INTERNATIONAL STANDARD

ISO 13232-3

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AMENDMENT 1
2012-07-15

Motorcycles — Test and analysis procedures for research evaluation of rider crash protective devices fitted to motorcycles —

Part 3: Motorcyclist anthropometric impact dummy

Amendment 1: MATD test helmet

Motocycles — Méthodes d'essai et d'analyse de l'évaluation par la recherche des dispositifs, montés sur les motocycles, visant à la protection des motocyclistes contre les collisions —

Partie 3: Mannequin anthropométrique de motocycliste pour essais de choc

Amendement 1: Casque d'essai MATD

Reference number
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Foreword

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

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

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

Amendment 1 to ISO 13232-3:2005 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 22, *Motorcycles*.

Motorcycles — Test and analysis procedures for research evaluation of rider crash protective devices fitted to motorcycles —

Part 3:
Motorcyclist anthropometric impact dummy

Amendment 1: MATD test helmet

Global changes

Add consequential amendments to this and other parts of ISO 13232, as needed.

Page 2, Normative references

Add the following reference to the list of Normative references:

UN/ECE Regulation 22, *Uniform provisions concerning the approval of protective helmets and of their visors for drivers and passengers of motor cycles and mopeds*

Page 3, Subclause 4.2

Rename 4.2 as “Motorcyclist dummy head, head skins, and helmet”

Create a new subclause 4.2.1 entitled “Head and head skins” which includes the existing text from the original 4.2.

Add the following new subclause to 4.2 and increment all subsequent figures and tables by 1:

4.2.2 Helmet

The dummy shall be fitted with a full face MATD test helmet according to the procedures described in ISO 13232-6. The MATD helmet shall have a size designation of either small (56 cm) or medium (58 cm). The helmet shall have a mass of 1,54 ± 0,02 kg. The MATD helmet shall have the overall length and overall width given in Figure 1. The MATD helmet shall meet the resultant acceleration values of UN/ECE Regulation 22-05 for helmets with a non-protective lower face cover, as in UN/ECE 22-05, 6.2 and 7.3.6. Each test helmet shall be from a production lot that has been certified according to clause 5 herein using the procedures in clause 6 herein.

Dimensions in millimetres (tolerance: ±10 mm)

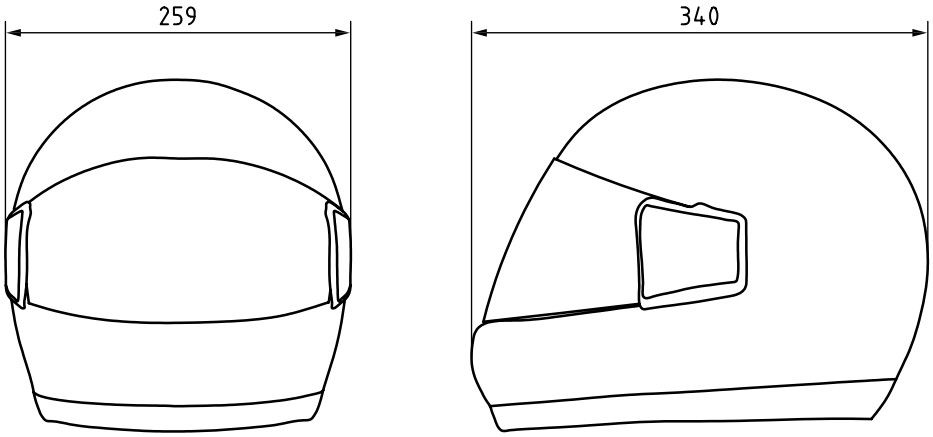

Figure 1 — Full face MATD helmet

When an MATD helmet specimen from a given production lot is tested according to the procedures described in 6.10, the specified peak resultant acceleration values for each test impact location shall be as given in Table 1.

Table 1 — Specified peak resultant acceleration values for certification of MATD helmet

Impact location[a]	Required value
B	236 g
P	263 g
R	234 g
X	190 g
[a] Locations as defined in UN/ECE Regulation 22-05.	

Page 8, Clause 5

Replace Clause 5 with the following:

5 Sampling of frangible components and MATD test helmets

5.1 Initial conformity of production

For certification of any new design, material specification, or manufacturing process of any frangible component or MATD helmet and for each of the test methods described in clause 6, 10 unused components or helmets shall be tested to establish estimates of the sample's mean and standard deviation. For example, certification of three different test methods would require 30 components to be tested.

The sample mean value shall be within ± 5 % of the specified value for all strengths, abdominal insert static forces and peak resultant head form accelerations. The sample mean value shall be within ± 20 % of the specified value for all static deflections. The sample standard deviation shall be less than 7 % of the sample mean value for all strengths, abdominal insert static forces and peak resultant head form accelerations. The sample standard deviation shall be less than 10 % of the sample mean value for all static deflections.

5.2 Subsequent conformity of production

Once a sample involving a specific design, material specification, and manufacturing process have been certified, three components from each lot which is identically manufactured shall be tested to verify the applicable characteristics specified in Table 7.

Table 7 — Frangible component subsequent conformity of production characteristics

Component	Characteristic
Frangible abdominal insert	Forces at 40 mm deflection
Frangible leg bone	Dynamic bending strength
Knee shear pin	Failure moments given in Table 5
Knee compliance element	Pre-failure rotations given in Table 5
MATD test helmet	Peak resultant head form accelerations given in Table 1

Page 20, Clause 6

Add the following subclause to clause 6:

6.10 MATD test helmet impact test

6.10.1 Apparatus

The impact apparatus shall be as described in UN/ECE Regulation 22-05. The helmet shall be fitted onto a 57 cm test head form (ISO Size J) for all tests.

6.10.2 Procedure

Each helmet test sample shall be marked and tested under the specified ambient conditions at impact locations B, P, R and X (as defined in UN/ECE Regulation 22-05) and impacted onto the specified flat steel anvil using the procedures described in UN/ECE Regulation 22-05. Record the peak resultant head form acceleration value for each test.

Page 51, Annex B

Add “and helmets” following “skins” in the title of B.2.2

Add the following as a new paragraph to the end of B.2.2:

Helmet designs by various manufacturers change periodically, and specific helmet models are not generally available worldwide or over long periods of time. In order to allow researchers worldwide to compare test results, which is the purpose of this part of ISO 13232, a standardized helmet has been specified. This is based on UN/ECE Regulation 22-05 test results including clauses 6.2 and 7.3.6 therein, for helmets with non-protective lower face cover, for the previous ISO 13232-6:2005 standardized Bieffe B12R helmet. Matching the Bieffe B12R test helmet performance, within a specified tolerance, ensures that other test helmet makes and models will produce similar reproducible results for tests done according to ISO 13232-6:2005. Without such a requirement, it is possible that various researchers could reach different conclusions about protective devices, depending on the particular performance characteristics of the test helmet used, even if the same such helmet was used in all tests in a series, as further explained in detail subsequently.

Page 71, Annex B

Replace the title “B.3 Sampling of frangible components” by “B.3 Sampling of frangible components and MATD helmet”

Add subclause title “B.3.1 frangible components.”

Replace “B.3.1 Initial conformity of production (see 5.1)” by “B.3.1.1 Initial conformity of production (see 5.1).”

Replace “B.3.2 Subsequent conformity of production (see 5.2) by “B.3.1.2 Subsequent conformity of production (see 5.2).”

Add the following new subclause to B.3:

B.3.2 Sampling of MATD helmets (clause 5)

The purposes of MATD helmet sampling and measurement are to: allow for performance specification of potentially different MATD helmet models and to ensure that the variability in MATD helmets is controlled to a feasible minimum.

B.3.2.1 Initial conformity of production (subclause 5.1)

A sample of 10 MATD helmets are specified because this is the approximate minimum number needed to establish a usable mean and standard deviation. A relatively tight bound of 5 % for the sample mean for peak resultant head form accelerations is given because these values are crucial in injury assessment. Likewise, a relatively tight specification on the allowable standard deviation is given in order to control variation of MATD helmets. A standard deviation less than 7 % of the sample mean is specified for all peak resultant head form accelerations because this reflects the relatively tight bounds that have been achieved with the existing MATD helmet design. Data in Tables B.18 to B.21 for the performance characteristics of the MATD helmet indicate that the MATD helmet meet the criteria.

B.3.2.2 Subsequent conformity of production (subclause 5.2)

The purpose of the subsequent conformity of production (CoP) tests is for lot checking and quality control of components, once the MATD helmet has been certified by the manufacturer. Here a compromise between the cost of quality control sampling and the reliability of the sampling process has been reached. For typical past production runs of 30 to 60 helmets, a sample of three helmets represents 5 % to 10 % destructive sampling, which is relatively costly. For a sample of three helmets, assuming a normal distribution and the same mean, it would be expected that one of the MATD helmets would exceed one standard deviation in its properties. Therefore, if none of the MATD helmet peak resultant head form accelerations deviates by more than two standard deviations (14 %) the lot is considered to be normally distributed and acceptable for impact testing. If one or more of the samples deviates by more than two standard deviations, this exceeds the bounds of a normal distribution, and a larger sample is then used to improve the reliability of the estimate. This involves three more helmets from the same lot. Then, again, if one third of the total test sample deviates by more than two standard deviations from the established means, the lot is considered to exceed the bounds of a normal distribution and is rejected for full-scale impact testing purposes.

Table B.18 — Sampled peak resultant head form accelerations of MATD helmet (UN/ECE Regulation 22-05 Test Position B)

Specimen number	Peak resultant head form acceleration g
1	255,0
2	247,2
3	244,2
4	236,6
5	235,0
6	235,0
7	236,0
8	236,6
9	226,6
10	212,2
NOTE 1 Mean: 236,4 g	
NOTE 2 Standard deviation: 11,6 g (4,9 %)	

Table B.19 — Sampled peak resultant head form accelerations of MATD helmet (UN/ECE Regulation 22-05 Test Position P)

Specimen number	Peak resultant head form acceleration g
1	265,4
2	268,9
3	256,2
4	255,2
5	255,7
6	255,7
7	275,8
8	262,1
9	267,1
10	263,0
NOTE 1 Mean: 262,5 g	
NOTE 2 Standard deviation: 6,9 g (2,6 %)	

Table B.20 — Sampled peak resultant head form accelerations of MATD helmet (ECE 22-05 Test Position R)

Specimen number	Peak resultant head form acceleration g
1	221,9
2	233,6
3	245,3
4	233,0
5	232,0
6	232,0
7	238,8
8	228,0
9	244,1
10	227,0
NOTE 1 Mean: 233,6 g	
NOTE 2 Standard deviation: 7,4 g (3,2 %)	

Table B.21 — Sampled peak resultant head form accelerations of MATD helmet (UN/ECE Regulation 22-05 Test Position X)

Specimen number	Peak resultant head form acceleration g
1	194,2
2	185,4
3	194,0
4	184,6
5	188,5
6	188,5
7	192,9
8	193,9
9	189,1
10	185,9
NOTE 1 Mean: 189,7 g	
NOTE 2 Standard deviation: 3,8 g (2,0 %)	

ICS 43.140

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