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 001 … .Channel 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 filter-ing.
.Filter or .Filter 001 .Filter 002 … .Filter 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	??HICR0000??00RX ??HICR0015??00RX ??HICR0036??00RX D?HICR00HDFH00RX D?HICR0015PA00RX D?HICR0015PB00RX D?HICR0015PC00RX D?HICR0015PJ00RX D?HICR0015PS00RX
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	??BRIC0000??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??SR0X
	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	??NICFSPDA??00XX ??NICFSPDP??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		??NIEFCUDP??00XX
	.Duration time	duration time at which the maximum ratio occurred	??NIEFCUDN??00XX
	.Absolute value	absolute force value related to maximum ratio	??NIEFCUDP??00ZX
	.Channel 001	force channel used	
	.Filter	normally CFC1000	
	.ENCAP Points	for EuroNCAP testing with	
	.ENCAP Line	different reference lines	

	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".
	 ".ENCAP Points" with two decimal places.
	 ".ENCAP Line" must be one of:
	  Green - Yellow
	  Yellow -Orange
	  Orange - Brown
	  Brown - Red
	 This specifies to which reference line the maximum ratio belongs.		

Coding notes	*FL1*: SP = Single Peak
	      CU = Cumulative
	 FL2: DN = Duration of loading (Dol) for negative part of channel
	      DP = Dol for positive part of channel
	
	 EuroNCAP uses just cumulative analysis
	 FL1 = CU
	 FL2 = for tensile Fz force (Fz+) use DP
	      for the two shear force values (Fx+ and Fx-) use DP and DN
	 Location is always Upper Neck!		

NIC (FMVSS)	Neck Injury Criterion FMVSS Frontal Impact		
NECK	Subset T2		??NECKIPCO??F0ZX
	Subset S1		??NECKOPTN??F0ZX
	.Ratio	F_max/F_(max,limit)	
	Note: Criterion for axial upper neck force used in FMVSS 208		

Coding notes	*FL1*: IP = In-Position OP = Out of position
	      is needed for ".Ratio" calculation using different
	      limit values for HF dummy
	 FL2: TN = Tension, CO = Compression
	 Location is always Upper Neck!		

NIC (Rear)	Neck Injury Criterion, Rear Impact		
NICR	Subset T2		??NICR00FIBR00XX
	.Factor	factor in NIC formula (0.2)	??NICR00SIBR00XX
	~~.THRCEnd~~	end of head contact time	??NICR00FIR200XX
	.Channel 001	Head or T1 accel. In X	??NICR00SIR200XX
	.Channel 002	T1 or head accel. In X	
	.Filter	normally CFC60 or CFC180	
	Note: Only used for BIORID, RID2 and TRID Neck FI = fixed interval (0..150ms) SI = selected interval according to video analysis (like EuroNCAP) Factor = 0.2 for BIORID and RID2		

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	??NIJCIPCE??00YX ??NIJCIPCF??00YX ??NIJCIPTE??00YX ??NIJCIPTF??00YX ??NIJCIP00??00YX ??NIJCOPCE??00YX ??NIJCOPCF??00YX ??NIJCOPTE??00YX ??NIJCOPTF??00YX ??NIJCOP00??00YX
	Note: Used in FMVSS 208 IP = IN-position OP = Out-of-position 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) 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.		

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	??NKMCFA00??00YX ??NKMCFP00??00YX ??NKMCEA00??00YX ??NKMCEP00??00YX ??NKMC0000??00YX
	Note: Used in FMVSS 208 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) 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.		

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

VC / V*C	Viscous Criterion Chest (Rib)		
VCCR	Subset T2 .Channel 001 (.Channel 002) .Filter .Scaling factor .Deformation constant	chest rib deflection or thoracic spine/sternum acceleration (sternum/thoracic spine acceleration) normally CFC180 for deflection measurement dummy specific scaling factor dummy specific constant used	??VCCR0000H3VEXX ??VCCR0003H3VEXX ?1VCCRLEUP??VEYX ?1VCCRLEMI??VEYX ?1VCCRLELO??VEYX ?1VCCRLE01??VEYX ?1VCCRLE02??VEYX ?1VCCRLE03??VEYX ?3VCCRRIUP??VEYX … ?4VCCRLEUP??VEYX … ?6VCCRRIUP??VEYX ?1VCCR0003??VEXX

Coding notes	*FL1:*
	1. Use 00 for V*C calculation of frontal impact dummy like H3 based on rotational potentiometer
	2. Use UP and LO when determine V*C from acceleration measurement on the sternum and spine
	FL2:
	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:
	    11VCCRLE01S2VEYX (correct!)
	    11VCCR01LES2VEYX (incorrect!)
	
	*For V*C values based on Polynomial 3rd order calculated Chest Deflection (**CHST0003H*DSX*) then corresponding CVC is:*
	**VCCR0003H*VEXX		

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 ?3VCARRIUP??VEYX ?3VCARRILO??VEYX ?3VCARRI01??VEYX ?3VCARRI02??VEYX ?4VCARLEUP??VEYX … ?6VCARRIUP??VEYX …
	Note: Used for side impact dummies with abdominal ribs like S2, BS, WS. Middle rib is not available in current dummy designs. *Fine Location2*: 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!)		

THPC	*Thoracic Performance Criterion*	
THPC		??THPC0000E1EV0X
	Note: just pass/fail information based on other criteria (VC and RDC). Typically used for side impact dummy E1 in ECE-R 95.	

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	??TTIN0000SIACYX
	Note: Should be used for SI (SH) dummy only		

Xg	*Xg Value*		
????	Subset T3 Subset S3 .Exceedance level		??HEAD01XC??TI0X ??HEAD05XS??TI0X ??PELV05XS??TI0X
Coding notes	*FL1:* 00..99 should be used to distinguish between different exceedance levels FL2: XC = Xg value for Cumulative calculation XS = Xg value for Single peak analysis Made from vector resultant of linear acceleration at referenced measurement location!		
Coding notes	Could be applied to different body regions (HEAD, CHST,PELV,…).		

3ms / Xms	*3ms / Xms Value*		
????	Subset T1 just for 3S: Subset T3		??HEAD003CH3ACRX ??HEAD003SH3ACRX ??CHST003CH3ACRX ??CHST003SH3ACRX ??PELV003CH3ACRX ??PELV003SH3ACRX
		7ms value for head (fiction)	??HEAD007SH3ACRX
	Note: Known as "*3ms Value*" or "*3ms Clip Value*" Typically used with main locations HEAD, CHST, PELV, SPIN 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). For an Xms the appropriate interval is given in FL2. So the interval is limited to a maximum of 9ms.		
Coding notes	FL2: 3C= 3ms Cumulative calculation 3S= 3ms Single Peak FL2: 5C= 5ms Cumulative calculation (Xms with 5ms) 5S= 5ms Single Peak (Xms with 5ms)		

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		??CHSI0000??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 ?3RDCRRIUP??DSYX … ?3RDCRRI01??DSYX … ?4RDCRLEUP??DSYX … ?6RDCRRIUP??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 ?1RDARLEL0??DSYX ?1RDARLE01??DSYX ?1RDARLE02??DSYX ?3RDARRIUP??DSYX ?3RDARRIL0??DSYX ?3RDARRI01??DSYX ?3RDARRI02??DSYX ?4RDARLEUP??DSYX … ?6RDARRIUP??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 ??CDRARI01??VDYX … ??CDRALEUP??VDYX ??CDRALEMI??VDYX ??CDRALEL0??VDYX ??CDRARIUP??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 ??ADRARI01??VAYX ??ADRARI02??VAYX ??ADRALE01??VDYX ??ADRALE02??VDYX ??ADRARI01??VDYX ??ADRARI02??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??F00X ??APFCRISU??F00X
	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??F0YX ??PSPFRI00??F0YX
	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??F0YX ??PELVRISU??F0YX
	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)	??ACTBLECOT3F0RX ??ACTBRICOT3F0RX
	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??PUF0XX
	Note: Criterion for Pedestrian Impactor Testing with Upper Leg (PU). Based on the sum channel (D?FEMRSU??PUF0XC) of the two measurements at the impactor (D?FEMRUP??PUF0XC, D?FEMRLO??PUF0XC)		

BMUL	Bending Moment (Upper Leg)		
FEMR	Subset T2	Use CFC180	D?FEMRUP??PUM0YX D?FEMRMI??PUM0YX D?FEMRLO??PUM0YX
	Note: Criterion for Pedestrian Impactor Testing with Upper Leg (PU). Can be calculated for each of the three strain gauges (D?FEMRUP??PUM0YC, D?FEMRMI??PUM0YC, D?FEMRLO??PUM0YC) 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
	Note: Load Duration Analysis or "Time-Dependent Loading Criterion" (SAE J1727). 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.		

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
	Note: EuroNCAP analysis uses simple sort algorithm and is not compatible with SAE J1727 method. 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. ".ENCAP Points" with two decimal places. ".ENCAP Line" must be one of: Green - Yellow Yellow -Orange Orange - Brown Brown - Red This specifies to which reference line the maximum ratio belongs.		

FAC	*Femur Acceptability Criterion*		
FACR	Subset T2 Subset S1	use CFC600	??FACRLELO??FOZX ??FACRRIUP??FOZX
	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.		

KTH	Knee Tight Hip Criterion		
KTHC	Subset T1 Subset S1	use CFC600	??KTHCLE00??IMZX ??KTHCRI00??IMZX
	Note: Maximum value of negative part of the signal (axial compression femur force) is used and maximum impulse from the same channel. Used in the IIHS Small Overlap testing.		
Coding notes	Used for frontal impact dummy H3 and based on lower femur force, that is coded as ??FEMRLE00H3F0ZP/??FEMRRI00H3F0ZP.		

ACTB	Resultant Compressive Acetabulum Force Criterion		
ACTB	Subset T2 Subset S1	use CFC600	??ACTBLEC0??FORX ??ACTBRIC0??FORX
	Note: Maximum value of negative part of the signal (axial compression force) given as absolute value.		
Coding notes	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 ??KNSLRI00??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????PLANYX
	Note: Criterion for Pedestrian Impactor Testing with Legform (PL). Bending Angle (D?KNEE????PLANYC) will be calculated from angle measured at Tibia of impactor (D?TIBI????PLANYC).		

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????PLACXC).		

TI	Tibia Index		
TIIN	Subset T2 Subset S3	use CFC600 for force and moment	??TIINLL00??000X ??TIINRU00??000X ??TIINLLT0??000X ??TIINRUT0??000X
	.Mrc	critical intercept value for resultant bending moment	
	.Fzc	critical intercept value for the axial tibia force	
	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??F0ZX ??TCFCRILO??F0ZX
	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	*Average Acceleration during Compression Phase*		
AACP	Subset T3 .Channel 001 .Channel 002 … .Channel 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                :11HICR0036H300RX
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*g**2.5] according to formula).

History

1.6.2

- added Subset S4

- added BRIC

- added SUFEHM

- added KTH

- added ACTB CO

- changed to Consolas Font to improve readability of ISO codes