No. 4789. AGREEMENT CONCERNING THE ADOPTION OF UNIFORM CONDITIONS OF APPROVAL AND RECIPROCAL RECOGNITION OF APPROVAL FOR MOTOR VEHICLE EQUIPMENT AND PARTS. DONE AT GENEVA ON 20 MARCH 1958[1]

ENTRY INTO FORCE of Regulation No. 22 (Uniform provisions concerning the approval of protective helmets for drivers and passengers of motor cycles) as an annex to the above-mentioned Agreement.

The said Regulation came into force on 1 June 1972 in respect of Belgium and the Netherlands, in accordance with article 1 (5) of the Agreement.

Authentic texts of the Regulation : English and French.

Registered ex officio *on 1 June 1972.*

1. SCOPE

This Regulation applies to protective helmets for drivers and passengers of motor cycles with or without side-car.*

2. DEFINITIONS†

For the purposes of this Regulation,

2.1. "*protective helmet*" means a helmet primarily intended to protect the upper part of the wearer's head against concussions. Some helmets may provide additional protection;

2.2. "*shell*" means the hard part of the protective helmet which gives it its general shape;

2.3. "*shock-absorbing fittings*" means all the parts designed to distribute impact and to absorb kinetic energy in concussion. The main shock-absorbing components used are as follows :

2.3.1. *anti-concussion tapes*, flexible supporting straps which maintain a clearance between the wearer's head and the inner surface of the helmet and are designed to deaden concussions,

2.3.2. *protective padding*, material designed to absorb kinetic energy in concussion;

2.4. "*harness*" means all the fittings which keep the helmet in position on the wearer's head, comprising the following :

2.4.1. *cradle*, harness part that surrounds and is in contact with the head. It may be fixed or adjustable,

2.4.2. *headband*, harness part surrounding the head just above the basic plane,

* Protective helmets for wear in competitions may have to comply with stricter provisions.

† See also the drawing in annex 3.

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[1] United Nations, *Treaty Series*, vol. 335, p. 211; for subsequent actions, see references in Cumulative Indexes Nos. 4 to 9, as well as annex A in volumes 652, 656, 659, 667, 669, 672, 673, 680, 683, 686, 696, 723, 730, 740, 752, 754, 756, 759, 768, 771, 772, 774, 777, 778, 779, 787, 788, 797, 801, 802, 808, 811, 814, 815, 818, 820 and 825.

2.4.3. *cushioning*, material to promote the wearer's comfort,
2.4.4. *drawlace*, cord in the cradle for adjusting clearance between the top of the wearer's head and the inside of the shell,
2.4.5. *chin-strap*, strap which passes under the wearer's chin to keep the helmet in position,
2.4.6. *neck curtain*, part of the protective helmet covering the wearer's neck,
2.4.7. *ear flaps*, part of the protective helmet designed to protect the wearer's ears. May be combined with the neck curtain;
2.5. " *peak* " means the permanent or detachable extension of the shell above the eyes;
2.6. " *basic plane* " means the plane level with the external auditory meatus and the lower edge of the orbits;
2.7. " *approval of a protective helmet* " means the approval of a protective helmet type;
2.8. " *protective helmet type* " means a category of protective helmets which do not differ in such essential respects as the size, dimensions and materials of the shell and other components of the helmets.

3. APPLICATION FOR APPROVAL

Application for approval of a protective helmet type shall be submitted by the manufacturer or by the holder of the trade name or mark or by his duly accredited representative and for each type the application shall be accompanied by the following:

3.1. drawings, in triplicate, to a scale of 1:1, sufficiently detailed to permit identification of the type of helmet, including methods of assembly,

3.2. a brief technical specification stating in particular the materials used,
3.3. seven samples.

4. MARKINGS

4.1. Samples of protective helmets submitted for approval in conformity with paragraph 3.3 above, shall bear the trade name or mark.

4.2. This marking shall be clearly legible and indelible.

5. APPROVAL

5.1. If the samples of a protective helmet type submitted in pursuance of paragraph 3.3 above satisfy the provisions of this Regulation, approval shall be granted.
5.2. An approval number shall be assigned to each type approved; the number so assigned may not be assigned by the same Contracting Party to another type of helmet covered by this Regulation.
5.3. Notice of approval, or refusal of approval, of a type of helmet shall be communicated to the countries which are Parties to the Agreement and which apply this Regulation, by means of a form conforming to the model in annex 1 to this Regulation, and of an attached drawing (supplied by the applicant for approval) of a format not exceeding A 4 (210 × 297 mm) or folded to that format and, if possible, to the scale of 1:1.
5.4. The administrative department which has approved a protective helmet type

under this Regulation shall issue to the manufacturer, as his production proceeds, labels (or an authorization to affix labels) bearing :

5.4.1. an international approval marking consisting of :
5.4.1.1. a circle surrounding the letter " E " followed by the distinguishing number of the country which has granted approval*;
5.4.1.2. the approval number, below the circle; and
5.4.1.3. a serial number—such numbers to be continuous for all protective helmets the types of which have been approved in the same country, and each authority to keep a register from which it can check that type and serial numbers correspond for the labels it issues or authorizes to be affixed.

5.5. Annex 2 to this Regulation gives an example of the arrangement of the approval mark.
5.6. In order to be considered as approved under this Regulation, subject to the provisions of paragraph 9 below, every protective helmet shall have one of the labels referred to in paragraph 5.4 affixed to its harness.

5.7. The label referred to in paragraph 5.4 above shall be clearly legible and resistant to wear.
5.8. Every six months, the administrative department of each country Party to the Agreement applying this Regulation shall communicate to the administrative departments of the other countries Parties to the Agreement applying this Regulation a list of the approval and serial numbers borne by the labels it has issued or has authorized to be affixed during the previous six months.

6. GENERAL SPECIFICATIONS
6.1. A protective helmet shall consist essentially of a hard shell with a smooth outer surface having no reinforcing ridges, fittings inside the shell for shock-absorption, a cradle and a chin-strap.

6.2. The protective helmet may be fitted with ear flaps and a neck curtain. It may also have a peak provided that the latter meets the requirements of paragraphs 7.9 and 7.10 of this Regulation concerning flexibility and non-flammability.

6.3. No component other than those mentioned in this Regulation shall be fitted on the protective helmet unless so designed as to be unlikely to cause injury to the wearer in an accident.
6.4. The protective helmet shall protect as much of the head above the basic plane

* 1 for the Federal Republic of Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for Czechoslovakia, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, and 12 for Austria : subsequent numbers shall be assigned to other countries in the chronological order in which they ratify the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts or in which they accede thereto, and the numbers so assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

as possible while in no way hampering direct vision and while permitting good peripheral vision.

6.5. The profile of the leading edge of the protective helmet shall not prevent the wearing and proper use of ordinary goggles. The helmet shall not dangerously affect the wearer's ability to hear. The temperature in the space between the head and the shell shall not rise inordinately; to prevent this, ventilation holes may be let into the shell.

6.6. There shall be nothing other than the goggle clips projecting more than 3 mm ($\frac{1}{8}$ in) from the outer surface of the shell. Goggle clips may not project more than 5 mm ($\frac{3}{16}$ in) from the outer surface of the shell and must be attached to the back of the helmet. However, that condition shall not apply if a slight glancing blow will easily knock the clips off the shell. Rivet heads shall not project more than 1.6 mm ($\frac{1}{16}$ in) from the outer surface of the shell and shall have no sharp edges.

6.7. All the edges of the protective helmet shall be smooth and rounded. The inside shall have no metal part or other rigid projection that might injure the wearer's head in a collision. Rivet heads shall not project more than 1.6 mm ($\frac{1}{16}$ in) from the inner surface of the shell and shall be free from sharp edges. Any external projections permitted under paragraph 6.6 above shall be smooth and adequately faired to other surfaces.

6.8. The shock-absorbing fittings shall be such that the impact on the head is not highly concentrated.

6.9. The various parts of the protective helmet shall be so assembled that none of them can be easily jolted off.

6.10. Any device for securing the harness to the shell shall be protected from abrasion.

6.11. The cradle and the chin-strap shall be securely fixed to the shell. The chin-strap shall have a width of at least 20 mm ($\frac{25}{32}$ in) and have a shape that makes it convenient to rest against the chin-point.

6.12. The materials used in the manufacture of the various parts of a protective helmet shall be durable, i.e. their characteristics shall not be appreciably affected by aging or by use of the helmet in normal conditions (exposure to the sun, rain, cold, dust, vibrations; contact with the skin; the effects of perspiration or products applied to the skin or hair). If the technical service conducting tests has any doubts as to the suitability of a material, it may submit samples of helmets to treatment processes other than those laid down in paragraph 7.2 below.

6.13. For harness parts which come into contact with the skin, the manufacturer may not use materials which are known to cause skin irritation or diseases.

6.14. The weight of a protective helmet shall be as small as possible and shall not exceed 1 kg (2 lb 3 oz).

7. TESTS FOR TYPE APPROVAL

7.1. *Utilization of samples submitted for type approval*

7.1.1. Three samples shall be tested, after treatment, to ascertain the shock-absorption properties of the complete protective helmet.

7.1.2. After treatment, one sample shall be tested for resistance to penetration.

7.1.3. Two samples shall be tested, without treatment, for rigidity—one for transverse rigidity and the other for longitudinal rigidity. In addition, one of these two samples shall be tested for harness deformation and for peak flexibility, and the other for harness tearing and peak non-flammability.

7.1.4. One sample shall be retained by the technical service conducting tests as an " approved " specimen.

7.2. *Treatment for testing*

7.2.1. *Low-temperature treatment*
The protective helmet shall be exposed to a temperature of $-20°C \pm 2°C$ for a period of 4 to $4\frac{1}{2}$ hours.

7.2.2. *Moisture treatment*
The outer surface of the protective helmet shall be sprayed with water at air temperature and at the rate of one litre per minute for a period of 4 to $4\frac{1}{2}$ hours.

7.2.3. *Heat treatment*
The protective helmet shall be exposed to a temperature of $50°C \pm 2°C$ for a period of 4 to $4\frac{1}{2}$ hours.

7.2.4. The oven and the coolers used for heat and low-temperature treatments shall be sufficiently large for the helmets not to touch each other or the sides of the equipment.

7.2.5. After-treatment tests shall be carried out within two minutes after the removal of the protective helmet from the treatment equipment.

7.3. *Selection of points on the shell for shock-absorption and resistance to penetration tests*
The technical service conducting tests shall select for each type of protective helmet and taking into account the specific frequency of blows in the frontal and occipital regions, the points on the shell to take the impact in the shock-absorption and resistance to penetration tests described in paragraphs 7.4 and 7.5 below. The selection shall be so made as to make certain that the test requirements are met at every point on the shell more than 50 mm (2 in) above the basic plane.

7.4. *Shock-absorption tests*

7.4.1. Two shock-absorption tests shall be applied on different areas of the shell to each of the three protective helmets mentioned in paragraph 7.1.1. Of these samples one shall be given low-temperature treatment, the second moisture treatment and the third heat treatment.

7.4.2. No part of the helmet shall be altered before the test. Any drawlace or cradle adjustment shall be fully loosened before the test.

7.4.3. Shock-absorption capacity shall be assessed by direct measurement of the maximum force transmitted to a fixed headform. The protective helmet shall be placed for the purpose on a headform mounted on a fixed-base dynamometer, and shall be struck by a 5 kg (11 lb) ± 25 grams (±0.9 oz) drop hammer falling from a height, measured from the lower face of the hammer to the point of impact on the helmet, of 2.50 m (8.2 ft) ± 0.01 m (±0.04 in). The helmet shall be so mounted that the impact is produced at the point on the shell selected for testing by the technical service.

7.4.4. The dynamometer and the headform shall be so positioned that the vertical axis of the dynamometer as close as possible coincides with the path of the hammer's centre of gravity, which should pass through the centre of gravity of the headform.

7.4.5. The headform shall be so mounted on the dynamometer, and the dynamometer on its base, that the total impact force on the headform is transmitted to the dynamometer and none of it lost through deformation, absorption or relative motion. The base must be heavy and big enough for the dynamometer to register the total force transmitted.

7.4.6. The maximum force transmitted to the headform shall not exceed 15,000 N (1,500 kp, 3,300 lbf).

7.5. *Resistance to penetration*

7.5.1. The sample which, in accordance with paragraph 7.1.2 above, shall be tested for resistance to penetration shall undergo the same treatment as the sample with which the poorest results were obtained in the shock-absorption test.

7.5.2. The protective helmet shall be placed on a headform in such a way that the plane tangential to the shell at the point selected for the test is about horizontal. A metal punch with a conical head rounded at the top is placed vertically to touch the shell at the point selected and held in position by a ring. A metal drop hammer falls on the top of the punch, and the depth to which the point penetrates into the shell is measured by means of an inertia-free device, such as a photo-electric device, indicating the minimum vertical distance reached, in this test, between the point of the punch and the headform.

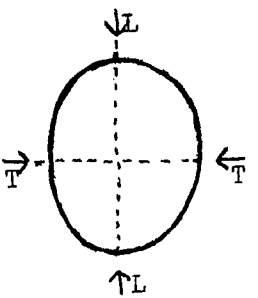
7.5.3. The testing device mentioned in paragraph 7.5.2 above shall have the following characteristics:

Weight of punch	0.3 kg (10½ oz) ± 10 grams (±0.4 oz)
Angle of cone forming punch head . .	60° ± 1°
Radius of rounded top of punch head	0.5 mm (0.02 in)
Weight of drop hammer	3 kg (6 lb 10 oz) ± 25 grams (±0.9 oz)
Height of fall measured between the top face of punch and lower face of drop hammer.	1 m (39 in) ± 0.005 m (±0.02 in)

7.5.4. During the test, the point of the punch shall not come nearer than 5 mm (0.2 in), measured vertically, to the headform.

7.6. *Rigidity*

7.6.1. The protective helmet is placed between two parallel plates by means of which a known load can be applied along the longitudinal axis (line LL in the figure shown) or the transverse axis (line TT in the figure shown). An initial load of 30 N (3 kg, 6½ lbf) is applied and after two minutes the distance between the plates is measured. The load is then increased by 100 N (10 kp, 22 lbf) every two minutes to a maximum of 630 N (63 kp, 140 lbf). After two minutes of application of the 630-N load the distance between the plates is measured.



7.6.2. The load applied to the plates is then reduced to 30 N again and kept at that value for five minutes; the distance between the plates is then measured.

7.6.3. A new helmet must be used for the test along the longitudinal axis and another new helmet for the test along the transverse axis.

7.6.4. For the tests along both axes, the measured deformation under the 630-N load shall not exceed that under the initial 30-N load by more than 40 mm ($1\frac{9}{16}$ in).

7.6.5. After the return to the 30-N load, the measured deformation shall not exceed that under the initial 30-N load by more than 15 mm ($\frac{19}{32}$ in).

7.7. *Harness deformation*

7.7.1. One of the protective helmets already used for the rigidity test is placed on a headform with cradle adjusted and drawlace tightened (in order to prevent any deformation of the shell during the test), attached to the chin-strap being a device with one or two metal rollers beneath which the strap can slide and a component to which vertical loads can be applied. If there are two metal rollers, they shall each be 12.5 mm (½ in) in diameter and the distance between their centres shall be 76 mm (3 in) so as to represent the jawbone; if there is only one roller, it shall be 70–100 mm (2¾–4 in) in diameter. An initial load of 4.5 kg (10 lb) is applied and increased every 30 seconds at a uniform rate to a total

load of 50 kg (110 lb), this total load being maintained for two minutes, after which the extent of the vertical movement is measured.

7.7.2. The total sag due to the extension under load of the harness itself and its attachment shall not exceed 25 mm (1 in).

7.8. *Harness tearing*

7.8.1. The device described in paragraph 7.7.1 above is attached to the chin-strap, the protective helmet being kept in position by its shell. An initial load of 4.5 kg (10 lb) is then applied and increased at a uniform rate every 63 seconds up to a total load of 100 kg (220 lb).

7.8.2. The harness shall not tear or become detached from the shell.

7.9. *Peak flexibility*

7.9.1. The protective helmet is mounted on an upright headform of appropriate size, so that the upper surface of the peak becomes tangent to a horizontal plane. A bag weighing 12 kg (25 lb) is placed on top of the helmet to hold it firmly in position. A weight of 1 kg (2 lb 3 oz) is then freely suspended for two minutes by a cord attached to a point within 12.5 mm ($\frac{1}{2}$ in) of the centre of the leading edge of the peak.

7.9.2. The deflection of the peak, measured vertically at the foremost point of the peak, shall not be less than 6 mm ($\frac{1}{4}$ in) or more than 32 mm ($1\frac{1}{4}$ in).

7.10. *Peak non-flammability*

7.10.1. The protective helmet is mounted on a stand at a convenient height and a flame 15–20 mm ($\frac{19}{32}$–$\frac{25}{32}$ in) long from a Bunsen burner with the air supply cut off is brought into contact with the leading edge of the peak, the Bunsen being held at an angle of about 45° to the horizontal for ten seconds.

7.10.2. The materials of the peak should not flare up, and any flame should go out in less than five seconds after the removal of the burner.

7.11. *Headforms*

7.11.1. The headforms used for the tests shall comply with the specifications shown in annex 4.

7.11.2. The internal circumference of the headband of each protective helmet shall be measured with an expanding metal ring gauge. The helmet must be tested on the largest headform whose circumference does not exceed the internal circumference of the helmet.

7.11.3. To obtain accurate results, the helmet must be firmly fixed on the headform by means of its harness and chin-strap (unless loosening of the drawlace is prescribed) or by other suitable means so as to avoid any relative motion.

7.12. *Measuring instruments for checking shock-absorption*

7.12.1. The measuring instruments used shall be able to measure, without distortion, impact forces of up to 25,000 N (2,500 kp or 5,500 lbf) for frequencies of up to at least 2,000 Hz.

7.12.2. From their recordings it must be possible to determine the maximum force transmitted.

7.12.3. The drop hammer shall consist of a hardwood, metal or metal-and-wood

block weighing 5 kg (11 lb), with a circular or square cross section with a flat striking face of 380 cm^2 (59 in^2). The hammer should fall freely and without oscillation.

8. RECORDS OF TESTS

8.1. Each technical service shall make out records of tests for type approval and keep such records for two years. In the case of shock-absorption and resistance to penetration tests, the record shall indicate the location on the helmet of the point of impact of the concussion or the punch.

9. CONFORMITY OF PRODUCTION AND ROUTINE TESTS

9.1. Every protective helmet bearing a label as described in paragraph 5.4 above shall conform to the approved type.

9.2. In order to verify conformity as aforesaid a sufficient number of routine tests shall be carried out on mass-produced protective helmets.

9.3. Helmets shall be selected for testing as offered or to be offered for sale.

9.4. The rate of routine tests, mentioned in paragraph 9.2 above, shall be determined in the following way.

9.4.1. The initial rate of testing shall be 3 in 200 helmets produced.

9.4.2. After 20 successful tests the rate is reduced to 3 in 400. One failure on test shall result in a reversion to the initial rate of testing.

9.4.3. The administrative department may increase the rate of routine tests to 3 in 100 helmets produced if repeated failure on tests should occur.

9.4.4. If two or more types of protective helmets do not differ in any other respect than the size of the shell the rate of routine tests prescribed in paragraphs 9.4.1 and 9.4.2 above may be calculated on the total production of the said types. The size of helmets to be tested shall then be selected by the administrative department granting approval.

9.5. The protective helmets selected in accordance with paragraph 9.3 above for checking as to their conformity with an approved type, shall undergo some of the tests described in paragraph 7 above, chosen by the technical service. If the approval tests on a type have shown no variation in the protective qualities of the materials after low-temperature, moisture and heat treatment, the technical service conducting approval tests may reduce the variety and severity of the treatment for these tests, provided there is no change in the materials used or in manufacture.

9.6. Each technical service shall make out records of tests for checking conformity with that approved type of helmet and keep such records for two years. The provisions of the second sentence of paragraph 8.1 above are applicable for these tests.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

10.1. The approval granted in respect of a protective helmet may be withdrawn if the foregoing conditions are not satisfied.

10.2. If a Contracting Party to the Agreement withdraws an approval it has previously granted, it shall forth-with notify the other Contracting Parties applying this Regulation there-of by means of a copy of the approval form bearing at

the end in large letters the signed and dated annotation : " APPROVAL WITHDRAWN ".

11. INFORMATION TO WEARERS

11.1. Every protective helmet offered for sale shall bear a clearly visible label with the following inscription in the national language or at least one of the national languages of the country in which it is offered for sale :

" For adequate protection, this helmet must fit closely and allow of good lateral vision. This helmet is designed to absorb the force of a blow through partial destruction of or damage to the shell or its fittings. Any helmet that has taken a violent blow should be replaced, even if the damage if has suffered is not immediately apparent."

11.2. Every protective helmet must be clearly marked with its weight to the nearest 50 grammes (2 oz) in the normal unit of weight used in the country of sale.

12. NAMES AND ADDRESSES OF TECHNICAL SERVICES CONDUCTING APPROVAL TESTS AND ADMINISTRATIVE DEPARTMENTS

The Parties to the Agreement which apply this Regulation shall communicate to the Secretariat of the United Nations the names and addresses of the technical services conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or refusal or withdrawal of approval issued in other countries, are to be sent.

ANNEX 1

(Maximum format : A 4 (210 × 297 mm))

STAMP OF ADMINISTRATION

Communication concerning approval (or refusal or withdrawal of approval) of a type of protective helmet for drivers and passengers of motor cycles pursuant to Regulation No. ...

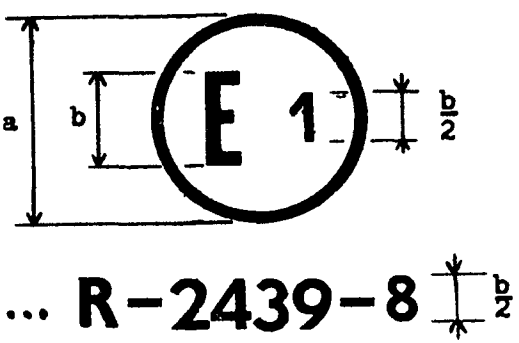
Approval No. ....

1. Trade name or mark .....
2. Manufacturer's name .....
3. Address .....
4. If applicable, name of manufacturer's representative .....

5. Address .....
6. Brief description of the helmet .....
7. Submitted for approval on .....
8. Technical service conducting approval tests .....
9. Date of report issued by that service .....
10. Number of report issued by that service .....
11. Approval granted/refused* .....
12. Remarks .....
13. Place .....
14. Date.....
15. Signature.....
16. The attached drawing No. .... shows the protective helmet complete with fittings .....

ANNEX 2

ARRANGEMENT OF THE APPROVAL MARK



	a	b
Minimum dimensions	12	5.6

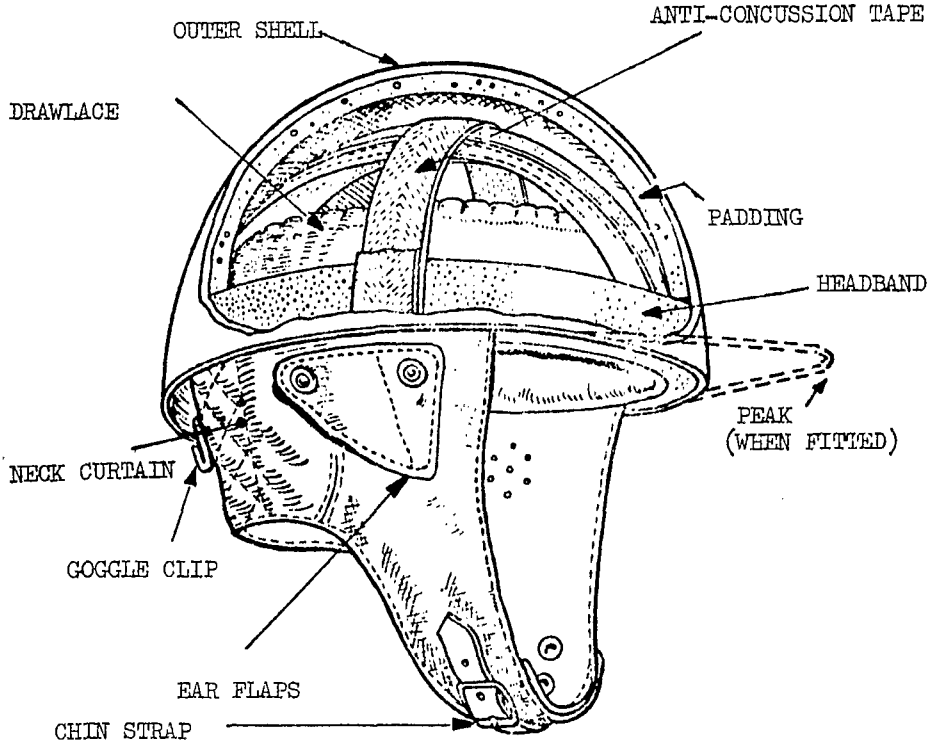
(millimetres)

The above approval mark, affixed to a protective helmet, shows that, pursuant to Regulation No. , the type of that helmet has been approved in the Federal Republic of Germany (E 1), under approval number 2439, and that its serial number is 8.

* Strike out what does not apply.

ANNEX 3

DRAWING OF PROTECTIVE HELMET



ANNEX 4

WOODEN HEADFORMS

A set of wooden headforms* shall be designed to cover as far as possible the range of sizes of the human head. Sizes of headbands are indicated in the following table :

Code letter of headform	*Circumference of headform* (the correspondence between inches and centimetres is approximate, the figures having been rounded off)	
	inches	*cm*
A	19⅝	50
B	20	51
C	20⅜	52
D	20¾	53
E	21⅛	54
F	21½	55
G	21⅞	56
H	22¼	56.5
J	22⅝	57
K	23	58
L	23⅜	59
M	23¾	60
N	24⅛	61
O	24½	62
P	24⅞	63
Q	25¼	64

Only the top of the headform is designed to represent the human head; the bottom is arbitrarily designed to enable the headform to be mounted either in an inclined position or upright, and also to provide a " chin " so that the helmet can be held securely on the headform by its chin-strap. In all the sizes, the inclined axis slopes up from rear to front at an angle of 30° to the horizontal and passes through a point on the central vertical axis 12.7 mm (½ inch) above the base line. This point is assumed to be the position of the centre of gravity of the human head.

The top of each headform is made of laminated beech† planed to a thickness of 12.7 mm (½ inch) (or 6.3 mm (¼ inch) if need be) and cut to outlines based on the dimensions shown in the following tables.‡ The grain in each layer should run from front to back. The layers are glued and screwed together, the glue used being a synthetic resin. Accurate assembly is facilitated by marking transverse and longitudinal axes on each layer and by drilling a 6.3 mm (¼ inch) diameter hole through the centre

* See appendix 1 to this annex.

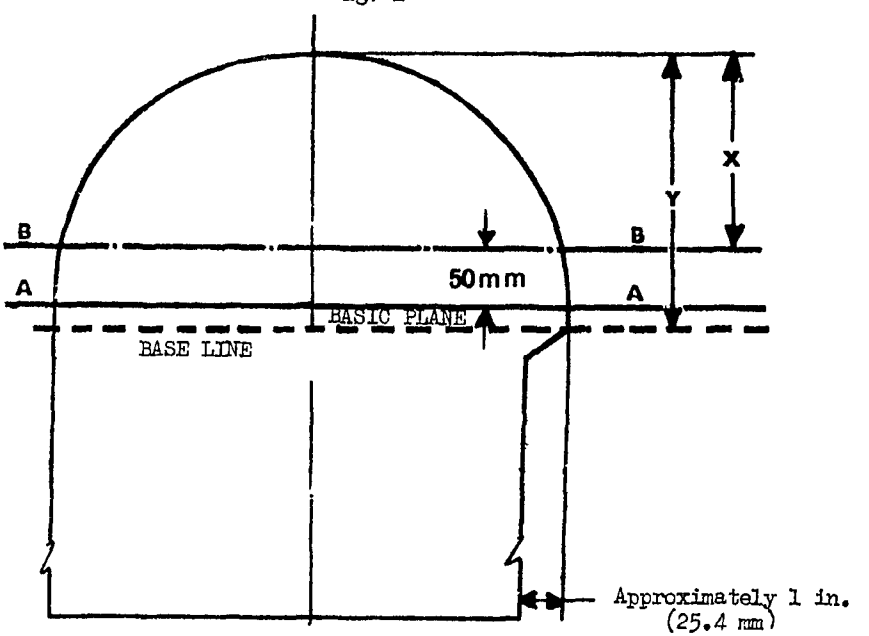
† Beech having a density of 0.64 to 0.71 (40–45 lb/cu.ft) at a moisture content of 12 per cent; straight in grain, free from defects and rot.

‡ See appendix 2 to this annex.

of each. When the headform is assembled, these holes form a channel along the central vertical axis which can be used for inserting a calliper gauge. The lower part is then built up from nine more layers, 12.7 mm (½ inch) thick, cut to the same outline as the base-line section but with the rear ends truncated. The assembled headform must be held in a press until the glue has hardened, when it can be given its final shape. The projections on the top are cut away to give the required smooth curved surface; the sides of the base are flattened off and the " chin " rounded. The back of the base is cut off at an angle of 60° to the horizontal so that the headform can be mounted with its inclined axis vertical for the shock-absorption test. A flat wooden block is glued and screwed to the sloping face to make the total thickness of wood along the inclined axis equal to that along the vertical axis. Lines must be marked round the shaped headform to indicate the two lines AA and BB* and the headform must be given several coats of shellac to seal it. Finally, two duralumin mounting plates are attached to it by two 25.4-mm (1 inch) countersunk steel screws.

Annex 4 — Appendix 1

Fig. 1



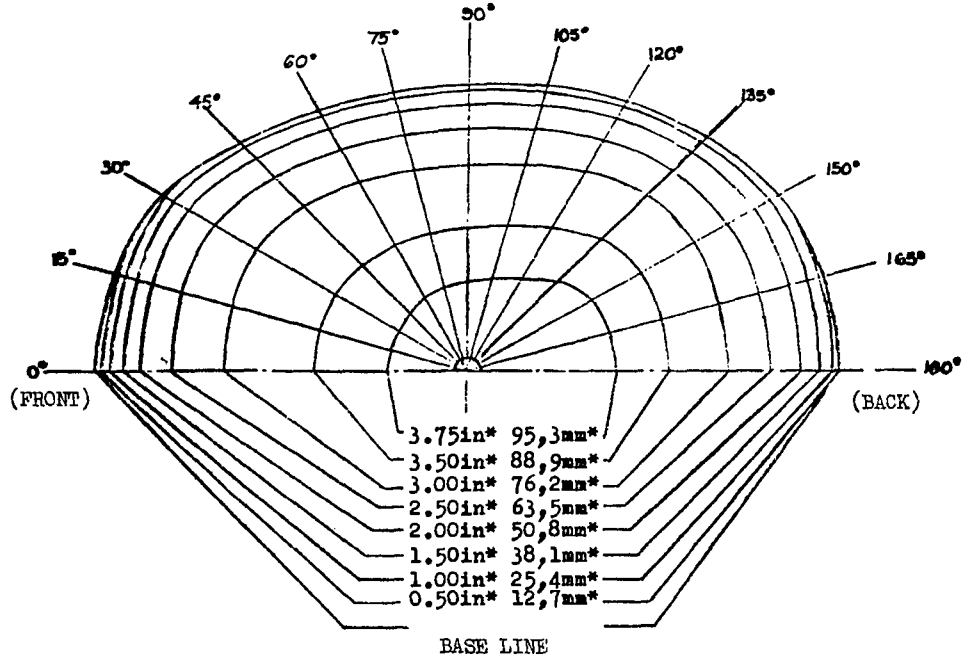
The line BB is scribed around the headform, set on a plane table, with a scriber set at X mm below the top of the headform. The line AA is scribed 50 mm below the line BB.

The base line to be taken in producing headforms is indicated in column Y.

* See fig. 1 in appendix 1 to this annex.

Letter	*X*		*Y*	
	mm	*Inches*	*mm*	*Inches*
A	26.93	1.06	89.66	3.53
B	28.70	1.13	91.18	3.59
C	30.22	1.19	92.71	3.65
D	31.75	1.25	94.48	3.72
E	33.27	1.31	96.01	3.78
F	35.05	1.38	97.53	3.84
G	36.57	1.44	99.06	3.90
H	38.10	1.50	100.33	3.97
J	39.62	1.56	102.36	4.03
K	41.40	1.63	103.88	4.09
L	42.92	1.69	105.41	4.15
M	44.45	1.75	107.18	4.22
N	45.97	1.81	108.71	4.28
O	47.75	1.88	110.23	4.34
P	49.27	1.94	111.76	4.40
Q	50.80	2.00	113.53	4.47

Fig. 2



Except for heights above the base line, all dimensions for which numerical values are given are constant for all sizes of headform.

For dimensions A, B and C and polar co-ordinates of horizontal sections, see tables in Appendix 2.

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* Distance above the base line.

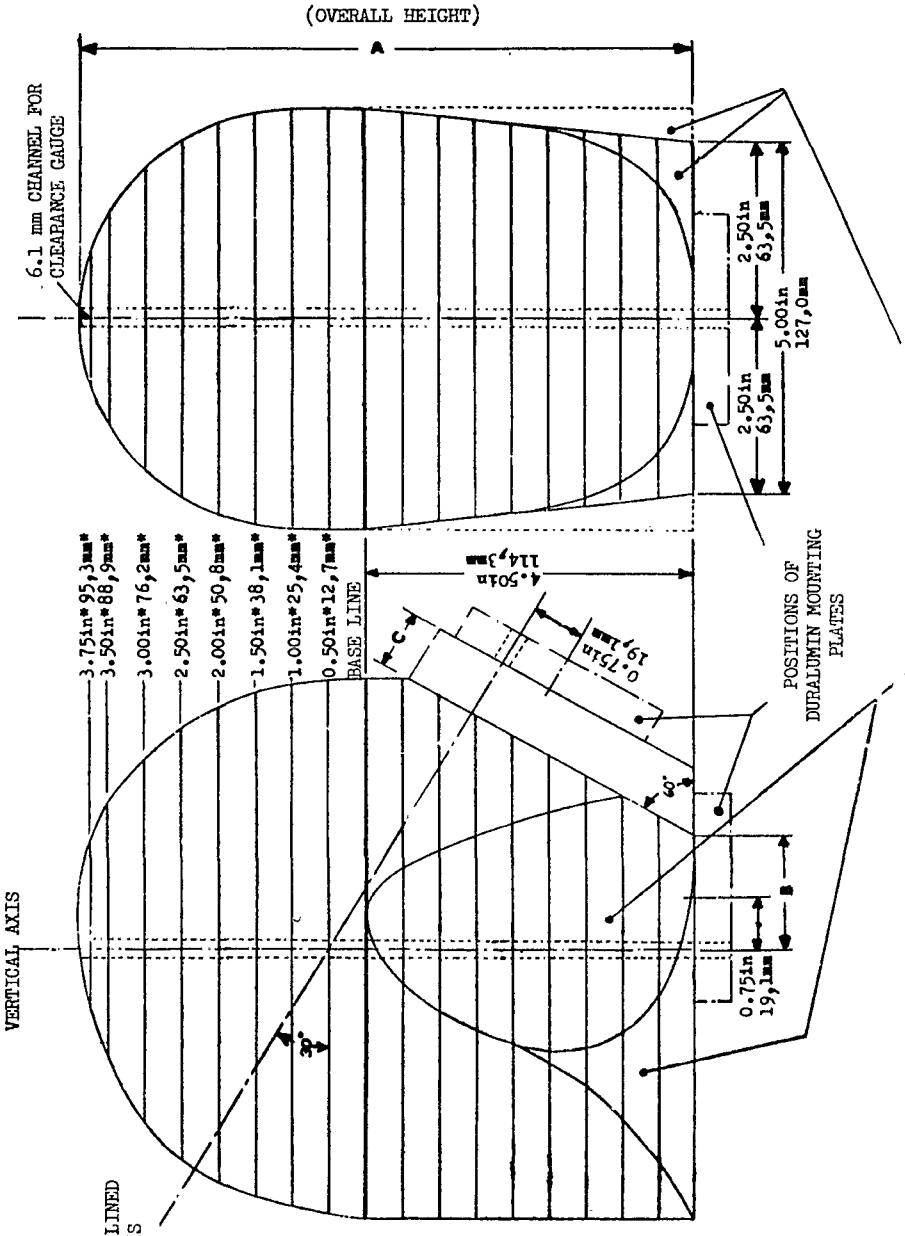
(OVERALL HEIGHT)
A
6.1 mm CHANNEL FOR CLEARANCE GAUGE
3.75in* 95,3mm*
3.50in* 88,9mm*
3.00in* 76,2mm*
2.50in* 63,5mm*
2.00in* 50,8mm*
1.50in* 38,1mm*
1.00in* 25,4mm*
0.50in* 12,7mm*
BASE LINE
4.50in 114,3mm
C
0.75in 19,1mm
30°
60°
2.501n 63,5mm
2.501n 63,5mm
5.001n 127,0mm
POSITIONS OF DURALUMIN MOUNTING PLATES
SIDES FLATTENED OFF AND CHIN ROUNDED AS SHOWN
VERTICAL AXIS
INCLINED AXIS
B
0.751n 19,1mm
* Distance above base line.

Fig. 3

ANNEX 4 - Appendix 2

ANNEXE 4 - Appendice 2

Polar Co-ordinates of Horizontal Cross-Sections and other Dimensions of Wooden Headforms lettered A to Q (To be read in conjunction with Figures 1 and 2)

Coordonnées polaires des sections droites horizontales et autres dimensions des fausses têtes repérées A à Q (à lire en se référant aux figures 1 et 2)

A

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	3.47	88,13	3.40	86,36	3.27	83,05	2.97	75,43	2.75	69,85	2.63	66,80	2.62	66,54	2.73	69,34	2.89	73,40	3.10	81,28	3.31	84,07	3.45	87,63	3.47	88,13
½	3.42	86,86	3.36	85,34	3.27	83,05	2.97	75,43	2.75	69,85	2.63	66,80	2.62	66,54	2.73	69,34	2.89	73,40	3.10	81,28	3.31	84,07	3.45	87,63	3.47	88,13
1	3.33	84,58	3.29	83,56	3.24	82,29	2.97	75,43	2.75	69,85	2.63	66,80	2.62	66,54	2.73	69,34	2.89	73,40	3.10	81,28	3.31	84,07	3.39	86,10	3.39	86,10
1½	3.18	80,77	3.16	80,26	3.13	79,50	2.87	72,89	2.66	67,56	2.57	65,27	2.56	65,02	2.56	67,56	2.82	71,62	3.01	78,76	3.20	81,28	3.26	82,80	3.26	82,80
2	2.94	74,67	2.93	74,42	2.91	73,91	2.68	68,07	2.49	63,24	2.40	60,96	2.39	60,70	2.49	63,24	2.63	66,54	2.82	71,62	2.90	73,66	3.02	76,70	3.02	76,70
2½	2.55	64,77	2.55	64,77	2.55	64,77	2.36	59,44	2.19	55,62	2.10	55,88	2.09	53,56	2.18	55,37	2.33	59,18	2.50	63,50	2.66	67,56	2.66	67,56	2.66	67,56
3	1.80	45,72	1.80	45,72	1.79	45,46	1.71	43,43	1.63	41,40	1.59	40,38	1.59	40,38	1.67	42,41	1.82	46,22	1.93	50,54	2.15	54,61	2.15	54,61	2.15	54,61
3½	1.22	30,98	1.23	31,24	1.23	31,24	1.22	25,95	1.18	29,97	1.17	29,71	1.19	25,88	1.28	32,51	1.42	36,06	1.59	40,38	1.77	43,94	1.75	44,45	1.75	44,45

	inches/pouces	mm
Dimension A :	8.03	203,96
" B :	1.16	29,46
" C :	1.24	31,49

B

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	3.53	89,66	3.47	88,13	3.33	84,58	3.02	76,70	2.81	71,37	2.69	68,32	2.68	68,07	2.79	70,86	2.96	75,18	3.17	80,51	3.38	85,85	3.50	88,90	3.53	89,66
½	3.48	88 39	3.44	87,37	3.32	84,32	3.02	76,70	2.81	71,37	2.69	68,32	2.68	68,07	2.79	70,86	2.96	75,18	3.17	80,51	3.38	85,85	3.50	88,90	3.53	89,66
1	3.38	85,85	3.36	85,34	3.29	83,56	3.02	76,70	2.81	71,37	2.69	68,32	2.68	68,07	2.79	70,86	2.96	75,18	3.17	80,51	3.38	85,85	3.44	87,37	3.47	88,13
1½	3.24	82,29	3.23	82,04	3.18	80,77	2.93	74,42	2.73	69,34	2.62	66,54	2.61	66,29	2.71	68,83	2.86	72,64	3.06	77,72	3.26	82,80	3.31	84,07	3.32	84,32
2	3.01	76,45	3.02	76,70	2.55	64,77	2.75	69,85	2.56	65,02	2.46	62,48	2.46	62,48	2.55	64,77	2.69	68,32	2.88	73,15	3.05	77,47	3.07	77,97	3.07	77,97
2½	2.62	66,54	2.63	66,80	2.63	66,80	2.41	61,21	2.23	56,64	2.14	54,35	2.15	54,61	2.23	56,64	2.37	60,19	2.57	65,27	2.73	69,34	2.73	69,34	2.73	69,34
3	1.94	49,27	1.95	49,53	1.95	49,53	1.82	46,22	1.71	43,43	1.66	42,16	1.67	42,41	1.75	44,45	1.66	42,16	2.08	52,83	2.25	57,15	2.26	57,40	2.26	57,40
3½	1.42	36,06	1.44	36,57	1.44	36,57	1.38	35,05	1.32	33,52	1.29	32,76	1.30	33,02	1.37	34,79	1.51	38,35	1.69	42,92	1.87	47,49	1.86	47,24	1.85	46,99
3½	0.52	13,20	0.52	13,20	0.53	13,97	0.56	14,22	0.60	15,24	0.65	16,51	0.65	16,51	0.77	19,55	0.89	22,60	1.06	26,92	1.21	30,73	1.21	30,73	1.21	30,73

	inches/pouces	mm
Dimension A :	8.09	205,48
" B :	1.24	31,46
" C :	1.17	29,71

Note : Dimensions indicated are in inches in column 1 and in mm in column 2.

Note : Les dimensions sont indiquées en pouces dans la première colonne et en mm dans la seconde.

ANNEX 4 - Appendix 2 (continued)

ANNEXE 4 - Appendice 2 (suite)

E

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	3,72	94,48	3.66	92,96	3.53	89,66	3.23	82,04	3.00	76,20	2.88	73,15	2.87	72,89	2.98	75,69	3.14	79,75	3.34	84,83	3.57	90,67	3.69	93,72	3.72	94,48
1/2	3.67	93,21	3.62	91,94	3.53	89,66	3.23	82,04	3.00	76,20	2.88	73,15	2.87	72,89	2.98	75,69	3.14	79,75	3.34	84,83	3.57	90,67	3.69	93,72	3.72	94,48
1	3.59	91,18	3.57	90,67	3.50	88,90	3.23	82,04	3.00	76,20	2.88	73,15	2.87	72,89	2.98	75,69	3.14	79,75	3.34	84,83	3.57	90,67	3.65	92,71	3.66	92,96
1 1/2	3.45	87,63	3.46	87,88	3.38	85,85	3.15	80,01	2.94	74,67	2.82	71,62	2.81	71,37	2.92	74,16	3.06	77,72	3.25	82,55	3.49	88,64	3.51	89,15	3.51	89,15
2	3.23	82,04	3.24	82,29	3.19	81,02	2.97	75,43	2.77	70,35	2.67	67,81	2.66	67,56	2.77	70,35	2.91	73,91	3.11	78,99	3.30	83,82	3.32	58,92	3.32	84,32
2 1/2	2.89	73,40	2.90	73,66	2.89	73,40	2.70	68,58	2.52	64,00	2.42	61,46	2.41	61,21	2.50	63,50	2.64	67,05	2.83	71,88	3.01	76,45	3.01	76,45	3.01	76,45
3	2.27	57,65	2.28	57,91	2.29	58,16	2.20	55,88	2.07	52,57	1.99	50,54	1.98	50,29	2.05	52,07	2.17	55,11	2.35	59,69	2.54	64,51	2.55	64,77	2.55	64,77
3 1/4	1.83	46,48	1.83	46,48	1.83	46,48	1.78	45,21	1.70	43,18	1.67	42,41	1.69	42,92	1.75	44,45	1.87	47,49	2.06	52,32	2.22	56,38	2.24	56,89	2.23	56,64
3 1/2	1.20	30,48	1.20	30,48	1.21	30,73	1.22	30,98	1.23	31,24	1.23	31,24	1.25	31,75	1.33	33,78	1.45	36,83	1.59	40,38	1.73	43,94	1.74	44,19	1.74	44,19

	inches/pouces	mm
Dimension A	8.28	210,31
" B	1.49	37,84
" C	0.96	24,38

F

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	3,78	96,01	3.72	94,88	3.58	90,93	3.29	83,56	3.07	77,97	2.94	74,67	2.93	74,42	3.04	77,21	3.19	81,02	3.40	86,36	3.63	92,20	3.75	95,25	3.78	96,01
1/2	3.73	94,74	3.69	93,72	3.58	90,93	3.29	83,56	3.07	77,97	2.94	74,67	2.93	74,42	3.04	77,21	3.19	81,02	3.40	86,36	3.63	92,20	3.75	95,25	3.78	96,01
1	3.63	92,20	3.61	91,69	3.56	90,42	3.29	83,56	3.07	77,97	2.94	74,67	2.93	74,42	3.04	77,21	3.19	81,02	3.40	86,36	3.63	92,20	3.59	93,72	3.71	94,23
1 1/2	3.52	89,40	3.53	89,66	3.47	88,13	3.22	81,78	3.00	76,20	2.88	73,15	2.88	73,15	2.97	75,43	3.12	79,24	3.31	84,07	3.53	89,66	3.56	90,42	3.59	91,18
2	3.32	84,32	3.32	84,32	3.29	83,56	3.05	77,47	2.85	72,39	2.75	69,85	2.74	69,59	2.82	71,62	2.96	75,18	3.14	79,75	3.33	84,58	3.36	85,34	3.37	85,59
2 1/2	2.98	75,69	2.98	75,69	2.97	75,43	2.76	70,10	2.59	65,78	2.50	63,50	2.49	63,24	2.57	65,27	2.70	68,58	2.86	72,64	3.04	77,21	3.07	77,97	3.08	78,23
3	2.41	61,21	2.40	60,96	2.40	60,96	2.31	58,67	2.16	54,86	2.08	52,83	2.07	52,57	2.14	54,35	2.29	58,16	2.45	62,23	2.63	66,80	2.63	66,80	2.64	67,05
3 1/2	1.38	35,05	1.37	34,79	1.37	34,79	1.38	35,05	1.39	35,30	1.41	35,81	1.42	36,06	1.49	37,84	1.61	40,89	1.78	45,21	1.93	49,02	1.93	49,02	1.93	49,02
3 3/4	0.64	16,25	0.63	16,00	0.63	16,00	0.67	17,01	0.71	18,03	0.78	19,81	0.84	21,33	0.92	23,36	1.02	25,90	1.14	28,95	1.27	32,25	1.28	32,51	1.28	32,51

	inches/pouces	mm
Dimension A	8.34	211,83
" B	1.57	39,87
" C	0.88	22,35

Note : Dimensions indicated are in inches in column 1 and in mm in column 2.

Note : Les dimensions sont indiquées en pouces dans la première colonne et en mm dans la seconde.

ANNEX 4 - Appendix 2 (continued)

ANNEXE 4 - Appendice 2 (suite)

J

Height above base line Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	3.97	100,83	3.89	98,80	3.79	96,26	3.47	88,13	3.25	82,04	3.13	79,50	3.12	79,24	3.23	82,04	3.38	85,85	3.61	91,69	3.81	96,77	3.94	100,07	3.97	100,83
½	3.92	97,02	3.86	98,04	3.77	95,75	3.47	88,13	3.23	82,04	3.13	79,50	3.12	79,24	3.23	82,04	3.38	85,85	3.61	91,69	3.81	96,77	3.94	100,07	3.97	100,83
1	3.81	96,77	3.77	95,75	3.72	94,48	3.47	88,13	3.23	82,04	3.13	79,50	3.12	79,24	3.23	82,04	3.38	85,85	3.61	91,69	3.80	96,52	3.87	98,29	3.89	98,80
1½	3.69	93,72	3.65	92,71	3.62	91,94	3.39	86,10	3.15	80,01	3.04	77,21	3.06	77,72	3.15	80,01	3.30	83,82	3.52	89,40	3.72	94,48	3.77	95,75	3.78	96,01
2	3.51	89,15	3.49	88,64	3.46	87,88	3.23	82,04	3.00	76,20	2.91	73,91	2.93	74,42	3.03	76,96	3.17	80,51	3.38	85,85	3.56	90,42	3.58	90,93	3.58	90,93
2½	3.21	81,53	3.18	80,77	3.19	81,02	2.99	75,94	2.76	70,61	2.68	68,07	2.69	68,32	2.80	71,12	2.93	74,42	3.13	79,50	3.30	83,82	3.31	84,07	3.31	84,07
3	2.73	69,34	2.72	69,08	2.73	69,34	2.57	65,27	2.41	61,21	2.32	58,92	2.33	59,18	2.43	61,72	2.56	65,02	2.73	69,34	2.88	73,15	2.89	73,40	2.89	73,40
3½	1.86	47,24	1.87	47,49	1.89	48,00	1.82	46,22	1.75	44,45	1.72	43,68	1.74	44,19	1.82	46,22	1.97	50,03	2.13	54,10	2.29	58,16	2.30	58,42	2.30	58,42
3½	1.29	32,76	1.29	32,76	1.31	33,27	1.28	32,51	1.26	32,00	1.27	32,25	1.30	33,02	1.38	35,05	1.50	38,10	1.66	42,16	1.83	46,48	1.86	47,24	1.86	47,24

	inches/pouces	mm
Dimension A :	8.53	216,66
" B :	1.82	46,22
" C :	0.67	17,01

K

Height above base line Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	4.03	102.36	3.98	101,09	3.82	97,02	3.53	89,66	3.31	84,07	3.20	81,28	3.18	80,77	3.28	83,31	3.46	87,88	3.65	92,71	3.87	98,29	4.00	101,60	4.03	102,36
½	3.98	101,09	3.94	100,07	3.82	97,02	3.53	89,66	3.31	84,07	3.20	81,28	3.18	80,77	3.28	83,31	3.46	87,88	3.65	92,71	3.87	98,29	4.00	101,60	4.03	102,36
1	3.89	98,80	3.87	98.29	3.79	96,26	3.53	89,66	3.31	84,07	3.20	81,28	3.18	80,77	3.28	83,31	3.46	87,88	3.65	92,71	3.87	98,29	3.93	99,82	3.96	100,58
1½	3.76	95,50	3.75	95,25	3.69	93,72	3.44	87,37	3.23	82,04	3.13	79,50	3.13	79,50	3.21	81,53	3.38	85,85	3.56	90,42	3.76	95,50	3.82	97,02	3.85	97,79
2	3.58	90,93	3.56	90,42	3.53	89,66	3.29	83,56	3.09	78,48	3.00	76,20	3.00	76,20	3.09	78,48	3.27	83,05	3.44	87,37	3.62	91,94	3.64	92,45	3.67	93,21
2½	3.27	83,05	3.26	82,80	3.23	82,04	3.04	77,21	2.84	72,13	2.75	69,85	2.77	70,35	2.85	72,39	3.02	70,70	3.18	80,77	3.33	84,58	3.35	85,09	3.37	85,59
3	2.80	71,12	2.80	71,12	2.81	71,37	2.68	68,07	2.51	63,75	2.41	61,21	2.41	61,21	2.48	62,99	2.64	67,05	2.82	71,62	2.95	74,93	2.96	75,18	2.96	75,18
3½	2.04	51,81	2.04	51,81	2.04	51,81	2.00	50,80	1.91	48,51	1.84	45,73	1.86	47,24	1.94	49,27	2.05	52,07	2.24	56,89	2.39	60,70	2.39	60,70	2.39	60,70
3½	1.48	37,59	1.47	37,33	1.47	37,33	1.47	37,33	1.45	36,83	1.44	36,57	1.46	37,08	1.53	38,86	1.66	42,16	1.85	46,99	2.01	51,05	2.04	51,81	2.02	51,30
4	0.72	18,28	0.70	17,78	0.70	17,78	0.71	80,34	0.73	18,54	0.76	19,30	0.79	20,06	0.86	21,84	0.98	24,89	1.14	28,95	1.33	33,78	1.42	36,06	1.44	36,57

	inches/pouces	mm
Dimension A :	8.59	218,18
" B :	1.90	48,26
" C :	0.60	15,24

Note : Dimensions indicated are in inches in column 1 and in mm in column 2.

Note : Les dimensions sont indiquées en pouces dans la première colonne et en mm dans la seconde.

ANNEX 4 - Appendix 2 (continued)

ANNEXE 4 - Appendice 2 (suite)

N

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	4.22	107,18	4.16	105,66	4.03	102,36	3.74	94,99	3.51	89,15	3.38	85,85	3.37	85,59	3.47	88,13	3.63	92,20	3.85	97,79	4.05	102,87	4.17	105,91	4.22	107,18
½	4.16	105,66	4.12	104,64	4.03	102,36	3.74	94,99	3.51	89,15	3.38	85,85	3.37	85,59	3.47	88,13	3.63	92,20	3.85	97,79	4.05	102,87	4.17	105,91	4.22	107,18
1	4.08	103,63	4.05	102,87	4.00	101,60	3.74	94,99	3.51	89,15	3.38	85,85	3.37	85,59	3.47	88,13	3.63	92,20	3.85	97,79	4.05	102,87	4.14	105,15	4.18	106,17
1½	3.95	100,33	3.92	99,56	3.90	99,06	3.65	92,71	3.43	87,12	3.32	84,32	3.31	84,07	3.41	86,61	3.55	90,17	3.78	96,01	3.96	100,58	4.02	102,10	4.06	103,12
2	3.78	96,01	3.77	95,75	3.74	94,99	3.52	89,40	3.30	83,82	3.18	80,77	3.19	81,02	3.27	83,05	3.41	86,61	3.63	92,20	3.80	96,52	3.85	97,79	3.88	98,55
2½	3.50	88,90	3.50	88,90	3.49	88,64	3.29	83,56	3.09	78,48	2.96	75,18	2.97	75,43	3.06	77,72	3.19	81,02	3.39	86,10	3.55	90,17	3.58	90,93	3.61	91,69
3	3.08	78,23	3.09	78,48	3.11	78,99	2.94	74,67	2.76	70,10	2.65	67,31	2.65	67,31	2.73	69,34	2.85	72,39	3.03	76,96	3.17	80,51	3.19	81,02	3.22	81,78
3½	2.41	61,21	2.41	61,21	2.42	61,46	2.35	59,69	2.21	56,13	2.15	54,61	2.16	54,86	2.24	56,89	2.37	60,19	2.55	64,77	2.71	68,83	2.72	69,08	2.72	69,08
3 3/4	1.95	49,53	1.95	49,53	1.96	49,78	1.90	48,26	1.83	46,48	1.79	45,46	1.80	45,72	1.87	47,49	2.02	51,30	2.20	55,88	2.38	60,45	2.37	60,19	2.37	60,19
4	1.26	32,00	1.25	31,75	1.26	32,00	1.28	32,51	1.29	32,76	1.30	33,02	1.33	33,78	1.41	35,81	1.53	38,86	1.73	43,94	1.88	47,75	1.89	48,00	1.88	47,75

	inches/pouces	mm
Dimension A :	8.78	223,01
" B :	2.15	54,61
" C :	0.38	96,52

O

Height above base line / Hauteur au-dessus de la ligne de base	(Front) 0° (Avant)		15°		30°		45°		60°		75°		90°		105°		120°		135°		150°		165°		(Rear) 180° (Arrière)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
0	4.28	108,71	4.23	107,44	4.07	103,37	3.77	95,75	3.56	90,42	3.45	87,63	3.43	87,12	3.55	90,17	3.71	94,23	3.93	99,82	4.15	105,41	4.25	133,35	4.28	108,71
½	4.24	107,69	4.19	106,42	4.07	103,37	3.77	95,75	3.56	90,42	3.45	87,63	3.43	87,12	3.55	90,17	3.71	94,23	3.93	99,82	4.15	105,41	4.25	133,35	4.28	108,71
1	4.14	105,15	4.11	104,39	4.05	102,87	3.77	95,75	3.56	90,42	3.45	87,63	3.43	87,12	3.55	90,17	3.71	94,23	3.93	99,82	4.15	105,41	4.20	106,68	4.21	106,93
1½	4.03	102,36	4.02	102,10	3.98	101,09	3.71	94,23	3.50	88,90	3.39	86,10	3.38	85,85	3.50	88,90	3.66	92,96	3.88	98,55	4.07	103,37	4.10	104,14	4.10	104,14
2	3.85	97,79	3.84	97,53	3.80	96,52	3.55	90,17	3.35	85,09	3.24	82,29	3.25	82,55	3.36	85,34	3.54	89,91	3.73	94,74	3.92	99,56	3.95	100,33	3.95	100,33
2½	3.59	91,18	3.59	91,18	3.56	90,42	3.32	84,32	3.12	79,24	3.02	76,70	3.03	76,96	3.14	79,75	3.30	83,82	3.48	88,39	3.66	92,96	3.67	93,21	3.67	93,21
3	3.19	81,02	3.20	81,28	3.18	80,77	3.00	76,20	2.82	71,62	2.73	69,34	2.74	69,59	2.83	71,88	2.98	75,69	3.17	80,51	3.33	84,58	3.33	84,58	3.33	84,58
3½	2.54	64,51	2.54	64,51	2.54	64,51	2.42	61,46	2.30	58,42	2.25	57,15	2.27	57,65	2.37	60,19	2.50	63,50	2.68	68,07	2.83	71,88	2.81	71,37	2.83	71,88
3 3/4	2.13	54,10	2.12	53,84	2.13	54,10	2.07	52,57	1.98	50,29	1.93	49,02	1.95	49,53	2.03	51,56	2.18	55,37	2.38	60,45	2.53	64,26	2.52	64,00	2.52	64,00
4	1.48	37,59	1.48	37,59	1.50	38,10	1.51	38,35	1.50	38,10	1.49	37,84	1.51	38,35	1.59	40,38	1.71	43,43	1.89	48,00	2.02	51,30	2.02	51,30	2.01	51,05

	inches/pouces	mm
Dimension A :	8.84	224,53
" B :	2.24	56,89
" C :	0.31	78,74

Note : Dimensions indicated are in inches in column 1 and in mm in column 2.

Note : Les dimensions sont indiquées en pouces dans la première colonne et en mm dans la seconde.