

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 E

Calculated Values Codes and Channels

— Version 1.6 —

Revision 2

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RED E: Calculated Values

E.1 File Organization

Calculated Values, which are derived from the measured channels like the HIC or the delta-V, could be stored in separate channels files. These specific channel files contain additional descriptors to describe the calculation that has been used and the variant of the value that is stored in the file. For each *Calculated Value* a separate channel file is available.

Calculated Values Files (see E.2.2) are also stored in the CHANNEL subdirectory.

E.2 Terms

E.2.1 Calculated Value (CV) or Calculated Result (CR)

The *Calculated Value* is determined by one or several numerical values that have been calculated for a criterion. In the *Calculated Channel File* these values are stored as pure numerical value below the descriptors in the file.

E.2.2 Calculated Value File (CVF)

Channel containing all the descriptors and the value of a Calculated Value (like the HIC,...)

E.2.3 Calculated Value Code (CVC)

ISO code used to identify a Calculated Value; Code always ends with "X" for the filter class.

Example: 11HICR0036H300RX
(HIC_36 Value from resultant acceleration for HIII dummy at seating position 1 in test object 1)

E.2.4 Calculated Channel (CC)

Channel derived from the measured channels by mathematical operation. This kind of channel is similar to a measurement channel but may need additional descriptors in the *Calculated Channel File* to determine the calculation parameters used.

E.2.5 Calculated Channel File (CCF)

The CCF is the file containing all the descriptors and data of a *Calculated Channel*.

E.3 Descriptors for Calculated Values

Calculated Values need additional descriptors. There are two different types of descriptors: Time descriptors and special descriptors. Time descriptors define the analysis interval that has been used and the time or interval, which belongs to the *Calculated Value*. Special descriptors are specific to the *Calculated Value* and the calculation that has been carried out.

Descriptors for *Calculated Values* are handled like normal descriptors (See chapter 6.1 in the ISO/TS 13499 main document.). They start with a dot (".") and they are optional descriptors.

E.3.1 Descriptors/Attributes for Calculated Values

All numerical values for the Calculated Values or the parameters used to determine the Calculated Value (like ".Time", ".Absolute value", ".Dz", ...) must be given in SI units.

| Descriptor for CVC | Data Format | Remark |
|---|--------------|--|
| .Time | float | The appropriate time where the calculated value occurred |
| .Start time | float | Start time of the interval belonging to the calculated value (e.g. for the HIC). Only for criteria, that uses an interval and not a single point in time. |
| .End time | float | End time of the interval belonging to the calculated value (e.g. for the HIC). Only for criteria, that uses an interval and not a single point in time. |
| .Analysis start time | float | Start of the time interval that has been taken into account for the calculation of the value |
| .Analysis end time | float | End of the time interval that has been taken into account for the calculation of the value |
| .Channel 001Channel nnn | alphanumeric | ISO Code of the first channel used for the calculation. Order of the channels used is arbitrary. Channel codes for these channels should be given with their initial channel class as the filtering used for the calculation is specified with the ".Filter" descriptor. If the filter is not unique for all the channels use ".Filter 001", ".Filter 002", ... to specify the filtering. |
| .Filter or .Filter 001 .Filter 002Filter nnn | alphanumeric | Filter used: Only if all channels has been filtered with the same channel class! If individual filtering is needed for the channels used add the appropriate number behind the ".Filter" attribute. |
| .Threshold level | float | Specific for Head Contact Duration: Threshold level used for the calculation |
| .Search level | float | Specific for Head Contact Duration: Search Level used for the calculation |
| .Mass | float | Specific for Head Contact Duration: Mass value used for the calculation |
| .Duration time | float | For load-duration calculations: Duration for the value closest to the limit line |
| .Absolute value | float | For load-duration calculations: Absolute value for the value closest to the limit line |
| .Factor | float | Factor used in the calculation: Currently for NICR (rear impact) |
| .THRCStart -> or .Analysis start time | float | Start time for head contact to head rest used in the calculation: Currently for NICR (rear impact) |
| .THRCend .Analysis end time | float | End time for head contact to head rest used in the calculation: Currently for NICR (rear impact) |
| .Scaling factor | float | Scaling factor in the V*C formula (could alternatively also be described as "factor"; Scaling factor has been taken |

| | | |
|-----------------------|-------|---|
| | | from the paper describing crash criteria) |
| .Deformation constant | float | Devisor used in the V*C calculation |
| .Dz | float | lever used for correction with Fx (or Fy) force for total moment calculation |
| .Dx | float | lever used for correction with Fz force for total moment calculation (lower neck) |

| Descriptor for CVC | Data Format | Remark |
|--------------------|--------------|--|
| .Exceedance level | float | For Xg calculation: Exceedance level used in the calculation |
| .Ratio | float | Used for NIC (FMVSS) |
| .Aint | float | For CTI calculation: divisor for A3ms part in the formula |
| .Dint | float | For CTI calculation: Divisor for Deflection part in the formula |
| .Mrc | float | For Tibia Index calculation: Divisor for resultant bending moment |
| .Fzc | float | For Tibia Index calculation: Divisor for axial force |
| .Stars | float | For NCAP calculation: Star rating in numerical form 1..5 |
| .Method | alphanumeric | For Acomp calculation: Valid values are: "Variant 1" or "Variant 2" |
| .Time ribs | float | For TTI calculation: Time for maximum of rib acceleration |
| .Time spine | float | For TTI calculation: Time of maximum of spine acceleration |
| .Remark | alphanumeric | Here you can place additional information about the calculation |
| .Formula | alphanumeric | Formula description or link to external macro used for calculation |
| .ENCAP points | float | For EuroNCAP analysis. Specifies the point rating for this criterion. Should be given with two decimal places. |
| .ENCAP line | alphanumeric | For Duration of Loading (DoF) analysis related to EuroNCAP analysis. Specifies the relevant reference line used. ENCAP Line must be one out of: Green - Yellow Yellow - Orange Orange - Brown Brown - Red |

E.3.2 Descriptor subsets

Several *Calculated Values* require the specific subsets of descriptors. The following subsets have been defined for the table in E.2.2.

The channel descriptors should contain the channels used in calculation. If more than one channel is used they can occur in arbitrary order. Channel codes for these channels should be given with their initial channel class as the filtering used for the calculation is specified in with the ".Filter" descriptor. If filter is not unique for all the channels use ".Filter 001", ".Filter 002", ... to specify the filtering.

E.3.2.1 Subset T1

| Descriptor | Meaning |
|----------------------|--------------------------------------|
| .Analysis start time | Start time of analysis interval used |
| .Analysis end time | End time of analysis interval used |

E.3.2.2 Subset T2

| Descriptor | Meaning |
|----------------------|---|
| .Time | Time at which the Calculated Value occurred |
| .Analysis start time | Start time of analysis interval used |
| .Analysis end time | End time of analysis interval used |

E.3.2.3 Subset T3

| Descriptor | Meaning |
|----------------------|--|
| .Start time | Start of interval at which the CV occurred |
| .End time | End of interval at which the CV occurred |
| .Analysis start time | Start time of analysis interval used |
| .Analysis end time | End time of analysis interval used |

E.3.2.4 Subset S1

| Descriptor | Meaning |
|--------------|--------------------------------------|
| .Channel 001 | Channel 1 used in calculation for CV |
| .Filter | CFC used for the channel |

E.3.2.5 Subset S2

| Descriptor | Meaning |
|--------------|--------------------------------------|
| .Channel 001 | Channel 1 used in calculation for CV |
| .Channel 002 | Channel 2 used in calculation for CV |
| .Channel 003 | Channel 3 used in calculation for CV |

E.3.2.6 Subset S3

| Descriptor | Meaning |
|--------------|---|
| .Channel 001 | Channel 1 used in calculation for CV |
| .Channel 002 | Channel 2 used in calculation for CV |
| .Channel 003 | Channel 3 used in calculation for CV |
| .Filter | CFC for all the channels used for calculation |

E.3.2.7 Subset S4

| Descriptor | Meaning |
|--------------|---|
| .Channel 001 | Channel 1 used in calculation for CV |
| .Channel 002 | Channel 2 used in calculation for CV |
| .Channel 003 | Channel 3 used in calculation for CV |
| .Channel 004 | Channel 4 used in calculation for CV |
| .Channel 005 | Channel 5 used in calculation for CV |
| .Channel 006 | Channel 6 used in calculation for CV |
| .Filter | CFC for all the channels used for calculation |

E.4 Calculated Value Codes and Descriptors

Additional descriptors are needed to describe the calculation and the parameters used in the calculation. These additional descriptors are optional, but a specific subset is needed to have a valid description of a particular criterion. The following table gives the descriptors needed for each kind of criterion.

In the table the "?" is used in the ISO coding for an arbitrary valid character for this position in the code. The subsets that are used in the table are described in E.3.2. Additional information could be found in RED C.

E.4.1 Table description:

| Short name | Name of criterion | | |
|-------------------------------|--------------------------|-------------------------|---|
| ISO Main Location Code | Descriptors | Comments on descriptors | Example Calculated Channel Codes |
| | Notes | | |
| Coding notes | | | |

Rows for "Notes" and "Coding notes" is optional.

E.4.2 Tables of Calculated Value Codes and Descriptors

| HIC | Head Injury Criterion | | |
|--------------|--|---|---|
| HICR | Subset T3 Subset S3 | HIC Value (no window limit) HIC 15ms Value HIC 36ms Value HIC(d) FMH (FMVSS201) HIC 15 Adult Head Impactor HIC 15 ACEA Head Impactor HIC 15 Child Head Impactor HIC 15 JARI Adult Head HIC 15 JARI Small Head normally CFC1000 | ??HI CR0000??00RX ??HI CR0015??00RX ??HI CR0036??00RX D?HI CR00HDFH00RX D?HI CR0015PA00RX D?HI CR0015PB00RX D?HI CR0015PC00RX D?HI CR0015PJ00RX D?HI CR0015PS00RX |
| Coding Notes | TOB: New Coding for test objects since 1.4: "D" = "Dummy Impactor" FL2: "HD" for the free motion head form (FMVSS201) | | |

| HAC | Head Acceptability Criterion | | |
|-------------|---|-------------------------|------------------|
| HACR | Subset T3 Subset S3 | HAC Normally CFC600! | ??HACR0000??00RX |
| | Same criterion as HIC, but CFC600 used. Will be used with 36ms maximum window. Used in ECE R80. | | |

| HPC | Head Performance Criterion | | |
|-------------|--|---|------------------|
| HPCR | Subset T3 Subset S3 | HPC: like HIC 36ms/HIC 15ms but only if contact occurred | ??HPCR0036??00RX |
| | HPC used in ECE R94 and pedestrian head impactor regulations/regulation proposals. | | |

| BriC | Brain Injury Criterion (Rotational) | | |
|-------------|---|--|-------------------|
| BRIC | Subset T1 Subset S3 | BRIC: uses angular velocity channels with CFC60 | ??BRI C0000??000X |
| | BRIC is proposed/used for FMVSS or USNCAP regulation. This criterion will use the independent maximum values of AVX/Y/Z signals. Therefore, the direction is coded as "0" and not as "R". | | |

| | | | |
|---------------|--|---|--------------------------------------|
| SUFEHM | Strasbourg University Finite Element Head Model (Translation + Rotational) | | |
| HEAD | Subset T2 Subset S4 | uses linear acceleration and angular velocity channels with CFC1000 | ??HEADSM00??000X ??HEADVM00??SROX |
| | Criterion will deliver the max. von Mises Stress (VM) as well as the AIS 2+ Risk for DAI as so called SUFEHM value (SM). Unit for van Mises Stress kPa. Unit for Risk is % | | |

| | | | |
|-------------|---|------------------------------|------------------|
| HCD | Head Contact Duration | | |
| HECD | Subset T3 Subset S3 .Threshold level .Search level .Mass | HCD is contact duration time | ??HECD0000??00RX |
| | Note: Maximum of several HIC calculations for time intervals with head contact. Contact Intervals are identified by the ".Threshold level" and the ".Search level" | | |

| | | | |
|------------------|--|--|--|
| NIC (ECE) | Neck Injury Criterion, Frontal Impact ECE | | |
| NICF | Subset T1 .Duration time .Absolute value .Channel 001 .Filter | duration time at which the maximum ratio occurred absolute force value related to maximum ratio force channel used normally CFC1000 | ??NI CFSPDA??00XX ??NI CFSPDP??00ZX |
| | Note: Load Duration Analysis or "Time-Dependent Loading Criterion" (SAE J1727). Value is maximum ratio in the form: "0.2" (=20%) The absolute force value for this ratio is supplied in the attribute ".Absolute value". | | |
| Coding notes | FL1: SP = Single Peak CU = Cumulative FL2: DA = Duration of loading (Dol) using absolute channel DN = Dol for negative part of channel DP = Dol for positive part of channel ECE Regulation FL1 = CU or SP not exactly specified; SAE = SP assumed for ECE FL2 = for tensile Fz force (Fz+) use DP for absolute shear force (Fx+ and Fx-) use DA | | |

| NIC (Euro NCAP) | | Neck Injury Criterion, Frontal Impact Euro NCAP | |
|------------------------|--|--|-------------------|
| NIEF | Subset T1 | | ??NI EFCUDP??00XX |
| | .Duration time | duration time at which the maximum ratio occurred | ??NI EFCUDN??00XX |
| | .Absolute value | absolute force value related to maximum ratio | ??NI EFCUDP??00ZX |
| | .Channel 001 | force channel used | |
| | .Filter | normally CFC1000 | |
| | .ENCAP Points | for EuroNCAP testing with | |
| | .ENCAP Line | different reference lines | |
| | <p>Note: Load Duration Analysis or "Time-Dependent Loading Criterion" (SAE J1727).</p> <p>Value is maximum ratio in the form: "0.2" (=20%)</p> <p>The absolute force value for this ratio is supplied in the attribute ".Absolute value".</p> <p>".ENCAP Points" with two decimal places.</p> <p>".ENCAP Line" must be one of:</p> <p>Green - Yellow</p> <p>Yellow -Orange</p> <p>Orange - Brown</p> <p>Brown - Red</p> <p>This specifies to which reference line the maximum ratio belongs.</p> | | |
| Coding notes | <p>FL1: SP = Single Peak</p> <p>CU = Cumulative</p> <p>FL2: DN = Dol for negative part of channel</p> <p>DP = Dol for positive part of channel</p> <p>EuroNCAP uses just cumulative analysis</p> <p>FL1 = CU</p> <p>FL2 = for tensile Fz force (Fz+) use DP</p> <p>for the two shear force values (Fx+ and Fx-) use DP and DN</p> <p>Location is always Upper Neck!</p> | | |

| NIC (FMVSS) | | Neck Injury Criterion FMVSS Frontal Impact | |
|--------------------|--|---|------------------|
| NECK | Subset T2 | | ??NECKIPC0??FOZX |
| | Subset S1 | | ??NECKOPTN??FOZX |
| | .Ratio | F_max/F_(max,limit) | |
| | Note: Criterion for axial upper neck force used in FMVSS 208 | | |
| Coding notes | <p>FL1: IP = In-Position OP = Out of position</p> <p>is needed for ".Ratio" calculation using different limit values for HF dummy</p> <p>FL2: TN = Tension, CO = Compression</p> <p>Location is always Upper Neck!</p> | | |

| NIC (Rear) | | Neck Injury Criterion, Rear Impact | |
|-------------------|---|---|--------------------|
| NICR | Subset T2 | | ??NI CROOFI BR00XX |
| | .Factor | factor in NIC formula (0.2) | ??NI CROOSI BR00XX |
| | .THREnd | end of head contact time | ??NI CROOFI R200XX |
| | .Channel 001 | Head or T1 accel. In X | ??NI CROOSI R200XX |
| | .Channel 002 | T1 or head accel. In X | |
| | .Filter | normally CFC60 or CFC180 | |
| | <p>Note: Only used for BIORID, RID2 and TRID Neck</p> <p>FI = fixed interval (0..150ms)</p> <p>SI = selected interval according to video analysis (like EuroNCAP)</p> <p>Factor = 0.2 for BIORID and RID2</p> | | |

| NIJ | Normalized Neck Injury Criterion | | |
|-------------|---|--|---|
| NIJC | Subset T2 Subset S3 .Fzcc .Fzct .Mycf .Myce | Critical Intercept Values: Fz compression Fz tension My flexion My extension | ??NI JCI PCE??00YX ??NI JCI PCF??00YX ??NI JCI PTE??00YX ??NI JCI PTF??00YX ??NI JCI P00??00YX ??NI JCOPCE??00YX ??NI JCOPCF??00YX ??NI JCOPTE??00YX ??NI JCOPTF??00YX ??NI JCOP00??00YX |
| | <p>Note: Used in FMVSS 208</p> <p>IP = IN-position</p> <p>OP = Out-of-position</p> <p>Direction of normalized Force is "Z" and direction of normalized moment involved is "Y" -> "Y" is used to allow a future extension for NIJ criteria for side impact (FZ and MX! -> X)</p> <p>For each dummy there will be 4 CVF, each containing the Nij for one combination of CE, CF, TE, TF. The optional variant with "00" in fine location 2 is the absolute maximum of all these four values.</p> | | |

| NKM | Combined Neck Criterion (Rear Impact) | | |
|-------------|---|---|---|
| NKMC | Subset T2 Subset S3 .Fxca .Fxcp .Mycf .Myce | Critical Intercept Values: Fx anterior shear Fz posterior shear My flexion My extension | ??NKMCF A00??00YX ??NKMCF P00??00YX ??NKMCE A00??00YX ??NKMCE P00??00YX ??NKM C0000??00YX |
| | <p>Note: Used in FMVSS 208</p> <p>Direction of normalized Force is "X and direction of normalized moment involved is "Y" -> "Y" is used to allow a future extension for NKM criteria for lateral direction using MX! -> X)</p> <p>For each dummy there will be 4 CVF, each containing the NKM for one combination of AE, AF, PE, PF. This is referenced in the fine location 1. The optional variant with "00" in fine location 1 is the absolute maximum of all these four values.</p> | | |

| MOC / MTO | Total Moment Neck | | |
|------------------|---|---|--|
| TMON | Subset T2 | | ??TMONUPPO??MOYX ??TMONUPNE??MOYX ??TMONLOPO??MOYX ??TMONLONE??MOYX |
| | .Channel 001 | in arbitrary order if needed: | |
| | .Channel 002 | bending moment (My) | |
| | .Channel 003 | shear force (e.g. Fx) | |
| | | axial force (e.g. Fy) | |
| | | (just if needed for correction formula) | |
| | .Filter | should be CFC600 (used for force and moment channels) | |
| | .Dz | lever in Z-direction | |
| | .Dx | lever in X-direction used for calculation (just if needed for correction formula) | |
| | <p>Note: for some load cells the Dx and for some also the Dz is needed in the calculation of total moment.</p> <p>UP = at Occipital Condyle</p> <p>LO = at lower neck</p> <p>PO = Positive (Flexion)</p> <p>NE = Negative (Extension)</p> <p>Result value always given as absolute value.</p> | | |

| VC / V*C | Viscous Criterion Chest (Rib) | | |
|-----------------|---|---|---|
| VCCR | Subset T2 | | ??VCCR0000H3VEXX ??VCCR0003H3VEXX ?1VCCRLEUP??VEYX ?1VCCRLEMI ??VEYX ?1VCCRLELO??VEYX ?1VCCRLE01??VEYX ?1VCCRLE02??VEYX ?1VCCRLE03??VEYX ?3VCCRRI UP??VEYX ... ?4VCCRLEUP??VEYX ... ?6VCCRRI UP??VEYX ?1VCCR0003??VEXX |
| | .Channel 001 | chest rib deflection or thoracic spine/sternum acceleration | |
| | (.Channel 002) | (sternum/thoracic spine acceleration) | |
| | .Filter | normally CFC180 for deflection measurement | |
| | .Scaling factor | dummy specific scaling factor | |
| | .Deformation constant | dummy specific constant used | |
| Coding notes | <p>FL1:</p> <p>1. Use 00 for V*C calculation of frontal impact dummy like H3 based on rotational potentiometer</p> <p>2. Use UP and LO when determine V*C from acceleration measurement on the sternum and spine</p> <p>FL2:</p> <p>1. Use 01, 02, 03 or UP, MI, LO according to the coding for the related channel of a side impact dummy (dummy specific).</p> <p>Regardless of the coding for the dummy in FL1 and FL2 here is a strict rule to have LE and RI in FL1 and then UP, MI, LO or 01, 02, 03 in FL2!</p> <p>For example S2 dummy:</p> <p>11VCCRLE01S2VEYX (correct!)</p> <p>11VCCR01LES2VEYX (incorrect!)</p> <p><i>For V*C values based on Polynomial 3rd order calculated Chest Deflection (**CHST0003H*DSX*) then corresponding CVC is:</i></p> <p>**VCCR0003H*VEXX</p> | | |

| | |
|--|---|
| | FL3: Used for side impact dummies like E1, E2, S2, BS, WS and for frontal impact dummies like H3, HF, HM, TH, Y3, Y6. |
|--|---|

| VC | Viscous Criterion Abdominal Rib | | |
|------|---|---|---|
| VCAR | Subset T2 .Channel 001 .Filter .Scaling factor .Deformation constant | Abdominal rib deflection normally CFC180 for deflection measurement dummy specific scaling factor dummy specific constant used | ?1VCARLEUP??VEYX ?1VCARLELO??VEYX ?1VCARLE01??VEYX ?1VCARLE02??VEYX ?3VCARRI UP??VEYX ?3VCARRI LO??VEYX ?3VCARRI 01??VEYX ?3VCARRI 02??VEYX ?4VCARLEUP??VEYX ... ?6VCARRI UP??VEYX ... |
| | <p>Note: Used for side impact dummies with abdominal ribs like S2, BS, WS. Middle rib is not available in current dummy designs. <i>Fine Location2:</i> 1. Use 01, 02, 03 or UP, MI, LO according to the coding for the related channel of a side impact dummy (dummy specific) Regardless of the coding for the dummy in FL1 and FL2 here is a strict rule to have LE and RI in FL1 and then UP, MI, LO or 01, 02, 03 in FL2! For example S2 dummy: 11VCARLE01S2VEYX (correct!) 11VCAR01LES2VEYX (incorrect!)</p> | | |

| THPC | Thoracic Performance Criterion | | |
|------|--|--|------------------|
| THPC | | | ??THPC0000E1EVOX |
| | <p>Note: just pass/fail information based on other criteria (VC and RDC). Typically used for side impact dummy E1 in ECE-R 95.</p> | | |

| TTI | Thoracic Trauma Index | | |
|------|---|---|--------------------|
| TTIN | Subset T1 .Channel 001 .Channel 002 .Filter .Time ribs .Time spine | rib acceleration used spine acceleration (T12) must be FIR100 times for individual maximum values used to derive TTI | ??TTI N0000SI ACYX |
| | Note: Should be used for SI (SH) dummy only | | |

| Xg | Xg Value | | |
|--------------|--|--|--|
| ???? | Subset T3 Subset S3 .Exceedance level | | ??HEAD01XC??TIOX ??HEAD05XS??TIOX ??PELV05XS??TIOX |
| Coding notes | <p>FL1: 00..99 should be used to distinguish between different exceedance levels</p> <p>FL2: XC = Xg value for Cumulative calculation XS = Xg value for Single peak analysis</p> <p>Made from vector resultant of linear acceleration at referenced measurement location!</p> <p>Could be applied to different body regions.</p> | | |

| 3ms / Xms | 3ms / Xms Value | | |
|------------------|--|------------------------------|--|
| ???? | Subset T1 just for 3S: Subset T3 | | ??HEAD003CH3ACRX ??HEAD003SH3ACRX ??CHST003CH3ACRX ??CHST003SH3ACRX ??PELV003CH3ACRX ??PELV003SH3ACRX |
| | | 7ms value for head (fiction) | ??HEAD007SH3ACRX |
| | <p>Note:</p> <p>Known as "3ms Value" or "3ms Clip Value"</p> <p>Typically used with main locations HEAD, CHST, PELV, SPIN</p> <p>In regulations the 3ms Value is often calculated for resultant channels only. But also used for single direction channel of force and moment measurements (IIHS side impact).</p> <p>For an Xms the appropriate interval is given in FL2. So the interval is limited to a maximum of 9ms.</p> | | |
| Coding notes | <p>FL2: 3C= 3ms Cumulative calculation 3S= 3ms Single Peak</p> <p>FL2: 5C= 5ms Cumulative calculation (Xms with 5ms) 5S= 5ms Single Peak (Xms with 5ms)</p> | | |

| THAC | Thoracic Acceptability criterion | | |
|-------------|---|--|--|
| THAC | Subset T3 Subset S3 | | ??THAC003C??ACRX ??THAC003S??ACRX ??THAC005C??ACRX ??THAC005S??ACRX |
| | Note: Used in ECE-R 80 for H2 (or H3) dummies | | |

| CTI | Combined Thoracic Index | | |
|-------------|--|---|--------------------------------------|
| CTIN | .Channel 001 .Channel 002 .Channel 003 .Channel 004 .Filter 001 .Filter 002 .Filter 003 .Filter 004 .Aint .Dint | chest compression channel spine acceleration X spine acceleration Y spine acceleration Z in arbitrary order use CFC180 for acceleration use CFC600 for deflection intercept value for acceleration intercept value for chest deflection | ??CTIN0000??000X ??CTIN0000??000X |
| | Note: NHTSA research for TH dummy. In principle applicable for frontal dummies. | | |

| THCC / TCC | Thoracic Compression Criterion | | |
|-------------------|---|--|------------------|
| THCC | Subset T2 Subset S1 | | ??THCC0000??DSXX |
| | Note: Used for frontal impact dummies like H3, HF, HM, TH. Absolute value of compression. Used in ECE-R 94. | | |

| SI Chest | Severity Index Chest | | |
|-----------------|--|--|-------------------|
| CHSI | Subset T3 Subset S3 | | ??CHSI 0000??00RX |
| | Note: Used for frontal impact dummies like H2, H3. Historical criterion. | | |

| RDC (Chest) | Rib Deflection Criterion Chest Rib | | |
|--------------------|--|--|--|
| RDCR | Subset T2 Subset S1 | | ?1RDCRLEUP??DSYX ?1RDCRLEMI ??DSYX ?1RDCRLELO??DSYX ?1RDCRLE01??DSYX ?1RDCRLE02??DSYX ?1RDCRLE03??DSYX ?3RDCRRI UP??DSYX ... ?3RDCRRI 01??DSYX ... ?4RDCRLEUP??DSYX ... ?6RDCRRI UP??DSYX ... |
| | Note: Used for side impact dummies like E1, E2, S2, BS, WS. Absolute value of compression! | | |

| RDC (Abdomen) | Rib Deflection Criterion Abdominal Rib | | |
|----------------------|--|--|---|
| RDAR | Subset T2 Subset S1 | | ?1RDARLEUP??DSYX ?1RDARLELO??DSYX ?1RDARLE01??DSYX ?1RDARLE02??DSYX ?3RDARRI UP??DSYX ?3RDARRI LO??DSYX ?3RDARRI 01??DSYX ?3RDARRI 02??DSYX ?4RDARLEUP??DSYX ... ?6RDARRI UP??DSYX ... |
| | Note: Used for side impact dummies with abdominal ribs like BS, S2, WS. Absolute value of compression! | | |

| CDRA | Chest Deflection Rate from Acceleration/Deflection Measurement | | |
|-------------|--|--|---|
| CDRA | Subset T2 for deflection Measurement: .Channel 001 .Filter 001 for acceleration Measurement: Subset S2 .Filter 001 .Filter 002 .Filter 003 | Physical dimension indicates if calculation is based on deflection channel (VD) or based an acceleration channels (VA) Acceleration channel on rib (or sternum) and corresponding spine acceleration Deflection channel used in calculation | ??CDRALE01??VDYX ??CDRALE02??VDYX ??CDRALE03??VDYX ??CDRARI 01??VDYX ... ??CDRALEUP??VDYX ??CDRALEMI ??VDYX ??CDRALELO??VDYX ??CDRARI UP??VDYX ... ??CDRALE01??VAYX ... ??CDRALEUP??VAYX ... |
| | Note: Calculation based on acceleration uses relative acceleration measurement and additional deflection channel (according to TWG side airbag OoP). | | |

| ADRA | Abdominal Deflection Rate from Acceleration/Deflection Measurement | | |
|-------------|---|--|--|
| ADRA | Subset T2 for deflection Measurement: Subset S1 for acceleration Measurement: Subset S2 .Filter001 .Filter002 .Filter003 | Physical dimension indicates if calculation is based on deflection channel (VD) or based an acceleration channels (VA) Acceleration channel on rib (or sternum) and corresponding spine acceleration Deflection channel used in calculation | ??ADRALE01??VAYX ??ADRALE02??VAYX ??ADRARI 01??VAYX ??ADRARI 02??VAYX ??ADRALE01??VDYX ??ADRALE02??VDYX ??ADRARI 01??VDYX ??ADRARI 02??VDYX |
| | Note: Calculation based on acceleration uses relative acceleration measurement and additional deflection channel (according to TWG side airbag OoP). | | |

| | | | |
|-------------|---|--|---------------------------------------|
| APF | Abdominal Peak Force | | |
| APFC | Subset T2 Subset S3 | The three channels are the frontal, middle and rear forces measured at the abdomen. Use CFC600 (ECE-R 95) | ??APFCLESU??FOOX ??APFCRI SU??FOOX |
| | Note: Used for E1 and E2 side impact dummies. | | |

| | | | |
|--------------|--|-----------------------|---------------------------------------|
| PSPF | Pubic Symphysis Peak Force | | |
| PSPF | Subset T2 Subset S1 | use CFC600 (ECE-R 95) | ??PSPFLE00??FOYX ??PSPFRI 00??FOYX |
| | Note: Typically used for E1 and E2 side impact dummies. Maximum compression force. | | |
| Coding notes | "LE" and "RI" in FL1 only needed to identify impact side. Measurement location on the dummy is the same. | | |

| | | | |
|----------------------|--|--|---------------------------------------|
| CAIF (or PPF) | Combined Acetabulum and Iliac Peak Force (Pelvic Peak Force) | | |
| PELV | Subset T2 .Channel 001 .Channel 002 .Filter | use CFC600/CFC1000 (depending on regulation FMVSS 214 or IIHS) | ??PELVLESU??FOYX ??PELVRI SU??FOYX |
| | Note: Typically used for S2 side impact dummies. Maximum for sum of the iliac and acetabulum force channels. | | |
| Coding notes | "LE" and "RI" in FL1 only needed to identify impact side. Measurement location on the dummy is the same. | | |

| | | | |
|--------------|--|--------------------------------------|---------------------------------------|
| ACTB | Resultant Acetabulum Force (ENCAP) | | |
| ACTB | Subset T2 SubSet S3 | use CFC600 (ENCAP 9.x, TB026) | ??ACTBLECOT3FORX ??ACTBRI COT3FORX |
| | This is a special variant of the vector resultant generated from the FOX/Y/Z forces on each leg of the T3-Dummy. Based on the FX channel the compression phase will be determined and only in this phase the resultant will be calculated. Otherwise the result channel is set to zero. This processing reflects the biomechanical injury mechanism addressed with this criterion. | | |
| Coding notes | | | |

| | | | |
|-------------|--|------------|-----------------|
| PSFF | Pedestrian Sum of Femur Force (Upper Leg) | | |
| FEMR | Subset T2 | use CFC180 | D?FEMRSU??PUFOX |
| | Note: Criterion for Pedestrian Impactor Testing with Upper Leg (PU). Based on the sum channel (D?FEMRSU??PUFOX) of the two measurements at the impactor (D?FEMRUP??PUFOX, D?FEMRLO??PUFOX) | | |

| | | | |
|-------------|---|------------|---|
| BMUL | Bending Moment (Upper Leg) | | |
| FEMR | Subset T2 | Use CFC180 | D?FEMRUP??PUMOYX D?FEMRMI ??PUMOYX D?FEMRLO??PUMOYX |
| | Note: Criterion for Pedestrian Impactor Testing with Upper Leg (PU). Can be calculated for each of the three strain gauges (D?FEMRUP??PUMOYC, D?FEMRMI ??PUMOYC, D?FEMRLO??PUMOYC) at the impactor. | | |

| FFC | Femur Force Criterion | | |
|-------------|---|--|--------------------------------------|
| FFCR | Subset T1 Subset S1 .Duration time .Absolute value | use CFC600 duration time at which the maximum ratio occurred absolute value related to maximum ratio | ??FFCRLEDN??00ZX ??FFCRRIDN??00ZX |
| | <p>Note: Load Duration Analysis or "Time-Dependent Loading Criterion" (SAE J1727).</p> <p>LE = Left (Lower) LU = Left Upper RI = Right (Lower) RU = Right Upper DN = Load Duration Analysis for Negative part of signal! Value is maximum ratio in the Form: "0.2" (=20%) Used for frontal impact dummies like H3, HF, HM TH.</p> | | |

| FFC Euro NCAP | Femur Force Criterion, Frontal Impact EuroNCAP | | |
|----------------------|---|---|--------------------------------------|
| FFCE | Subset T1 Subset S1 .Duration time .Absolute value .ENCAP Points .ENCAP Line | use CFC600 duration time at which the minimum points are achieved (not always the same as for maximum ratio!) related absolute force value related (minimum) point value relevant "color" line for rating (see below) | ??FFCELEDN??00ZX ??FFCERIDN??00ZX |
| | <p>Note: EuroNCAP analysis uses simple sort algorithm and is not compatible with SAE J1727 method.</p> <p>LE = Left (Lower) LU = Left Upper RI = Right (Lower) RU = Right Upper DN = Load Duration Analysis for Negative part of signal! For EuroNCAP the "Lower Femur" measurement should be used! Value is maximum ratio in the Form: "0.2" (=20%) Used in EuroNCAP for H3 dummy.</p> <p>".ENCAP Points" with two decimal places.</p> <p>".ENCAP Line" must be one of: Green - Yellow Yellow -Orange Orange - Brown Brown - Red This specifies to which reference line the maximum ratio belongs.</p> | | |

| FAC | Femur Acceptability Criterion | | |
|-------------|--|------------|-------------------------------------|
| FACR | Subset T2 Subset S1 | use CFC600 | ??FACRLELO??F0ZX ??FACRRIP??F0ZX |
| | <p>Note: Maximum value of negative part of the signal (axial compression force) given as absolute value. Used in the FMVSS 208 (Fine Location 2 = LO). Used for frontal impact dummies like H3, HF, HM TH.</p> | | |

| | | | |
|-------------|---|------------|---------------------------------------|
| KTH | Knee Tight Hip Criterion | | |
| KTHC | Subset T1 Subset S1 | use CFC600 | ??KTHCLE00??IMZX ??KTHCRI 00??IMZX |
| | Note: Maximum value of negative part of the signal (axial compression force) is used and maximum impulse from the same channel. Used in the IIHS Small Overlap testing. Used for frontal impact dummy H3. | | |

| | | | |
|-------------|---|------------|---------------------------------------|
| ACTB | Resultant Compressive Acetabulum Force Criterion | | |
| ACTB | Subset T2 Subset S1 | use CFC600 | ??ACTBLEC0??FORX ??ACTBRI C0??FORX |
| | Note: Maximum value of negative part of the signal (axial compression force) given as absolute value. Used in the FMVSS 208 (Fine Location 2 = LO). Used for frontal impact dummies like H3, HF, HM TH. | | |

| | | | |
|-------------|---|------------|---------------------------------------|
| KNDS | Knee Displacement | | |
| KNSL | Subset T2 Subset S1 | Use CFC180 | ??KNSLLE00??DSXX ??KNSLRI 00??DSXX |
| | Note: Used in ECE-R 94. Used for frontal impact dummies like H3, HF, HM TH. | | |

| | | | |
|--------------|--|------------|------------------|
| SD-LF | Shear Displacement (Legform) | | |
| KNEE | Subset T2 | Use CFC180 | D?KNEE00??PLDSXX |
| | Note: Criterion for Pedestrian Impactor Testing with Legform (PL). Displacement (D?KNEE00??PLDSXC) will be calculated from bending angle measured at the femur (D?FEMR00??PLANYC). | | |

| | | | |
|--------------|---|------------|------------------|
| BA-LF | Bending Angle (Legform) | | |
| KNEE | Subset T2 | Use CFC180 | D?KNEE????PLANXX |
| | Note: Criterion for Pedestrian Impactor Testing with Legform (PL). Bending Angle (D?KNEE????PLANXX) will be calculated from angle measured at Tibia of impactor (D?TIBI????PLANXX). | | |

| | | | |
|--------------|---|------------|------------------|
| TA-LF | Tibia Acceleration (Legform) | | |
| TIBI | Subset T2 | Use CFC180 | D?TIBI????PLACXX |
| | Note: Criterion for Pedestrian Impactor Testing with Legform (PL). Acceleration will be measured at upper Tibia (D?TIBI????PLACXX). | | |

| TI | Tibia Index | | |
|-------------|--|--|--|
| TIIN | Subset T2 Subset S3 .Mrc .Fzc | use CFC600 for force and moment critical intercept value for resultant bending moment critical intercept value for the axial tibia force | ??TIINLL00??000X ??TIINRU00??000X ??TIINLLT0??000X ??TIINRUT0??000X |
| | Note: Could be calculated on upper and lower tibia. Used for frontal impact dummies like H3, HF, HM TH. LL = Left Lower LU = Left Upper RL = Right Lower RU = Right Upper TO = IIHS calculation using total moment 00 = ECE calculation using measured moment | | |

| TCFC | Tibia Compression Force Criterion | | |
|-------------|--|--|--------------------------------------|
| TCFC | Subset T2 Subset S1 | | ??TCFCLEUP??FOZX ??TCFCRILO??FOZX |
| | Note: Used for frontal impact dummies like H3, HF, HM TH. Maximum value of negative part of the signal (axial compression force) given as absolute value. | | |

| NCAP | New Car Assessment Program | | |
|-------------|---|--|--|
| NCAP | Subset T1 .Channel 001 .Channel 002 .Channel 003 .Channel 004 .Channel 005 .Channel 006 .Filter 001 .Filter 002 .Filter 003 .Filter 004 .Filter 005 .Filter 006 .Stars | Three channels for head acceleration (HIC) and three channels for resultant chest acceleration CFC1000 for head and CFC180 for chest (spine) acceleration | ?0NCAP000000000X ?1NCAP000000000X ?3NCAP000000000X |
| | Note: Value is the probability (P_combined) in the Form: "0.2" .Stars should be 1...5 Related to the star rating of US-NCAP, but here dummy specific stars (TOB = 1..3) or vehicle specific rating as published by NHTSA (TOB = 0). | | |

| ACOMP | <i>Average Acceleration during Compression Phase</i> | | |
|--------------|---|--|--------------------------------------|
| AACP | Subset T3 .Channel 001 .Channel 002Channel nnn .Method | could be "Variant 1" or "Variant 2" | ??AACP??????ACXX ??AACP??????ACXX |
| | Note: Numbered because of different possible locations. If more than one channel is used (determined by the attributes ".Channel 002", ...) the acceleration channel used for the calculation contains the mean value of the all channels for each timestep. | | |

E.4.3 Example of Calculated Value Channels

The Calculated Value File the descriptors and also the suitable descriptors from measured channels are given. Below these descriptors there is only one value given. This value is the Calculated Value.

File name: ISO_CV_04.001

```

Test object number      : 1
Name of the channel     : HIC VALUE 36
Laboratory channel code : HIC value driver
Customer channel code   : HIC_36 value front left side
Channel code            : 11HI CR0036H300RX
Unit                    : 1
Reference system        : NOVALUE
Transducer type         : NOVALUE
Pre-filter type         : NOVALUE
Cut off frequency       : NOVALUE
Channel amplitude class : NOVALUE
Sampling Interval       : NOVALUE
Bit Resolution          : NOVALUE
Time of first sample    : NOVALUE
Start offset interval   : NOVALUE
End offset interval     : NOVALUE
Reference channel       : NOVALUE
Reference channel name  : NOVALUE
Data status             : ok
Data source             : Calculation
Number of samples       : 1
. Start time            : 0.0779
. End time              : 0.1139
. Analysis start time   : 0.0
. Analysis end time     : 0.3
. Filter                : CFC1000
. Channel 001           : 11HEAD0000H3ACXP
. Channel 002           : 11HEAD0000H3ACYP
. Channel 003           : 11HEAD0000H3ACZP
732
    
```

In this example the Calculated Value is "732". For HIC value there is no physical unit ($[s \cdot g^{**2.5}]$ according to formula).

History

1.6.2

- added SUFEHM
- added ACTB CO
- changed to Consolas Font to improve readability of ISO codes