

Business Stream Mobility

Aviation

Meeting IWG Safer Transport of Children in
Buses and Coaches, Brussels

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For Use In Aircraft - Qualification

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Child car seats with additional qualification for the lap belt in the aircraft

Why should you use child seats on the aircraft!



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Authority specifications

- **ICAO DOC 10049 MANUAL ON THE APPROVAL AND USE OF CHILD RESTRAINT SYSTEMS**
 - Manual prepared by an ICAO (International Civil Aviation Organization) working group in consultation with major country authorities and airlines.
 - TÜV Rheinland Kraftfahrt GmbH was an active member of this working group at a very early stage together with EASA (European Union Aviation Safety Agency) and FAA (Federal Aviation Administration – USA)

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Authority specifications

- **Commission Regulation (EU) No 965/2012 on air operations**
 - Includes as "Easy Access" variant also the applicable guidelines
- **LBA Circular 14-2008**
 - Basis for airlines registered in Germany, implementation of EU 965/2012 in national law
- **AC_120-87C Use of Child Restraint Systems on Aircraft**
 - Conditions for the use of child restraint systems in aircraft in the U.S.

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Authority specifications

- **UN-R 129/ UN-R 44**

- Automotive Regulation - the basis of aviation certification
- ECE R44 has been replaced by R129. Despite the upcoming ban for sale of new UN-R 44 approved systems these system will be in use to secure children for many years.

- **FMVSS 213**

- Automotive Regulation of the USA. Includes the possibility of aviation certification. The use of FMVSS systems is not permitted for European road traffic.

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Leaflets and recommendations

- **Travelling with children - EASA**
 - EASA recommendations and guidelines for passengers
- **Child Safety tips for parents**
 - FAA recommendations and guidelines for passengers

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Content of aviation regulations (Europe)

- Children under 2 years of age shall be carried in a CRS accepted by aviation authorities if travelling in a separate aircraft seat.
- Children under 2 years of age are not required to have their own seat.
- Double occupancy of seats is allowed with an adult and a child under 2 years (with mandatory use of "Loop Belt" connection between child and adult).
- Children from 2 years old on always shall use their own seat.
 - > Securing with adult lap belt
 - > accepted CRS may be used.



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Content of aviation regulations (Europe)

CRS accepted by the aviation authorities:

- Loop Belt
- ETSO (European Technical Standard Order) seat (Part of the aircraft by means of a Supplemental Type Certificate)
- UN-R 44 or UN-R 129 approved child seats with additional qualification "For use in Aircraft" from TÜV Rheinland Kraftfahrt GmbH
- FMVSS / CMVSS 213 seats with additional qualification "For use in [motorvehicles and] aircraft".



Child car seats with additional qualification for the lap belt in the aircraft

Reasons for the "For Use in Aircraft" qualification

- **Different, non-standardized belt lengths of the fixed lap belt part on a P6 dummy:**



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Reasons for the "For Use in Aircraft" qualification

- **Different, non-standardized belt lengths of the fixed lap belt part on a P3 dummy and a real 3 years old child:**



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Reasons for the "For Use in Aircraft" qualification

- Different, non-standardized belt lengths when used to secure vehicle CRS:



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Reasons for the "For Use in Aircraft" qualification

- Different, non-standardized belt lengths when used to secure vehicle CRS:



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Reasons for the "For Use in Aircraft" qualification

- **Seat widths of the passenger aircraft seats:**



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Content of the "For Use In Aircraft" test requirements

- Does the CRS fit to the aircraft seats (width, size)?
- Is the length of the various aircraft seat lap belts compatible with the CRS?
- Is the position and function of the buckle correct?
- Are specific instructions for use in the aircraft available?

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Content of the "For use in Aircraft" tests

- Perform a sled test using a crash pulse according to UN-R 44/UN-R 129 with the CRS fixed on UN-R test bench or SAE AS8049 16g aviation pulse with the CRS fixed on special test bench (aircraft seat provided by TÜV Rheinland Kraftfahrt) with a 2-point seat belt.:
 - Child seat shall safely restrain the child
 - No structural damage to the child seat
 - No sharp edges
 - No opening of interlocks
 - For rear-facing CRS, the dummy's head shall not exceed the vertical boundary plane at the foremost point of the CRS seat back.
 - Use of a dashboard barrier not permitted

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Content of the "For use in Aircraft" tests

- Sled test with 2-point belt – UN-R 44/129 frontal impact pulse or SAE AS8049 16g with test bench:

FRONTAL IMPACT

Definition of the different curves

Time (ms)	Acceleration (g) Low corridor	Acceleration (g) High corridor
0	-	10
20	0	-
50	20	28
65	20	-
80	-	28
100	0	-
120	-	0

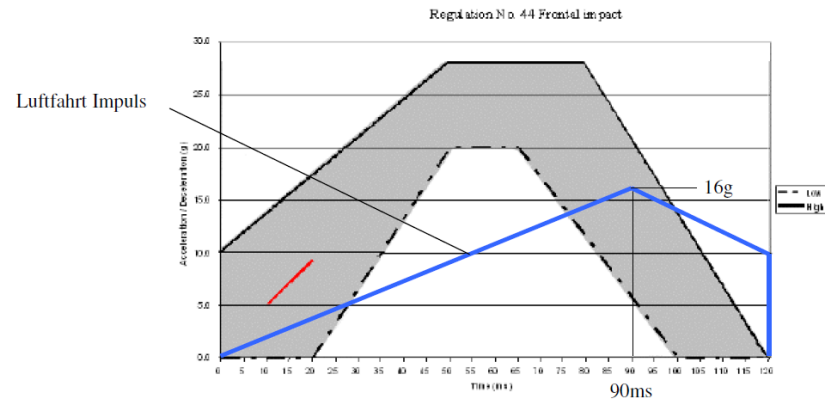


Illustration shows a forward facing seat	TEST 1	TEST 2
Inertial load shown by arrow		
Min V m/s(ft/s)	10.67 (35)	13.41 (44)
Max. t _r s	0.08	0.09
Min. G	14	16
Deform floor:		
Degrees roll	0	10
Degrees pitch	0	10
Test Pulse Simulating Aircraft floor Deceleration - Time History:		
tr= Rise time V = Impact Velocity G = Deceleration measured on test fixture or sled near the seat position.		

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"For use in Aircraft" Label



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TÜV Rheinland Service „Child Seats Welcome“

Applicability

- Compliance with regulations (e.g. EU OPS)
- Enables usage of current child seats

Safety

- Equivalent safety level of adults and infants
- Assured restraint of qualified „For Use in Aircraft“ labeled CRS

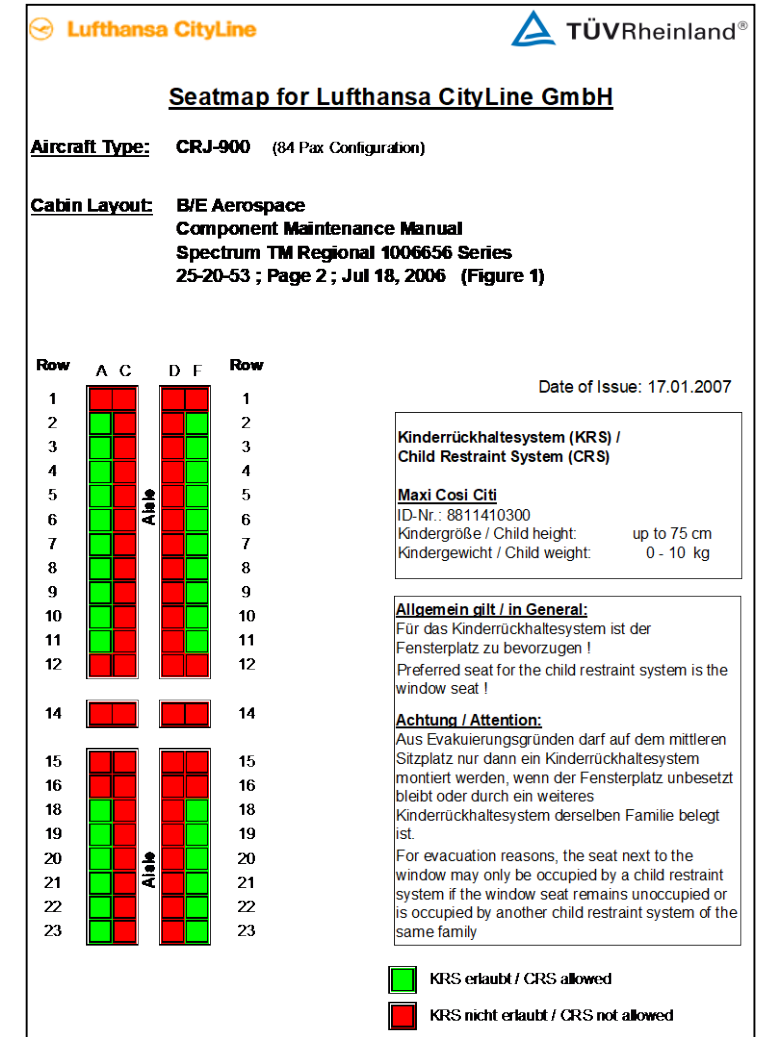


Improvement

- Ensures airline's boarding procedures
- Ensures airline's Operational readiness

Customer friendliness

- Transparency for passengers
- Continuously updated online list of compatible CRS



Thank you for your attention

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