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Reference: C.N.805.2001.TREATIES-1 (Depositary Notification)

AGREEMENT CONCERNING THE ADOPTION OF UNIFORM TECHNICAL
PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS
WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND
THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS
GRANTED ON THE BASIS OF THESE PRESCRIPTIONS.
GENEVA, 20 MARCH 1958

REGULATION NO. 94. UNIFORM PROVISIONS CONCERNING THE
APPROVAL OF VEHICLES WITH REGARD TO THE PROTECTION OF THE
OCCUPANTS IN THE EVENT OF A FRONTAL COLLISION

PROPOSAL OF AMENDMENTS TO REGULATION No. 94

On 17 August 2001, the Secretary-General received from the Administrative Committee of the above Agreement, pursuant to article 12 (1) of the Agreement, amendments proposed to the above Regulation.

..... A copy, in the English and French languages, of the document containing the text of the proposed amendments is transmitted herewith (doc. TRANS/WP.29/806) (*Copies of the proposed amendments are transmitted in hard copy only*).

The Secretary-General wishes to draw attention to article 12 (2) and (3) of the Agreement which read as follows:

"2. An amendment to a Regulation will be considered to be adopted unless, within a period of six months from its notification by the Secretary-General, more than one-third of the Contracting Parties applying the Regulation at the time of notification have informed the Secretary-General of their disagreement with the amendment. If, after this period, the Secretary-General has not received declarations of disagreement of more than one-third of the Contracting Parties applying the Regulation, the Secretary-General shall as soon as possible declare the amendment as adopted and binding upon those Contracting Parties applying the Regulation who did not declare themselves opposed to it. When a Regulation is amended and at least one-fifth of the Contracting Parties applying the unamended Regulation subsequently declare that they wish to continue to apply the unamended Regulation, the unamended Regulation will be regarded as an alternative to the amended Regulation and will be incorporated formally as such into the Regulation with effect from the date of adoption of the amendment or its entry into force. In this case the obligations of the Contracting Parties applying the Regulation shall be the same as set out in paragraph 1.

3. Should a new Contracting Party accede to this Agreement between the time of the

Attention: Treaty Services of Ministries of Foreign Affairs and of international organizations concerned.

notification of the amendment to a Regulation by the Secretary-General and its entry into force, the Regulation in question shall not enter into force for that Contracting Party until two months after it has formally accepted the amendment or two months after the lapse of a period of six months since the communication to that Party by the Secretary-General of the proposed amendment."

21 August 2001

A handwritten signature in black ink, consisting of a stylized, cursive script that is difficult to decipher but appears to be a personal name or initials.



**Economic and Social
Council**

Distr.

GENERAL

TRANS/WP.29/806

3 August 2001

ENGLISH

Original: ENGLISH
and FRENCH

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations (WP.29)

DRAFT SUPPLEMENT 1 TO THE 01 SERIES OF AMENDMENTS
TO REGULATION No. 94

(Frontal collision protection)

Note: The text reproduced below was adopted by the Administrative Committee (AC.1) of the amended 1958 Agreement at its eighteenth session, following the recommendation by WP.29 at its one-hundred-and-twenty-fourth session. It is based on document TRANS/WP.29/2001/25, as amended (TRANS/WP.29/792, para. 146).

Paragraphs 11 to 11.3., amend to read:

- "11. TRANSITIONAL PROVISION
- 11.1. As from the official date of entry into force of the 02 series of amendments, no contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 02 series of amendments.
- 11.2. As from 1 October 2002, Contracting Parties applying this Regulation shall grant ECE approvals only to those types of vehicles which comply with the requirements of this Regulation as amended by the 02 series of amendments."

Annex 5, paragraph 2.9.2., amend to read:

- "2.9.2. A size 11KW shoe, which meets the configuration size, sole and heel thickness specifications of the US military standard MIL S 13192, change "P" and whose weight is $0,57 \pm 0,1$ kg, shall be placed and fastened on each foot of the test dummies."

Annex 10, amend to read:

"Annex 10

CERTIFICATION PROCEDURE FOR THE DUMMY LOWER LEG AND FOOT

1. UPPER FOOT IMPACT TEST
- 1.1. The objective of this test is to measure the response of the Hybrid III foot and ankle to well-defined, hard faced pendulum impacts.
- 1.2. The complete Hybrid III lower leg assembly, left (86-5001-001) and right (86-5001-002), equipped with the foot and ankle assembly, left (78051-614) and right (78051-615), shall be used, including the knee assembly.
- The load cell simulator (78051-319 Rev A) shall be used to secure the knee assembly (78051-16 Rev B) to the test fixture.
- 1.3. Test procedure
- 1.3.1. Each leg assembly shall be maintained (soaked) for four hours prior to the test at a temperature of $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and a relative humidity of 40 ± 30 per cent. The soak period shall not include the time required to reach steady state conditions.
- 1.3.2. Clean the impact surface of the skin and also the impactor face with isopropyl alcohol or equivalent prior to the test. Dust with talc.
- 1.3.3. Align the impactor accelerometer with its sensitive axis parallel to the direction of impact at contact with the foot.
- 1.3.4. Mount the leg assembly to the fixture shown in Figure 1. The test fixture shall be rigidly secured to prevent movement during impact. The centre line of the femur load cell simulator (78051-319) shall be vertical with a tolerance of $\pm 0.5^{\circ}$. Adjust the mount such that the line joining the knee clevis joint and the ankle attachment bolt

is horizontal with a tolerance of $\pm 3^\circ$, with the heel resting on two sheets of a flat low friction (PTFE sheet) surface. Ensure that the tibia flesh is located fully towards the knee end of the tibia. Adjust the ankle such that the plane of the underside of the foot is vertical and perpendicular to the direction of impact with a tolerance of $\pm 3^\circ$ and such that the mid sagittal plane of the foot is aligned with the pendulum arm. Adjust the knee joint to 1.5 ± 0.5 g range before each test. Adjust the ankle joint so that it is free and then tighten just sufficiently to keep the foot stable on the PTFE sheet.

- 1.3.5. The rigid impactor comprises a horizontal cylinder diameter 50 ± 2 mm and a pendulum support arm diameter 19 ± 1 mm (Figure 4). The cylinder has a mass of 1.25 ± 0.02 kg including instrumentation and any part of the support arm within the cylinder. The pendulum arm has a mass of 285 ± 5 g. The mass of any rotating part of the axle to which the support arm is attached should not be greater than 100 g. The length between the central horizontal axis of the impactor cylinder and the axis of rotation of the whole pendulum shall be $1,250 \pm 1$ mm. The impact cylinder is mounted with its longitudinal axis horizontal and perpendicular to the direction of impact. The pendulum shall impact the underside of the foot, at a distance of 185 ± 2 mm from the base of the heel resting on the rigid horizontal platform, so that the longitudinal centre line of the pendulum arm falls within 1° of a vertical line at impact. The impactor shall be guided to exclude significant lateral, vertical or rotational movement.
- 1.3.6. Allow a period of at least 30 minutes between successive tests on the same leg.
- 1.3.7. The data acquisition system, including transducers, shall conform to the specifications for CFC 600, as described in appendix 5 of this annex.
- 1.4. Performance specification
 - 1.4.1. When each ball of the foot is impacted at $6.7 (\pm 0.1)$ m/s in accordance with paragraph 1.3., the maximum lower tibia bending momentum about the y-axis (M_y) shall be 120 ± 25 Nm.
2. LOWER FOOT IMPACT TEST WITHOUT SHOE
 - 2.1. The objective of this test is to measure the response of the Hybrid III foot skin and insert to well-defined, hard faced pendulum impacts.
 - 2.2. The complete Hybrid III lower leg assembly, left (86-5001-001) and right (86-5001-002), equipped with the foot and ankle assembly, left (78051-614) and right (78051-615), shall be used, including the knee assembly.

The load cell simulator (78051-319 Rev A) shall be used to secure the knee assembly (78051-16 Rev B) to the test fixture.

2.3. Test procedure

- 2.3.1. Each leg assembly shall be maintained (soaked) for four hours prior to the test at a temperature of 22 ± 3 °C and a relative humidity of 40 ± 30 per cent. The soak period shall not include the time required to reach steady state conditions.
- 2.3.2. Clean the impact surface of the skin and also the impactor face with isopropyl alcohol or equivalent prior to the test. Dust with talc. Check that there is no visible damage to the energy absorbing insert to the heel.
- 2.3.3. Align the impactor accelerometer with its sensitive axis parallel to the impactor longitudinal centre line.
- 2.3.4. Mount the leg assembly to the fixture shown in Figure 2. The test fixture shall be rigidly secured to prevent movement during impact. The centre line of the femur load cell simulator (78051-319) shall be vertical with a tolerance of $\pm 0.5^\circ$. Adjust the mount such that the line joining the knee clevis joint and the ankle attachment bolt is horizontal with a tolerance of $\pm 3^\circ$ with the heel resting on two sheets of a flat low friction (PTFE sheet) surface. Ensure that the tibia flesh is located fully towards the knee end of the tibia. Adjust the ankle such that the plane of the underside of the foot is vertical and perpendicular to the direction of the impact with a tolerance of $\pm 3^\circ$ and such that the mid sagittal plane of the foot is aligned with the pendulum arm. Adjust the knee joint to 1.5 ± 0.5 g range before each test. Adjust the ankle joint so that it is free and then tighten just sufficiently to keep the foot stable on the PTFE sheet.
- 2.3.5. The rigid impactor comprises a horizontal cylinder diameter 50 ± 2 mm and a pendulum support arm diameter 19 ± 1 mm (Figure 4). The cylinder has a mass of 1.25 ± 0.02 kg including instrumentation and any part of the support arm within the cylinder. The pendulum arm has a mass of 285 ± 5 g. The mass of any rotating part of the axle to which the support arm is attached should not be greater than 100 g. The length between the central horizontal axis of the impactor cylinder and the axis of rotation of the whole pendulum shall be 1.250 ± 1 mm. The impact cylinder is mounted with its longitudinal axis horizontal and perpendicular to the direction of impact. The pendulum shall impact the underside of the foot, at a distance of 62 ± 2 mm from the base of the heel resting on the rigid horizontal platform, so that the longitudinal centre line of the pendulum arm falls within 1° of a vertical line at impact. The impactor shall be guided to exclude significant lateral, vertical or rotational movement.
- 2.3.6. Allow a period of at least 30 minutes between successive tests on the same leg.
- 2.3.7. The data acquisition system, including transducers, shall conform to the specifications for CFC 600, as described in appendix 5 of this annex.

- 2.4. Performance specification
 - 2.4.1. When each heel of the foot is impacted at 4.4 ± 0.1 m/s in accordance with paragraph 2.3., the maximum impactor acceleration shall be 295 ± 50 g.
3. LOWER FOOT IMPACT TEST (WITH SHOE)
 - 3.1. The objective of this test is to control the response of the Shoe and Hybrid III heel flesh and ankle joint to well-defined hard faced pendulum impacts.
 - 3.2. The complete Hybrid III lower leg assembly, left (86-5001-001) and right (86-5001-002), equipped with the foot and ankle assembly, left (78051-614) and right (78051-615), shall be used, including the knee assembly. The load cell simulator (78051-319 Rev A) shall be used to secure the knee assembly (78051-16 Rev B) to the test fixture. The foot shall be fitted with the shoe specified in annex 2, appendix 3, paragraph 2.9.2.
 - 3.3. Test procedure
 - 3.3.1. Each leg assembly shall be maintained (soaked) for four hours prior to the test at a temperature of 22 ± 3 °C and a relative humidity of 40 ± 30 per cent. The soak period shall not include the time required to reach steady state conditions.
 - 3.3.2. Clean the impact surface of the underside of the shoe with a clean cloth and the impactor face with isopropyl alcohol or equivalent prior to the test. Check that there is no visible damage to the energy absorbing insert to the heel.
 - 3.3.3. Align the impactor accelerometer with its sensitive axis parallel to the impactor longitudinal centre line.
 - 3.3.4. Mount the leg assembly to the fixture shown in Figure 3. The test fixture shall be rigidly secured to prevent movement during impact. The centre line of the femur load cell simulator (78051-319) shall be vertical with a tolerance of $\pm 0.5^\circ$. Adjust the mount such that the line joining the knee clevis joint and the ankle attachment bolt is horizontal with a tolerance of $\pm 3^\circ$, with the heel of the shoe resting on two sheets of a flat low friction (PTFE sheet) surface. Ensure that the tibia flesh is located fully towards the knee end of the tibia. Adjust the ankle such that a plane in contact with the heel and sole of the underside of the shoe is vertical and perpendicular to the direction of impact with a tolerance of $\pm 3^\circ$ and such that the mid sagittal plane of the foot, and shoe is aligned with the pendulum arm. Adjust the knee joint to 1.5 ± 0.5 g range before each test. Adjust the ankle joint so that it is free and then tighten just sufficiently to keep the foot stable on the PTFE sheet.
 - 3.3.5. The rigid impactor comprises a horizontal cylinder diameter 50 ± 2 mm and a pendulum support arm diameter 19 ± 1 mm (Figure 4). The cylinder has a mass of 1.25 ± 0.02 kg including instrumentation and any part of the support arm within the cylinder. The pendulum arm has a mass of 285 ± 5 g. The mass of any rotating part of the axle to which the support arm is attached should not be greater than 100 g. The length between the central horizontal axis of the

impactor cylinder and the axis of rotation of the whole pendulum shall be $1,250 \pm 1$ mm. The impact cylinder is mounted with its longitudinal axis horizontal and perpendicular to the direction of impact. The pendulum shall impact the heel of the shoe in a horizontal plane which is a distance of 62 ± 2 mm above the base of the dummy heel when the shoe is resting on the rigid horizontal platform, so that the longitudinal centre line of the pendulum arm falls within one degree of a vertical line at impact. The impactor shall be guided to exclude significant lateral, vertical or rotational movement.

- 3.3.6. Allow a period of at least 30 minutes between successive tests on the same leg.
- 3.3.7. The data acquisition system, including transducers, shall conform to the specifications for CFC 600, as described in appendix 5 of this annex.
- 3.4. Performance specification
 - 3.4.1. When the heel of the shoe is impacted at 6.7 ± 0.1 m/s in accordance with paragraph 3.3, the maximum Tibia compressive force (Fz) shall be 3.3 ± 0.5 kN.

Figure 1
Upper foot impact test
Test set-up specifications

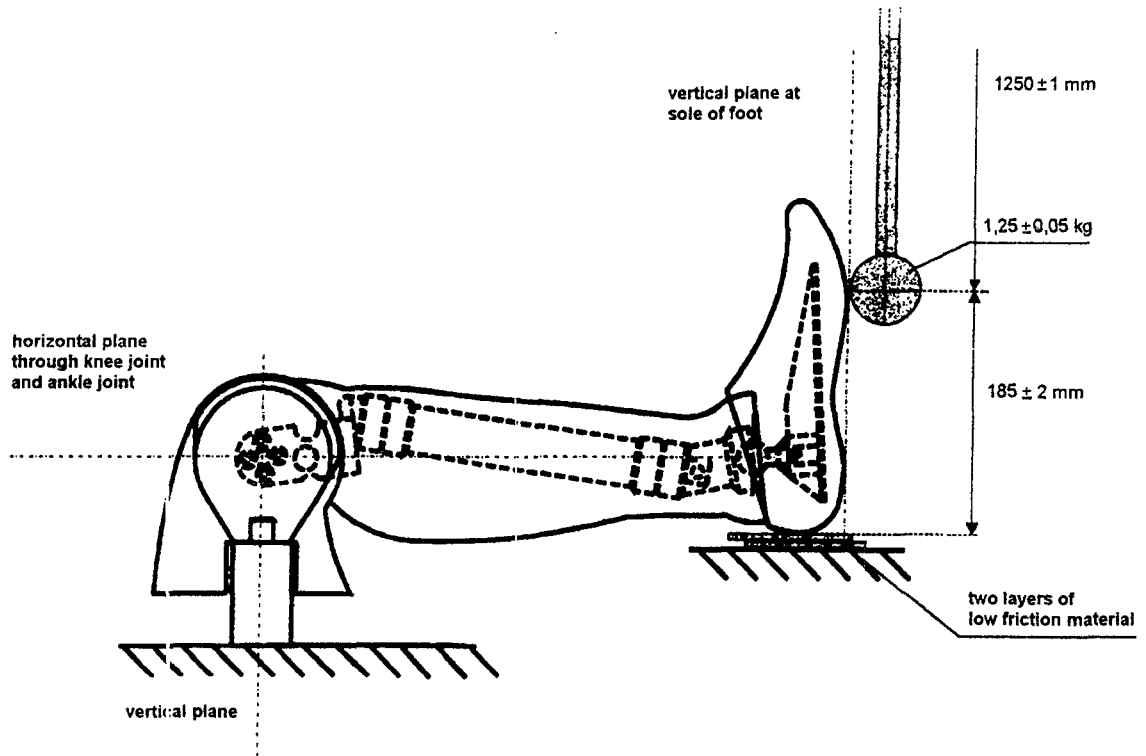


Figure 2

Lower foot impact test (without shoe)

Test set-up specifications

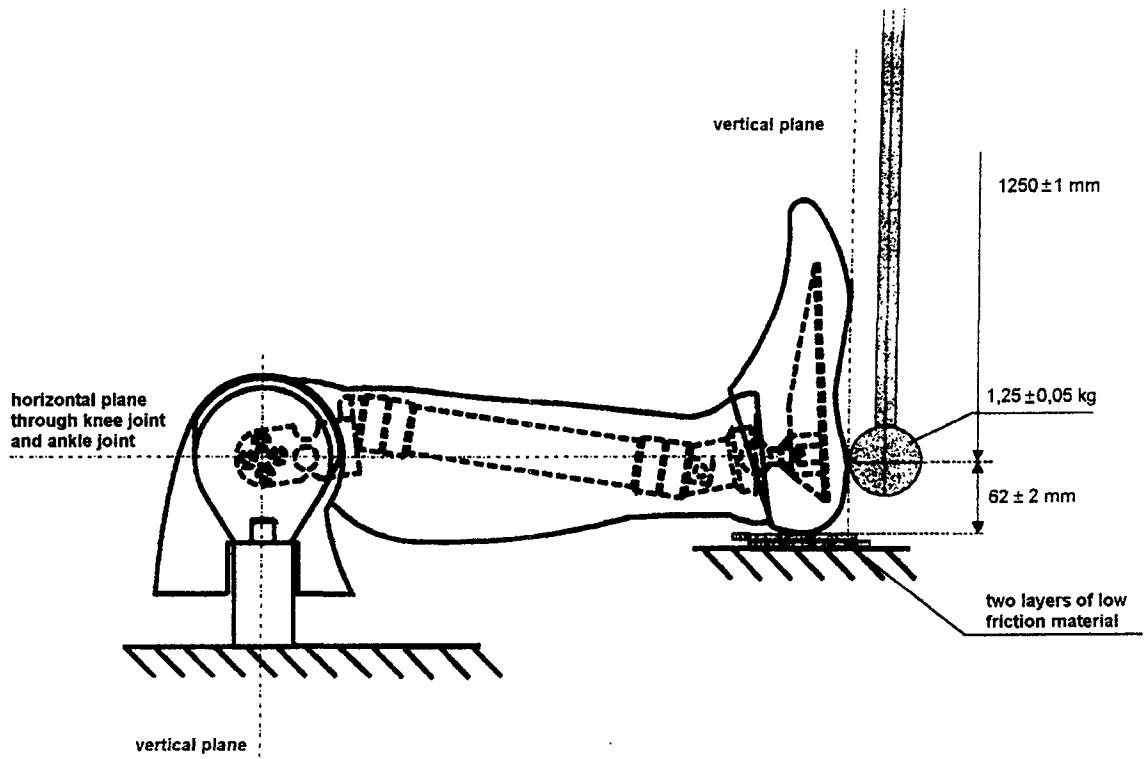


Figure 4
Pendulum impactor

Material: aluminium alloy
Mass of arm: 285 +/- 5g
Mass of impact cylinder:
1250 +/- 20g

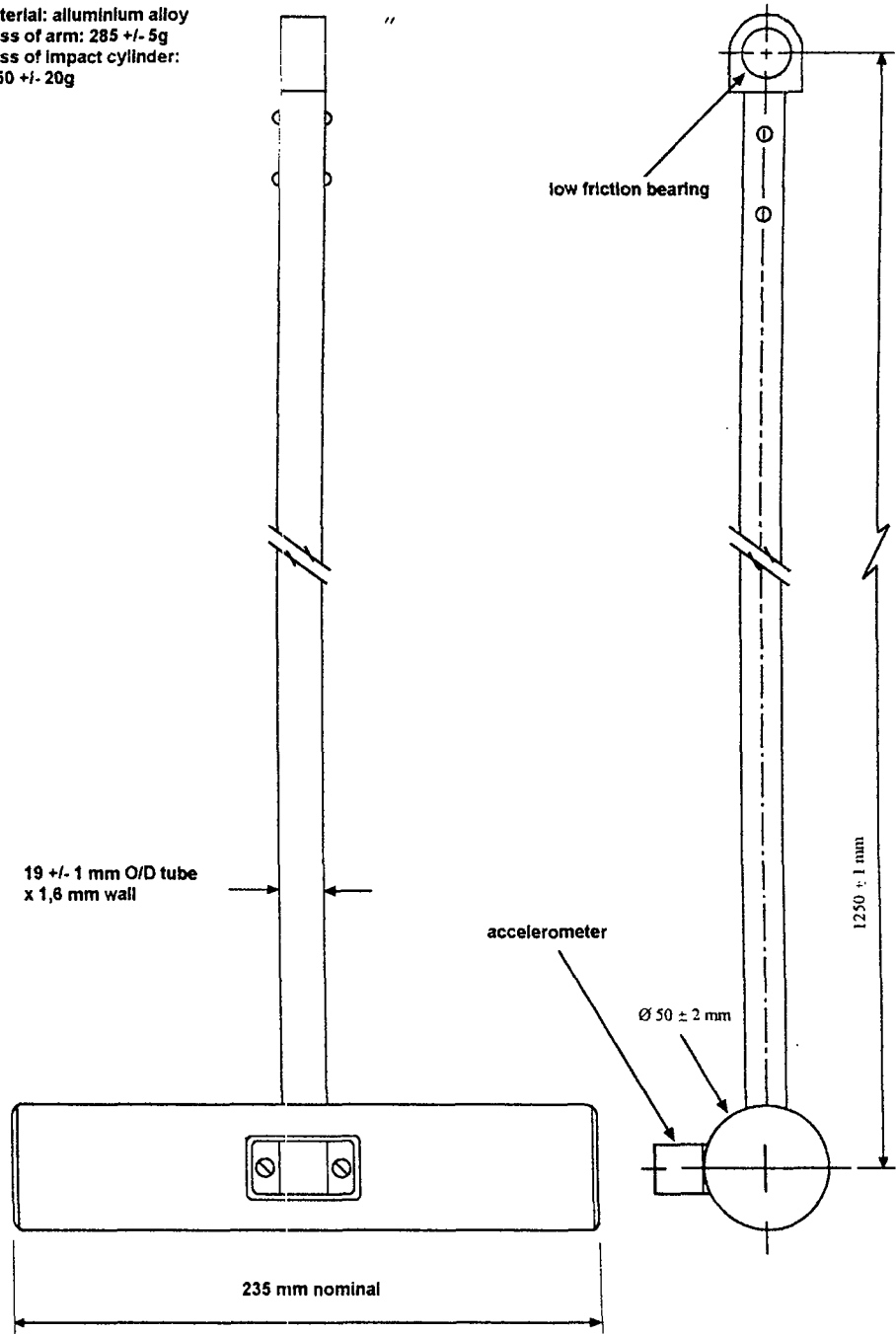


Figure 3

Lower foot impact test (with shoe)

Test set-up specifications

