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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

Related electronic document A

Descriptors and Hints

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1 Data formats

1.1 Physical units

Data and descriptor values have to be expressed in SI units. Table 2.21 shows the allowed physical units in their notation. If decimal submultiples or agreed units of descriptor values deviant from the defaults described in this document are used, the numerical value has to be followed by the unit enclosed in squared brackets.

1.2 Definition of basic and generic data types

Valid basic data types are integer, float and string. Generic data types are boolstring, datetime, coded, reference and filereference.

string: a set of characters according to ISO/IEC 8859-1 without length restrictions.

integer: set of characters representing numbers which don't have any fractional digits.

float: set of characters representing floating-point type with the decimal symbol being a dot (ASCII 46).

boolstring: set of characters representing Boolean values (see 2.8).

datetime: YYYY-MM-DD**T**hh:mm:ss**±***hh:mm* with **±***hh:mm* as difference to UTC or
YYYY-MM-DD hh:mm:ss without time zone, interpreted as UTC+00:00 or
YYYY-MM-DD if time information is unavailable
— in accordance with ISO 8601.

coded: enumeration of valid values (see 2 Coded values).

reference: value of a channel code part or identifier used within another file. References are built from the lexical space ASCII {48 – 57, 65 – 90, 95, 97 – 122}.

filereference: filename with extension but without path information (according to the filename convention).

tuple: (float; float)

tuple list: (float; float) (float; float) (float; float)
A tuple list consists of two or more tuples.

triple: (float; float; float)

triple list: (float; float; float) (float; float; float) (float; float; float)
A triple list consists of two or more triples.

tuple dict: (string: float; float)
A tuple dict is a tuple which is enhanced by a describing string.

triple dict: (string: float; float; float)
A tuple dict is a triples which is enhanced by a describing string.

list of tuple dict: (string: float; float) (String: float; float) (String: float; float)
A list of tuple dicts consists of two or more tuple dictionary. The key (string) is separated by ":" from the values. This struct allows a generic definition of tuple values. The key max be the location in percentage of the vehicle front and the values the x and y coordinates.

list of triple dict: (string: float; float; float) (String: float; float; float) (String: float; float; float)
A list of triple dicts consists of two or more triple dictionary. The key (string) is separated by ":" from the values. This struct allows a generic definition of tuple values. The key max be the location in percentage of the vehicle front and the values the x and y coordinates.

1.3 Information files

1.3.1 General rules

The following rules specify the general handling of information files (see main document 5.1).

Mandatory and optional descriptors are built from the lexical space ASCII {48 – 57, 65 – 90, 97 – 122}. Additional descriptors agreed between the transferring parties have to start with a “+” sign (ASCII 43).

The information of <mediatype> like channel, photo, movie and also <testobject> is described in a block structure. Every block starts with a blockbegin-descriptor and ends with a blockend-descriptor. Within a block the position order of the information lines is free.

The hash-symbol “#” (ASCII 35) is restricted to the blockbegin- and blockend-descriptors. These descriptors don’t have a value.

All descriptors belonging to the collectivity of media objects of the same type have to be positioned before the first block.

Blocking within a block is not allowed. Valid block-descriptors have to be defined in this document or agreed between the exchanging partners.

1.3.2 Test information

The information about the test has to be stored in the test information file in the main directory. The file extension is “mme”. In addition to the standard descriptors special blocks for the NHTSA and for biomechanical testinformation are described.

Table 1 — Test information (MME) file

File name:	“filename”.mme, where “filename” is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.1)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Data format edition number	YES		coded	**2.1 (see 2.1)**
Timestamp	YES		datetime	creation date of this medium
Laboratory name	YES		string	
Laboratory contact name	YES		string	person to contact
Laboratory contact phone	YES		string	
Laboratory contact fax	YES		string	
Laboratory contact email	YES		string	
Laboratory test ref number	YES		string	
Customer name	NO		string	
Customer test ref number	NO		string	
Customer project ref number	NO		string	
Customer order number	NO		string	
Customer cost unit	NO		string	
Customer contact name	NO		string	
Customer contact phone	NO		string	
Customer contact fax	NO		string	

Customer contact email	NO		string	
Title	NO		string	
Comments	NO		string	
Type of the test	YES		string	see 2.14
Subtype of the test	YES		string	see 2.15
Regulation	YES		string	see 2.16
Date of the test	YES		datetime	
Reference temperature	NO	K	float	measurement point depends on type of the test.
Relative air humidity	NO	%	float	measurement point depends on type of the test.
Number of testobjects	YES		integer	NOVALUE is not allowed
If ‘Number of testobjects’ > 0				
#Begin of testobject	YES			
Type	YES		reference	see ”Test Object” Column 1 in related electronic document *Channel Codes*.
Filename	YES		filereference	name of the testobject information file (see 1.3.3)
#End of testobject	YES			

1.3.2.1 Additional NHTSA test information

Additional information concerning the test set up and/or conditions required making the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the test information file within an optional information block.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 -- referred to as NHTSA -TRG in the “Remarks” column - for extended field definitions and codes. This document is available on the NHTSA web site at

http://www.nhtsa.gov/Research/Databases+and+Software/NHTSA+Test+Reference+Guides

File name:	“filename”.mme, where “filename” is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Test configuration	YES		coded	see NHTSA -TRG
Closing speed	YES	m/s	float	see NHTSA -TRG
Impact angle	YES	rad	integer	using [°] see 2.21
Side impact point	YES	m	float	see NHTSA -TRG
Test type	NO		coded	see NHTSA -TRG
Track surface	NO		coded	see NHTSA -TRG
Track condition	NO		coded	see NHTSA -TRG
NHTSA Offset	NO	m	float	see NHTSA -TRG
NHTSA Comments	NO		string	multiple lines, 70 char maximum
#End of NHTSA				

1.3.2.2 Additional biomechanical test information

Additional biomechanical information concerning the test set up has to be added to the test information file within an optional information block.

File name:	“filename”.mme, where “filename” is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.3)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of biomechanical				
Financial support	YES		string	for instance EC or national program
Project ref number	YES		string	for instance Contract number of the EC project
Project contact name	YES		string	name of the coordinator of the project
Project contact email	YES		string	
#End of biomechanical				

1.3.3 Object information

All information concerning testobjects, occupants and restraint systems has to be stored in the Object-subdirectory. Allowed filenames are built from the testnumber and the first characters of the channel codes: the testobject, the position and the main location. Every object is described in an own file with the file extension “mmi”.

For testobjects the filenames consist of the <testnumber> and the <testobject>. For occupants the filenames consist of the <testnumber>, <testobject> and <position>. For restraint systems the filenames consist of the <testnumber>, <testobject>, <position> and <mainlocation> with AIRB and SEBE stored in separate files.

The MME file contains only the information about the number and the type of testobjects and the testobject information filenames.

1.3.3.1 Standard testobject information

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents for all testobject types (for example see 4.1.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Name	YES		string	
Velocity	YES	m/s	float	at time zero
Mass	YES	kg	float	
Impact side	YES		coded	see “Fine Location 1” in related electronic document *Channel Codes* e.g. LE, RI
Driver position	NO		coded	see “Position” in related electronic document *Channel Codes* e.g. 1, 3
Class	NO		string	
Code	NO		string	
Ref number	NO		string	

Offset	NO	%	float	overlap in percent
Additional contents for testobject types B and M				
Barrier width	{YES}[1]	m	float	mandatory for testobject B and M
Barrier height	{YES}[1]	m	float	mandatory for testobject B and M
Yaw angle	{YES}[1]	rad	float	mandatory for testobject M Angle of barrier with normal to direction of vehicle travel. Units: radians limited to $\pm\pi/2$. 0 rad means that the barrier is perpendicular to the vehicle. Positive sense: Clockwise when viewed from above (SAE J211)
Reference system id	{YES}[1]		reference	mandatory if a loadcell matrix is used coordinate reference system for the loadcell matrix (see 1.3.4)
Origin X	{YES}[1]	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – X coordinate
Origin Y	{YES}[1]	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – Y coordinate
Origin Z	{YES}[1]	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – Z coordinate
Number of loadcells	{YES}[1]		integer	mandatory if a loadcell matrix is used

1.3.3.2 Additional NHTSA testobject information

Additional information concerning the testobjects required making the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the testobject information files (see 1.3.3.1) within an own optional information block.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 -- referred to as NHTSA -TRG in the "Remarks" column - for extended field definitions and codes. This document is available on the NHTSA web site at

http://www.nhtsa.gov/Research/Databases+and+Software/NHTSA+Test+Reference+Guides

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents for testobject vehicle (for example see 4.1.2.1)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Vehicle make	YES		string	free text
Vehicle model	YES		string	free text
Vehicle year	YES		integer	4 digit year

[1] Mandatory under specific conditions

Body type	YES		coded	see NHTSA -TRG
VIN	YES		string	free text
Vehicle test weight	YES	kg	integer	see NHTSA -TRG
Wheel base	YES	m	float	see NHTSA -TRG
Vehicle length	YES	m	float	see NHTSA -TRG
Vehicle width	YES	m	float	see NHTSA -TRG
Vehicle center of gravity	YES	m	float	see NHTSA -TRG
Vehicle speed	YES	m/s	float	see NHTSA -TRG
Crab angle	YES	rad	float	using [°] see 2.21
Angle of moving cart	YES	rad	float	using [°] see 2.21
Veh orientation on cart	YES	rad	float	using [°] see 2.21
Engine type	NO		coded	see NHTSA -TRG
Engine size	NO	L	float	
Transmission type	NO		coded	see NHTSA -TRG
Steering column separation	NO		coded	see NHTSA -TRG
Column collapse mechanism	NO		coded	see NHTSA -TRG
Vehicle modifications	NO		string	50 characters max. see NHTSA -TRG
Principal dir of force	NO	rad	float	using [°] see 2.21
Bumper engagement	NO		coded	see NHTSA -TRG
Sill angagement	NO		coded	see NHTSA -TRG
A-Pillar engagement	NO		coded	see NHTSA -TRG
Damage profile distance 1	NO	m	float	see NHTSA -TRG
Damage profile distance 2	NO	m	float	see NHTSA -TRG
Damage profile distance 3	NO	m	float	see NHTSA -TRG
Damage profile distance 4	NO	m	float	see NHTSA -TRG
Damage profile distance 5	NO	m	float	see NHTSA -TRG
Damage profile distance 6	NO	m	float	see NHTSA -TRG
Vehicle damage index	NO		coded	see NHTSA -TRG
Total length indentation	NO	m	float	see NHTSA -TRG
Center damaged area to CG	NO	m	float	see NHTSA -TRG
Maximum crush distance	NO	m	float	see NHTSA -TRG
#End of NHTSA				
Contents for testobject barrier (for example see 4.1.2.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Barrier shape	NO		coded	see NHTSA -TRG
Rigid or deformable barrier	NO		coded	see NHTSA -TRG
Angle of fixed barrier	NO	rad	float	using [°] see 2.21
Diameter of pole barrier	NO	m	float	see NHTSA -TRG
NHTSA Comments	NO		string	Multiple lines, 70 char maximum
#End of NHTSA				

1.3.3.3 Additional biomechanical testobject information

Additional biomechanical information concerning the testobjects has to be added to the testobject information files. Biomechanical tests are mostly performed with a test subject on a test device. The test device has to be described as one of the possible testobjects (see Column 1 in related electronic document *Channel Codes*). The test subject has to be described within an occupant information file (see 1.3.3.4)

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of biomechanical				
Acceleration	NO	m/(s*s)	float	maximum of acceleration
#End of biomechanical				

1.3.3.4 Occupant information

The occupant information for all dummies, volunteers or PMHS have to be stored within separate files in the Object-subdirectory.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 -- referred to as NHTSA -TRG in the "Remarks" column - for extended field definitions and codes. This document is available on the NHTSA web site at

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File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject><position>.			
Location:	Object-subdirectory			
Contents (for example see 4.1.2.3)				
Descriptor	**Mandatory**	**Unit**	**Data type**	**Remark**
Dummy type	{YES}[1]		coded	mandatory for NHTSA tests see "Fine Location 3" in related electronic document *Channel Codes*.
Dummy subtype	NO		string	e.g. Build Level D
Dummy id	NO		string	
Dummy temperature	NO	K	float	
Out of position	NO		boolstring	see 2.8
#Begin of biomechanical				
Gender	{YES}[1]		coded	mandatory for biomechanical tests see 2.11
Age	{YES}[1]		float	mandatory for biomechanical tests in years
#End of biomechanical				
#Begin of NHTSA				
Dummy manufacturer Ser No	NO		string	50 characters max. see NHTSA -TRG
Dummy modifications	NO		string	50 characters max. see NHTSA -TRG

Head to windshield header	NO	m	float	see NHTSA -TRG
Head to windshield	NO	m	float	see NHTSA -TRG
Head to side header	NO	m	float	see NHTSA -TRG
Head to side window	NO	m	float	see NHTSA -TRG
Chest to dash	NO	m	float	see NHTSA -TRG
Chest to steering wheel	NO	m	float	see NHTSA -TRG
Arm to door	NO	m	float	see NHTSA -TRG
Hip to door	NO	m	float	see NHTSA -TRG
Knees to dash	NO	m	float	see NHTSA -TRG
Head to seatback	NO	m	float	see NHTSA -TRG
Neck to seatback	NO	m	float	see NHTSA -TRG
Chest to seatback	NO	m	float	see NHTSA -TRG
Knee to seatback	NO	m	float	see NHTSA -TRG
Seat track position	{YES}[1]		coded	mandatory for NHTSA tests see NHTSA –TRG
1st contact for head	NO		coded	see NHTSA -TRG
2nd contact for head	NO		coded	see NHTSA -TRG
1st contact for chest abdo	NO		coded	see NHTSA -TRG
2nd contact for chest abdo	NO		coded	see NHTSA -TRG
1st contact for legs	NO		coded	see NHTSA -TRG
2nd contact for legs	NO		coded	see NHTSA -TRG
Head injury criterion HIC	NO	1	integer	nondimensional
Lo HIC time interval	NO	s	float	
Up HIC time interval	NO	s	float	
Thorax peak accel (CLIP3M)	NO	m/(s*s)	float	
L femur peak load	NO	N	float	
R femur peak load	NO	N	float	
Chest severity index	NO	1	integer	nondimensional
Lap belt peak load	NO	N	integer	
Shoulder belt peak load	NO	N	integer	
Thoracic trauma index	NO	1	float	nondimensional
Pelvis acceleration	NO	m/(s*s)	float	
NHTSA Comments	NO		string	Multiple lines, for NHTSA 70 char max.
#End of NHTSA				

1.3.3.5 Restraint system information

Additional information concerning airbags and seatbelts has to be added to the restraint system information files in the Object-subdirectory.

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_<testobject><position><main location>.
Location:	Object-subdirectory

Contents (for example see 4.1.2.4)			
Descriptor	**Mandatory**	**Data type**	**Remark**
#Begin of NHTSA			
Restraint type	YES	coded	see NHTSA -TRG
Restraint mount	NO	coded	see NHTSA -TRG
Restraint deployed	NO	coded	see NHTSA -TRG
NHTSA Comments	NO	string	Multiple lines, for NHTSA 70 char max.
#End of NHTSA			

1.3.4 Reference system information

The descriptive information about all reference systems has to be stored within one reference system information file in the Object-subdirectory. Reference coordinate systems belong to testobjects.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_Reference.		
Location:	Object-subdirectory		
Contents (for example see 4.1.3)			
Descriptor	**Mandatory**	**Data type**	**Remark**
Number of references	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all references			
For each reference, if 'Number of references' > 0			
#Begin of reference			
Reference system id	YES	coded	Id used in the reference system data file (see 2.3)
Description	NO	string	general description of the reference coordinate system
X origin	NO	string	description of the origin – X component
Y origin	NO	string	description of the origin – Y component
Z origin	NO	string	description of the origin – Z component
X direction	NO	string	description of the longitudinal axis orientation
Y direction	NO	string	description of the transversal axis orientation
Z direction	NO	string	description of the vertical axis orientation
#End of reference			

1.3.5 Channel information

The descriptive information about all channels has to be stored in the header section of each channel file. The main use of the channel information file is for sorting. The hierarchical order of the redundant information is as follows: lowest priority has the information in front of the channel blocks; medium priority has the information within the channel block; highest priority has the information in the header of the channel data file.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_Channel.

Location:	Channel-subdirectory		
Contents (for example see 4.1.4)			
Descriptor	**Mandatory**	**Data type**	**Remark**
Number of channels	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all channels			
For each channel, if 'Number of channels' > 0			
#Begin of channel			
Extended channel code	YES	coded	See "Channel code" in related electronic document *Channel Codes* and 2.20
Channel code	NO	coded	see "Channel code" in related electronic document *Channel Codes*.
Reference system id	NO	coded	Id used in the reference system data file (see 2.3)
Data origin	NO	coded	Id used in the reference system data file (see 2.19)
All descriptors which are specified within the channel file headers (see1.4.2) are possible but optional. The information of the channel file overrides the information of this file.			
#End of channel			

1.3.6 Moving image information

1.3.6.1 Moving image information file

The descriptive information about all films, videos and image sequences has to be stored within one moving image information file in the Movie-subdirectory. If a single image sequence is referenced, the value for 'Name of the movie file' has to point to a subdirectory of the MOVIE directory.

File name:	"filename".mmi, where "filename" is identical to <testnumber>_Movie.			
Location:	Movie-subdirectory			
Contents (for example see 4.1.5.1)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Number of movies	YES		integer	NOVALUE is not allowed
… descriptors, which are valid for all movies				
For each movie, if 'Number of movies' > 0				
#Begin of movie				
Movie id	YES		reference	Id of the movie for referencing
Name of movie file	YES		filereference	
Pixel size	YES	m	float	
Aspect ratio of pixels	YES		float	height of the pixel / width of the pixel
Width of image	YES	pixel	integer	
Height of image	YES	pixel	integer	
Number of images	YES		integer	
Film speed	YES	Hz	float	frames per second
Lens focal length	YES	m	float	

Shutter time	YES	s	float	
Start time of movie	YES	s	float	time of the first image
End time of movie	NO	s	float	time of the last image
Time offset	NO	s	float	delay between transducer T_0-signal and exposure start of movie T_0-image; positive if movie T_0 is later than transducer T_0
Data source	NO		coded	see 2.4
Description	NO		string	
Camera id	NO		string	
Camera type	NO		string	
Lens id	NO		string	
Lens type	NO		string	
Focus	NO		string	
Aperture	NO		string	
Format of movie file	NO		string	e.g. AVI
Colour	NO		string	e.g. B/W, RGB, YUV
Compression code	NO		string	e.g. X264
Compression quality	NO		string	e.g. 85%
Keyframes	NO		integer	
Time vector filename	NO		filereference	one component data file in the Channel-subdirectory
Image history filename	NO		filereference	
Correction parameter file	NO		filereference	
Movie images corrected	NO		boolstring	see 2.8
Comments	NO		string	
#End of movie				

1.3.6.2 Correction parameter file

The correction parameter file is optional. It is referenced as value of “Correction parameter file” in the *moving image information file*. The file content for the correction methods “bundle adjustment” and “extended rejection in space” has to be:

File name:	“filename”.cor, where “filename” is identical to the <testnumber>_<movie id>.			
Location:	Movie-subdirectory			
Contents (for example see 4.1.5.2)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Distortion correction type	YES		coded	**bundle adjustment** see 2.9
Pixel distance x	YES	m	float	
Pixel distance y	YES	m	float	
Principal point x	YES	pixel	float	deviation from the center of the image (positive from left to right)
Principal point y	YES	pixel	float	deviation from the center of the image (positive from top to bottom)

Calibrated focal length	YES	m	float	as positive value
Distortion unit	YES		coded	**pixel** or **mm,** for the correction coefficients
Distortion correction A1	YES		float	1. corr. coeff. for radial symmetrical distortion
Distortion correction A2	YES		float	2. corr. coeff. for radial symmetrical distortion
Distortion correction A3	YES		float	3. corr. coeff. for radial symmetrical distortion
Distortion correction B1	YES		float	1. corr. coeff. for radial asymmetrical distortion
Distortion correction B2	YES		float	2. corr. coeff. for radial asymmetrical distortion
Distortion correction C1	YES		float	affinity
Distortion correction C2	YES		float	non-orthogonality
Distortion correction R0	YES		float	2. zero crossing of the distortion curve

1.3.6.3 Image history file

The image history file is optional. It is referenced as value of *Image history filename* in the moving image information file. The descriptors are not mandatory. They are unique but their position order shall show the time history of the single processing steps. The numbering of the descriptors is used to differentiate between twice or more usage of the same processing item.

File name:	"filename".imh, where "filename" is identical to the <testnumber>_< movie id >.		
Location:	Movie-subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Image processing system	NO	string	with version number
Image interpolation	NO	string	with version number
Sharpening i	NO	string	typically 1 integer value
Colour matrix i	NO	string	
White balance i	NO	string	typically 3 integer values
Brightness i	NO	string	single or matrix of integer
Contrast i	NO	string	single or matrix of integer
Saturation i	NO	string	integer or float
Hue i	NO	string	typically integer
Gamma i	NO	string	typically 1 float value

1.3.7 Photo information

The descriptive information about all fotos has to be stored within one photo information file in the Photo-subdirectory.

File name:	"filename".mmi, where "filename" is identical to <testnumber>_Photo.			
Location:	Photo-subdirectory			
Contents (for example see 4.1.6)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Number of photos	YES		integer	NOVALUE is not allowed

… descriptors, which are valid for all photos				
For each photo, if ‘Number of photos’ > 0				
#Begin of photo				
Photo id	YES		string	Id of the photo for referencing
Testobject	YES		reference	<testobject>, type of testobject in test information file
Classification	YES		coded	see 2.7
Width of image	YES	pixel	integer	
Height of image	YES	pixel	integer	
Aspect ratio of pixels	YES		float	Height of the pixel / width of the pixel
Name of photo file	YES		filereference	
Photographer	NO		string	
Description	NO		string	
Camera type	NO		string	
Lens focal length	NO	m	float	
Direction	NO		string	e.g. left hand side
Aperture	NO		string	
Exposure time	NO	s	float	
Format of photo file	NO		string	e.g. TIFF or JPEG
Colour	NO		string	e.g. B/W, RGB, YUV
Compression	NO		string	
Comments	NO		string	
#End of photo				

1.3.8 Static measurement information file

The descriptive information about static data which cannot be stored point based in the Static measurement data file has to be stored within one information file in the Static-subdirectory.

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_Static.		
Location:	Static-subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of static data files	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all static data files			
For each static data file, if ‘Number of static data files’ > 0			
#Begin of staticdata			
Filename	YES	filereference	
Classification	YES	coded	see 2.7
Description	NO	string	
Format of file	NO	string	e.g. STL
Reference system id	NO	coded	see 2.3
#End of staticdata			

1.3.9 Additional information files

The descriptive information about media objects like documents or reports has to be stored within one information file in the corresponding subdirectory. These information files are optional.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<mediatype>.		
Location:	corresponding subdirectory e.g. Report		
Contents (for example see 4.1.7)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of <mediatypes >	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all <mediatypes>			
For each <mediatype>, if 'Number of < mediatypes >' > 0			
#Begin of <mediatype>			
Filename	YES	filereference	
Description	NO	string	
Format of file	NO	string	e.g. PDF
Originator	NO	string	
#End of <mediatype>			

1.4 Data files

1.4.1 General rules

The following rules specify the general handling of data files (see main document 5.2).

The data block of each data file starts with the separator line '#Start of data' and may be consisting of one or more columns. The columns are separated by column separators. In each column, where data is unavailable, insert the reserved word "NOVALUE" (see main document 4.3)

Some commonly used data structures are predefined in the following chapters. The column description of the predefined data structures may be omitted. **MultiChannel** has to be used for all data structures which are not predefined or agreed between the exchanging partners. In this case all columns have to be described in the header section. All descriptors which are identical for all columns shall be positioned before the column block structure.

1.4.2 Channel data files

Channel data have to be stored within one component data files in the Channel-subdirectory.

Allowed filenames are built by the <testnumber>, the <channelcode> defined in the related electronic document *Channel Codes* and the <codeextension>.

File name:	"filename".mmd, where "filename" is identical to <testnumber>_<channelcode>_<codeextension>.mmd			
Location:	Channel-subdirectory			
Contents (for example see 4.2.3)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Data structure	YES		coded	**Channel** (see 2.2)
Instrumentation standard	YES		string	
Name of the channel	YES		string	
Data source	YES		coded	see 2.4
Data status	YES		coded	see 2.5
Unit	YES		coded	see 2.21 and "Dimension" in related electronic document *Channel Codes*
Cut off frequency	YES	Hz	float	-3dB frequency of Pre-filter
Channel amplitude class	YES		float	see ISO 6487
Sampling interval	YES	s	float	time step
Bit resolution	YES		integer	
Time of first sample	YES	s	float	'minus' before impact
Number of samples	YES		integer	
Reference channel	YES		coded	see 2.6
Reference channel name	NO		reference	<channelcode> of the time reference channel if 'Reference channel' is explicit
Laboratory channel code	NO		string	
Customer channel code	NO		string	
Channel frequency class	NO		coded	see "Filter class" in related electronic document *Channel Codes*.
Transducer type	NO		string	
Transducer id	NO		string	

Uuid	NO		string	universally unique identifier for this data set according ISO/IEC 9834-8:2004
Prefilter type	NO		string	anti-aliasing filter
First global maximum value	NO		float	same unit as used in the data section
Time of maximum value	NO	s	float	
First global minimum value	NO		float	same unit as used in the data section
Time of minimum value	NO	s	float	
Start offset interval	NO	s	float	'minus' before impact
End offset interval	NO	s	float	'minus' before impact
Offset post test	NO		float	same unit as used in the data section
Inverse sensitivity	NO		float	[unit / sensor output]
Inverse polynom coeff A	NO		float	[unit / (sensor output)^3]
Inverse polynom coeff B	NO		float	[unit / (sensor output)^2]
Inverse polynom coeff C	NO		float	[unit / (sensor output)^1]
Inverse polynom coeff M	NO		float	same unit as used in the data section
Transfer function used	NO		coded	see 2.12
Direction polarity	NO		coded	see 2.13
Power func sensitivity	NO		float	used only for Power function
Power func eng offset	NO		float	used only for Power function
Power func electr offset	NO		float	used only for Power function
Power func exponent	NO	1	float	used only for Power function
Offset pre test	NO		float	[sensor output]
Loadcell width	{YES}[1]	m	float	mandatory for loadcell channels width of loadcell
Loadcell height	{YES}[1]	m	float	mandatory for loadcell channels height of loadcell
Loadcell top left Y	{YES}[1]	m	float	mandatory for loadcell channels defines top, left of loadcell with reference to the loadcell matrix origin
Loadcell top left Z	{YES}[1]	m	float	mandatory for loadcell channels defines top, left of loadcell with reference to the loadcell matrix origin
Transducer natural frequency	NO	Hz	float	
Transducer damping ratio	NO	1	float	
Calibration date	NO		datetime	
Calibration due date	NO		datetime	
Sensitivity	NO		float	Must not be used if Inverse sensitivity is missing or NOVALUE !
Comments	NO		string	
#Start of data				
... Data section ...				

[1] Mandatory for loadcell channels

1.4.3 Multi column data files

Data which is not specified within this document have to be stored within multicolumn data files in a media specific subdirectory otherwise in the Object-subdirectory.

File name:	"filename".mmd		
Location:	media specific subdirectory		
Contents (for example see 4.2.1)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**MultiChannel** (see 2.2)
Description	NO	string	
… all descriptors defined in 1.3 and 1.4, if they are valid for all columns			
#Start of data			
... Data section ...			
Contents if 'Data structure' is MultiChannel			
Number of columns	YES	integer	NOVALUE is not allowed
#Begin of column			
Name	YES	string	title of the column
Unit	YES	string	see 2.21
Format	YES	coded	see 2.18
… all descriptors defined in the chapters 1.3 and1.4, if they are valid for the specific column			
Comments	NO	string	
#End of column			

1.4.4 Static measurement data file

Static measurement data may consist of points, lines and areas and is stored as multicolumn data files in the Static subdirectory.

File name:	“filename”.mmd, where “filename” starts with <testnumber>_		
Location:	Static-subdirectory		
Contents (for example see 4.2.4)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**StaticData** (see 2.2)
#Start of data			
... Data section ...			
Column specification if ‘Data structure’ is StaticData			
Field descriptor	**Value**	**Remark**	
Number of columns	7		
Description of column 1			
Name	Name		
Unit	1		
Format	string	shall be the <channelcode>	
Description of column 2			
Name	Refsys		
Unit	1		
Format	reference	Reference system id (see 1.3.4 and 2.3)	
Description of column 3			
Name	Index		
Unit	1		
Format	string	Index of line element, **NOVALUE** for points	
Description of column 4			
Name	Classification	Classification, see 2.7	
Unit	1		
Format	coded	see 2.7	
Description of column 5			
Name	X		
Unit	m		
Format	float		
Description of column 6			
Name	Y		
Unit	m		
Format	float		
Description of column 7			
Name	Z		
Unit	m		
Format	float		

1.4.5 Reference system data file, Camera position file and Object data file

The position and orientation of all cameras should be stored within one camera position file.
The relations between all reference systems described in the reference system information file have to be stored within one reference system data file. Reference coordinate systems belong to testobjects.
All other objects which can be described by a position and orientation should be stored in an object data file.
All these files are multicolumn data files with the data structure **6DoF**.

File name:	"filename".mmd, where "filename" is identical to the <testnumber>_Reference or <testnumber>_Movie or <testnumber>_Object		
Location:	Movie- or Object-subdirectory		
Contents (for example see 4.2.2)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**6DoF** (see 2.2)
#Start of data			
... Data section ...			
Column specification if 'Data structure' is 6DoF			
Field descriptor	**Value**	**Remark**	
Number of columns	10		
Description of column 1			
Name	Name		
Unit	1		
Format	reference	Reference system id (see 1.3.4 and 2.3) , object id or Movie id from moving image information file	
Description of column 2			
Name	RefSys		
Unit	1		
Format	reference	Reference system id (see 1.3.4 and 2.3)	
Description of column 3			
Name	Time		
Unit	s		
Format	float		
Description of column 4			
Name	X		
Unit	m		
Format	float		
Description of column 5			
Name	Y		
Unit	m		
Format	float		
Description of column 6			
Name	Z		
Unit	m		

Format	float	
Description of column 7		
Name	QuaternionW	
Unit	1	
Format	float	
Description of column 8		
Name	QuaternionX	
Unit	1	
Format	float	
Description of column 9		
Name	QuaternionY	
Unit	1	
Format	float	
Description of column 10		
Name	QuaternionZ	
Unit	1	
Format	float	

1.4.6 3D point data file

The coordinates of a three dimensional point can be combined and stored in a multicolumn data file of data structure **Point** in the Object-subdirectory. The filename includes the Channel code with the direction “M”. The columns contain the values for the Time, X, Y and Z component. The data structure **PointStdDev** is an enlargement with 3 additional columns for the standard deviations of the spatial components.

File name:	“filename”.mmd, where “filename” is identical to <testnumber>_<channelcode>_<codeextension>.mmd with the direction “M” in the Channel code		
Location:	Object-subdirectory		
Contents (for example see 4.2.5)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**Point, PointStdDev** (see 2.2)
#Start of data			
... Data section ...			
Column specification if ‘Data structure’ is Point			
Field descriptor	**Value**	**Remark**	
Number of columns	4		
Description of column 1			
Name	Time		
Format	float		
Unit	s		
Description of column 2			
Name	X		

Format	float	
Unit	m	
Description of column 3		
Name	Y	
Unit	m	
Format	float	
Description of column 4		
Name	Z	
Unit	m	
Format	float	
Column specification if 'Data structure' is PointStdDev		
Number of columns	7	
Field descriptor	**Value**	**Remark**
… the 4 column descriptions of **Points** and in addition		
Description of column 5		
Name	SX	
Format	float	
Unit	m	
Description of column 6		
Name	SY	
Unit	m	
Format	float	
Description of column 7		
Name	SZ	
Unit	m	
Format	float	

1.5 Comment files

All comment files contain unformatted text. To reference a data channel use the channel code with an appended colon (for example see 4.3.2).

2 Coded values

2.1 Valid values for the descriptor 'Data format edition number'

Value	Remark
2.0	old version related to ISO TS 13499 Second Edition 2014-03-01
2.1	current version related to ISO TS 13499 Third Edition 2019-05-01

2.2 Valid values for the descriptor 'Data structure'

Value	Remark
MultiChannel	user specific number of columns; see1.4.3; Object-subdirectory
Channel	1 column; see 1.4.2; Channel-subdirectory
StaticData	7 columns; see 1.4.4; Static-subdirectory
Point	4 columns; see 1.4.6; Object-subdirectory
PointStdDev	7 columns; see 1.4.6; Object-subdirectory
6DoF	10 columns; see 1.4.5; Object- or Movie-subdirectory

2.3 Valid values for the descriptor 'Reference system id'

Value	Remark
LOC	local coordinate system for transducers according to SAE J211
nST	testobject *n* static (see related electronic document *Channel Codes*)
nT0	testobject *n* at T_0 (see related electronic document *Channel Codes*)
nDY	testobject *n* dynamic (see related electronic document *Channel Codes*)
nii	testobject *n* and a 2 digit number *ii*

2.4 Valid values for the descriptor 'Data source'

Value	Remark
transducer	data has been generated by transducer
camera	data has been generated by camera
simulation	data has been generated by simulation
calculation	data has been calculated from different sources
parameter	data can be constant or limit curve
NOVALUE	undefined / other

See 2.19

2.5 Valid values for the descriptor ‘Data status‘

Value	Remark
ok	faultless sample data
channel failed	NOVALUE for every time step
meaningless data	sample data not meaningful
no data	no sample data available
questionable data	sample data partially meaningful; NOVALUE for questionable data
scaling factor applied	
system failed	
linearised data	could be used when spikes are interpolated
NOVALUE	no status information available

2.6 Valid values for the descriptor ‘Reference channel‘

Value	Remark
implicit	Time reference is given with the descriptor values ‘Time of first sample’ and ‘Sampling interval’.
explicit	Explicit time channel exists in test data. Channel name is given with the descriptor ‘Reference channel name’.
NOVALUE	No time reference is available. For example in case of constant channels (filter class ‘X’).

2.7 Valid values for the descriptor ‘Classification‘

Value	Remark
PRE	before the test procedure
DURING	during the test procedure
POST	after the test procedure
CONSTANT	fixed relation for the whole time
SENSOR	related to the preparation of the test (image of the transducer)
NOVALUE	no classification is available

2.8 Valid values for the descriptors of type ‘boolstring’

Value	Remark
YES	representing the Boolean value TRUE
NO	representing the Boolean value FALSE
NOVALUE	no information available

2.9 Valid values for the descriptor ‘Distortion correction type‘

The descriptor ‘Distortion correction type’ is used within correction parameter files to distinguish the type of correction.

Value	Remark
bundle adjustment	see 1.3.6.2
extended rejection in space	see 1.3.6.2

2.10 Valid values for the descriptor ‘Distortion unit‘

Value	Remark
mm	see 1.3.6.2
pixel	see 1.3.6.2

2.11 Valid values for the descriptor ‘Gender‘

Value	Remark
male	see 1.3.3.4
female	see 1.3.3.4

2.12 Valid values for the descriptor ‘Transfer function‘

For a long time only linear regression has been used to describe the calculation of physical units from the transducer signal. New types of transducers and new regulations require an extended concept of the describing parameters. The way from the transducer signals to the exchanged data can be described as a set of transfer functions.

Transfer function	Use case	Application
`Linear regression`	Linear transducer with relative measurement	Standard for most transducers
`Linear regression with offset`	Linear transducer with absolute measurement	Absolute pressure, IR-TRACC angle transducer
`Polynomial regression 3rd order`	Nonlinear transducer with polynomial approximation	Polynomial calibrated belt force
`Power function`	Nonlinear transducer with power function approximation	Displacement transducer in the IR-TRACC
`Linear regression`	Linear transducer with relative measurement and additional polynomial calibration[1)]	Chest deflection of H III Dummy

Tab 1: **Use cases for transfer functions**

[1)] In the case of chest deflection measurement the data has to be calculated and exchanged with the *Linear regression* transfer function. In the channel file header the used parameters and in addition the parameters necessary for the calculation of the *Polynomial regression 3rd order* transfer function have to be stored. This functionality needs different descriptors for both transfer functions.
For all use cases described in **Tab 1** a specific set of descriptors are defined in **Tab 2**. The descriptors of the transfer functions are in principle optional, but if a specific function is named in the channel header, the set of associated descriptors has to be complete.

Transfer function	Formula		Descriptor	Unit

Necessary for all functions	D : physical value [Unit] S : sensor output reading [eU]		Transfer function used Direction polarity Offset post test	- - [Unit]
Linear regression	D = C * S	C	Inverse sensitivity Offset pre test Sensitivity[2)]	[Unit/eU] [eU] [eU/Unit]
Linear regression with offset	D = C * S + M	C M	Inverse polynom coeff C Inverse polynom coeff M Offset pre test	[Unit/eU] [Unit] [eU]
Polynomial regression 3rd order	$D = A * S^3 + B * S^2 + C * S + M$	A B C M	Inverse polynom coeff A Inverse polynom coeff B Inverse polynom coeff C Inverse polynom coeff M	$[Unit/(eU)^3]$ $[Unit/(eU)^2]$ [Unit/eU] [Unit]
Power function	$D = C * (S + S_0)^{\alpha} + M$	C M S_0 α	Power func sensitivity Power func eng offset Power func electr offset Power func exponent	[Unit/eU] [Unit] [eU] [1]

Tab 2: **Parameters and descriptors of transfer functions**

[2)] Additional information: must not be used if *Inverse sensitivity* is missing or NOVALUE

The function *Linear regression with offset* is a special case of *Polynomial regression with offset* where the cubic and quadratic coefficients are 0.
Independent from the transfer function the descriptor *Offset post test* can be used to document the offset correction in physical units in the time between *Start offset interval* and *End offset interval*.

2.13 Valid values for the descriptor ‘Direction polarity‘

Value	Remark
+	see 1.4.2
-	see 1.4.2

2.14 Valid values for the descriptor ‘Type of the test‘

The values for ‘Type of the test’ can be expanded by the exchanging partners.

Value	Remark
C2C	Active safety test: car to car scenarios
VRU	Active safety test: vulnerable road user scenarios
LSS	Active safety test: lane support system scenarios
Airbag Test	
Bumper Test	
Car To Car Impact	
Component Sled Test	
Component Test	Test of vehicle components
Door Intrusion	
Drop Test	
Dummy Certification E2	
Dummy Certification ER	
Dummy Certification FH	

Dummy Certification H3	
Dummy Certification HF	
Dummy Certification HM	
Dummy Certification PF	
Dummy Certification PJ	
Dummy Certification PL	
Dummy Certification PS	
Dummy Certification PU	
Dummy Certification Q0	
Dummy Certification Q1	
Dummy Certification Q2	
Dummy Certification Q3	
Dummy Certification Q4	
Dummy Certification Q6	
Dummy Certification QA	
Dummy Certification S2	
Dummy Certification TH	
Dummy Certification WS	
Dummy Certification Y2	
Dummy Certification Y6	
Dummy Certification Y7	
Frontal Impact	
Frontal Sled Test	Simulation of a frontal impact
Misuse Test	
Other	None of the listed types of test
Pedestrian Protection	
Pendulum Test	
Pressure Test	
Rear Impact	
Rear Sled Test	Simulation of a rear impact
Rollover Leftside	
Rollover Rightside	
Roof Crush	
Side Impact Leftside	
Side Impact Rightside	
Side Sled Test Leftside	Simulation of a side impact from the left side
Side Sled Test Rightside	Simulation of a side impact from the right side
Towing Test	

2.15 Valid values for the descriptor ‘Subtype of the test‘

The values for ‘Subtype of the test’ can be expanded by the exchanging partners. The table contains recommendations for a subset of the types of test listed in 2.14.

Value	Remark

Frontal	Subtype of *Car to Car Impact*
Side	Subtype of *Car to Car Impact*
0 Degree	Subtype of *Rear Impact*
0 Degree Active	Subtype of *Frontal Impact*
0 Degree Empty	Subtype of *Frontal Impact*
0 Degree Passive	Subtype of *Frontal Impact*
30 Degree Leftside Active	Subtype of *Frontal Impact*
30 Degree Leftside Passive	Subtype of *Frontal Impact*
30 Degree Rightside Active	Subtype of *Frontal Impact*
30 Degree Rightside Passive	Subtype of *Frontal Impact*
MPDB Leftside	Subtype of *Frontal Impact*
Oblique Leftside	Subtype of *Frontal Impact*
ODB 10 Degree Leftside	Subtype of *Frontal Impact*
ODB Leftside	Subtype of *Frontal Impact* and *Rear Impact*
ODB Rightside	Subtype of *Frontal Impact* and *Rear Impact*
Pole	Subtype of *Frontal Impact*
Small Overlap Leftside	Subtype of *Frontal Impact*
Small Overlap Rightside	Subtype of *Frontal Impact*
Underride	Subtype of *Frontal Impact*
Embankment	Subtype of *Rollover Leftside* and *Rollover Rightside*
Lateral	Subtype of *Rollover Leftside* and *Rollover Rightside*
Ramp	Subtype of *Rollover Leftside* and *Rollover Rightside*
Sandbed	Subtype of *Rollover Leftside* and *Rollover Rightside*
Barrier	Subtype of *Side Impact Leftside* and *Side Impact Rightside*
Pole 75 Degree	Subtype of *Side Impact Leftside* and *Side Impact Rightside*
Pole 75 Degree S2	Subtype of *Side Impact Leftside* and *Side Impact Rightside*
Pole 75 Degree E2	Subtype of *Side Impact Leftside* and *Side Impact Rightside*
Pole 90 Degree	Subtype of *Side Impact Leftside* and *Side Impact Rightside*
Abdomen Impact Left	Subtype of *Dummy Certification E2, ER, S2, WS*
Abdomen Impact Right	Subtype of *Dummy Certification E2, ER, S2, WS*
Abdomen Weight Test	Subtype of *Dummy Certification Q0, Q1, Q2, Q3, Q6, QA*
Acetabulum Impact Left	Subtype of *Dummy Certification S2*
Acetabulum Impact Right	Subtype of *Dummy Certification S2*
Ankle Motion Left	Subtype of *Dummy Certification TH*
Ankle Motion Right	Subtype of *Dummy Certification TH*
Ball Impact Left Foot	Subtype of *Dummy Certification H3, TH*
Ball Impact Right Foot	Subtype of *Dummy Certification H3, TH*
Dynamic Bending Test	Subtype of *Dummy Certification PL, PU*
Dynamic Pendulum Test	Subtype of *Dummy Certification PF*
Face Rigid Bar Impact	Subtype of *Dummy Certification TH*
Face Rigid Disk Impact	Subtype of *Dummy Certification TH*
Head Drop Test	Subtype of *Dummy Certification PJ*
Head Drop Test Frontal	Subtype of *Dummy Certification Hx, Yx, WS, Qx, FH, TH*
Head Drop Test Left	Subtype of *Dummy Certification E2, ER, S2, WS, Qx*

Head Drop Test Rear	Subtype of *Dummy Certification Y2*
Head Drop Test Right	Subtype of *Dummy Certification E2, ER, S2, WS, Qx*
Head Impact Test	Subtype of *Dummy Certification TH*
Heel Impact Left Foot	Subtype of *Dummy Certification H3, TH*
Heel Impact Right Foot	Subtype of *Dummy Certification H3, TH*
Heel Impact With Shoe Left Foot	Subtype of *Dummy Certification H3*
Heel Impact With Shoe Right Foot	Subtype of *Dummy Certification H3*
Hip Flexion Left	Subtype of *Dummy Certification H3*
Hip Flexion Right	Subtype of *Dummy Certification H3*
Iliac Impact Left	Subtype of *Dummy Certification S2*
Iliac Impact Right	Subtype of *Dummy Certification S2*
Inverse Test	Subtype of *Dummy Certification PF*
Knee Impact Left	Subtype of *Dummy Certification H3, HF, HM, Y7, TH*
Knee Impact Right	Subtype of *Dummy Certification H3, HF, HM, Y7, TH*
Knee Slider Left	Subtype of *Dummy Certification H3, HF, HM*
Knee Slider Left Low Speed	Subtype of *Dummy Certification H3*
Knee Slider Right	Subtype of *Dummy Certification H3, HF, HM*
Knee Slider Right Low Speed	Subtype of *Dummy Certification H3*
Lower Ribcage Oblique Test	Subtype of *Dummy Certification TH*
Lower Abdomen Dynamic Impact	Subtype of *Dummy Certification TH*
Lumbar Flexion	Subtype of *Dummy Certification Qx*
Lumbar Flexion Left	Subtype of *Dummy Certification E2, ER, Qx*
Lumbar Flexion Right	Subtype of *Dummy Certification E2, ER, Qx*
Neck Extension	Subtype of *Dummy Certification Hx, Yx, Q0, QA, TH*
Neck Flexion	Subtype of *Dummy Certification Hx, Yx, Qx, TH*
Neck Flexion Left	Subtype of *Dummy Certification E2, ER, S2, WS*
Neck Flexion Right	Subtype of *Dummy Certification E2, ER, S2, WS*
Neck Occipital Condyle Joint Test	Subtype of *Dummy Certification TH*
Pelvis Impact Left	Subtype of *Dummy Certification E2, ER, WS, Q4, QA*
Pelvis Impact Right	Subtype of *Dummy Certification E2, ER, WS, Q4, QA*
Pendulum Test	Subtype of *Dummy Certification PF*
Rib 1 Drop 204mm	Subtype of *Dummy Certification E2*
Rib 1 Drop 459mm	Subtype of *Dummy Certification E2, ER*
Rib 1 Drop 815mm	Subtype of *Dummy Certification E2, ER*
Rib 2 Drop 204mm	Subtype of *Dummy Certification E2*
Rib 2 Drop 459mm	Subtype of *Dummy Certification E2, ER*
Rib 2 Drop 815mm	Subtype of *Dummy Certification E2, ER*
Rib 3 Drop 204mm	Subtype of *Dummy Certification E2*
Rib 3 Drop 459mm	Subtype of *Dummy Certification E2, ER*
Rib 3 Drop 815mm	Subtype of *Dummy Certification E2, ER*
Shoulder Impact Left	Subtype of *Dummy Certification E2, ER, S2, WS, Q4, QA*
Shoulder Impact Right	Subtype of *Dummy Certification E2, ER, S2, WS, Q4, QA*
Shoulder Impact Upper Arm Left	Subtype of *Dummy Certification QA*
Shoulder Impact Upper Arm Right	Subtype of *Dummy Certification QA*

Static Bending Test	Subtype of *Dummy Certification PL*
Static Shearing Test	Subtype of *Dummy Certification PL*
Static Femur Test	Subtype of *Dummy Certification PF*
Static Tibia Test	Subtype of *Dummy Certification PF*
Static Knee Joint Test	Subtype of *Dummy Certification PF*
Thorax Impact	Subtype of *Dummy Certification Hx, Yx, Q1, Q2, Q3, Q6, QA*
Thorax Impact Low Speed	Subtype of *Dummy Certification H3, HF*
Thorax Impact Left	Subtype of *Dummy Certification S2, WS, Qx*
Thorax Impact Right	Subtype of *Dummy Certification S2, WS, Qx*
Thorax Impact Without Arm Left	Subtype of *Dummy Certification S2, WS, Q4*
Thorax Impact Without Arm Right	Subtype of *Dummy Certification S2, WS, Q4*
Torso Bending	Subtype of *Dummy Certification HF, HM, Y6, Y7*
Upper Ribcage Central Impact	Subtype of *Dummy Certification TH*
Upper Abdomen Dynamic Impact	Subtype of *Dummy Certification TH*
Lower Legform	Subtype of *Pedestrian Protection*
Upper Legform	Subtype of *Pedestrian Protection*
Adult Headform	Subtype of *Pedestrian Protection*
Child Headform	Subtype of *Pedestrian Protection*
Other	

2.16 Valid values for the descriptor ‘Regulation‘

The regulation can be a reference to a national standard or to a consumer organisation. A consumer test is sometimes followed by the start year of validity. National standards are normally followed by one or two numbers. If a number represents a year it has to be a four digit notation YYYY. In the case of two numbers they have to be separated by ’/ ‘ (ASCII 47) and the year is the second value. Often a test is according to multiple regulations. Therefore a list of valid regulations separated by comma (ASCII 44) is possible.

Value	Remark
ADR	National Standard of Australia
AIS	National Standard of India
CMVSS	National Standard of Canada
CONTRAN	National Standard of Brazil
UN-R	Standard of the UN (formerly ECE-R)
EG	Standard of European Union
FMVSS	National Standard of US
GB	National Standards of the People’s Republic of China
GTR	Worldwide Standard of the UN
KMVSS	National Standard of South Korea
TRIAS	National Standard of Japan
ANCAP	Australian New Car Assessment Program
AseanNCAP	Asean New Car Assessment Program
BNVSAP	Bharat New Vehicle Safety Assessment Programm
CNCAP	China New Car Assessment Program
CIASI	China Insurance Automotive Safety Index
EuroNCAP	European New Car Assessment Program

IIHS	Insurance Institute For Highway Safety
JNCAP	Japan New Car Assessment Program
KNCAP	Korean New Car Assessment Program
LatinNCAP	Latin New Car Assessment Program
RCAR	Research Council for Automobile Repairs
USNCAP	US New Car Assessment Program
ISO	International Organization for Standardization
SAE	Society of Automotive Engineers
Manual	User Manual (referenced for Dummy Certification)
Internal	Company specific regulation
Other	None of the listed standards or consumer tests

2.17 Valid values for block descriptors

Blockbegin- and blockend-descriptors are used within information and data files to structure the information lines. Blocks are surrounded by a '#Begin of <value>' and a '#End of <value>' descriptor. Predefined values are listed in the following table.

Value	Remark
column	used for the description section of multicolumn data files
testobject	used for testobject information in the mme file
NHTSA	used for additional NHTSA specific information, may occur one-time per file
biomechanical	used for the additional information of biomechanical test environments, may occur one-time per file
reference	used within reference system information and data files
movie	used for movie information files
photo	used for photo information files
channel	used for channel information files
staticdata	Used for static data information files

2.18 Valid values for the format specification

Value	Remark
integer	see 1.2
float	see 1.2
string	see 1.2
boolstring	see 1.2
datetime	see 1.2
coded	see 1.2
reference	see 1.2
filereference	see 1.2

2.19 Valid values for the data origin

Value	Remark
T	origin of the channel data is a transducer
F	origin of the channel data is filmanalysis
S	origin of the channel data is simulation
C	the channel data is a combination of different origin
0	undefined / other

2.20 Valid values for the codeextension

The <codeextension> is a concatenation of the 'Reference system id' in table 2.3 and the 'Data origin' in table 2.19. Predefined values for the <codeextension> are all possible combinations of the values listed in tables 2.3 and 2.19. Examples are shown in the following table.

Value	Remark
1T0S	simulation data in the coordinate system of testobject 1 at stage T0
1T0F	filmanalysis data in the coordinate system of testobject 1 at stage T0
1DYF	filmanalysis data in the coordinate system of the moving testobject 1
DSTC	calculated data of a dummy part (e.g. headimpactor) in a static coordinate system (e.g. photogrammetric measurement)
TSTF	filmanalysis data in the static testrig coordinate system
S01T	transducer data in the coordinate system 01 of testobject S specified in the reference system information file
102S	simulation data in the coordinate system 02 of testobject 1 specified in the reference system information file
LOCT	transducer data in the local coordinate system

2.21 Allowed units

The SI units are currently divided into base units and derived units, which together form what is called "the coherent system of SI units." The units allowed to use for the data exchange are described in their notation in the following table. Additional units may be used if agreed between the exchanging partners. For the descriptor 'Unit' the spelling described in the column 'Unit' has to be used.

For all other descriptors, where the value deviates from the default, the unit enclosed in squared brackets has to follow the numerical value. One blank (ASCII 32) is allowed for the interspace between number and unit.

Unit	Quantity	Remark
m	Length	base unit
s	Time	base unit
kg	Mass	base unit
A	Electric Current	base unit
K	Temperature	base unit
cd	Luminous Intensity	base unit
rad	Angle	coherent derived unit
sr	Solid Angle	coherent derived unit

Hz	Frequency	coherent derived unit
N	Force	coherent derived unit
Pa	Pressure	coherent derived unit
J	Energy	coherent derived unit
W	Power	coherent derived unit
C	Electric Charge	coherent derived unit
V	Voltage	coherent derived unit
F	Electrical Capacity	coherent derived unit
lm	Luminous Flux	coherent derived unit
lx	Illuminance	coherent derived unit
m/s	Velocity	derived unit
m/(s*s)	Acceleration	derived unit
rad/s	Angle Velocity	derived unit
rad/(s*s)	Angle Acceleration	derived unit
m/(s*s*s)	Jerk	derived unit
Nm	Moment	derived unit
kg*m/s	Impulse	derived unit
V/A	Resistance	derived unit
m*m	Area	derived unit
m*m*m	Volume	derived unit
m*m*m/s	Volume Flow Rate	derived unit
kg/s	Mass Flow Rate	derived unit
Cd/(m*m)	Luminance	derived unit
1	Unit One	without unit or ratio of two mutually comparable quantities
%	Percent	symbol for the number 0.01 (% is ASCII 37)
For all other descriptors than 'Unit' the following units have to be enclosed in squared brackets:		
mm	Length	decimal submultiple of the base unit
µm	Length	decimal submultiple of the base unit (µ is ASCII 181)
ms	Time	decimal submultiple of the base unit
µs	Time	decimal submultiple of the base unit (µ is ASCII 181)
pixel	Image Unit	accepted Non-SI unit
L	Volume	accepted Non-SI unit
°	Angle	accepted Non-SI unit (° is ASCII 176)
°/s	Angle Velocity	accepted Non-SI unit (° is ASCII 176)
°/(s*s)	Angle Acceleration	accepted Non-SI unit (° is ASCII 176)
dB	Decibel	accepted Non-SI unit
°C	Temperature	accepted Non-SI unit (° is ASCII 176)
g	Acceleration	Accepted Non-SI unit with the conversion factor 9.80665 m/(s*s)

3 Hints

3.1 Recommended compression algorithm for AVI format files

The recommended compression algorithm for the use in AVI files is **X264** Revision 1195. This codec may be used with the following parameters:

Single pass – ratefactor-based (CRF)	
Ratefactor	23 or less
FourCC	X264
ME algorithm	umh
Subpixel ME refinement	7 RD on all
Min. GOP Size	7
Max. GOP Size	7
Max. Number of consecutive B-Frames	0

3.2 Single image sequences

In most cases of movie exchange container files like AVI are used. Sometimes it could be necessary to exchange the original single images. To avoid equivocal filenames the best method is to store every sequence of single images within a subdirectory of the movie subdirectory. The name of the subdirectory shall be equal to the container filename without extension. The names of the single image files shall contain numbers for sorting. The descriptive parameters of the container file and the image sequence are partly different. Therefore it is necessary to use two distinct movie blocks within the MMI file if both are exchanged. For the whole image sequence only one descriptor *'Name of moviefile'* can be used. It shall contain only the subdirectory name without dots and pathnames.

Example for the image sequence IMG00000.TIF ... IMG00350 in the subdirectory TEST01_T3CAM0MI together with the container file TEST01_ T3CAM0MI.AVI in reduced imagesize and time range:

```
#Begin of movie
Name of movie file          TEST01_T3CAM0MI.AVI
Number of images            211
Start time of movie         -10
Width of image              512
Height of image             512
Colour                      RGB
Format of movie file        AVI
Compression code            X264
Compression quality         23
...
#End of movie
#Begin of movie
Name of movie file          TEST01_T3CAM0MI
Number of images            351
Time zero                   -50
Width of image              1024
Height of image             1024
Colour                      RGB
Format of movie file        TIF
Compression code            uncompressed
Compression quality         NOVALUE
...
#End of movie
```

3.3 Channel code – Naming convention for the position field

For special seat arrangements with different rows or more than three seats per row the usage of capital letters A - Z for the position field is recommended.

3.4 Combination of dummy parts

When combining parts of different dummy types a unique FineLocation3 has to be used. Esp. when using the 50th percentile male Hybrid III legs together with the THOR FineLocation3 should be T3 for all dummy channels.

3.5 Testobject information files

For the descriptor '*Class'* the EuroNCAP class or the platform type is recommended for vehicles. The descriptor '*Code'* should refer to the code of model type or stage of development for vehicles and to the code of Fine Location 3 for pedestrian impactors. The '*Ref number'* should be a unique identification number like the vehicle Id.

3.6 Naming rules for channels

For the Channel Codes the following general naming rules apply:

• The MainLocation should describe the position of the measurement point.

• ChannelCodes which deviate from the following rules but are in use for a long time should not be changed.

Especially for new dummy and impactor channels the following naming rules apply:

• The naming of the channels should describe the structure of the dummy as a measurement device.

• The FineLocation1 should describe the most significant spatial orientation of the channel.

• The FineLocation2 should describe the less significant characteristic of the channel location or property.

• The FineLocation3 is identical to the dummy code.

In addition for all other channels where the FineLocation3 is not reserved for the dummy code the following rules apply:

• The FineLocation 1,2,3 should be used in the order X,Y,Z in the coordinate system of the testobject, if all three spatial directions are used.

• If one or two spatial directions are unused the other move up, resulting in 00 values at the FineLocations 3 and possibly 2.

3.7 MME directory structure – Recommendations for special data

For the exchange of data files with CAN-Bus or FlexRay protocols the subdirectory ***Busdata*** should be used.

For the exchange of simulation input- or output-decks the subdirectory ***Simulation*** should be used.

The additional data according ISO TS 23520 'Equipment eXchange – data format specification for operational information relevant for equipment exchange and testing' should be exchanged in the subdirectory ***Equipment***.

4 Examples

4.1 Examples of information files

4.1.1 Examples of test information files

4.1.1.1 Example of MME file

Filename: 2019ISO2.mme **see 1.3.2**

Data format edition number	2.1
Timestamp	2011-03-04T09:25:15+01:00
Laboratory name	:ALPHA Car Test Laboratory
Laboratory contact name	:Frank N. Stein
Laboratory contact phone	:+49-222/123-4567
Laboratory contact fax	:+49-222/123-8901
Laboratory contact email	:frank.stein@alpha.cartest.com
Laboratory test ref number	:2011WG3
Customer name	:ISO/TC22/SC12/WG3 Safety Laboratory
Customer test ref number	:2011ISO1
Customer project ref number	:ISOTC22
Customer order number	:SC12WG3
Customer cost unit	:2011/0
Customer contact name	:Mary Land
Customer contact phone	:+44-123/555-123
Customer contact fax	:+44-123/555-456
Customer contact email	:mary.land@iso.tc22.sc12.wg3.uk
Title	:Example Test
Type of the test	Frontal Impact
Subtype of the test	ODB leftside
Regulation	ECE-R_94_2003,ADR_73_2005,TRIAS_18_2012,GB_20913_2007
Date of the test	2011-03-03T10:25:00+01:00
Reference temperature	22.5 [°C]
Relative air humidity	:75
Number of test objects	:2
#Begin of testobject	
Type	1
Filename	2019ISO2_1.INF
#End of testobject	
#Begin of testobject	
Type	B
Filename	2019ISO2_B.INF
#End of testobject	

4.1.1.2 Example of additional NHTSA test information

Filename: 2011NHTSA2.mme **see 1.3.2.1**

Data format edition number	:2.1
...	
#Begin of NHTSA	
Test type	NCA
Test configuration	VTB
Track surface	CON
Track condition	DRY
. . .	
#End of NHTSA	

4.1.1.3 Example of additional biomechanical test information

Filename: 2011BIOMECH2.mme **see 1.3.2.2**

Data format edition number	:2.1
...	
#Begin of biomechanical	
Financial support	EC
Project ref number	EC09-12345
Project contact name	Beerlustconi
Project contact email	beerlustconi@projects.eu
#End of biomechanical	

4.1.2 Examples of object information files

4.1.2.1 Example of vehicle information file

Filename: 2019ISO2_1.mmi **see 1.3.3.1 and 1.3.3.2**

Name	Vehicle A
Velocity	15.72
Mass	1430.00
Impact side	FR
Driver position	1
Class	Small Family Car
Code	A0
Ref number	007-008
Offset	40
#Begin of NHTSA	
Vehicle make	CarManu
Vehicle model	Eagle
Vehicle year	2009
. . .	
#End of NHTSA	

4.1.2.2 Example of barrier information file

Filename: 2019ISO2_B.mmi **see 1.3.3.1 and 1.3.3.2**

Name	Fixed barrier
Velocity	0.00
Mass	90000.00
Impact side	FR
Class	Block without deformable element
Code	xyz
Ref number	1111-012
Barrier width	3.2
Barrier height	1.64
Yaw angle	-90 [°]
Reference system id	BST
Comments	according to the SAE J211 reference coordinate system
Origin X	0.12
Origin Y	-1.4
Origin Z	-1.8
Number of loadcells	64
#Begin of NHTSA	
Barrier shape	LCB
Rigid or deformable barrier	R
Angle of fixed barrier	0
Diameter of pole barrier	NOVALUE

NHTSA Comments	NO DATA COLLECTED ON A1, B1, C1, D1, D2, D3,
NHTSA Comments	D4,D5,D6,D7,D8,D9
#End of NHTSA	

4.1.2.3 Example of occupant information file

Filename: 2019ISO2_11.mmi **see 1.3.3.4**

Comments	V3239.OCC in NHTSA format
Comments	- DRIVER OCCUPANT INFORMATION
Dummy id	CC123
Dummy type	H3
Dummy subtype	Build Level D
Dummy temperature	NOVALUE
Out of position	NO
#Begin of biomechanical	
Gender	male
Age	NOVALUE
#End of biomechanical	
#Begin of NHTSA	
Dummy Manufacturer Ser No	VECTOR, S/N:034
Dummy Modifications	UNMODIFIED
Head to Windshield Header	.350
Head to Windshield	.635
Head to Side Header	.245
Head to Side Window	.325
Chest to Dash	.515
Chest to Steering Wheel	.320
Arm to Door	.126
Hip to Door	.154
Knees to Dash	.220
Head to Seatback	NOVALUE
Neck to Seatback	NOVALUE
Chest to Seatback	NOVALUE
Knee to Seatback	NOVALUE
Seat Track Position	RW
1st Contact for Head	AB
2nd Contact for Head	NO
1st Contact for Chest Abdo	AB
2nd Contact for Chest Abdo	NO
1st Contact for Legs	DP
2nd Contact for Legs	SC
Head Injury Criterion HIC	377
Lo HIC Time Interval	.0528
Up HIC Time Interval	.0887
Thorax Peak Accel (CLIP3M)	426.59
L Femur Peak Load	3534
R Femur Peak Load	4642
Chest Severity Index	NOVALUE
Lap Belt Peak Load	6474
Shoulder Belt Peak Load	5109
Thoracic Trauma Index	NOVALUE
Pelvic Acceleration	NOVALUE
#End of NHTSA	

4.1.2.4 Example of restraint system information file

Filename: 2019ISO2_11SEBE.mmi **see 1.3.3.5**

#Begin of NHTSA	
Restraint type	3PT
Restraint mount	BC
Restraint Deployed	NA
#End of NHTSA	

4.1.3 Example of reference system information file

Filename: 2019ISO2_Reference.mmi **see 1.3.4**

Number of references	5
#Begin of reference	
Reference system id	LOC
Description	local transducer systems according to SAE J211
X origin	center of gravity of the transducer
Y origin	center of gravity of the transducer
Z origin	center of gravity of the transducer
X direction	x-direction of the transducer
Y direction	y-direction of the transducer
Z direction	z-direction of the transducer
#End of reference	
#Begin of reference	
Reference system id	1T0
Description	vehicle system at time 0
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the vehicle to the rear
Y direction	from the left to the right of the vehicle
Z direction	opposite to the force of gravity
#End of reference	
#Begin of reference	
Reference system id	1DY
Description	vehicle system dynamic
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the vehicle to the rear
Y direction	from the left to the right of the vehicle
Z direction	opposite to the force of gravity
#End of reference	
#Begin of reference	
Reference system id	101
Description	vehicle system at T0 / direction of the axes according to SAE J211
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the rear of the vehicle to the front
Y direction	from the left to the right of the vehicle
Z direction	in the direction of the force of gravity
#End of reference	
#Begin of reference	
Reference system id	TST
Description	test rig static
X origin	marker on the floor in front of the barrier
Y origin	marker on the floor in front of the barrier
Z origin	marker on the floor in front of the barrier
X direction	from the barrier to the vehicle, opposite to the driving direction
Y direction	from the left to the right of the vehicle

Z direction	opposite to the force of gravity
#End of reference	

4.1.4 Example of channel information file

Filename: 2019ISO2_Channel.mmi **see 1.3.5**

Number of channels	75
Reference system id	LOCT
Data origin	transducer
#Begin of channel	
Extended channel code	11HEAD0000H3ACXA_LOCT
#End of channel	
#Begin of channel	
Extended channel code	11HEAD0000H3ACYA_LOCT
#End of channel	
#Begin of channel	
…	

4.1.5 Examples of moving image information

4.1.5.1 Example of moving image information file

Filename: 2019ISO2_Movie.mmi **see 1.3.6.1**

Number of movies	7
Comments	
Comments	information valid for all movies
Comments	
Pixel size	12 [µm]
Aspect ratio of pixels	:1.00
Data source	:camera
Camera type	:KAPPA OCP
Format of movie file	:AVI
Colour	:RGB
Movie images corrected	:NO
Comments	
Comments	specific information of movie 1
#Begin of movie	
Movie id	L1
Name of movie file	:2019ISO2_T4CAM0MI.AVI
Camera id	:KAPPA12
Width of image	:1920
Height of image	:1440
Number of images	:351
Film speed	:1000
Start time of movie	-0.05
Time offset	360 [µs]
End time of movie	0.3
Description	:total view of vehicle 1 from the left side
Lens id	:14579435
Lens type	:Schneider
Lens focal length	:10 [mm]
Focus	:infinite
Aperture	:5.6 - 8
Shutter time	250 [µs]
Compression code	:X264
Compression quality	:23
Keyframes	:7
Time vector filename	:2019ISO2_10VEHC000000TI00_TSTF.mmd
Image history filename	:2019ISO2_T4CAM0MI.imh
Correction parameter file	:2019ISO2_T4CAM0MI.cor

#End of movie	
Comments	specific information of movie 2
#Begin of movie	
Movie id	:2019ISO2_T6CAM0MI.AVI
Description	:total view of vehicle A from the right side
Camera id	:KAPPA67

. . .

4.1.5.2 Example of COR file

Filename: 2019ISO2_T4CAM0MI.cor **see 1.3.6.2**

Distortion correction type	:bundle adjustment
Pixel distance x	:16 [µm]
Pixel distance y	:16 [µm]
Principal point x	:-9.38
Principal point y	:-8.25
Calibrated focal length	:10.128 [mm]
Distortion unit	:mm
Distortion correction A1	:-1.1685e-003
Distortion correction A2	:5.3873e-006
Distortion correction A3	:2.8685e-007
Distortion correction B1	:-1.4558e-005
Distortion correction B2	:-3.2337e-005
Distortion correction C1	:6.6139e-007
Distortion correction C2	:3.6798e-005
Distortion correction R0	:3.413

4.1.6 Example of photo information file

Filename: 2019ISO2_Photo.mmi **see 1.3.7**

Number of photos	:6
Comments	:
Comments	: information valid for all photos
Comments	:
Width of image	:1170
Height of image	:1000
Aspect ratio of pixels	:1.00
Photographer	Hamilton
Camera type	:ETA 007
Aperture	4 – 5.6
Exposure time	:0.008
Format of photo file	:TIFF
Colour	:RGB
Compression	:LZW
Comments	:############################
Comments	: specific information of photo 1
#Begin of photo	
Photo id	1
Testobject	1
Classification	POST
Name of photo file	:BRIGPOST.TIF
Description	:partial view of the front of vehicle B
Direction	:right
#End of photo	
Comments	:############################
Comments	: specific information of photo 2
#Begin of photo	
Photo id	2
Testobject	1

. . .

4.1.7 Example of static measurement information file

Filename: 2019ISO2_Static.mmi **see 1.3.8**

Number of static data files	3
#Begin of staticdata	
Filename	2019ISO2_10VEHC.mmd
Classification	NOVALUE
Description	Static data of the Vehicle, Points and Lines (Pre- and Post-Test)
#End of staticdata	
#Begin of staticdata	
Filename	2019ISO2_B0DEFO_POST.stl
Classification	POST
Description	Scan data of the Deformable Barrier Surface Post-Test
#End of staticdata	
#Begin of staticdata	
Filename	2019ISO2_11OCCU.stl
Classification	PRE
Description	Scan data of the Driver Occupant Pre-Test
#End of staticdata	

4.1.8 Example of report information file

Filename: 2019ISO2_Report.mmi **see 1.3.9**

Number of reports	3
#Begin of report	
Filename	2019ISO2_Report.pdf
Description	Main test report
#End of report	

. . .

4.2 Examples of data files

4.2.1 Example of multi column data file

Filename: 2019ISO2_Steeringwheel_Movement.mmd **see 1.4.2**

```
Data structure            MultiChannel
Number of columns         4
Comments                  Relative movement of the steering wheel hub
Comments
Description               Time[s]   X[m]   Z[m]   R[m]
#Begin of Column
Comments                  Timebase
Name                      Time
Unit                      s
Format                    float
#End of Column
#Begin of Column
Comments                  Movement in X-Direction relative to Time Zero
Name                      X
Unit                      m
Format                    float
#End of Column
#Begin of Column
Comments                  Movement in Z-Direction relative to Time Zero
Name                      Z
Unit                      m
Format                    float
#End of Column
#Begin of Column
Comments                  Resultant relative movement in XZ-plane
Name                      R
Unit                      m
Format                    float
#End of Column
#Start of data
-0.001   -6.60e-003    5.16e-003    8.38e-003
 0.000    0.00e+000    0.00e+000    0.00e+000
 0.001    1.20e-002   -1.95e-003    1.22e-002
 0.002    4.02e-003   -8.98e-003    9.84e-003
 0.003    5.04e-004   -1.56e-002    1.56e-002
 0.004   -1.36e-004   -1.98e-002    1.98e-002
 0.005   -3.13e-003   -1.37e-002    1.40e-002
 0.006   -2.85e-003   -1.25e-004    2.86e-003
 0.007   -3.75e-003    5.92e-003    7.01e-003
. . .
```

4.2.2 Example of reference system data file

Filename: 2019ISO2_Reference.mmd **see 1.4.5**

```
Data structure            6DoF
Comments                  Name  Refsys  Time   X  Y  Z   Qw  Qx  Qy  Qz
#Start of data
1T0   TST   CONSTANT   2.9522   -7.3176   1.6790   1.00000   0.00000   0.00000   0.00000
101   1T0   0.000    0.0000    0.0000   0.0000    0.00000   0.00000   1.00000   0.00000
1DY   1T0   -0.002   0.0340   -0.0001   0.0001    1.00000   0.00000   0.00000   0.00000
1DY   1T0   -0.001   0.0170    0.0002  -0.0001    1.00000   0.00000   0.00000   0.00000
```

1DY	1T0	0.000	0.0000	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
1DY	1T0	0.001	-0.0160	0.0005	0.0002	1.00000	0.00000	0.00000	0.00000

. . .

4.2.3 Examples of channel data

4.2.3.1 Example of channel data file with local transducer data

Filename: 2019ISO2_11HEAD0000H3ACXA_LOCT.mmd **see 1.4.2**

```
Data structure                    Channel
Instrumentation standard          ISO_6487_1987,SAE_J211_1985
Name of the channel               :Head Acceleration X
Data source                       :transducer
Data status                       :ok
Unit                              :m/(s*s)
Cut off frequency                 :2000.0
Channel amplitude class           :2000.0
Sampling interval                 :0.0001
Bit resolution                    :12
Time of first sample              :0.0000
Number of samples                 :2500
Reference channel                 :implicit
Reference channel name            :NOVALUE
Laboratory channel code           :HEAD01AX
Customer channel code             :1HEAD_X_ACC
Channel frequency class           :1000
Transducer type                   :TAU 7270 A
Transducer id                     071234
Transducer natural frequency      27000
Transducer damping ratio          0.3
Uuid                              7d444840-9dc0-11d1-b245-5ffdce74fad2
Calibration date                  2011-01-02T11:30:00+01:00
Calibration due date              2012-01-01
Prefilter type                    :Butterworth, 6 pole
First global maximum value        :+1.237802E+02
Time of maximum value             :+0.18450
First global minimum value        :-5.489905E+02
Time of minimum value             :+0.06860
Start offset interval             :-0.0500
End offset interval               :+0.0000
Offset post test                  NOVALUE
Inverse sensitivity               NOVALUE
Inverse polynom coeff A           NOVALUE
Inverse polynom coeff B           NOVALUE
Inverse polynom coeff C           NOVALUE
Inverse polynom coeff M           NOVALUE
Offset pre test                   NOVALUE
Loadcell width                    NOVALUE
Loadcell height                   NOVALUE
Loadcell top left Y               NOVALUE
Loadcell top left Z               NOVALUE
#Start of data
-4.788391E-01
. . .
```

4.2.3.2 Example of channel data file with filmanalysis data

Filename: 2019ISO2_ 11HEAD0000H3DSXV_1DYF.mmd **see 1.4.2**

Data structure	Channel
Instrumentation standard	internal - dynamical vehicle coordinate system
Name of the channel	Head Displacement X
Data source	camera
Data status	ok
Unit	m
Cut off frequency	NOVALUE
Channel amplitude class	NOVALUE
Sampling interval	0.001
Bit resolution	NOVALUE
Time of first sample	-0.01
Number of samples	211
Reference channel	implicit

#Start of data
0.468
0.466
. . .

4.2.4 Example of static measurement data file

Filename: 2019ISO2_10VEHC.mmd **see 1.4.4**

Data structure StaticData
Comments Name Refsys Index Classification X Y Z
#Start of data

11APILMI0000DSM0	1ST	NOVALUE	PRE	0.361	-0.7885	07172
11APILMI0000DSM0	1ST	NOVALUE	POST	0.406	-0.7832	07255
. . .						
10DASB	1ST	1	PRE	0.300	-0.450	0.655
10DASB	1ST	2	PRE	0.301	-0.450	0.654
10DASB	1ST	3	PRE	0.302	-0.450	0.653
10DASB	1ST	4	PRE	0.303	-0.450	0.652
. . .						

4.2.5 Example of 3D point data file

Filename: 2019ISO2_11HEADLEMI00DSMV_1T0F.mmd **see 1.4.6**

Data structure Point
Comments Time X Y Z
#Start of data

-0.0090	6.49e-001	-4.39e-001	7.30e-001
-0.0080	6.31e-001	-4.36e-001	7.32e-001
-0.0070	6.15e-001	-4.38e-001	7.31e-001
-0.0060	5.98e-001	-4.40e-001	7.31e-001

. . .

4.2.6 Example of camera position file

Filename: 2019ISO2_Movie.mmd **see 1.4.5**

Data structure				6DoF					
Comments				MovieId Refsys Time[s] X[m] Y[m] Z[m] Qw Qx Qy Qz					
#Start of data									
L1	TST	0.000	2.9521	-7.3178	1.6081	0.76506	0.64370	0.01340	0.01277
L1	TST	0.001	2.9522	-7.3177	1.6080	0.76506	0.64370	0.01341	0.01277
...									
L1	TST	0.150	2.9525	-7.3177	1.6081	0.76506	0.64370	0.01347	0.01272
IN1	1T0	CONSTANT	0.8000	-0.4000	0.0200	0.96593	0.00000	-0.25882	0.00000
IN2	1T0	CONSTANT	0.8000	-0.4000	0.0280	0.96126	0.00000	-0.27564	0.00000
. . .									

4.3 Example of comment files

4.3.1 Example of test comment file

Filename: 2019ISO2.txt **see 1.5**

The car to car test was performed on 3rd of March 2011 at ALPHA Car Test Laboratory. The airbags of vehicle A had to be exchanged before the test.

4.3.2 Example of channel comment file

Filename: 2019ISO2_Channel.txt **see 1.5**

Following problems occurred:
13HEAD0000H3ACXA: large deviations at post test calibration...