Lower Right Thorax Qualification V1.3

This document describes the requirements for the data set preparation for the Lower Right Thorax Qualification according to TB 026 Version 1.3 February 2023, Euro NCAP.

1   Data Organization

The data set has to be delivered in ISO MME 1.6 format given by ISO/TS 13499 (respectively ISO MME). The data set must contain the *.mme file and a directory named "CHANNEL", which contains the *.chn file and the channel files. Reports in common file formats (*.pdf, *.emf) may be included in a directory "REPORT" next to the directory "CHANNEL".

2   Data Preparation

2.1 Channels

2.1.1   Required Measurement Channels

The measurement channels shown in the following table must be included in the data set.

Channel Description / Proposed Longname	Channel Code
Chest MTRAC Rotation Right Lower Y	D0CHSTRILOT3ANYP
Chest MTRAC Rotation Right Lower Z	D0CHSTRILOT3ANZP
Chest MTRAC Length Right Lower 0	D0CHSTRILOT3DC0P[1]
Impactor Acceleration X	T0IMPA000000ACXP[2]

2.1.2   Optional Channels

- All measurement channels taken on the dummy in this full body test shall be included in the data set, if available.
- Calculated channels can be included in the data set.

2.1.3   Further Channel Requirements

- No filtering is applied to the channels.
- A time range of at least 200 ms before contact (expected T0) and 300 ms after contact (expected T0) has to be included in each channel.
- For further processing a conversion to coordinate axes will be performed. The conversion formula often requires lever arms (delta value). For the standard design, the absolute value of this lever arm is 15.65 mm. When a special design with a different lever am was used, this

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[1] Despite the documentation of NHTSA, the MTRAC length information is usually not provided and exchanged as voltage channel (VO), but as distance channel (DC). For the conversion of VO to DC sensor specific parameters are required.

[2] In the NHTSA document THOR-50M Qualification Procedures and Requirements April 2023, the code used for the impactor is 'SENSMI'. Here, the recommendation of the ISO MME working group is followed by using the code 'IMPA' (T0SENSMI0000ACXP → T0IMPA000000AXCP).

value has to be given in the DC0 channel as additional descriptor '.MTRAC_leverarm'. If such a descriptor is not given, the standard values will be assumed.

2.1.4 Physical Units

All dynamic measurements have to be given in SI units.

Static tilt sensors should be given in the unit "deg" (degrees).

The SI units must be written as shown in the following table (from **ISO/TS 13499 Database**):

Physical Dimension	ISO Code	Unit
Acceleration	AC	m/(s*s)
Angle	AN	rad
Angular Acceleration	AA	rad/(s*s)
Angular Velocity	AV	rad/s
Distance	DC	m
Displacement	DS	m
Energy	EN	J
Event	EV	1
Force	FO	N
Humidity	HU	%
Lever Arm	LE	m
Mass	MA	kg
Moment	MO	Nm
Temperature	TE	K
Velocity	VE	m/s
Voltage	VO	V

2.1.5 Channel Sorting

The channels have to be sorted in the following order:

- Dummy channels
- Pendulum/test rig channels
- Other channels

The channel sorting given for dummy channels by the document **ISO/TS 13499 – RED B : 2021 E** has to be respected.

2.1.6 Sign Convention

All measurement channels should be delivered in their own local coordinate systems with respect to SAE J1733 November 2018. This reference system has to be specified as "Instrumentation standard" in the channel information file (*.chn).

In the channel T0IMPA000000ACXP, the acceleration of the impactor should become negative as the impactor contacts the dummy.

2.1.7 Offset Correction and T0 (Time Zero) Definition

The following sequence of steps has to be applied:

- Pre-Shift:
  Set T0 to the time when the pendulum first contacts the dummy. Perform bias removal of the channel T0IMPA000000ACXP by subtracting the average value of the data samples over the period between (-0.05 s) to (-0.01 s) prior to T0.
- Shift:
  Set T0 to the first data sample, where the bias removed channel T0IMPA000000ACXP filtered by CFC180 exceeds the 3 g level (= 29.41995 m/s²)[3].
- Final Shift:
  Shift the time by 7 ms for all channels (shift samples forward in time).
- Offset Correction:
  Perform bias removal of the remaining measured (unfiltered) channels by subtracting the average value of the data samples over the period between (-0.05 s) to (-0.01 s) prior to T0. Do not perform bias removal for absolute channels (e. g. angle, voltage, constant channels) or MTRAC channels.

Subtype of the test	Filter Class	Search level	Final Shift
THLR	CFC180	3 g	7 ms

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[3] A sampling rate of at least 10 kHz is assumed.

3 ISO MME Test Descriptor File (*.mme)

3.1 General Information

The following information must be included:

Type of the test	Dummy Certification T3
Subtype of the test	THLR
Regulation	Euro NCAP TB026 V1.3 2023-02
Laboratory test ref. number	*A unique test ref. number must be provided here.*
Customer test ref. number	*A unique test ref. number must be provided here (must comply to the test name).*
Date of the test	*The date of the test must be provided here in the format YYYY-MM-DD.* *Time information is not necessary.*
Data format edition number	1.6
Reference temperature	*The reference temperature in Kelvin must be provided here.*
Relative air humidity	*The relative air humidity must be provided here.*

3.2 Test Objects

- The test objects must have the following order: Dummy, Pendulum/Test Rig
- For the dummy, the following information must be included:

Name of test object 1	Dummy
Driver position object 1	0
Impact side test object 1	FR
Type of test object 1	D
Ref. number of test object 1	*The pure dummy ID must be provided here or 'NOVALUE' for a component test without dummy reference.*
Code of test object 1	*The part number must be provided here or 'NOVALUE' if unknown.*

- For the pendulum/test rig, the following information must be included:

Name of test object 2	Pendulum/Test Rig
Velocity test object 2	*The pendulum/test rig velocity in m/s must be provided here.*
Mass test object 2	*The pendulum/test rig mass in kg must be provided here.*
Driver position object 2	0
Impact side test object 2	FR
Type of test object 2	T