

6.3.4.2 Mechanical Integrity

Mechanical integrity of the REESS shall be tested in both the longitudinal and lateral direction relative to the installation in the vehicle. For each direction either a generic component based procedure in accordance with paragraph 6.3.4.2.1, or a vehicle specific procedure shall be conducted.

If the vehicle specific approach is selected a vehicle based test procedure according to 6.3.4.2.2 or a vehicle specific component test according to 6.3.4.2.3 can be applied alternatively for the longitudinal and the lateral direction.

The test applies only to REESS intended to be installed in vehicles of category M1 and N1.

6.3.4.2.1 Generic component test

The test shall be conducted in accordance with Annex 8D of this Regulation.

For a REESS installed in a vehicle in a position where any point of the REESS enclosure is outside of the outer vehicle boundaries approval to this paragraph shall not be permitted

6.3.4.2.2 Vehicle based test

Compliance with the requirements of the acceptance criteria of Paragraph 6.3.4.2.3 below may be demonstrated by RESS(s) installed in vehicles that have been subjected to a vehicle crash test in accordance with UNECE regulations ECE R12 Annex 3 or ECE R94 Annex 3 for frontal impact, and ECE R95 Annex 4 for side impact.

In this case, the ambient temperature and the state of charge shall be in accordance with the said Regulations.

6.3.4.2.3 Vehicle specific component test

The test shall be conducted in accordance with Annex 8D of this Regulation.

The crush load defined in Paragraph 3.2. of Annex 8D of this Regulation may be replaced by the contact force according to ECE-R12 Annex 3 or ECE R94 Annex 3 in the direction of travel and with the mechanical load according to ECE R95 Annex 4 in the direction horizontally perpendicular to the direction of travel. The contact force shall be determined by the vehicle manufacturer using test or simulation data and agreed by the Technical Service.

The manufacturer may define the relevant parts of the vehicle structure used for the mechanical protection of the REESS components. The test shall be conducted with the REESS mounted to this vehicle structure in a way which is representative of its mounting in the vehicle.

For a REESS installed in a vehicle in a position where any point of the REESS enclosure is outside of the outer vehicle boundaries approval to this paragraph shall not be permitted

The approval of a REESS tested under paragraph 6.3.4.2.2 shall be limited to the specific vehicle type.

6.3.4.2.3 Acceptance criteria

During the test there shall be no evidence of:

- (a) fire
- (b) explosion
- (c) electrolyte leakage greater than 7% of the total electrolyte amount or more than 5 l whichever is the smaller

The isolation resistance of the tested-device shall ensure at least 100 Ω /Volt for the whole REESS measured in accordance with Annex 4A, or the protection degree IPXXB shall be fulfilled for the tested-device.

Compliance with the requirements of a) to c) of this paragraph shall be confirmed by visual inspection.

Annex 8D

Mechanical integrity

1. PURPOSE

The purpose of this test is to verify the safety performance of the RESS under contact loads which may occur during vehicle crash situation.

2. INSTALLATIONS

2.1 This test shall be conducted either with the complete RESS or with related subsystems of the RESS including the cells and their electrical connections. If the electronic management unit for the RESS is not integrated, such control unit may not be installed on the device under test by the discretion of the manufacturer.

2.2 The device under test shall be connected to the test fixture as recommended by the manufacturer.

3. PROCEDURES

3.1. General test conditions

The following condition shall apply to the test:

- a) the test shall be conducted under a standard ambient temperature of 20 ± 10 °C.
- b) at the beginning of the test, the state of charge of device under test shall be adjusted to a value in the upper 50% of the normal operating state of charge range.
- c) at the beginning of the test, all internal and external protection devices which effect the function of the device under test and which are relevant for the outcome of the test shall be operational.

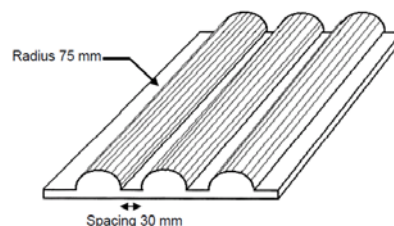
3.2. Crush force

The tested-device shall be crushed between a resistance and a crush plate as described in figure 7 with a force of at least 100 kN, but not exceeding 105 kN with an onset time less than 3 minutes and a hold time of at least 100 ms and not exceeding 10s.

A higher crush force or a longer onset time or an increase of both may be applied at the request of the manufacturer.

The application of the force onto the REESS shall be decided by the manufacturer together with the technical service with regard to the predetermined direction of travel and horizontally perpendicular to the direction of travel of the RESS.

Figure 7:



Dimension of the crush plate:
600 mm x 600 mm or smaller

After the release of the load the device under test shall be observed for 1 h at the ambient temperature conditions of the test environment. The test ends after the observing time