to be hardly separated from the ROPS (for example captive pins as locking pins or retaining pins);
- to avoid any confusion in the locking operation (the proper location of the pins shall be indicated);
- to avoid unintentional removing or losing of parts.

If the devices employed to lock the ROPS in the upright/lowered position are pins they shall be inserted or removed freely. If to do so there is a need to apply a force on the roll-bar this shall comply with the requirements of points 1 and 3 or 4 (see point 5.3).

For all other locking devices, they shall be engineered according to an ergonomic approach for what concerns the shape and the force especially avoiding pinching or shearing hazards.

5.5. Preliminary test of automatic locking system

An automatic locking system fitted on hand-operated foldable ROPS has to be submitted to a preliminary test before the ROPS strength test.

The roll-bar shall be moved from the lower position to the upright locked position and back. These operations correspond to one cycle. 500 cycles shall be completed.

This could be done manually or with the use of external energy (hydraulic, pneumatic or electric actuators). In both cases the force shall be applied within a plane parallel to the trajectory of the roll-bar and passing through the grasping area, the angular speed of the roll-bar shall be roughly constant and less than 20 deg/s.

After the 500 cycles, the force applied when the roll-bar is in the upright position shall not exceed by more than 50 % the allowed force (Table 7.2).

The unlocking of the roll-bar shall be done following the operator manual.

After the completion of the 500 cycles there shall be no maintenance or adjustment on the locking system.

Note 1: The preliminary test could be applied to automatic foldable ROPS systems as well. The test should be carried out before the ROPS strength test.

Note 2: The preliminary test could be carried out by the manufacturer. In such a case the manufacturer shall provide the test station with a certificate stating that the test has been done according the test procedure and that there was no maintenance or adjustment on the locking system after the completion of the 500 cycles. The test station will check the performance of the device with one cycle from the lower position to the upright locked position and back.

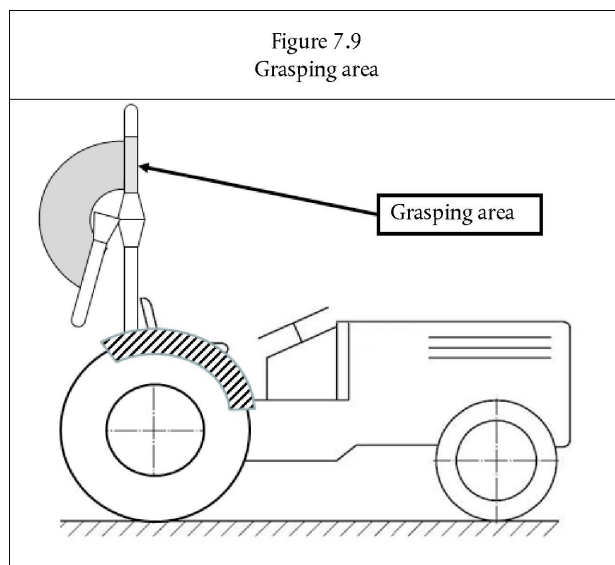
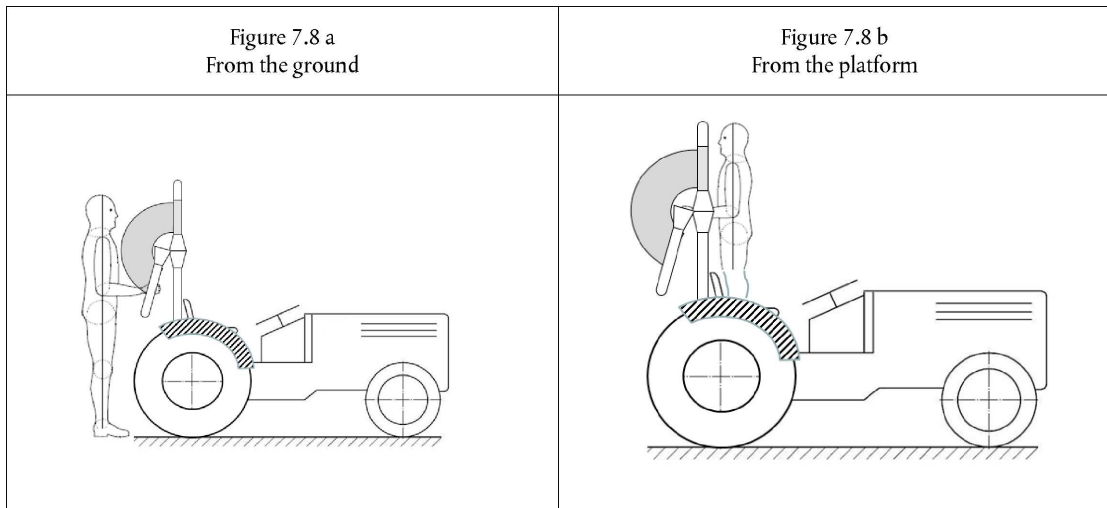


Figure 7.10
Accessible zones
(Dimensions in mm)

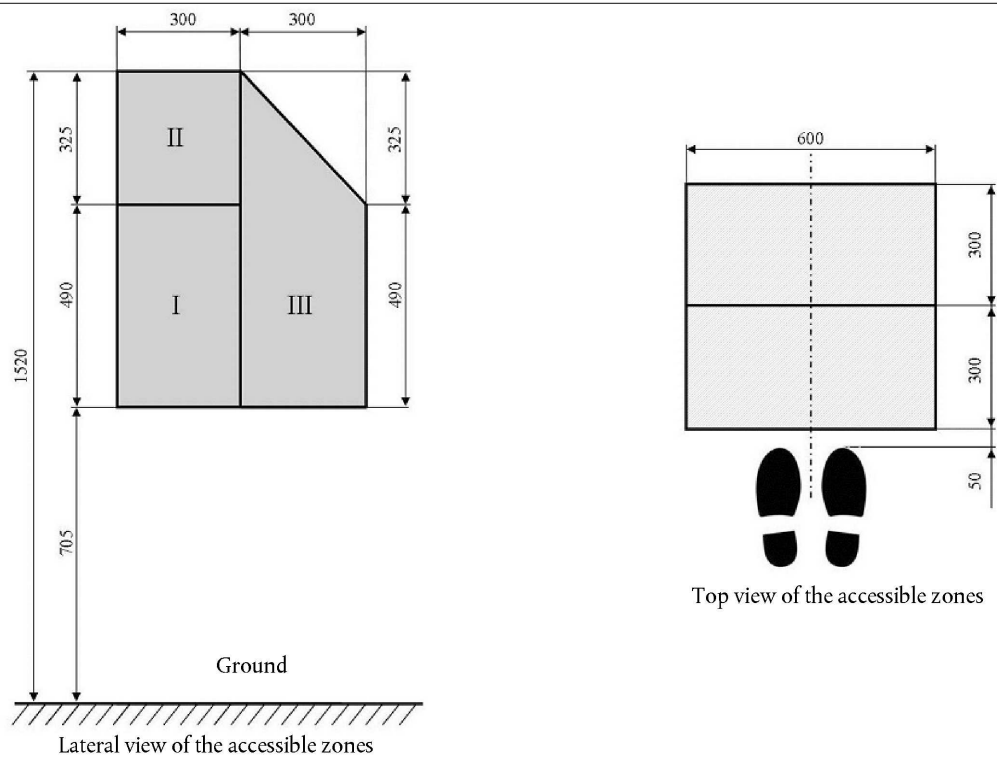
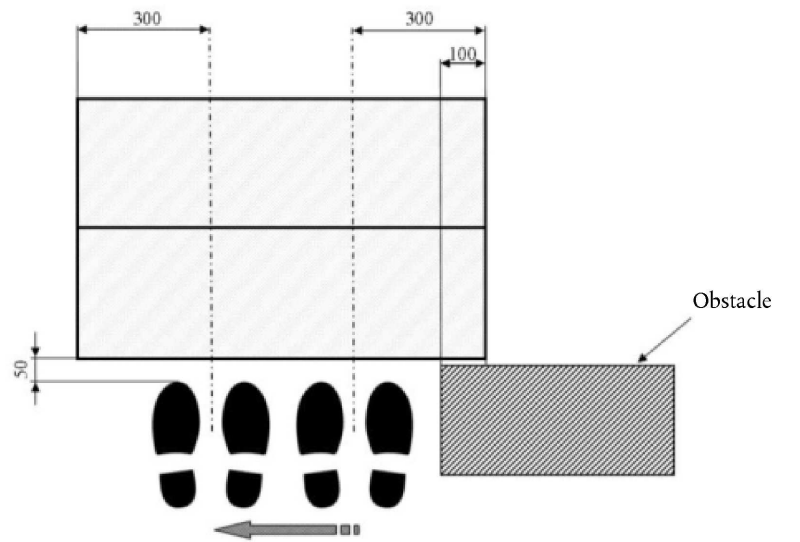
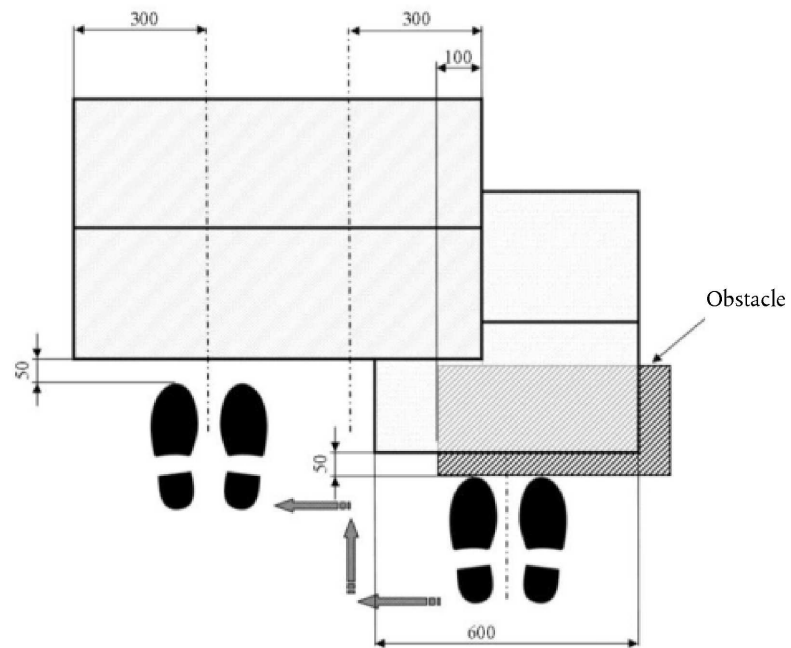


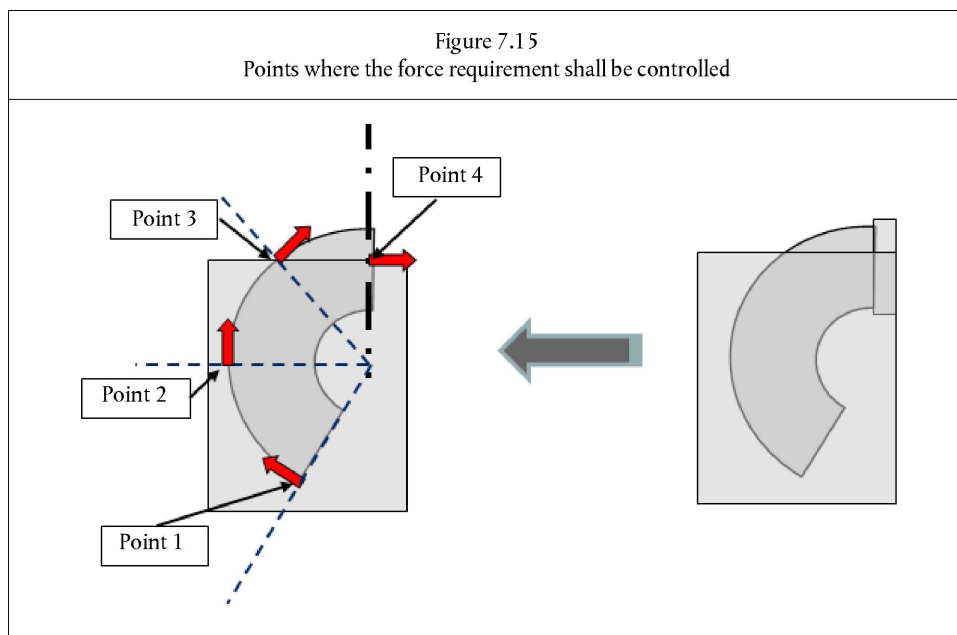
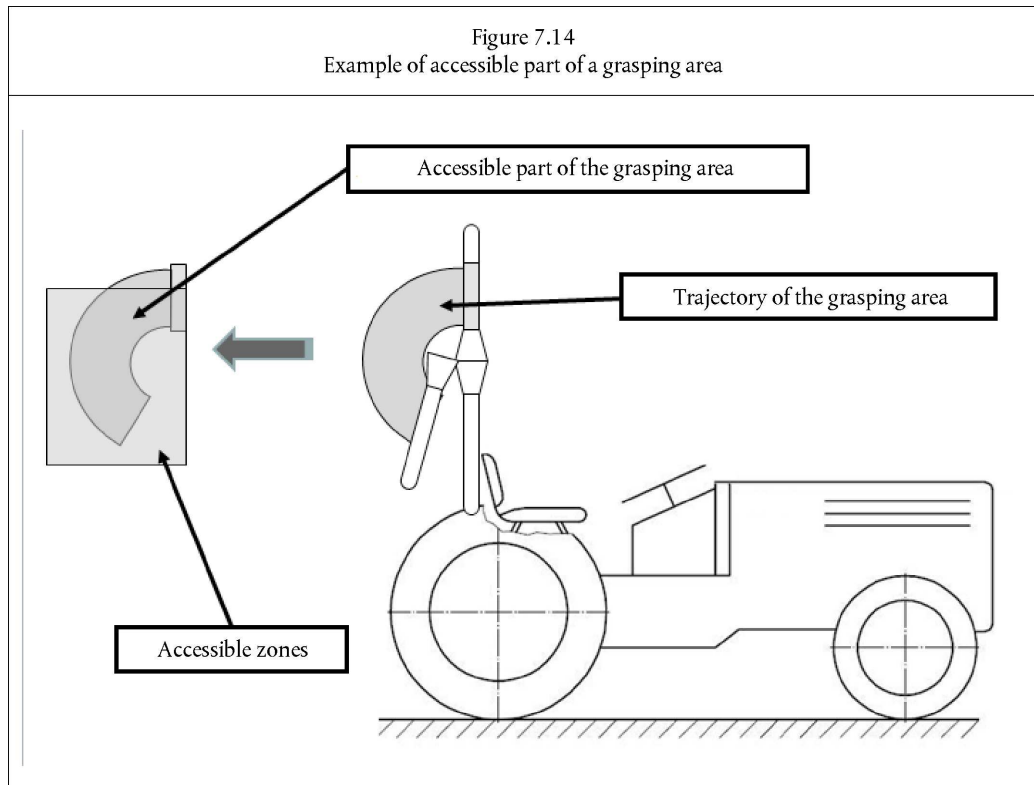
Figure 7.11
Envelope of the accessible zones
(Dimensions in mm)

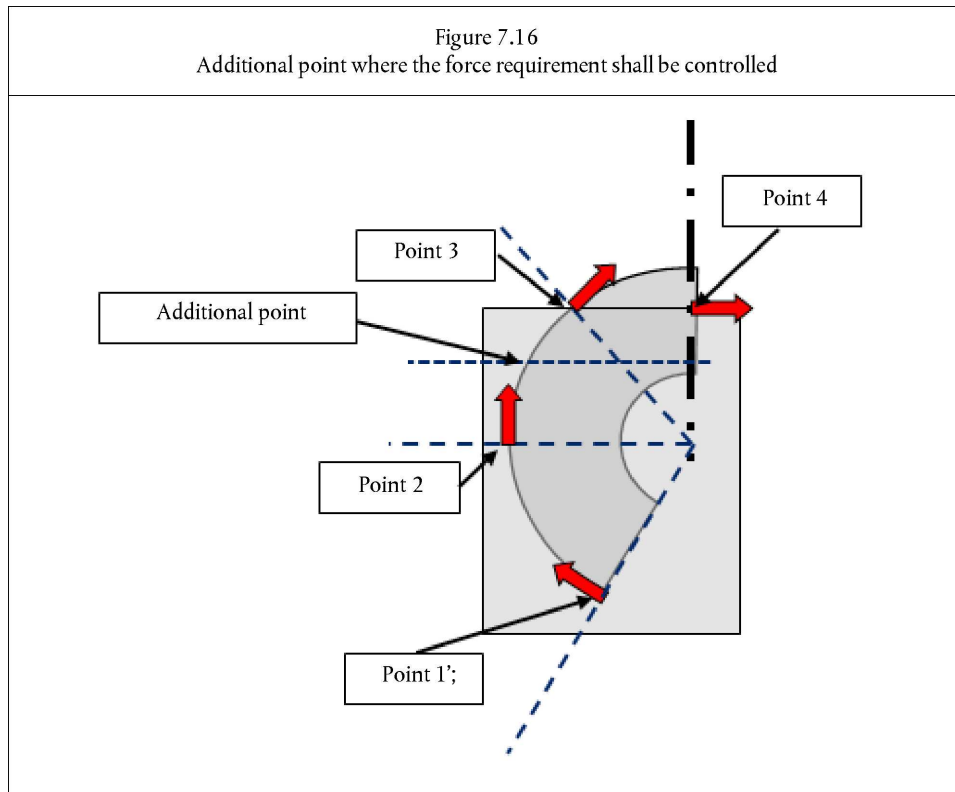


Displacement without change of directions



Displacement with one change of directions





(3) in the Explanatory notes to Annex X, explanatory note (1) is replaced by the following:

- (1) Unless the numbering of sections B2 and B3 which has been harmonised with the whole Annex, the text of the requirements and the numbering set out in point B are identical with the text and numbering of the OECD standard Code for the official testing of rear mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors, OECD standard Code 7, Edition 2017 of February 2017.
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ANNEX IV

Annex XI to Delegated Regulation (EU) No 1322/2014 is amended as follows:

(1) Point C is amended as follows:

(a) point 3.1.3. is replaced by the following:

‘3.1.3. A protective structure may be designed solely to protect the driver in the event of an object falling. Onto this structure it may be possible to fit weather protection for the driver, of a more or less temporary nature. The driver will usually remove this in warm weather. There are protective structures, however, in which the cladding is permanent and warm weather ventilation provided by windows or flaps. As the cladding may add to the strength of the structure and if removable may well be absent when an accident occurs, all parts that can be so taken away by the driver shall be removed for the purpose of the test. Doors and windows that can be opened shall be either removed or fixed in the open position for the test, so that they do not add to the strength of the protective structure.’;

(b) the following point 3.1.3.1. is inserted:

‘3.1.3.1. In case of an openable roof hatch on the vertical projection of the safety zone, on request of the manufacturer, under his responsibility and in accordance with his instructions, the test can be either performed with the roof hatch:

- in the closed — locked position,
- in the open position,
- removed.

In any case, the requirements of point 3.3. shall be fulfilled and a description of the test condition shall be stated in the test report.

Throughout the remainder of these rules, reference will only be made to testing the protective structure. It must be understood that this includes cladding not of a temporary nature.

A description of any temporary cladding supplied is to be included in the specifications. All glass or similar brittle material shall be removed prior to the test. Tractor and protective structure components which might sustain needless damage during the test and which do not affect the strength of the protective structure or its dimensions may be removed prior to the test if the manufacturer wishes. No repairs or adjustment may be carried out during the test. Several identical samples can be provided by the manufacturer if several drop tests are required.’;

(c) the following point 3.6.2.8. is inserted before Table 10.2:

‘3.6.2.8. Alternatively, these requirements can be verified by applying the test object impact if all structural members are at, or below, – 18 °C.’;

(d) the heading of Figure 10.3 is replaced by the following:

Figure 10.3

Minimum FOPS test configuration

Protective structure rigidly attached to the test bench at its normal mounting location’;

(2) in the Explanatory notes to Annex XI, explanatory note (1) is replaced by the following:

‘(1) Unless otherwise stated, the text of the requirements and the numbering set out in Point C are identical with the text and numbering of the OECD standard Code for the official testing of falling object protective structures on agricultural and forestry tractors, OECD standard Code 10, Edition 2017 of February 2017.’.

ANNEX V

Annex XIV to Delegated Regulation (EU) No 1322/2014 is amended as follows:

(1) Appendix 3 is amended as follows:

(a) in the table, the rows for PS Nos 1 and 2 are replaced by the following:

PS No	10^{-4} m ^a	t s
1	0 089	
2	0 215;	

(b) in the table, the rows for PS Nos 699 and 700 are replaced by the following:

PS No	10^{-4} m ^a	t s
699	0 023	
700	0 000	28·0;

(2) Appendix 4a is amended as follows:

(a) in the table, the rows for PS Nos 1 and 2 are replaced by the following:

PS No	10^{-4} m ^a	t s
1	0 022	
2	0 089;	

(b) in the table, the row for PS No 699 is replaced by the following:

PS No	10^{-4} m ^a	t s
699	0 062.	