TECHNICAL SPECIFICATION

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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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Contents

Page

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.

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:

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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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.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 first edition of ISO/TS 13499 cancels and replaces the first edition of ISO/TR 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 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded 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 term and definition apply.

3.1
test object
group of components with the same initial state (e.g. speed, direction of movement) at impact time

4 General requirements

4.1 Physical units

All data shall be expressed in SI units, 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 “NOVALUE”

For integrity, where data is unavailable, insert the reserved word “NOVALUE” as the data value.

4.3 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).

4.4 Data medium

The physical data medium shall be a 650 Mb CD-ROM (74 min), if no other medium is agreed or specified.

The data format shall be based on ISO 9660 with the possible extensions.

The data code shall be in ASCII, in accordance with ISO 8859-1, with the decimal symbol being a point (“.”) (ASCII 46).

5 Directory structure

All files relating to a particular test shall be held in a standard directory structure on the CD-ROM as follows.

<TESTNUMBER>	**main directory**
|	
|---------- <testnumber>.MME	test descriptor file
|---------- <testnumber>.TXT	test comment file
|---------- **CHANNEL**	**subdirectory**
|-----<testnumber>.CHN	channel information file
|-----<testnumber>.001	test channel file 1
……	
|-----<testnumber>.nnn	test channel file n
|-----CHANNEL.TXT	channel comment file
|---------- **DIAGRAM**	**subdirectory**
|-----DIAGRAM.TXT	defines file formats and short description of other files in this directory
|---------- **DOCUMENT**	**subdirectory**
|-----ISO_NORM.TXT	standard text file
|-----EXAMPLES_HINTS.TXT	examples and hints text file
|-----CHANNEL_CODES.TXT	channel codes text file
|---------- **MOVIE**	**subdirectory**
|-----<testnumber>.MII	moving image information file
|-----<Name of moviefile 1>	movie file 1
……	
|-----<Name of moviefile m>	movie file m
|-----MOVIE.TXT	movie comment file
|---------- **PHOTO**	**subdirectory**
|-----<testnumber>.PHO	photo information file
|-----<Name of photofile 1>	photo file 1
……	

	|-----<Name of photofile p>	photo file p
	|-----PHOTO.TXT	photo comment file
|----------	**REPORT**	**subdirectory**
	|-----REPORT.TXT	defines file formats and short description of other files in this directory
|----------	**STATIC**	**subdirectory**
	|-----<testnumber>.SD1	static data file of test object 1
	…..	
	|-----<testnumber>.SDQ	static data file of test object q
	|-----STATIC.TXT	static data comment file
|----------	(Additional subdirectories may be added here)	

NOTE 1 <testnumber> is an up-to-8-digit alphanumeric code specific to the test used in the test descriptor file (see 6.1). The main directory contains the test descriptor file, the test comment file and special subdirectories for the multimedia data.

NOTE 2 The text of this Technical Specification, its related electronic documents and additional certificates are stored in the DOCUMENT subdirectory.

NOTE 3 Any reports are stored in the REPORT subdirectory, while digital film and video data are stored in the MOVIE, still photograph data in the PHOTO, diagrams in the DIAGRAM, static measurements in the STATIC and transducer channel data in the CHANNEL subdirectories, respectively.

NOTE 4 Additional information can be stored in further subdirectories.

6 File organization

6.1 General

The information shall be stored in the following types of files:

— one *test descriptor file* for the whole test in the main directory (see 6.2);

— one optional *test comment file* for additional information in the main directory (see 6.3);

— one optional *comment file* for additional information in every subdirectory (see 6.3);

— one *channel information file* in the CHANNEL subdirectory (see 6.4.1);

— one *test channel file* for each channel in the CHANNEL subdirectory (see 6.4.2);

— one *text file (TXT)*, used to describe any diagram stored in the DIAGRAM subdirectory;

— *TXT files* to hold all standards and complementary certificates stored in the DOCUMENT subdirectory

— one *movie information file* and all digital film and video files in the MOVIE subdirectory (see 6.5);

— one *photo information file* and all digital photo files in the PHOTO subdirectory (see 6.6);

— *TXT files* to define optional test reports and results in the REPORT subdirectory;

— one *static measurement file* for each test object in the STATIC subdirectory (see 6.7);

— *TXT files* used throughout to define the format of other files in their directories, showing limitations as necessary.

Each line, except “Value of samples”, 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. Tabulation stops (“tabs”) are not allowed. Case-sensitivity is not required for description fields.

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 descriptor file shall be the first descriptor. All other description fields shall be unique within a file. Their position order may be free, although they shall not be between or after “Values of samples” in the test channel files.

All line descriptors are mandatory except comments and additional partner-specific descriptors agreed between the transferring parties.

6.2 Test descriptor (MME) file

This file contains general information concerning the test. Each item shall be separated by a “carriage return” and a “line feed” (CR/LF). Each line may comprise up to 80 characters. Information within one line shall be separated by a single space.

The test descriptor or MME (Multimedia exchange) file shall be as given in Table 1.

Table 1 — Test descriptor (MEE) file

File name:	“filename”.MME, where “filename” is identical to the ⟨test number⟩.	
Location:	main directory	
	Contents	
Field descriptor	**Data format**	**Remark**
Data format edition number	Float	See Clauses 7 and 8.
Laboratory name	Alphanumeric	
Laboratory contact name	Alphanumeric	Person to contact
Laboratory contact phone	Alphanumeric	
Laboratory contact fax	Alphanumeric	
Laboratory contact email	Alphanumeric	
Laboratory test ref. number	Alphanumeric	
Customer name	Alphanumeric	
Customer test ref. number	Alphanumeric	
Customer project ref. number	Alphanumeric	
Customer order number	Alphanumeric	
Customer cost unit	Alphanumeric	
Customer test engineer name	Alphanumeric	
Customer test engineer phone	Alphanumeric	

Table 1 (*Continued*)

Field descriptor	Data format	Remark
Customer test engineer fax	Alphanumeric	
Customer test engineer email	Alphanumeric	
Title	Alphanumeric	
Medium no./number of media	Integer/integer	
Timestamp	19 alphanumeric	YYYY-MM-DD hh:mm:ss — in accordance with ISO 8601 creation date of this medium.
Comments	Alphanumeric	
Type of the test	Alphanumeric	For example, frontal impact.
Reference temperature	Float	Measurement point depends on type of the test.
Relative air humidity	Float	Measurement point depends on type of the test.
Date of the test	10 alphanumeric	YYYY-MM-DD in accordance with ISO 8601.
Number of test objects	m integer	
The following block describes test object 1		
Name of test object 1	Alphanumeric	
Velocity test object 1	Float	Metres per second
Mass test object 1	Float	Kilograms
Driver position object 1	Alphanumeric	See “Position” in related electronic document *Channel codes*.
Impact side test object 1	Alphanumeric	See “Fine Location 1” in related electronic document *Channel codes*.
Type of test object 1	Alphanumeric	See “Test Object” Column 1 in related electronic document *Channel codes*.
Class of test object 1	Alphanumeric	
Code of test object 1	Alphanumeric	
Ref. number of test object 1	Alphanumeric	
The following block describes test object 2		
Name of test object 2	Alphanumeric	
Velocity test object 2	Float	Metres per second
Mass test object 2	Float	Kilograms
Driver position object 2	Alphanumeric	See “Position” in related electronic document *Channel codes*.
Impact side test object 2	Alphanumeric	See “Fine Location 1” in related electronic document *Channel codes*.
Type of test object 2	Alphanumeric	See “Test Object” Column 1 in related electronic document *Channel codes*.
Class of test object 2	Alphanumeric	
Code of test object 2	Alphanumeric	
Ref. number of test object 2	Alphanumeric	
The following block describes test object m		
Name of test object m	Alphanumeric	
Velocity test object m	Float	Metres per second

Table 1 (*Continued*)

Field descriptor	Data format	Remark
Mass test object m	Float	Kilograms
Driver position object m	Alphanumeric	See “Position” in related electronic document *Channel codes*.
Impact side test object m	Alphanumeric	See “Fine Location 1” in related electronic document *Channel codes*.
Type of test object m	Alphanumeric	See “Test Object” Column 1 in related electronic document *Channel codes*.
Class of test object m	Alphanumeric	
Code of test object m	Alphanumeric	
Ref. number of test object m	Alphanumeric	

6.3 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” 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 “carriage return” and a “line feed” (CR/LF). If information specific to an individual data channel needs to be given, the information line shall start with the test channel file name.

The comment files shall be as follows:

File name: <subdirectory-name>.TXT

Location: in every subdirectory

Contents:

unformatted text

……

test channel file name: unformatted text

……

unformatted text

6.4 Channel file

6.4.1 Channel information (CHN) file

This file contains general information concerning the test channels. Each item shall be separated by a “carriage return” and a “line feed” (CR/LF). Each line may comprise up to 80 characters.

The CHN file shall be as given in Table 2.

Table 2 — Channel information (CHN) file

File name:	"filename".CHN, where "filename" is identical to the ⟨test number⟩.
Location:	CHANNEL subdirectory

Contents		
Field descriptor	**Data format**	**Remark**
Instrumentation standard	Alphanumeric	Includes version number or edition date.
Number of channels	n integer	
Name of channel 001	Alphanumeric	Corresponding to file "filename.001"
Name of channel 002	Alphanumeric	Corresponding to file "filename.002"
"....."		The code of the related electronic document *Channel codes* should be used.
Name of channel nnn	Alphanumeric	Corresponding to file "filename.nnn".

6.4.2 Test channel file

This file contains information concerning the specific channel and all its measurement values, expressed in physical units and balanced. Each item shall be separated by a "carriage return" and a "line feed" (CR/LF). Each line may be up to 80 characters. Information within one line shall be separated by one space.

The test channel file shall be as given in Table 3.

Table 3 — Test channel file

File name:	"filename".NNN, where "filename" is identical to the ⟨test number⟩; "NNN" is the channel number: one file per channel.
Location:	CHANNEL subdirectory

Contents		
Field descriptor	**Data format**	**Remark**
Test object number	Integer	
Errors occurred	Alphanumeric	YES or NO
Name of the channel	Alphanumeric	
Laboratory channel code	Alphanumeric	
Customer channel code	Alphanumeric	
Channel code	Alphanumeric	See "Channel code" in related electronic document *Channel codes*.
Location [a]	Alphanumeric	See "Channel code" in related electronic document *Channel codes*.
Direction [a]	Alphanumeric	See "Direction" in related electronic document *Channel codes*.
Channel frequency class [a]	Alphanumeric	See "Filter class" in related electronic document *Channel codes*.
Unit	Alphanumeric	See "Dimension" in related electronic document *Channel codes*.
Reference system	Alphanumeric	Coordinate reference system (e.g. vehicle)
Transducer type	Alphanumeric	

Table 3 (*Continued*)

Field descriptor	Data format	Remark
Pre-filter type	Alphanumeric	Anti-aliasing filter
Cut off frequency	Float	–3dB frequency of Pre-filter in hertz
Channel amplitude class	Float	See ISO 6487.
Sampling interval	Float	Time step, expressed in seconds.
Bit resolution	Integer	
Comments	Alphanumeric	
Time of first sample	Float	In seconds; “minus” before impact.
Number of samples	Integer	
First global maximum value [b]	Float	Without unit
Time of maximum value [b]	Float	
First global minimum value [b]	Float	Without unit
Time of minimum value [b]	Float	
Start offset interval [b]	Float	In seconds; “minus” before impact.
End offset interval [b]	Float	In seconds; “minus” before impact.
	Float	Value [c] of sample 1
	Float	Value [c] of sample 2
	•	•
	•	•
	•	•
	Float	Value of sample n

[a] Optional if Channel code is used.

[b] Optional data.

[c] All values should start by a number or a sign (+ or –) followed by a number.

6.5 Moving image information (MMI) file

This file contains information concerning all digital films, videos, simulations and any other moving images held in the MOVIE subdirectory. Each item shall be separated by a “carriage return” and a “line feed” (CR/LF).

The MMI file shall be as given in Table 4.

Table 4 — Moving image information (MMI) file

File name:	"filename".MII, where "filename" is identical to the ⟨test number⟩.
Location:	MOVIE subdirectory

Contents		
Field descriptor	**Data format**	**Remark**
Number of movies	o integer	
The following block describes movie 1		
ID-number 1	Integer	
Origin 1	Alphanumeric	For example, HyGe, simulation.
Camera type 1	Alphanumeric	
Description 1	Alphanumeric	
Lens focal length 1	Float	
Number of images 1	Integer	
Film speed 1	Float	Frames per second
Shutter time 1	Float	Seconds
Aperture 1	Float	
Time zero 1	Integer	Frame number of time zero
Time vector filename 1	Alphanumeric	NO if no timevector file exists.
Reference system 1	Alphanumeric	Reference system for the next six items
Location X 1	Float	Metres
Location Y 1	Float	Metres
Location Z 1	Float	Metres
Theta X 1	Float	Degrees
Theta Y 1	Float	Degrees
Theta Z 1	Float	Degrees
Width of image 1	Integer	Pixels
Height of image 1	Integer	Pixels
Aspect ratio of pixels 1	Float	1,0 for square pixels
Colour 1	Alphanumeric	For example, B/W, RGB, YUV
Name of movie file 1	Alphanumeric	According to the filename convention.
Format of movie file 1	Alphanumeric	For example, AVI file format.
Code used 1	Alphanumeric	For example, INDEO.
Compression 1	Alphanumeric	For example, JPEG 70 %.
Comments	Alphanumeric	
The following block describes movie 2		
ID-number 2	... see above.	
The following block describes movie o		
ID-number o	... see above.	

6.6 Photo information (PHO) file

This file contains information concerning all digital still photographs. Each item shall be separated by a “carriage return” and “line feed” (CR/LF).

The PHO file shall be as given in Table 5.

Table 5 — Photo information (PHO) file

File name:	“filename”.PHO, where “filename” is identical to the ⟨test number⟩.
Location:	PHOTO subdirectory

Contents		
Field descriptor	**Data format**	**Remark**
Number of photos	p integer	
The following block describes photo 1		
ID-number 1	Integer	
Test object number 1	Integer	See test descriptor file.
Camera type 1	Alphanumeric	
Post-test/Pre-test 1	Alphanumeric	POST or PRE
Description 1	Alphanumeric	
Direction 1	Alphanumeric	For example, left-hand side.
Aperture 1	Float	
Exposure time 1	Float	Seconds
Width of image 1	Integer	Pixels
Height of image 1	Integer	Pixels
Aspect ratio of pixels 1	Float	1,0 for square pixels
Colour 1	Alphanumeric	For example, B/W, RGB, YUV.
Name of photo file 1	Alphanumeric	According to the filename convention.
Format of photo file 1	Alphanumeric	For example, TIFF or JPEG file format.
Compression 1	Alphanumeric	
Comments	Alphanumeric	
The following block describes photo 2		
ID-number 2	... see above.	
The following block describes photo p		
ID-number p	... see above.	

6.7 Static data (SD) file

This file contains all static measurements both pre- and post-test. Each item shall be separated by a “carriage return” and “line feed” (CR/LF).

The SD file shall be as given in Table 6.