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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Meaning of the colour marks:

black	**no change to the old version**
red	**proposed change or addition**
dark blue	**has to be managed by the ISO**
light blue	**not clarified at the moment**

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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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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 1000, *SI units and recommendations for use of their multiples and certain other units*

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

ISO 8721, *Road vehicles – Measurement techniques in impact tests – Optical 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*

ISO 9660, *Information processing – Volume and file structure of CD-ROM for information interchange*

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Testnumber

The testnumber is an alphanumeric code specific to the test.

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.

3.3 Channel code

The channel code consists of 16 characters composed of a sequence of codes for test object, position, main location, fine locations, physical dimension, direction and filter class.

Example: | 1 | 1 | HEAD | CG | 00 | H3 | AC | X | A |

Meaning: Test Object   = 1   Vehicle no. 1
                Position   = 1   Front left

Main Location	= HEAD	Dummy head
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, ISO 6487

3.4 Reference system

Three dimensional coordinate system which belongs to a test object or a part of a test object.

3.5 Media object

Multimedia data of vehicle safety tests which are from the same type are combined to media objects. Examples are photos, movies, channels.

3.6 Quaternion

The ambiguities for trigonometric functions can be avoided when a rotation matrix with algebraic functions is used. The three independent rotations are discribed by four algebraic parameters the quaternions qw, qx, qy and qz.

3.7 Line delimiter

A valid line delimiter is a "carriage return" and "line feed" (CR/LF). For the exchange between unix systems ...

3.8 Column separator

A tabulator (ASCII 9) and one or multiple blanks (ASCII 32) are valid separators between columns.

4   General requirements

4.1 Physical units

All data shall be expressed in SI units or in their multiples, in accordance with ISO 1000. In particular, acceleration, a, shall be given in metres per second squared (m/s^2) and velocity, v, in metres per second (m/s).

4.2 Data types

The data code shall be in ASCII in accordance with ISO 8859-1 with the decimal symbol being a point (".") (ASCII 46). Valid basic data types are integer, float and string. Generic data types are date, datetime and coded. The data types are defined in RED A.

4.3 NOVALUE

For integrity, where data is unavailable, insert "-9999999.9" if the data format is float and insert the reserved word "NOVALUE" as the data value in all other cases.

4.4 Placeholder

In channel codes, question marks ("?") shall be used as placeholders, one for each alphanumeric character. These shall be replaced by valid combinations (see the related electronic documents).

4.5 Data medium

The physical data medium shall be agreed or specified by the exchanging partners. If the medium is a CD-ROM the data format shall be based on ISO 9660 with the possible extensions.

4.6 Filename convention

The name of a file is composed by a base filename, a point and an extension. The base filename and the extension are build from the lexical space ASCII {46, 48 – 57, 65 – 90, 95 –122}.

5 Directory structure

All files relating to a particular test have to be held in a standard directory structure as follows.

```
<TESTNUMBER>                               main directory
    |
    |---------- <testnumber>.MME          test information file
    |---------- <testnumber>.TXT          test comment file
    |---------- CHANNEL                   subdirectory
    |            |----<testnumber>_Channel.INF     channel information file
    |            |-----<Name of channel file 1>    channel data file 1
    |            . . .
    |            |-----<Name of channel file n>    channel data file n
    |            |-----<testnumber>_Channel.TXT    channel comment file
    |---------- DOCUMENT                  subdirectory
    |            |-----<testnumber>_Document.INF   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.INF      moving image information 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
    |            |-----<Name of object file 1>     object information file 1
    |            . . .
    |            |-----<Name of object file o>     object information file o
    |            |-----<testnumber>_Object.TXT     object comment file
    |---------- PHOTO                     subdirectory
    |            |-----<testnumber>_Photo.INF      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
    |---------- REFERENCE                 subdirectory
    |            |-----<testnumber>.RSI            reference system information file
    |            |-----<testnumber>.REF            reference system data file
    |            |-----<testnumber>_Reference.TXT  reference system comment file
    |---------- REPORT                    subdirectory
                 |-----<testnumber>_Report.INF     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
                        |-----<name of static data file>     static measurement data file
                        |-----<testnumber>_Static.TXT        static measurement comment file
        |---------- (Additional subdirectories may be added here)
```

The main directory contains the test information file, the optional test comment file and special subdirectories for the multimedia data.

For every media object type a specific subdirectory has to be used. These subdirectories are optional. For the media objects MOVIE, PHOTO and CHANNEL the information file is mandatory if the subdirectory exists. Any other used subdirectory shall contain an information file.

The information about test objects, occupants, restraint systems and other components have to be stored in the OBJECT subdirectory.

Any reports and diagrams have to be stored in the REPORT-subdirectory, while digital film and video data are stored in the MOVIE, picture data in the PHOTO, static measurement data in the STATIC, channel data in the CHANNEL and reference system data in the REFERENCE subdirectories. All additional documents which are not test results shall be stored in the DOCUMENT directory.

Additional information can be stored in further subdirectories.

6 File organization

6.1 General

The information shall be stored in the following directories and files:

The main directory contains

— one *test information file* with general information concerning the test.

The object subdirectory contains

— all *object information files*. These files contain the information concerning test objects, occupants and restraint systems. Allowed filenames are built from the testnumber and the first characters of the channel codes defined in RED B.

The reference subdirectory contains

— one *reference system information file* with the description of all reference systems;

— one *reference system data file* with the relations between the reference systems.

Each media subdirectory contains

— all data files of the specific media object (channel, photo, movie, static data, document, report) (see 6.3);

— one information file with the media specific describing information (only for channels, movies and photos).

The main directory and all subdirectories shall contain

— one optional *comment file* for additional information (see 6.4);

Each additional subdirectory shall contain

— one *INF file* used throughout to describe the format of other files in the directory showing limitations as necessary. The filename is built from the testnumber and the subdiectory name with the extension INF.

6.2 Information files

6.2.1   General rules for information files

Each line shall begin with a description field having a maximum of 28 characters. Position 29 may be a colon. The test information shall start at position 30. Each line shall end with a line delimiter. Tabulation stops ("tabs") are not allowed. Case-sensitivity is not required for description fields.

If some information belongs to a single media object these descriptors have to be summarized within an information block. Every block has a begin- and an end-descriptor. The general information valid for all media objects of the same type is not block structured.

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

The descriptor "Data format edition number" in the test information file shall be the first descriptor. The position order of all other descriptors may be free within a block. All description fields except "Comments" shall be unique within a block.

The mandatory and optional descriptors are described in RED A. Additional partner-specific descriptors can be agreed between the transferring parties. They have to start with a "+".

6.2.2   Additional information files

Additional information to specific media objects shall be summarised within information files satisfying the general rules (see 6.2.1).

6.2.3   XML version of information files

For each information file an equivalent XML file is allowed. The usage of XML files has to be agreed between the exchanging partners.

6.3 Data files

6.3.1   General rules for data files

Data files consist of a header block and a data block. The header block in the beginning of the file is surrounded by a begin-descriptor and an end-descriptor. The construction of the descriptive lines is identical to the specification of an information file. The general rules for information files (see 6.2.1) apply also to the header block.

A data file may consist of one or more columns in the data block. The columns are separated by column separators. Specific often used data types are predefined. These definitions and the examples are shown in RED A.

6.3.2   Channel data files

These files contain measurement values from specific test channels expressed in physical units and balanced. A channel file may consist of one or more columns each belonging to a component of a physical quantity.

Allowed filenames are built by the testnumber and the channel codes defined in RED B. The file extension is identical to the 'Reference system Id' defined in the *reference system information file*.

6.3.3   Reference system data (REF) file

This file contains data which describe static or dynamic relations between reference systems with six degrees of freedom. A reference system data file consists of ten columns separated by column separators. The columns describe the name, reference system, time, the three spatial components and the four quaternions.

6.3.4   Static measurement data (STA) file

This file contains all data from static measurements. The static measurement file consists of seven columns separated by column separators. The columns describe the name, reference system, grouping information, time and the three spatial components of any measurement.

6.3.5   Additional data files

Additional data shall be summarised within data files satisfying the general rules (see 6.3.1).

6.4 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" shall be identical to the test number, while the names of the other comment files shall be equivalent to the names of the subdirectories with the extension "TXT". All comment files contain unformatted text.

Each item shall be separated by a line delimiter. If information specific to an individual data channel needs to be given, the information line shall start with the channel code.

The comment files shall be as follows:

File name:	<subdirectory-name>.TXT
Location:	in every subdirectory
Contents:	
	unformatted text

......

channel code: unformatted text

......

unformatted text

6.5 Additional information

Supplementary information may be stored in additional subdirectories. The subdirectory should be given a meaningful name that identifies the information. Only one additional subdirectory for each system should be used. It is the responsibility of the producer of the system to specify the format of any files in the directory used by their system.

7   Data formats

The first line of each information file / the test information file shall 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 all 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 transducer 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 codes and channel codes. See http://standards.iso.org/iso/13499.

The related electronic document *NHTSA Compatibility* (RED D) describes the additional information needed for the data exchange with the NHTSA. 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.

Specific translations into, and from, other formats will be added in the future.

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).