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BAM Dangerous Goods Rule (BAM-GGR) BAM-GGR 024

Procedure for the fulfilment of the additional performance requirements for the transport of critically defective lithium batteries and sodium-ion batteries

Revision 2

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BAM Dangerous Goods Rule (BAM-GGR)

BAM-GGR 024

Requirements for the transport of critically defective lithium batteries and sodium-ion batteries liable to react dangerously during transport in accordance with special provision 376 for road (ADR), rail (RID), inland waterway (ADN) and sea (IMDG Code) modes of transport.

As competent authority according to

- § 8, paragraph 1, number 1 (b) and (c) and (3) of the Gefahrgutverordnung Straße, Eisenbahn und Binnenschifffahrt (GGVSEB) in der Fassung der Bekanntmachung vom 18. August 2023 (BGBl. 2023 I Nr. 227)
(German regulation concerning the transport of dangerous goods by road, rail and inland waterways)
- § 12 paragraph 1, number 1 b) and (c) of the Gefahrgutverordnung See (GGVSee) in der Fassung der Bekanntmachung vom 21. Oktober 2019 (BGBl. I S. 1475), die zuletzt durch Artikel 16 des Gesetzes vom 12. Dezember 2019 (BGBl. I S. 2510) geändert worden ist, in the currently valid version der jeweils geltenden Fassung
(German regulation concerning the transport of dangerous goods by sea)

in conjunction with the

- Richtlinien zur Durchführung der Gefahrgutverordnung Straße, Eisenbahn und Binnenschifffahrt (GGVSEB) und weiterer gefahrgutrechtlicher Verordnungen (Durchführungsrichtlinien-Gefahrgut) - RSEB- vom 29. August 2023 (VkB1. 2023, S. 515, i.V.m. Dokument Nr. B 2207 - Vers. 08/23)
und
(Guideline for implementation of the German regulation concerning the transport of dangerous goods by road, rail and inland waterways)
and
- Richtlinien zur Durchführung der Gefahrgutverordnung See (GGVSee)
(Guideline for implementation of the German regulation concerning the transport of dangerous goods by sea)

in consultation with the Federal Ministry of Transport, has published the following Dangerous Goods Rule (GGR).

This rule describes the additional testing requirements for the transport of damaged or defective cells and batteries of UN numbers 3090, 3091, 3480, 3481, 3551 and 3552, which, under normal conditions of carriage, are liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours (hereinafter referred to as "critically defective batteries") by BAM as competent authority according to ADR/RID/IMDG-Code, Chapter 4.1 (Packing Instructions P 911 and LP 906, paragraph (2) in each case) and in accordance with ADR/RID/ADN/IMDG-Code Chapter 3.3 (Special Provision 376) as amended.

For reasons of simplicity, only the masculine form is used in this rule. It is to be understood in each case for the male, female and diverse form.

This 2nd revision replaces revision 1 dated June 17th, 2024.

Specifications for the transport of critically defective batteries previously issued by BAM remain valid until their expiry date or until revoked.

This BAM-GGR and its annexes, except for Annex 5: Refrigerated transport, may not be applied to existing specifications. The conditions of these specifications apply. Fire tests carried out before March 1st, 2024, that meet the requirements of Annex 2 of this BAM-GGR 024 may be used within the scope of the application of Part A of this BAM-GGR. Fire tests that deviate from the requirements of Annex 2 of this BAM-GGR may be submitted as part of an application in accordance with Part B of this BAM-GGR.

Berlin, May 23rd, 2025

Important notice

This English translation of BAM-GGR 024 is for information purposes only. In the event of discrepancies, the German version shall prevail.

Contents

BAM Dangerous Goods Rule (BAM-GGR) BAM-GGR 024	1
General part.....	5
1. Introduction.....	5
2. Scope of application / delimitation	6
PART A: Additional testing requirements according to P 911 / LP 906.....	7
PART B: Procedure for obtaining a specification for individual cases in accordance with special provision 376 (specification)	8
B.1 Initial specification for the individual case according to special provision 376.....	8
B.2 Issue of a specification for the individual case.....	9
B.3 Revision of the specification for the individual case in accordance with special provision 376	9
B.4 Prolongation of the specification for the individual case according to special provision 376..	9
B.5 Validity of the determination notice	10
B.6 Revocation of the determination notice	10
PART C: Conditions and ancillary provisions	11
C.1 Preparation before transport.....	11
C.2 Requirements for vehicles (ADR) and wagons (RID).....	11
C.3 Requirements for the driver.....	11
C.4 Requirements for cargo transport units (CTU) e.g. containers	12
C.5 Labelling.....	12
C.6 Transport document.....	12
C.7 Other provisions.....	12
C.8 Obligation to notify BAM	13
C.9 Annexes and modelltemplates	13

General part

1. Introduction

Lithium batteries (UN 3090, UN 3091, UN 3480, UN 3481) and sodium-ion batteries (UN 3551, UN 3552) are to be treated as dangerous goods.

In a critically defective condition, they must be transported in accordance with Special Provision 376 ADR/RID/ADN and the IMDG Code.

The criteria and requirements for the packaging to be used are specified in P 911 and LP 906 ADR/RID and IMDG Code. As the competent authority, BAM specifies the additional testing requirements for the packaging/large packaging used in accordance with P 911 and LP 906 (Part A of these BAM-GGR).

In addition, BAM may authorise alternative packagings and/or transport conditions that deviate from those requirements in accordance with Special Provision 376 (specification, Part B of this BAM-GGR).

BAM's activities within the scope of this BAM-GGR are subject to charges in accordance with the Dangerous Goods Cost Ordinance (Gefahrgutkostenverordnung - GGKostV) of 11 March 2019 (Federal Law Gazette I p. 308), last amended by Article 2 of the Ordinance of 17 December 2024 (Federal Law Gazette 2024 I p. 422), as amended.

These regulations are not applicable to air transport. For air transport, please refer to the responsibility of the Federal Aviation Office (Luftfahrtbundesamt).

Definitions and synonyms used	
Lithium batteries	UN 3090: "LITHIUM METAL BATTERIES (including lithium alloy batteries)" UN 3091: "LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)" UN 3480: "LITHIUM ION BATTERIES (including lithium ion polymer batteries)" UN 3481: "LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)"
Sodium ion batteries	UN 3551: "SODIUM ION BATTERIES with organic electrolyte" UN 3552: "SODIUM ION BATTERIES CONTAINED IN EQUIPMENT or SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte"
Lithium batteries or sodium ion batteries (without further addition)	Functional batteries as good as new or used without damage
Defective lithium batteries or sodium-ion batteries	Batteries that do not or no longer fulfil their full function and/or are damaged, but do not tend to disintegrate quickly or react dangerously
Critically defective batteries	Damaged or defective batteries with UN numbers 3090, 3091, 3480, 3481, 3551 and 3552 which, under normal transport conditions, are liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours
Cells	Smallest energy storage unit
Modules	Energy storage unit made of cells
Battery	A) Cell-to-pack battery: Batteries that are made of cells B) Batteries made of modules

Nominal energy	Max. energy according to manufacturer
SoC	State of Charge as a percentage of the nominal energy
Packagings	Packagings, large packagings and packagings > 3 m ³ content for the transport of dangerous goods
CCCV	Constant Current Constant Voltage Charging method

2. Scope of application

Classification into "(only) defective" and "critically defective" batteries is to be carried out in accordance with special Provision 376 ADR/RID/ADN/IMDG Code.

This BAM-GGR specifies the minimum requirements for the additional test procedures in accordance with paragraph (2) of P 911 and LP 906 ADR/RID/IMDG Code. The ADN also refers to the packing instructions P 911 and LP 906 of the ADR in special provision 376.

Measures deviating from the procedures described below must be agreed in writing with BAM in advance and on a case-by-case basis. In this case, Part B of this BAM-GGR shall apply.

Only the cells/modules/batteries assessed in the procedure or named and specified in the specification notice may be transported.

Critically defective batteries installed in cargo transport units, UN 3536, which no longer fulfil the criteria according to 2.2.9.1.7 a) ADR/RID/ADN or 2.9.4.1 IMDG Code, must also be considered.

Batteries with a safety-relevant defect that are installed in a vehicle and are to be assigned to UN 3171 and where a safe removal of the batteries is not possible can be transported in the installed state, e.g. in accordance with special provision 667 b (i) ADR/RID/ADN.

In emergency situations, the transport of critically defective batteries is exempted by the competent authorities and emergency services and for the protection of human life and the environment in accordance with 1.1.3.1 d) and e) ADR/RID/ADN.

The transport of (not-critically) defective batteries is carried out in accordance with Special Provision 376 and P 908 or LP 904 ADR/RID/IMDG Code. Transport in accordance with this BAM-GGR is also permitted.

Batteries may be transported for disposal or recycling in accordance with P 909 ADR/RID/IMDG Code and SP 377 or Special Provision 636 ADR/RID.

The transport of batteries of production runs consisting of not more than 100 cells or batteries and pre-production prototypes of cells or batteries when these prototypes are carried for testing is carried out in accordance with P 910/LP 905 and special provision 310 of the ADR/RID/IMDG Code, respectively.

PART A: Additional testing requirements according to P 911 / LP 906

As competent authority, BAM has specified the additional test requirements required in the packing instructions P 911 and LP 906, ADR/RID IMDG Code, paragraph (2) in each case, in this BAM-GGR.

In order to fulfil the additional testing requirements for packagings according to paragraph (2) of P 911 and LP 906 ADR/RID/IMDG Code, the procedures described in the annexes to this BAM-GGR shall be applied.

In addition to the procedures described in Annexes 1 to 5, the packaging must have a gas management system that is capable, among other things, of releasing high gas pressures and retaining as much of any released HF gas as possible.

A quality management system shall be applied that includes raw data acquisition and storage, calibration of the measurement equipment and validation of the test methods, documentation of the cell and battery data including the SoC, recording of the test progression of the fire test and documentation of the interior of the packaging.

All raw data and test reports must be kept for at least 2 years after completion of the last transport.

The use of the data collection sheet for cells/modules/batteries provided by BAM is recommended (see Annex 6). It is also advisable to prepare a summary of the test results and applied rules/conditions in accordance with this BAM-GGR. In any case, the documentation must contain at least the information listed in Annex 6.

The fire test (see Annex 2 of this BAM-GGR) to fulfil the additional test requirements can be carried out by any company or institution that fulfils the quality management requirements described above.

BAM reserves the right to check the application of the described additional test requirements in accordance with P 911 / LP 906 if necessary.

A packaging that has been design type approved and has successfully passed the above-mentioned additional test requirements may be used to transport critically defective batteries. The decision as to whether the packaging is suitable for a certain battery is based on the data of the tested cells/modules/batteries. The shipper remains responsible.

PART B: Procedure for obtaining a specification notice for individual cases in accordance with special provision 376 (specification)

BAM as the competent authority may authorise alternative packaging and/or transport conditions in accordance with special provision 376 ADR/RID/ADN/IMDG-Code if there is a deviation from the additional test procedures or other requirements of P 911 or LP906 described in the annexes to this BAM-GGR.

This is the case, for example, if the packaging used has an internal volume $> 3 \text{ m}^3$, if the packaging has no UN certification for other reasons, if the fire test cannot be carried out in accordance with the requirements of Annex 2 or if it is not possible to apply the procedures described in this BAM-GGR.

In such cases, an application can be made to BAM for a so-called case-by-case specification.

The applicant may be a natural or legal person, e.g. the manufacturer of the dangerous goods packaging or the manufacturer or user of the battery.

In addition to the procedures described in Annexes 1 to 5, the packagings shall have a gas management system that is capable, among other things, of releasing high gas pressures and effectively retaining HF gas that may be released.

BAM reserves the right to inspect the application of the described additional test requirements in accordance with P 911 / LP 906 and the manufacture of the packagings if necessary.

B.1 Initial specification for the individual case according to special provision 376

For a specification in accordance with Special Provision 376 the applicant shall submit the following documents in German language to BAM:

The application shall contain the following information:

Packaging identification:

- Design type test according to chapter 6.1 or 6.6 ADR/RID/IMDG-Code with suitable test report and respective UN certificate, if applicable,
- If applicable, technical drawings to identify the packaging and its components, including interior parts and filling material, if not included in the test report,
- If applicable, material data sheets, if not included in the test report,
- Test report on a fire test in compliance with the procedure in Annex 2; in case of deviations from this fire test procedure BAM shall be consulted.

Battery specifications:

- The applicant shall provide the cell/module/battery data using the data sheet (see model template in Annex 6).

BAM may request further documents from the applicant.

The application can be submitted online or using the form provided (Annex 7).

B.2 Issue of a specification for the individual case

If the evaluation of the documents in B.1 shows that the requirements of Special Provision 376 are fulfilled, BAM issues the specification for the transport of critically defective batteries in the form of a specification notice.

The specification notice is a prerequisite for the use of the assessed packaging for the transport of critically defective batteries.

The tested cell/module and battery data are specified in the annex to the specification notice. The cells, modules and batteries that may be transported on basis of the specification result from this compilation. For data protection reasons, this appendix is confidential and may only be passed on by the holder of the specification. It does not have to be carried during transport.

The specification is issued with a maximum validity of three years.

The validity of a revision is limited to the validity period of the original specification notice.

B.3 Revision of the specification for the individual case in accordance with special provision 376

It is necessary to apply for a revision of the specification if, within the period of validity of the specification:

- the name or address of the holder of the specification changes,
- fundamental changes are made to the packaging used (e.g. design changes, material changes),
- changes or additions are made to the cells/modules/batteries to be transported.

The holder of the specification shall inform BAM in advance if changes are to be made to the specification.

The following documents shall be submitted:

- Application (see B.1) for a revision of the specification notice with the following details:
- Name and address (old and new, if applicable)
- In the case of extension/amendment: description of the changes, documentation if applicable.

BAM will agree any further documents and measures required with the applicant.

B.4 Prolongation of the specification for the individual case according to special provision 376

To prolong the specification the following documents shall be submitted to BAM at least eight weeks before the currently valid specification expires:

- Application (see B.1) for prolongation of the specification notice with details of any amendments.

BAM may request further documents from the applicant.

B.5 Validity of the specification notice

The specification notice is only valid for the holder of the specification. In particular, the holder of the specification is responsible for assessing whether the critically defective battery in question may be transported in this packaging.

The specification expires after the expiry date stated in the specification notice.

B.6 Revocation of the specification notice

The specification notice may be revoked by BAM at any time.

From the time the revocation of the specification becomes effective, the corresponding packaging may no longer be used for the transport of critically defective batteries.

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PART C: Conditions and ancillary provisions

The following conditions and ancillary provisions are mandatory when applying the procedure according to Part B of this BAM-GGR. When applying Part A of this BAM-GGR, compliance with these conditions and ancillary provisions is recommended unless they are prescribed by the provisions of the ADR/RID/IMDG Code.

C.1 Preparation before transport

All contacts of the cells/modules/batteries shall be secured against external short circuits.

All openings for operating materials other than electrolyte shall be sealed.

Adhesions of dangerous goods and electrolyte on the outside of the packaging shall be removed as far as possible.

Suitable measures shall be taken to minimize the effects of vibrations and shocks.

It shall be ensured that at least 1.5 times the volume of the possible released liquid substance can be absorbed.

When transporting individual cells/modules, sufficient thermal insulation material shall be inserted between the individual cells/modules.

The specification holder/applicant of this BAM-GGR shall ensure that the user has all the information necessary to transport the cells/modules/batteries in their permitted packaging/configuration.

When transporting cells/modules/batteries packed in/with equipment (UN 3091, UN 3481, UN 3552), the equipment must not lead to a significant increase in the fire load. The equipment shall be emptied from other hazardous substances/hazardous goods. Examples of such equipment are small electrical appliances and tools such as laptops, cordless screwdrivers, cordless saws.

The packagings shall be stowed in such a way that they are easily accessible.

C.2 Requirements for vehicles (ADR) and wagons (RID)

Closed, sheeted and open vehicles/wagons may be used.

Access by unauthorized persons to the critically defective cells/modules/batteries to be transported must be securely prevented. In the case of covered and open vehicles/trolleys, this can be ensured by screwing down the lid of the outer packaging or by securing the locking brackets of the lid with a suitable locking system. In the case of covered vehicles/wagons, the load compartment of the vehicle shall be locked during transport.

The load compartment or the loading area of the vehicle shall be separated from the driver's cabin by a rigid, closed wall.

In the case of sheeted and closed vehicles/wagons, it must be ensured that the loading compartment of the vehicle/wagon is ventilated and that the air in the loading compartment can be exchanged at least six times per hour.

Closed vehicles may be equipped with a refrigeration unit.

C.3 Requirements for the driver

The driver must have a valid certificate in accordance with 8.2.1 ADR.

C.4 Requirements for cargo transport units (CTU) e.g. containers

Only covered CTUs may be used. It must be ensured that CTUs are ventilated and that the air in the CTU can be changed at least six times per hour.

CTUs must be closed during transport.

CTUs may be equipped with a refrigeration unit.

During sea/inland waterway transport, CTUs shall be transported exclusively on deck and away from heat sources. The outer packagings shall be stowed in the CTU in such a way that it is easily accessible.

The CTU shall not be stacked.

C.5 Labelling

The packages shall be labelled in accordance with the ADR/RID/ADN or IMDG Code.

C.6 Transport document

Each transport shall be accompanied by a transport document in accordance with ADR/RID/ADN or IMDG Code.

When applying Part A of this BAM-GGR:

It is recommended to carry a confirmation with the transport documents that this BAM-GGR has been applied,

When applying Part B of this BAM-GGR:

The specification (without annexes containing confidential data on cell and battery specifications) shall be carried with the transport documents.

C.7 Other provisions

In addition to the other applicable provisions, the following must be observed in particular:

The tunnel restriction code is "(E)".

The loading or unloading of critically damaged or defective cells/modules/batteries transported in accordance with this BAM-GGR in a place accessible to the public is prohibited. If the loading or unloading is carried out in a cordoned-off area on the premises of the specification holder/user of this BAM-GGR or on the premises of the consignee, carrier or consignor, this requirement is deemed to be fulfilled.

C.8 Obligation to notify BAM

If incidents occur during the transport of critically defective cells/modules/batteries based on this BAM-GGR, BAM must be informed immediately.

C.9 Annexes and model templates

Appendix 1 Unreactive cells

Appendix 2 Requirements for the fire test

Appendix 3 100-/80-/30 % rule

Appendix 4 Scaling

Appendix 5 Cooled transports

Appendix 6 Model template battery data (not part of the English translation)

Appendix 7 Application form (not part of the English translation)