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UN Regulation No. 129 (Enhanced Child Restraint Systems)

Proposal for Supplement 5 to the 03 series of amendments to UN Regulation No. 129 (Enhanced Child Restraint Systems)

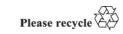
Submitted by the expert from the European Association of Automotive Suppliers*

The text reproduced below was prepared by the expert from the European Association of Automotive Suppliers (CLEPA) to clarify provisions of UN Regulation No. 129. It is based on GRSP-66-12 (Test Report Template) and GRSP-66-13 (Dimension Assessment Method) that were introduced during the sixty-sixth session of the Working Party on Passive Safety (GRSP) (see ECE/TRANS/WP.29/GRSP/66, para. 41). The modifications to the current text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

^{*} In accordance with the programme of work of the Inland Transport Committee for 2020 as outlined in proposed programme budget for 2020 (A/74/6 (part V sect. 20) para 20.37), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.









I. Proposal

Contents of the Regulation, amend to read:

"...

Annexes

...

27 List of Minimum Contents for The Test Reports included in the Type Approval Application"

Text of the Regulation, amend to read:

Paragraph 6.3.2.2.1., amend to read:

"6.3.2.2.1. Integral Class Enhanced Child Restraint Systems

The maximum external dimensions for the width, height and depth of the Enhanced Child Restraint System and if fitted, the locations of the ISOFIX anchorages system, with which its attachments shall engage, shall be defined by the ISOFIX Vehicle Seat Fixture as defined in paragraph 2.17.1. of this Regulation.

- (a) i-Size or Universal Belted Forward facing Enhanced Child Restraint Systems shall fit within the ISO/F2x size envelope for a reduced-height forward-facing toddler CRS;
- i-Size or Universal Belted Rearward facing Enhanced Child Restraint Systems shall fit within the ISO/R2 size envelope for a reduced-size rearward-facing toddler CRS;
- (c) Specific vehicle ISOFIX or Specific vehicle Belted Enhanced Child Restraint Systems shall fit:
 - (i) In vehicle(s) specified in a list or
 - (ii) At least in one of the ISO (R1, R2X, R2, R3, F2X, F2, F3, L1, L2) size envelopes as described in Annex 17 Appendix 2 of UN Regulation No. 16.

When conducting this assessment, the Integral Enhanced Child Restraint System shall be adjusted to the largest size of its declared stature range (height, depth and width dimensions as defined in Annex 18). When checking the width, the maximum loading allowed on the side of the ISOFIX Vehicle Seat Fixture shall be ≤ 135 N.

If the Enhanced Child Restraint System is capable of being adjusted to different positions of seat surface inclination, the fitting assessment shall be done in at least one position. If other positions of inclination are outside the limits of the applicable size envelope, the user manual shall indicate that the child restraint may not fit in all approved vehicles when used in one of these positions."

Paragraph 6.3.2.2.2., amend to read:

"6.3.2.2.2. Booster Seats

The maximum external dimensions for the width, height and depth of the Enhanced Child Restraint System and the locations of the ISOFIX anchorages system if any, with which its attachments shall engage, shall be defined by the i-Size booster fixture as defined in paragraph 2.17.2. of this Regulation.

- (a) i-Size booster seat Enhanced Child Restraint Systems shall fit within the ISO/B2 size envelope;
- (b) Specific vehicle booster seat Enhanced Child Restraint Systems shall fit:

- (i) In vehicle(s) specified in a list; or
- (ii) At least in one of ISO/B2 –ISO/B3 size envelope as described in Annex 17, Appendix 5 of UN Regulation No. 16.

When conducting this assessment, the booster seat shall be adjusted to accommodate children of 135 cm stature (height, depth and width dimensions as defined in Annex 18) or to the largest size of its declared stature range if the upper limit is below 135 cm. When checking the width, the maximum loading allowed on the side of the i-Size booster fixture shall be \leq 135 N.

The booster seat shall fit within the booster seat fixture in all angles of inclination of the fixture (90°-110°). The Enhanced Child Restraint System may be adjusted between inclination angles or positions to fit within the different booster seat fixture angles.

If other positions of inclination are outside the limits of the applicable size envelope, the user manual shall indicate that the child restraint may not fit in all approved vehicles when used in one of these positions. If the booster seat has a declared stature range above 135 cm, and if it is necessary to adjust the child restraint outside the limits of the applicable size envelope for such adjustments (height, depth and width dimensions), the user manual shall indicate that the child restraint may not fit in all approved vehicles when used in one of these positions.

In such cases, an Enhanced Child Restraint System shall still be categorised as an i-Size booster seat for the entire declared stature range, including statures above 135 cm, provided it fits within the applicable size envelope when adjusted for a child of 135 cm stature. If the maximum child stature that fits within the envelope is less than 135 cm, the booster seat shall be categorised as specific vehicle for statures included in the declared range that no longer fit within the envelope."

Paragraph 7.5., amend to read

"7.5. The measuring procedures shall correspond to those defined in the latest version of ISO 6487 with the SAE J211 sign convention. The channel frequency class shall be:

Table 10

Type of measurement	$CFC(F_H)$	Cut-off frequency (F_N)
Trolley acceleration	60	see ISO 6487Annex A
Belt loads	60	see ISO 6487Annex A
Chest acceleration	180	see ISO 6487Annex A
Head acceleration	1 000	1 650 Hz
Upper neck force	1 000	
Upper neck moment	600	
Chest deflection	600	
Abdominal pressure	180	

The sampling rate should be a minimum of 10 times the channel frequency class (i.e. in installations with channel frequency class of 1,000, this corresponds to a minimum sampling rate of 10,000 samples per second per channel)."

Insert a new paragraph 8.1., to read:

"8.1. The information defined in Annex 27 shall be provided in the test reports that are included in the Type Approval Application."

Paragraph 8.1., renumber as paragraph 8.2. and amend to read:

- "8.2. The conformity of production (CoP) and production qualification test report shall record the results of all tests and measurements including the following test data:
 - (a) The type of device used for the test (acceleration or deceleration device),
 - (b) The total velocity change,
 - (c) The trolley speed immediately before impact only for deceleration sleds,
 - (d) The acceleration or deceleration curve during all the velocity change of the trolley and at least 300 ms,
 - (e) The time (in ms) when the head of the manikin reaches its maximum displacement during the performance of the dynamic test,
 - (f) The place occupied by the buckle during the tests, if it can be varied, and
 - (g) The name and address of the laboratory where tests have been performed,
 - (h) And any failure or breakage,
 - (i) The following dummy criteria: HPC, Resultant head acceleration Cum 3ms, Upper neck tension force, Upper neck moment, Resultant chest acceleration Cum 3ms, Chest deflection; Abdominal Pressure (in frontal and rear impact); and
 - (j) Adult safety-belt bench installation forces.
 - (k) The minimum and maximum approved stature range for all categories of ECRS;
 - (1) The internal dimensions according to Annex 18, for all categories of ECRS;
 - (m) For booster cushions the minimum stature with corresponding sitting height according to paragraph 6.1.3.6."

Paragraphs 8.2. to 8.4.(former), renumber as 8.3. to 8.5.,

Insert a new Annex 27, to read:

"Annex 27

List of Minimum Contents for The Test Reports included in the Type Approval Application

This Annex contains a list of the minimum content and information that shall be provided in the test reports that are included in the Type Approval Application. How this information is presented in the Type Approval Application shall be the choice of the Technical Service, i.e. the layout, format, order of the information may be changed.

ECRS Des	cription			
	ECRS Status Category (3.2.2.)	re Range	Orientatio	n Attachment
Categor	y 1			
Categor	y 2			
Categor	y 3			
•••••	···			
6.	General Requirements			
6.1.2.5. 6.1.3.4.	Measurement from Cr to loa	d bearing	g point (Left	& Right) mm
0.1.3.4.				mm
6.1.2.6. 6.1.3.5.	Belt remaining on spool			mm
	If a gauge or fixture is used to instead of recording precise to of the physical check shall be	measuren	ients, verifi	
6.	General Requirements			
6.2.1.4.	Buckle position when smaller installed	st & large	est dummies	are
6.2.1.5.	Angle α and β measured with	smallest	& largest d	lummies α1
				β1
				α2
	If a gauge or fixture is used t dimensions, instead of record verification photos of the phy	ling preci	se measure	ments,
6.	General Requirements			
6.	Si	gned Dec	laration	Test Report Reference (If applicable)
6.3.1.1.	Si	_	laration	_

6.3.2.1. Internal measurement*

Configuration measured:

ISO volume used to confirm external dimensions:

Internal measurements:

Calculated Stature Range Minimum cm

Maximum cm

Sitting height measurement mm

Shoulder breadth measurement mm

Hip breadth measurement mm

E1) Min shoulder height measurement mm

E2) Max shoulder height measurement mm

F1) Min Abdomen depth measurement (If Applicable) mm

F2) Max Abdomen depth measurement (If Applicable) mm

G1) Min Upper leg thickness measurement (If Applicable) mm

G2) Max Upper leg thickness measurement (If Applicable) mm

6.3.2.2. External measurement*

Configuration measured:

e.g. Lateral Facing, Rearward Facing, Forward Facing Integral, Booster Seat, Booster Cushion

ISO volume used to confirm external dimensions:

ECRS Adjustments that fit within volume (if applicable):

Head rest position

Recline position

Side wing position

Verification photos of physical check

Or

Verification image if checked using CAD drawing

^{*}Complete for each different configuration

^{*}Complete for each different configuration

6.6.1.	Corrosion					
Test Re	ference numbe	r				
Descrip	tion of parts te	sted				
Descrip	tion of results:					
6.6.2.	Energy Absorp	tion				
Test Re	ference numbe	r				
	D	escriptio	n of impac	et site	Measur	ed Acceleration (g)
Site 1						
Site 2						
Site 3						
•••••						
All Resi	ults <60g				Pass/Fa	il
6.6.3.	Overturning*					
Test Re	ference numbe	r				
ECRS (Configuration	Integr	al / Non-ir	ntegral		
		RF/F	F			
		Booste	er Seat / Bo	ooster Cusl	hion	
ATD						
Mass A	pplied (kg)					
Rotatio	n	1	2	3	4	Pass/Fail
ATD Di (mm)	splacement					
*Donoo	t for each confi	auration	& ATDc			

Repeat for each configuration & ATDs

6.6.5.	Resistance to temperature	
	<u>-</u>	
	erence number	
Description	on of parts tested	
Dogarinti	on of regults	
_	on of results	
Dynamic	Test Reference using this ECRS	
6.7.1.	Buckle Requirements	
6.7.1.2.	Enclosed or non-enclosed buckle?	
	Surface area of button	
	If a gauge or fixture is used to verify instead of recording precise measure of the physical check shall be provide	ments, verification photos
6.7.1.4.	Shoulder strap positioner	Criteria Measure Pass/Fail
6.7.1.4.1.	Force required to close shoulder stra positioner	p <15 N N
6.7.1.4.2.	The force required to release the dev	ice <15 N N
6.7.1.4.3.	Height of shoulder strap positioner	<60 mm mm
	Buckle Tests Test N	lo. Criteria Measure Pass/Fai
6.7.1.7.1.	Buckle Test under load	<80 N N
6.7.1.7.2.	Buckle No-load test	40-80 N N
6.7.1.8.	Buckle Strength Test	>4000 N N
		>10000 N
Clause	Requirement	Measure-ment Value
6.7.4.	Straps	
	Test Reference	
6.7.4.1.	Width	
6.7.4.1.1.	The minimum width at the child-straps which make contact with the shall be 25 mm. These dimensions measured during the strap streng prescribed in paragraph 7.2.5.1. be without stopping the machine and	ne dummy under load shall be [mm] th test elow,

• under a load equal to 75 per cent of the

breaking load of the strap

Strength after room conditioning

6.7.4.2.

Clause	Requirement	Measure-ment Value
6.7.4.2.1.	On two sample straps conditioned as prescribed in paragraph 7.2.5.2.1., the breaking load of the strap shall be determined as prescribed in Paragraph 7.2.5.1.2. below.	Strap1 [kN] Strap2 [kN]
6.7.4.2.2.	The difference between the breaking loads of the two samples shall not exceed 10 per cent of the greater of the two breaking loads measured.	Difference [%]
6.7.4.3.	Strength after special conditioning:	
6.7.4.3.	Water	Water1 [kN]
6.7.4.3.		Water2 [kN]
6.7.4.3.		Differ. [%]
6.7.4.3.	Cold	Cold1 [kN]
6.7.4.3.		Cold2 [kN]
6.7.4.3.		Differ. [%]
6.7.4.3.	Hot	Hot1 [kN]
6.7.4.3.		Hot2 [kN]
6.7.4.3.		Differ. [%]
6.7.4.3.	Light	Light1 [kN]
6.7.4.3.		Light2 [kN]
6.7.4.3.		Differ. [%]
6.7.4.3.	Abrasion	Abrasion1
6.7.4.3.		Abrasion2
6.7.4.3.		Differ. [%]
6.7.4.3.1.	On two straps conditioned as prescribed in	Mean [kN]:
	one of the provisions of paragraph 7.2.5.2. below (except para. 7.2.5.2.1.), the breaking load of the strap shall be not less than 75 per cent of the average of the loads determined in the test referred to in paragraph 7.2.5.1.	>75%
6.7.4.3.2.	In addition, the breaking load shall be not less than 3.6 kN for the restraints of i-Size Enhanced Child Restraint Systems.	

6.7.5. ISOFIX attachment specifications

6.7.5.1. ISOFIX attachments and latching indicators shall be capable of withstanding repeated operations and shall, before the dynamic test prescribed in paragraph 7.1.3. of this Regulation, undergo a test comprising $2,000 \pm 5$ opening and closing cycles under normal conditions of use.

6.7.5.	ISOFIX attachment specifications		
6.7.5.2.	ISOFIX attachments shall have a locking mechanism which complies with the requirements specified in (a) or (b) as follows:		
6.7.5.2. (a)	Release of the locking mechanism of the complete seat, shall require two consecutive actions, the first of which should be maintained while the second is carried out; or		
6.7.5.2. (b)	The ISOFIX attachment opening force shall be at least 50 N when tested as prescribed in paragraph 7.2.8.		
6.7.6.	Lock-off device		
6.7.6.1.	The lock-off device shall be permanently attached to the Enhanced Child Restraint System.		
6.7.6.2.	The lock-off device shall not impair the the adult belt and shall undergo the ter operation requirements given in parag	nperature test	
6.7.6.3.	The lock-off device shall not prevent the rapid release of the child.		
6.7.6.4.	Class A device		
	The amount of slip of the webbing shal mm after the test prescribed in paragrabelow.		
6.7.6.5.	Class B device		
	The amount of slip of the webbing shal mm after the test prescribed in paragrabelow.		
6.3.2.3.	Mass (integral systems)		
Restraint Sy	f an integral ISOFIX Enhanced Child ystem (including inserts) combined with the largest child intended to use the	Mass of CRS [kg]	
Enhanced C 33 kg.	Child Restraint System shall not exceed	Max. Mass of Occupant [kg]	
	systems the combined mass of the ase shall be recorded.	Mass of System [kg]	
	mit is also applicable for "Specific FIX" Enhanced Child Restraint		

6.3.3.	ISOFIX attachments		
6.3.3.2.	Dimensions		
6.3.3.3.	Partial latching indication		
6.3.3.3.	The ISOFIX Enhanced Child Restraint System shall incorporate means by which there is a clear indication that both of the ISOFIX attachments are completely latched with the corresponding ISOFIX lower anchorages.	latch indicator	[Y/N]
6.3.3.3.	The indication means may be audible,	check	[Y/N]
6.3.3.3.	tactile or	check	[Y/N]
6.3.3.3.	visual or	check	[Y/N]
6.3.3.3.	a combination of two or more.	check	[Y/N]
6.3.3.3.	In case of visual indication, it shall be detectable under all normal lighting conditions.	check	[Y/N]
6.3.4.	ISOFIX Enhanced Child Restraint System top tether strap specifications		
6.3.4.1.	Top tether connector		
6.3.4.1.	The top tether connector shall be ISOFIX top tether hook as shown in Figure $\theta(c)$, or similar devices that fit within the envelope given by Figure $\theta(c)$.		[Y/N]
	Figure 0(c): ISOFIX top tether connector (hook type) dimensions		
6.3.4.2.	ISOFIX top tether strap features		
6.3.4.2.	The ISOFIX top tether strap shall be supported by webbing (or its equivalent), having a provision for adjustment and release of tension.	check	[Y/N]
6.3.4.2.1.	ISOFIX Top tether strap length ISOFIX Enhanced Child Restraint System top tether strap length shall be at least 2,000 mm.	TT strap length [mm]	
6.3.4.2.2.	No-slack indicator The ISOFIX top tether strap or the ISOFIX Enhanced Child Restraint System shall be equipped with a device that will indicate that all slack has been removed from the strap. The device may be part of an adjustment and tension relieving device.	check	[Y/N]
6.3.4.2.3.	Dimensions Engagement dimensions for ISOFIX top tether hooks are shown in Figure $\theta(c)$.	check	

6.3.5.1.	Support-leg and support-leg foot geometrical requirements	
6.3.5.1.	The support leg, including its attachment to the Enhanced child restraint systems and the support-leg foot shall lie completely within the support leg dimension assessment volume (see also figures 1 and 2 of annex 19 of this Regulation), which is defined as follows:	
6.3.5.1. (a)	In width by two planes parallel to the X'-Z' plane separated by 200 mm, and centred around the origin; and	Width in Y [mm]
6.3.5.1. (b)		min [mm]
6.3.5.1. (b)	plane and positioned at distances of 585 mm and 695 mm forward of the origin along the X' axis; and	max [mm]
	-> Distances in X	
6.3.5.1. (c)	In height by a plane parallel to the X'-Y'	min [mm]
6.3.5.1. (c)	plane, positioned at a distance of 70 mm above the origin and measured perpendicular to the X'-Y' plane. Rigid, non-adjustable parts of the support leg shall not extend beyond a plane parallel to the X'-Y' plane, positioned at a distance of 285 mm below the origin and perpendicular to the X'-Y' plane.	max [mm]
	-> Height in Z	
6.3.5.1.	The support-leg may protrude the support-leg dimension assessment volume, providing it remains within the volume of the relevant CRF.	check
	If a gauge or fixture is used to verify the required dimensions, instead of recording precise measurements, verification photos of the physical check shall be provided	
6.3.5.2.	Where incremental adjustment is provided, the step between two locked positions shall not exceed 20 mm.	Adjustment increments [mm]
6.3.5.2.	The support leg foot assessment volume is defined as follows:	
6.3.5.2. (a)	In width by two planes parallel to the X'-Z' plane, separated by 200 mm, and centred around the origin; and	Width in Y [mm]
6.3.5.2. (b)	In length by two planes parallel to the Z'-Y' plane and positioned at distances of 585 mm and 695 mm forward of the origin along the X' axis; and	min [mm]
	-> Distances in X	
6.3.5.2. (b)		max [mm]
6.3.5.2. (c)	In height by two planes parallel to the X'-Y' plane positioned at distances of 285 mm and	min [mm]

6.3.5.1.	Support-leg and support-leg foot geometrical requirements		
	540 mm below the origin along the X' axis.		
	-> Height in Z		
6.3.5.2. (c)		max [mm]	
6.3.5.2.	It shall be permissible for the support-leg to be adjustable beyond the height limits in the Z' direction (as indicated by key 6 in Figure 3 of Annex 19), providing that no parts extend beyond the limiting planes in the X' and Y' directions.	check	[Y/N]
6.3.5.3.	Support-leg foot dimensions		
6.3.5.3.	The dimensions of the support-leg foot shall me the following requirements:	et	
6.3.5.3. (a)	Minimum support-leg contact surface shall be $2,500 \text{ mm}^2$, measured as a projected surface $10 above the lower edge of the support-leg foot (see Figure 0(d));$		
6.3.5.3. (b)	Minimum outside dimensions shall be 30 mm in the X' and Y' directions, with maximum dimensions being limited by the support-leg foo assessment volume;	[mm]	
6.3.5.3. (c)	Minimum radius of the edges of the support-leg foot shall be 3.2 mm.	Radius [mm]	
	If a gauge or fixture is used to verify the require dimensions, instead of recording precise measurements, verification photos of the physic check shall be provided		
8.1 Minin	num Dynamic Test Information (per test)		
Test Facilit	y Name & Address		
Test Refere	ence Number		
ECRS Con booster sea	figuration (e.g. integral harness, non-integral t)		
ECRS Orie Lateral Fac	ntation (e.g. Forward Facing, Rearward Facing, cing)		
Recline Pos	sition (if applicable) (e.g. Upright, Reclined)		
Attachmen	t Method (e.g. seat belt, ISOFIX,)		
	ition (if applicable)		
Buckle Pos	, 11 ,		
	g Length (if applicable)		
Support Le			

8.1 Minimum Dynamic Test Information (per test)

Test Dummy

Sled Type (Deceleration/Acceleration)

Impact Speed km/h
Total Velocity Change km/h

Stopping Distance (deceleration only) mm

Maximum Head Horizontal Excursion mm

Time it occurs ms

Maximum Head Vertical Excursion mm

Time it occurs ms

D-E plane exceedance?

HPC

Resultant Head acceleration Cum 3ms g

Upper neck tension force (Fz+)* N

Upper neck flexion moment (My+)* Nm

Resultant Chest acceleration Cum 3ms g

Chest deflection (in frontal and rear impact) mm

Abdominal Pressure (in frontal and rear impact) bar

Breakage of parts?

 $^{^{\}ast}\text{The measurement procedures shall follow those of ISO 6487 with SAE J211 sign convention.''$

II. Justification

- 1. When assessing the width of Enhanced Child Restraint Systems (ECRS) in the vehicle seat fixture, the side wings are allowed a realistic flexion inward. This amended text clarifies the current procedure and formalises the practice.
- 2. The addition of Annex 27 containing the list of minimum contents for a Type Approval test report requires the essential measurement information to be provided in the Type Approval test report. How this information is presented in the Type Approval test report shall be the choice of the Technical Service. The aim of the proposal is at improving the transparency and consistency of Type Approval testing results and ensure that all assessments are carried out.