

Annex 4 to BAM-GGR 024

Scaling rule for the use of packaging with different dimensions

General

It is possible to use packaging with different dimensions compared to the packaging tested in the fire test (= 'original' packaging, OrigVerp). A distinction is made here between different scenarios:

- a) Use of packaging with the same internal volume but different dimensions. This is referred to as 're-scaling' (see Section 1).
- b) Use of packaging made of the same material and with a similar structure, but with a smaller internal volume. This is referred to as 'downscaling' (see Section 2).

The following requirements apply to all scaling scenarios:

- a) The "scaled" packaging (SkalVerp) should, in principal, be identical in construction (same material thickness, material type, construction method, insulation material, gas flow, etc.) to the original packaging (OrigVerp).

All scaled packaging must be design type tested and UN approved.

- b) The ratio of $V_{in}(SkalVerp)$ to $V_{in}(OrigVerp)$ is the scaling factor used to determine the following limit values:
 - Max. permitted energy content of the cells/modules/batteries to be transported
 - Max. permitted net mass of the cells/modules/batteries to be transported
- c) The thickness and structure of the insulation and filter material must not be scaled. The distance between the cells/modules/batteries and the outer walls, as well as the thickness of the insulation and filter material in the scaled packaging, must not be less than the corresponding distance/thickness in the original packaging; similarly, the wall structure of the packaging must not be reduced.

1. Re-scaling

OrigVerp and SkalVerp have the same internal volume

In addition to the points explained above, the following conditions apply:

- a) The distance between the cells/modules/batteries and the outer walls of the scaled packaging must not be less than the corresponding distance in the original packaging.
- b) The length, width and height of the scaled packaging may vary by a maximum of 10% compared to the original packaging. In this case, an additional fire test is not necessary. However, a new design type test and UN- approval may still be required.

The 100%-80%-30% rule can be applied to a re-scaled packaging.

2. Downscaling

The scaled packaging (SkalVerp) has a smaller internal volume than the original packaging.

Cells/modules/batteries of the same type as those tested in the OrigVerp may be transported in a SkalVerp with a proportionally reduced energy content. The energy content is reduced in line with the percentage reduction in internal volume. The 100%-80%-30% rule can be applied to this reduced energy content.

unofficial translation
for information only

Event tree

