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|  | E/ECE/TRANS/505/Rev.3/Add.159/Amend.2 |
|  |  | 24 November 2022 |

**Agreement**

 Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations[[1]](#footnote-2)\*

 (Revision 3, including the amendments which entered into force on 14 September 2017)

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 **Addendum 159 – UN Regulation No. 160**

 **Amendment 2**

Supplement 1 to the the original version of the Regulation – Date of entry into force: 8 October 2022

 Uniform provisions concerning the approval of motor vehicles with regard to the Event Data Recorder

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2022/25/Rev.1.

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**UNITED NATIONS**

*Paragraph 1.3.,* amend to read:

"1.3. The following data elements are excluded from the scope: VIN, associated vehicle details, location/positioning data, information of the driver, date and time of an event."

*Paragraphs 2.1, 2.14, 2.15, 2.29. and 2.52.,* amend to read:

2.1. "*Anti-lock braking* *activity*" means the anti-lock brake system is actively controlling the vehicle's brakes.

2.14. "*Ignition cycle, crash*" means the number (count) of power mode cycles as determined by the EDR ECU at the time when the crash event occurred since the first use of the EDR.

2.15. "*Ignition cycle download*" means the number (count) of power mode cycles as determined by the EDR ECU at the time when the data was downloaded since the first use of the EDR.

2.29. *“Rollover”* means any vehicle rotation of 90 degrees or more about any true longitudinal or lateral axis.

2.52. "*X-direction*" means in the direction of the vehicle’s X-axis, which is parallel to the vehicle's longitudinal centreline. The X-direction is positive in the direction of forward vehicle travel."

*Paragraphs 2.54., 2.55.,* delete.

*Paragraphs 2.29. to 2.53.,* renumber as *2.30. to 2.54., respectively.*

*Paragraph 5.3.2.*, amend to read:

"5.3.2. Conditions for triggering locking of data

 In the circumstances provided below, the memory for the event shall be locked to prevent any future overwriting of the data by subsequent events."

*Annex 4. Table1, amend to read:*

"Table 1

| *Data element[[2]](#footnote-3)* | *Condition for requirement[[3]](#footnote-4)* | *Recording interval/time[[4]](#footnote-5) (relative to time zero)* | *Data sample rate (samples per second)* | *Minimum range****[[5]](#footnote-6)*** | *Accuracy****[[6]](#footnote-7)*** | *Resolution4* | *Event(s) recorded for****[[7]](#footnote-8)*** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Delta-V, longitudinal | Mandatory - not required if longitudinal acceleration recorded at ≥500 Hz with sufficient range and resolution to calculate delta-v with required accuracy | 0 to 250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | 100 | -100 km/h to + 100 km/h. | ±10% | 1 km/h. | Planar |
| Maximum delta-V, longitudinal | Mandatory - not required if longitudinal acceleration recorded at ≥500 Hz | 0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | N/A | -100 km/h to + 100 km/h. | ±10% | 1 km/h. | Planar |
| Time, maximum delta-V, longitudinal | Mandatory - not required if longitudinal acceleration recorded at ≥500 Hz | 0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | N/A | 0–300 ms, or 0-End of Event Time plus 30 ms, whichever is shorter. | ±3 ms | 2.5 ms. | Planar |
| Speed, vehicle indicated | Mandatory | -5.0 to 0 sec | 2 | 0 km/h to 250 km/h | ±1 km/h | 1 km/h. | PlanarVRURollover |
| Engine throttle, % full (or accelerator pedal, % full) | Mandatory | -5.0 to 0 sec | 2 | 0 to 100% | ±5% | 1% | PlanarRolloverVRU |
| Service brake, on/off | Mandatory | -5.0 to 0 sec | 2 | On or Off | N/A | On or Off. | PlanarVRURollover |
| Ignition cycle, crash | Mandatory | -1.0 sec | N/A | 0 to 60,000 | ±1 cycle | 1 cycle. | PlanarVRURollover |
| Ignition cycle, download | Mandatory | At time of download[[8]](#footnote-9) | N/A | 0 to 60,000 | ±1 cycle | 1 cycle. | PlanarVRURollover |
| Safety belt status, driver  | Mandatory | -1.0 sec | N/A | Fastened, not fastened | N/A | Fastened, not fastened | PlanarRollover  |
| Air bag warning lamp[[9]](#footnote-10) | Mandatory | -1.0 sec | N/A | On or Off | N/A | On or Off. | PlanarRollover |
| Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver.  | Mandatory | Event | N/A | 0 to 250 ms | ±2ms | 1 ms. | Planar |
| Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, front passenger[[10]](#footnote-11). | Mandatory | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | Planar |
| Multi-event crash, number of events | If Recorded[[11]](#footnote-12) | Event | N/A | 1 or more | N/A | 1 or more. | PlanarVRURollover |
| Time from event 1 to 2 | Mandatory | As needed | N/A | 0 to 5.0 sec | ±0.1 sec | 0.1 sec. | PlanarRollover |
| Complete file recorded | Mandatory | Following other data | N/A | Yes or No | N/A | Yes or No. | PlanarVRURollover |
| Lateral acceleration(post-crash) | If Recorded | 0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.11 | 500 | -50 to +50g | +/- 10% | 1 g | PlanarRollover  |
| Longitudinal acceleration(post-crash) | If Recorded | 0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | 500 | -50 to +50g | +/- 10% | 1 g | Planar |
| Normal acceleration(post-crash) | If recorded |  0 to at least 250 ms[[12]](#footnote-13)  | 10  | -5 g to +5 g | ± 10% | 0.5 g | Rollover |
| Delta-V, lateral | Mandatory - not required if lateral acceleration recorded at ≥500 Hz and with sufficient range and resolution to calculate delta-v with required accuracy | 0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | 100 | -100 km/h to + 100 km/h. | ±10% | 1 km/h. | Planar |
| Maximum delta-V, lateral | Mandatory - not required if lateral acceleration recorded at ≥500 Hz | 0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | N/A | -100 km/h to + 100 km/h. | ±10% | 1 km/h. | Planar |
| Time maximum delta-V, lateral | Mandatory - not required if lateral acceleration recorded at ≥500 Hz | 0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | N/A | 0–300 ms, or 0-End of Event Time plus 30 ms, whichever is shorter. | ±3 ms | 2.5 ms. | Planar |
| Time for maximum delta-V, resultant. | Mandatory - not required if relevant acceleration recorded at ≥500 Hz | 0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. | N/A | 0–300 ms, or 0-End of Event Time plus 30 ms, whichever is shorter. | ±3 ms | 2.5 ms. | Planar |
| Engine rpm | Mandatory | -5.0 to 0 sec | 2 | 0 to 10,000 rpm | ±100 rpm[[13]](#footnote-14) | 100 rpm. | PlanarRollover |
| Vehicle roll angle | If recorded | 0 to at least 250 ms11 | 10 | -1080 deg to + 1080 deg. | ±10% | 10 deg. | Rollover |
| Anti-lock braking system activity  | Mandatory | -5.0 to 0 sec | 2 | Faulted, Non-Engaged, Engaged  | N/A | Faulted, Non-Engaged, Engaged  | PlanarVRURollover |
| Stability control  | Mandatory | -5.0 to 0 sec | 2 | Faulted, On, Off, Engaged | N/A | Faulted, On, Off, Engaged | PlanarVRURollover |
| Steering input | Mandatory | -5.0 to 0 sec | 2 | -250 deg CW to + 250 deg CCW. | ±5% | ±1%. | PlanarRollover VRU |
| Safety belt status, front passenger 9 | Mandatory | -1.0 sec | N/A | Fastened, not fastened | N/A | Fastened, not fastened | PlanarRollover  |
| Passenger air bag suppression status, front 9 | Mandatory | -1.0 sec | N/A | suppressed or not suppressed | N/A | suppressed or not suppressed | PlanarRollover |
| Frontal air bag deployment, time to nth stage, driver13. | Mandatory if fitted with a driver’s frontal air bag with a multi-stage inflator. | Event  | N/A | 0 to 250 ms | ±2 ms | 1 ms. | Planar |
| Frontal air bag deployment, time to nth stage, front passenger[[14]](#footnote-15)13, 9. | Mandatory if fitted with a front passenger’s frontal air bag with a multi-stage inflator. | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | Planar |
| Side air bag deployment, time to deploy, driver. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | Planar |
| Side air bag deployment, time to deploy, front passenger. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | Planar |
| Side curtain/tube air bag deployment, time to deploy, driver side. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | PlanarRollover |
| Side curtain/tube air bag deployment, time to deploy, passenger side. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | PlanarRollover |
| Pretensioner deployment, time to fire, driver. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | PlanarRollover |
| Pretensioner deployment, time to fire, front passenger9. | Mandatory  | Event | N/A | 0 to 250 ms | ±2 ms | 1 ms. | PlanarRollover |
| Seat track position switch, foremost, status, driver. | Mandatory if fitted and used for deployment decision | -1.0 sec | N/A | Yes or No | N/A | Yes or No. | PlanarRollover |
| Seat track position switch, foremost, status, front passenger9. | Mandatory if fitted and used for deployment decision | -1.0 sec | N/A | Yes or No | N/A | Yes or No. | PlanarRollover |
| Occupant size classification, driver  | If recorded | -1.0 sec | N/A | 5th percentile female or larger. | N/A | Yes or No. | PlanarRollover |
| Occupant size classification, front passenger9. | If recorded | -1.0 sec | N/A | 6yr old HIII US ATD or Q6 ATD or smaller | N/A | Yes or No. | PlanarRollover |

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1. \* Former titles of the Agreement:

 Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version);

 Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2). [↑](#footnote-ref-2)
2. [↑](#footnote-ref-3)
3. "Mandatory" is subject to the conditions detailed in Section 1. [↑](#footnote-ref-4)
4. Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is -0.1 to 1.0 sec (e.g., T = -1 would need to occur between -1.1 and 0 seconds.) [↑](#footnote-ref-5)
5. For data elements with system states, the term “engaged” also means “actively controlling” or “actively intervening” and “non-engaged” also means “on but not controlling”. Likewise, “*off”* also means “*deactivated*”. [↑](#footnote-ref-6)
6. Accuracy requirement only applies within the range of the physical sensor. If measurements captured by a sensor exceed the design range of the sensor, the reported element shall indicate when the measurement first exceeded the design range of the sensor. [↑](#footnote-ref-7)
7. "Planar" includes triggered events in sections 5.3.1.1, 5.3.1.2, and 5.3.1.3 and “VRU” includes triggered events in section 5.3.1.4. [↑](#footnote-ref-8)
8. The ignition cycle at the time of download is not required to be recorded at the time of the crash but shall be reported during the download process. [↑](#footnote-ref-9)
9. The air bag warning lamp is the readiness indicator specified in national air bag requirements and may also illuminate to indicate a malfunction in another part of the deployable restraint system. [↑](#footnote-ref-10)
10. List this element n times, once for each device. [↑](#footnote-ref-11)
11. "If recorded" means if the data is recorded in non-volatile memory for the purpose of subsequent downloading. [↑](#footnote-ref-12)
12. For rollover events the time at which the event is determined to have started as defined by the manufacturer. [↑](#footnote-ref-13)
13. These elements do not need to meet the accuracy and resolution requirements in specified crash tests [↑](#footnote-ref-14)
14. 13 List this element n - 1 times, once for each stage of a multi-stage air bag system. [↑](#footnote-ref-15)