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## **BAM-Dangerous Goods Procedural Rules (BAM-GGR)**

### **BAM-GGR 006 – Specific processes for the design type test and approval of fibreboard boxes (4G)**

*As the competent authority under:*

- § 6 (2) No. 8 of the Road and Rail Dangerous Goods Regulation (GGVSE) in the version published on 10 September 2003 (BGBl. I p. 1913, 2139), last amended by 1. GGVSEÄndV of 24 March 2004 (BGBl. I p. 485),
- § 6 (5) of the Maritime Dangerous Goods Regulation (GGVSee) of 4 November 2003 (BGBl. I p. 2286) and
- § 78 (3) of the Regulation of Aeronautical Directives for the Transport of Dangerous Goods and Approval of Air Transport Devices and Aircraft Models of 13 June 2001 (BGBl. I, p. 1221)

*and in connection with*

- the Directives for the Implementation of the Road and Rail Dangerous Goods Regulation (GGVSE) (GGVSE - Implantation Guidelines) – RSE – of 20 June 2003 (VkB1. 2003, Book 14, p. 418 with offprint),

*BAM publishes the following regulations following collaboration with the Federal Ministry for Traffic, Building and Housing (BMVBW) and the affected areas of business.*

*These regulations describe the process of proving compliance with the*

- Specifications for design type testing in accordance with the processes set down by the competent authority and their approval according to 6.1.5.1.1 and 6.6.5.1.1 of the ADR/RID/IMDG Code and/or 4.1.1 Chapter 4, Part 6 of the ICAO-TI,
- Specifications regarding repetition of the design type test following any alteration of the design, the material or the type of manufacturing of a packaging according to 6.1.5.1.4 and 6.6.5.1.4 of the ADR/RID/IMDG Code and/or 4.1.4 Chapter 4, Part 6 of the ICAO-TI.
- Specifications regarding the approval of selective tests for packagings differing only marginally from a design that has already been tested by the competent authority according to 6.1.5.1.5 and 6.6.5.1.5 of the ADR/RID/IMDG Code and/or 4.1.4 Chapter 4, Part 6 of the ICAO-TI.

*These regulations are applicable with immediate effect.*

*Berlin, 26 August 2004*

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#### **Revisions details:**

Rev. 1 of 6 August 2003: Draft.

Rev. 2 of 26 August 2004: Accepted version.

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## **BAM-GGR 006 – Specific processes for the design type test and approval of fibreboard boxes (4G)**

### **1. General**

#### 1.1 Scope

1.1.1 These regulations apply to the testing, approval and manufacturing of fibreboard boxes (4G) for the transport of dangerous goods, as well as to the requirements of the manufacturer for the closing of fibreboard boxes (4G) by the user according to the definitions in 6.1.4.12 of the ADR/RID/IMDG Code and/or 3.1.11 Chapter 3, Part 6 of the ICAO-TI.

#### 1.2 Definitions

##### 1.2.1 Basic test / Basic test report

The design type test responsible for granting approval is referred to as the basic test. The results of the design type test are summarised in the basic test report. The basic test report may consist of several individual test reports.

##### 1.2.2 Design type / Design type test / Design type approval

Definitions of the terms correspond to those in the RID/ADR/IMDG Code and ICAO-TI.

##### 1.2.3 Design type series

A design type whose combined volume and gross mass can be varied within the basic values (largest and smallest overall size; if applicable, also the intermediate size) as defined in its certificate of approval, whilst adhering to the conditions named in 3.2 (see Figure 1 in 3.2.1).

##### 1.2.4 Shortened test / Shortened test report

A shortened test is a reduced style of design type test consisting of a drop test on the weakest point (usually the corner on the top side). If the weakest point cannot be identified clearly, several drop tests are to be carried out with different points of impact until the point receiving most damage has been identified. The results of the shortened test have to be recorded in a shortened test report.

##### 1.2.5 Retest / Retest report

Complete design type test with test samples which display design modifications applied for. Results of the retest have to be recorded in a retest report.

### **2. Processes**

#### 2.1 Design type test

2.1.1 In principle, every fibreboard box design must undergo the prescribed test and approval process. The design type test process for all types of packagings is regulated in general by BAM GGR 005<sup>1</sup>.

2.1.2 In addition, modifications to the design type test can normally be tested and approved in accordance with the process described in this rules under Number 3. In this regard, as stated in Number 3, retests or shortened tests are required.

#### 2.2 Retests and shortened tests

2.2.1 If a retest or a shortened test is required by these regulations and no further details are defined, these tests are to be carried out by BAM or by a test body<sup>2</sup> recognised by BAM.

2.2.2 The conditions of the retest (drop height and stacking force) and shortened test (drop height) must correspond at least to those of the basic test.

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<sup>1</sup> Dangerous Goods Regulations BAM-GGR 005 – Process for carrying out a design type test for packagings for the transport of dangerous goods.

<sup>2</sup> Test bodies recognised by BAM are listed on the BAM website:  
[http://www.bam.de/service/amtl\\_mitteilungen/gefahrgut/gefahrgut.htm](http://www.bam.de/service/amtl_mitteilungen/gefahrgut/gefahrgut.htm).

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- 2.2.3 For retests and shortened tests BAM and/or the test body must be provided with either a test sample that has already filled and closed according to specifications or the required contents and means and devices of closing.
- 2.2.4 For plastics inner packagings with the exception of plastics bags for solid materials or articles, the test sample and its contents must be conditioned for the retest or shortened test to a temperature of  $-18^{\circ}\text{C}$  or lower in accordance with 6.1.5.3.2 of the ADR/RID/IMDG Code and/or 4.3.2 Chapter 4, Part 6 of the ICAO-TI.
- 2.2.5 Shortened tests and retest reports have to make reference to the basic test report and granted approval. The retest report must be structured as in a standard design type test report. The shortened test report must contain at least the following data: UN-identification, description of the inner packagings (number, material, test fillers), external dimensions of the packaging, tested gross mass, drop height, test result.
- 2.2.6 Shortened test and retest reports are to be kept during the validity of the approval and for at least one year after that. The holder of the approval is responsible for this.

### 3. Modification process

The following modifications of design types approved in Germany may be approved:

- Modification of the inner packagings
- Modification of the external dimensions (design type series)
- Modification of the material
- Modification of the closures and means of closing
- Recording of additional manufacturers and additional production sites of a manufacturer

Combinations of these modifications are also possible, provided that the minimum specification values – bursting strength and puncturing energy – are adhered to as defined in the basic test report. The water absorption of the outer surface may under no circumstances exceed  $155 \text{ g/m}^2$ . Such combinations require prior approval from BAM.

- 3.1 Modification of inner packagings
- 3.1.1 In addition to the possibilities of 6.1.5.1.6 of the ADR/RID/IMDG Code and/or 4.1.6 of Chapter 4, Part 6 of the ICAO-TI, modifications of the inner packagings of composite packagings that differ from those used during the design type test may be approved provided that a shortened test meeting the test regulations in 6.1.5 of the regulations in the introduction is successfully completed. The possibility of the modification of the inner packagings must also have been already disclosed in the certificate of approval of BAM. The shortened test can be carried out by the user or on behalf of the user.
- 3.1.2 The shortened test report is to be made available to BAM upon request; a change in the approval will not result.
- 3.2 Modification of the external dimensions (design type series).
- 3.2.1 Based on 6.1.5.1.2 of the ADR/RID/IMDG Code and/or 4.1.2, Chapter 4, Part 6 of the ICAO-TI, a design type series can be approved by BAM following selective testing. This test examines a minimum of two sizes with different combinations of gross mass and volumes. All combinations of gross mass and volumes are approved as a new size A, provided that they are below the connecting line between these sizes (see the lightly dotted region in the following Figure 1) and satisfy the following requirements:

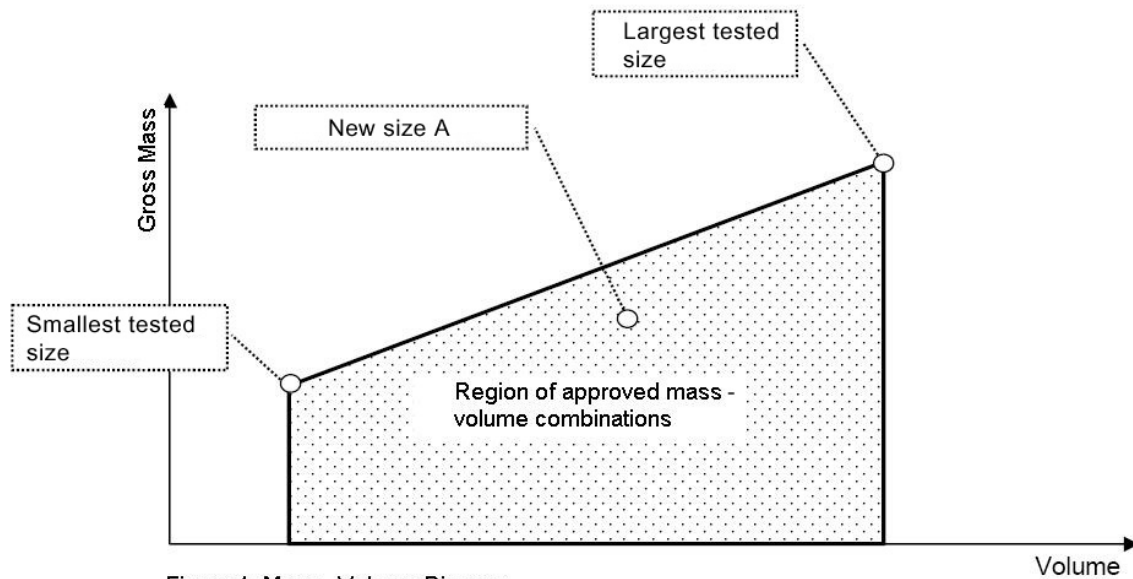


Figure 1: Mass - Volume Diagram

- a. The new size A lies below the connecting line between the smallest and largest sizes, i.e. the volume of the new size A neither falls below that of the smallest nor exceeds that of the largest tested sizes in the basic report, and the gross mass of the new size A does not lie beyond the connecting line between the sizes tested in the basic test report (the lightly dotted region in Figure 1).
- b. All other specifications of the approved design (bursting strength and puncturing energy) remain unchanged; the water absorption of the outer surface may under no circumstances exceed  $155 \text{ g/m}^2$ .
- c. Manufacturing is carried out by the manufacturer(s) named in the approval.
- d. Each new size A of a design type series passes successfully a retest.

The test body must determine the maximum approved gross mass and present the complete UN-marking in the retest report as a result of the retest. The retest report is to be provided to BAM and the monitoring body. A change in the approval will not result.

- 3.2.2 In addition, the approved mass-volume-region of a design type series can be extended if a size B (an example is depicted in Figure 2) lying outside the approved mass-volume-region is tested and approved. All new combinations of mass and volume are permitted provided that they lie below the connecting line between the new and previously tested sizes (see the heavily dotted region in Figure 2) and they satisfy the conditions of 3.2.1.

If the newly tested size B has a larger volume than the previous largest size, the new size B is designated the largest tested size and the previous largest size is designated the intermediate size; this applies correspondingly to a smaller volume of the new size B.

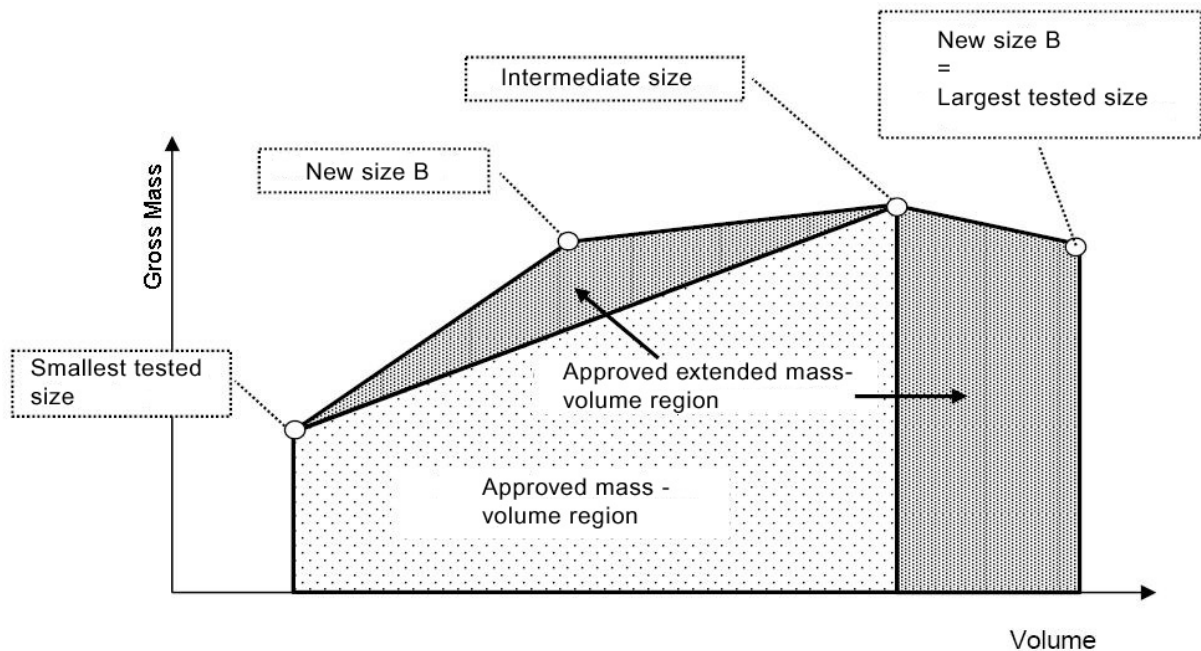


Figure 2: Mass - Volume Diagram

The retest report is to be submitted to BAM. If the requirements have been met, a new version of the approval stating the extended mass-volume region will be issued.

### 3.3 Modification of the material

3.3.1 In accordance with GGR-005 the following properties suffice for specification of the material fibreboard:

- Material of the front sides,
- Nominal wall thickness, type and sort of material of the top side of the cover or lid as well as of the sides and base,
- Grammage per layer and type of paper,
- Type of corrugated fibreboard,
- Bursting strength<sup>3</sup>, puncturing energy<sup>4</sup>, water absorption of outer surface<sup>5</sup> and crush resistance of the box.

3.3.2 The nominal wall thickness, type of material of the individual layers (kraft liner, test liner, etc.), grammage per layer and paper type and the total grammage may be modified under the following conditions:

- The technological characteristics of the modified corrugated fibreboard (bursting strength, puncturing energy) must achieve at least the corresponding values of the specification of the basic test report.
- The value for the water absorption of modified corrugated fibreboard may deviate from that of the specification of the basic test report but may under no circumstances exceed 155 g/m<sup>2</sup>.

3.3.3 A modification of the material of a packaging is considered approved if the above mentioned conditions have been fulfilled and a retest completed successfully. The retest report has to be submitted to BAM and the monitoring body. A change in the certificate of approval will not result.

### 3.4 Modification of the closures and means of closing.

<sup>3</sup> Test according to DIN EN ISO 2759

<sup>4</sup> Test according to DIN 53142

<sup>5</sup> Test according to DIN EN 20535

- 3.4.1 Manufacturing joins and user closures are to be defined in the specification of the basic test report. The following specifications are considered as sufficient for the description of the following types of closures:
- Adhesive tape: type (paper, reinforced or unreinforced plastics, textile), width and tear strength, and arrangement of tape(s);
  - Adhesion: type of adhesive (heat-, solvent-adhesive), position and measurements of the adhesive surfaces;
  - Foliation (only as user closure): number, arrangement, material, tensile strength and connection method (e.g. glued, fused, stapled);
  - Staples: number, arrangement, thickness and material.

The specifications valid for manufacturing joins serve as quality control during manufacturing. The specifications valid for user closures are part of the required information from the user, according to 6.1.1.5 of ADR/RID/IMDG Code and/or 1.1.5 of Chapter 4, Part 6 of the ICAO-TI, regarding the required measures when closing packagings. These measures have to be announced by the manufacturer.

- 3.4.2 In addition to the closures and means of closing<sup>6</sup> mentioned in the basic test report, the following modifications to the closures and means of closing may be approved:
- Adhesive tapes with lower technological characteristics (width, tear strength);
  - Alterations of the used adhesive or the arrangement of the adhesive points;
  - Decrease in the number or tear strength of the tapes or change of the connection method in the means of adhesion of a foliation;
  - Change in the number, thickness and material of the staples;

These modifications of a closure or means of closing are considered approved after successful completion of a shortened test. The shortened test report is to be submitted to BAM or the monitoring body upon request. A change in the certificate of approval will not result.

### 3.5 Alterations to the type of closing

3.5.1 Alterations in the type of closing, e.g. replacement of a double T adhesive with adhesive strips by simply sticking them over or replacement of an adhesive tape with heat adhesive closing, require a retest with the characteristics of the basic test. In the case of a design type series this retest can be combined with a shortened test or a retest for a new size A or B as described in 3.2.2.

3.5.2 The retest report is to be submitted to BAM. If the requirements are met a new version of the approval will be issued.

### 3.6 Recording of additional manufacturers and additional production sites of a manufacturer.

3.6.1 The certificate of approval of BAM allows for additional manufacturers and/or production sites of a manufacturer to be added. The requirement for this is BAM's recognition of a valid quality-assurance program for the manufacturer and successful repetition of the design type test with the same characteristics as for the basic test.

3.6.2 The test report is to be submitted to BAM. If all requirements are fulfilled the new manufacturer and/or additional production sites of a manufacturer are included in a new version of the approval.

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<sup>6</sup> Note: If the properties of the closures used in the basic test are not documented, a new design type test and approval are required for a modification of the closures.