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Road vehicles — Multimedia data exchange format for impact tests

Véhicules routiers — Format d'échange de données multimédia pour les essais de choc

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 13499 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

This second edition of ISO/TS 13499 cancels and replaces the first edition of ISO/TS 13499, which has been technically revised.

Road vehicles — Multimedia data exchange format for impact tests

1 Scope

This Technical Specification presents a simple means for the exchange of multimedia data on impact tests between different laboratories. A format has been developed which defines a directory structure and the exchange information as ASCII files. Related electronic documents are available on the ISO website.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 80000-1, *Quantities and units – Part 1 : General*

ISO 6487, *Road vehicles – Measurement techniques in impact tests - Instrumentation*

ISO 8601, *Data elements and interchange formats information interchange Representation of dates and times.*

ISO/IEC 8859-1, *Information technology – 8-bit single-byte codes graphic character sets – Part 1 : Latin alphabet No. 1*

3 Terms and definitions

For the purposes of this document and all related electronic documents, the following terms and definitions apply.

3.1 Test number

The test number is a code specific to the test. In this document and all related electronic documents it is referenced as <testnumber>.

3.2 Test object

A test object is a group of components with the same initial state (e.g. speed, direction of movement) at impact time. In this document and all related electronic documents it is referenced as <testobject>.

3.3 Channel code

The channel code consists of 16 characters. It is composed of a sequence of codes with a fixed length and specific order, defining test object, position, main location, fine locations, physical dimension, direction and filter class. In this document and all related electronic documents the complete channel code is referenced as <channelcode>.

Example:

1	1	HEAD	CG	00	H3	AC	X	A

Meaning:	Test object	= 1	Vehicle no. 1	referenced as <testobject>
	Position	= 1	Front left	referenced as <position>
	Main location	= HEAD	Dummy head	referenced as <mainlocation>

Fine location 1	= CG	Center of gravity
Fine location 2	= 00	Undefined
Fine location 3	= H3	H III dummy
Dimension	= AC	Acceleration
Direction	= X	X-direction
Filter class	= A	CFC 1000, see ISO 6487

3.4 Reference system

A reference system is a three dimensional coordinate system which belongs to a test rig, a test object or a part of a test object. For each used reference system a specific identifier has to be defined.

3.5 Channel code extension

The data from different data sources or within different reference systems for the same measurement position described by a specific <channelcode> have to be distinguished. For this reason and for future purposes an extension of the <channelcode> is necessary. In this document and all related electronic documents this extension is referenced as <codeextension>. For details see 4.4 , 5.2 and the related electronic document A.

3.6 Media type

Multimedia data of vehicle safety tests which is from the same type is grouped to media types. Examples are photo, movie and channel. In this document and all related electronic documents this is referenced as <mediatype>.

3.7 Quaternion

The ambiguities of trigonometric functions can be avoided when a rotation matrix with algebraic functions is used. The three independent rotations are described by four algebraic parameters the quaternion qw, qx, qy and qz. For details see the related electronic document A.

3.8 Descriptor

A descriptor is a text with a maximum length of 28 characters identifying specific information. Tabulation stops (ASCII 9) are not allowed. Case-sensitivity is not required.

3.9 Line delimiter

A valid line delimiter is a “carriage return" (ASCII 13) followed by a "line feed" (ASCII 10). The line length is not limited.

3.10 Column separator

One or multiple tabulation stops (ASCII 9) or one or multiple blanks (ASCII 32) are valid separators between columns.

4 General requirements

4.1 Physical units

All data have to be expressed in SI units in accordance with ISO 80000, if not explicitly specified in the related electronic documents. In particular, acceleration, a, has to be given in metres per second squared *m/(s*s)* and velocity, v, in metres per second *m/s*.

4.2 Data types

The data values have to be in ASCII in accordance with ISO 8859-1 with the decimal symbol being a dot (ASCII 46). Valid basic data types are integer, float and string. Generic data types are date and datetime in accordance with ISO 8601 and coded, reference and filereference. The data types are defined in the related electronic document A.

4.3 NOVALUE

For integrity, where data is unavailable, insert the reserved word "NOVALUE" as the data value. “NOVALUE” is not case sensitive.

4.4 Filename convention

The name of a file is composed by a base filename, a dot (ASCII 46) and an extension. The base filename and the extension are built from the lexical space ASCII {43, 45, 48 – 57, 65 – 90, 95, 97 – 122}. The ‘_’ character (ASCII 95) is reserved for the separation within filenames. Filenames are case sensitive. The <testnumber> is free, but has to be unique within the whole file structure. All other parts of filenames have to be used in the same notation as described in this document and all related electronic documents.

5 File types

5.1 Information files

Information files consist of a sequence of information lines. Each information line has to end with a line delimiter.

An information line has to start with a descriptor of 28 characters. Position 29 contains a separator, this may be a colon. The test information has to start at position 30**.**

If some information lines belong to a single <mediatype> these lines have to be summarized within an information block. Every block has a blockbegin- and a blockend-line. The general information valid for all <mediatypes> is not block structured and is positioned in front of the first block. Nesting of blocks is not allowed.

Comment lines may be used at any line and have to be marked by the descriptor "Comments". Each following line of a comment has to begin with this descriptor. Comment lines should not contain computer-readable information.

The information line with the descriptor "Data format edition number" in the *test information file* has to be the first line. Within a block the position order of all information lines is free. All descriptors except comments have to be unique within a block.

The mandatory and optional descriptors are specified in the related electronic document A. Additional partner specific descriptors may be agreed between the transferring parties. They have to start with a “+” sign (ASCII 43).

The filename of the *test information file* has to be built from the <testnumber> a dot (ASCII 46) and the extension “mme”. The names of all other multimedia information files start with the <testnumber>. They have the extension “mmi”. Information files are described in more detail in related electronic document A.

5.2 Data files

Data files consist of a header section and a data section. The header section is always in the beginning of the file. The data section starts with a *separator line* and ends at the End of File marker. The construction of the descriptive lines is identical to the specification of an information file. The general rules for information files (see 5.1) apply also to the header section.

A data file may consist of one or more columns in the data section. The columns are separated by column separators. Specific often used data structures are predefined. These definitions and the examples are shown in the related electronic document A.

The filenames of all multimedia data files have the extension “mmd”. Allowed filenames for channel data are built by the <testnumber>, the <channelcode> and the <codeextension> defined in the related electronic document A in the format <testnumber>_<channelcode>_<codeextension>.mmd.

5.3 Comment files

These optional files contain all additional information exceeding the data volumes of the information files. Comment files may be stored in the main directory or in any subdirectory. The name of the *test comment file* has to be identical to the <testnumber>, while the names of the other comment files has to be built from the <testnumber> followed by an “_” (ASCII 95) and the name of the subdirectory with the extension "txt". All comment files contain unformatted text.

Each item has to be separated by a line delimiter. If information specific to an individual data channel needs to be given, the information line has to start with the <channelcode>.

The comment files according to the exchanged media types have to be as follows:

File name: <testnumber>_<subdirectory-name>.txt

Location: in every subdirectory

Contents:

unformatted text

.....

<channelcode>: unformatted text

.....

unformatted text

6 File organisation

6.1 Directory structure

All files relating to a particular test have to be held in a standard directory structure as follows. Filenames and directory names are case sensitive. All subdirectories except the object and reference subdirectory are optional.

<testnumber>	**main directory**
|	
|---------- <testnumber>.mme	test information file
|---------- <testnumber>.txt	test comment file
|---------- **Channel**	**subdirectory**
|----<testnumber>_Channel.mmi	channel information file
|-----<Name of channel file 1>.mmd	channel data file 1
. . .	
|-----<Name of channel file ~~n~~c>.mmd	channel data file n
|-----<testnumber>_Channel.txt	channel comment file
|---------- **Document**	**subdirectory**
|-----<testnumber>_Document.mmi	document information file
|-----<Name of document file 1>	document file 1
. . .	
|-----<Name of document file d>	document file d
|-----<testnumber>_Document.txt	document comment file
|---------- **Movie**	**subdirectory**
|-----<testnumber>_Movie.mmi	movie information file
|-----<testnumber>_Movie.mmd	movie data file
|-----<Name of movie file 1>	movie file 1
. . .	
|-----<Name of movie file m>	movie file m
|-----<testnumber>_Movie.txt	movie comment file
|---------- **Object**	**subdirectory**
|-----<testnumber>_Reference.mmi	reference system information file
|-----<testnumber>_Reference.mmd	reference system data file
|-----<testnumber>_Reference.txt	reference system comment file
|-----<Name of object file 1>.mmi	object information file 1
. . .	
|-----<Name of object file o>.mmi	object information file o
|-----<testnumber>_Object.txt	object comment file
|---------- **Photo**	**subdirectory**
|-----<testnumber>_Photo.mmi	photo information file
|-----<Name of photo file 1>	photo file 1
. . .	
|-----<Name of photo file p>	photo file p
|-----<testnumber>_Photo.txt	photo comment file
|---------- **Report**	**subdirectory**
|-----<testnumber>_Report.mmi	report information file
|-----<Name of report file 1>	report file 1
. . .	
|-----<Name of report file r>	report file r
|-----<testnumber>_Report.txt	report comment file
|---------- **Static**	**subdirectory**
|-----<testnumber>_Static.mmi	static measurement information file
|-----<testnumber>_Static.mmd	static measurement data file
|-----<testnumber>_Static.txt	static measurement comment file
|---------- (Additional subdirectories may be added here)	

6.2 Main directory

The main directory has to contain one *test information file* with general information concerning the test. The *test comment file* and special subdirectories for the multimedia data are optional.

6.3 Subdirectories

6.3.1 Channel subdirectory

This optional subdirectory contains all *channel data files* with measurement values from specific test channels expressed in physical units. A *channel data file* consists of one or more columns each belonging to a component of a physical quantity. If this subdirectory exists, the *channel information file* is mandatory.

6.3.2 Document subdirectory

This optional subdirectory contains information which is no results of the test. If this subdirectory exists, the *document information file* is mandatory.

6.3.3 Movie subdirectory

This optional subdirectory contains all movies. If this subdirectory exists, the *movie information file* is mandatory. Camera positions have to be stored in the *movie data file*.

6.3.4 Object subdirectory

This mandatory subdirectory contains the information about test objects, occupants, restraint systems and other components. For each test object a separate mandatory *object information file* has to be used.

In addition this subdirectory contains the description of all reference coordinate systems in one *reference system information file*. The data which describes static or dynamic relations between coordinate systems with six degrees of freedom has to be stored in the *reference system data file*. If more than the local transducer coordinate systems are used, the reference system files are mandatory otherwise they are optional.

Optional *object information files* contain the information concerning occupants and restraint systems.

Filenames are built according to the following rules:

test objects:	<testnumber>_<testobject>.mmi
occupants:	<testnumber>_< testobject ><position>.mmi
restraint systems:	<testnumber>_< testobject ><position><mainlocation>.mmi

6.3.5 Photo subdirectory

This optional subdirectory contains all photos. If this subdirectory exists, the *photo information file* is mandatory.

6.3.6 Report subdirectory

This optional subdirectory contains the results of the test. If this subdirectory exists, the *report information file* is mandatory and the recommendation for the filename of the main report file is <testnumber>_Report. The fileextension of the main report should correspond to the file format (e.g. pdf).

6.3.7 Static subdirectory

This optional subdirectory contains all static measurement data. If this subdirectory exists, the *static measurement ~~information~~ data file* is mandatory.

6.3.8 Additional subdirectories

Supplementary information may be stored in additional subdirectories. The subdirectory should be given a meaningful name that identifies the information. Each additional subdirectory has to contain one information file used throughout to describe the format of other files in the directory showing limitations as necessary. The name of the information file is built from the <testnumber> and the subdirectory name with the extension “mmi”.

6.4 Files

Each used media subdirectory has to contain

— one *information file* with the media specific describing information (see 5.1);

— all data files of the specific media type (see 5.2).

The main directory and all subdirectories shall contain

— one optional *comment file* for additional information (see 5.3);

— all additional files of the specific media type.

7 Data formats

The first line of the *test information file* has to contain the descriptor "Data format edition number" as a reference to the version of the related electronic documents used to create the files.

8 Related electronic documents

The name and explanation of descriptors are given in the related electronic document *Descriptors and Hints* (RED A). See http://standards.iso.org/iso/13499. Future versions of this document will also contain the description of changes and hints for using the Technical Specification.

The related electronic document *Channel Codes* (RED B) gives the coding description, code lists and coding rules for measurement channels. See http://standards.iso.org/iso/13499.

The related electronic document *Figures* (RED C) presents figures of vehicles and dummies with the location of the channel codes and parts of it. See http://standards.iso.org/iso/13499.

The related electronic document *Compatibility* (RED D) describes the additional information needed for the data exchange under special conditions. See http://standards.iso.org/iso/13499.

The related electronic document *Calculated Values Codes and Channels* (RED E) defines the optional descriptors for calculated values which are derived from the measurement channels. See http://standards.iso.org/iso/13499.

The Bureau de Normalisation de l'Automobile (BNA) has been appointed by the ISO technical management board (TMB) as the maintenance agency responsible for regularly updating all electronic documents related to ISO/TS 13499.

A change of the related electronic documents will result in an increase of the value for the descriptor ´Data format edition number´ (see 7 and RED A).