

1.1 Mechanical impact

1.1.1 Mechanical Shock

3.4.1.1 Rationale

Simulates inertial loads which may occur during vehicle crash situation to [RESS].

3.4.1.2 Requirement

3.4.1.2.1 Conditions

For the longitudinal and lateral vehicle direction, one of the conditions described in 3.4.1.2.1.1 or 3.4.1.2.1.2 shall be applied.

3.4.1.2.1.1 Vehicle based test

[RESS] installed in a vehicle of category [M1, M2, N1 and N2] that undergoes a vehicle crash test according to ECE-R12 Annex 3 or ECE-R 94 Annex 3 shall meet the acceptance criteria under 3.4.1.2.2.

This test is equivalent to the test conditions described in table 5 in 3.4.1.2.1.2.

[RESS] installed in a vehicle of category[M1, M2, N1 and N2] that undergoes a vehicle crash test according to ECE-R95 Annex 4 shall meet the acceptance criteria under 3.4.1.2.2.

This test is equivalent to the test conditions described in table 6 in 3.4.1.2.1.2.

The approval of the [RESS] tested under this condition is limited to the installation in the specific vehicle type.

3.4.1.2.1.2 Component based test

[A complete [RESS] is to be tested for this condition. However, if conducting this test on a [RESS] is deemed inappropriate due to size or weight, this test may be conducted utilizing subsystem(s) including respective battery module(s), provided that all portions of the [battery module(s) of the RESS] are evaluated. If tests are performed on [subsystem basis], evidence shall be provided that the results are representative for [RESS].]

The [RESS] shall be at any state of charge, which allows the normal operation of the power train as recommended by the manufacturer.

The complete [RESS or subsystem(s)] shall be applied to the shock levels described in Table 5 and 6 in both positive and negative directions.

For every of the 4 evaluation conditions, a separate [RESS or subsystem(s)] can be used. The [RESS or subsystem(s)] shall be connected to the test fixture only by the intended mounting methods.

Table 5 – Shock levels in direction of travel

	Acceleration
[RESS] fitted vehicles of categories M1 and N1	20g
[RESS] fitted vehicles of categories M2 and N2	10g
[RESS] fitted vehicles of categories M3 and N3	6.6g

Table 6 – Shock levels horizontally perpendicular to the direction of travel

	Acceleration
[RESS] fitted vehicles of categories M1 and N1	8g
[RESS] fitted vehicles of categories M2 and N2	5g
[RESS] fitted vehicles of categories M3 and N3	5g

The test pulse shall be within the minimum and maximum curve as described in diagram 1 to 6. a higher shock level and longer duration as described in the maximum curve in diagram 1 to 6 can be applied to RESS if recommended by the manufacturer.

Diagram 1
M1, N1 Shock levels and duration in direction of travel

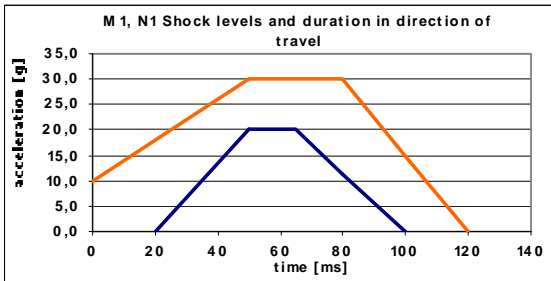


Diagram 2
M1, N1 Shock levels and duration in horizontally perpendicular to the direction of travel

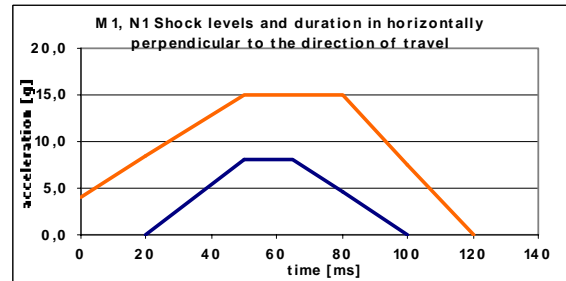


Diagram 3
M2, N2 Shock levels and duration in direction of travel

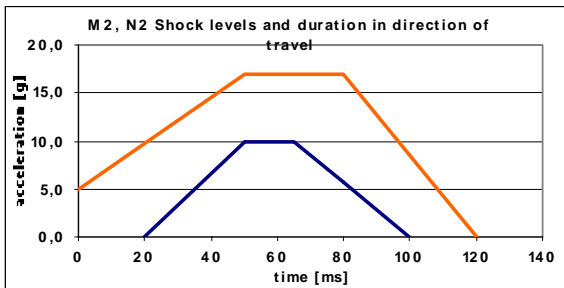


Diagram 4
M2, N2 Shock levels and duration in horizontally perpendicular to the direction of travel

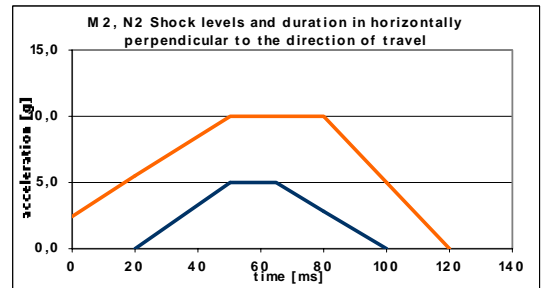


Diagram 5
M3, N3 Shock levels and duration in direction of travel

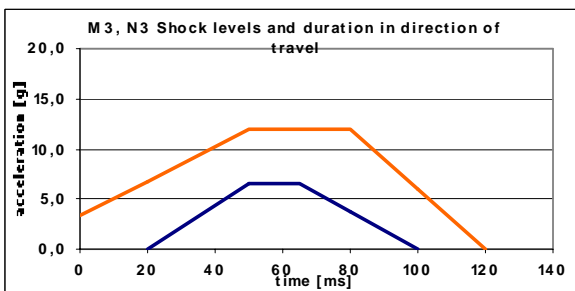
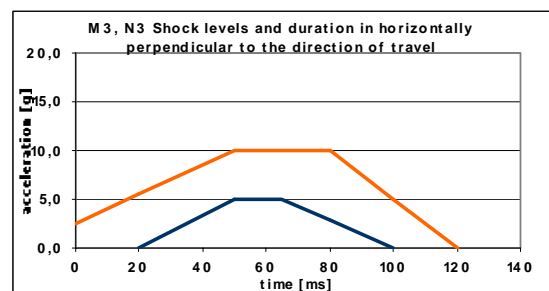


Diagram 6
M3, N3 Shock levels and duration in horizontally perpendicular to the direction of travel



3.4.1.2.2 Acceptance criteria

During the test, including 1 h after the test, the [RESS or subsystem(s)] shall exhibit no evidence of

- a) electrolyte leakage has to be less than 7% of the total electrolyte amount or less than 5 l whatever is smaller
- b) fire
- c) explosion
- d) at 3.4.1.2.1. (vehicle based test) [RESS] located inside the passenger compartment shall remain in the location in which they are installed and [RESS] components shall remain inside [RESS] boundaries. No part of any [RESS] that is located outside the passenger compartment for electric safety assessment shall enter the passenger compartment during or after the impact test procedures.

at 3.4.1.2.2. (Component based test) [RESS or pack(s)] shall be retained at its mounting locations and components shall remain inside its boundaries.

3.4.1.3 Verification Method

The evidence of a) to d) of 3.4.1.2.2 shall be checked by visual inspection.