



BSI Standards Publication

Lead-acid starter batteries

Part 5: Mechanical properties of battery housings and handles

National foreword

This British Standard is the UK implementation of EN 50342-5:2025. It supersedes BS EN 50342-5:2010, which will be withdrawn on 31 October 2028.

The UK participation in its preparation was entrusted to Technical Committee PEL/21, Secondary cells and batteries.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Date	Text affected
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English Version

Lead-acid starter batteries - Part 5: Mechanical properties of battery housings and handles

Batteries d'accumulateurs de démarrage au plomb - Partie 5: Propriétés mécaniques des boîtiers et poignées de batteries

Blei-Akkumulatoren-Starterbatterien - Teil 5: Mechanische Eigenschaften von Batteriegehäusen und Griffen

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European foreword

This document (EN 50342-5:2025) has been prepared by CLC/TC 21X, "Secondary cells and batteries".

The following dates are fixed:

- latest date by which this document has to be (dop) 2026-10-31 implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards (dow) 2028-10-31 conflicting with this document have to be withdrawn

This document supersedes EN 50342-5:2010 and all of its amendments and corrigenda (if any).

EN 50342-5:2025 includes the following significant technical changes with respect to EN 50342-5:2010:

- improvement of the structure and the wording of the document;
- clear definition of tests and requirement levels that need to be passed to state EN 50342-5 compliance;
- separation between test procedures and requirements;
- differentiation between system level tests and requirements compared to component level tests and requirements.

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1 Scope

This document is applicable to housing and accessory parts of lead-acid batteries made of polypropylene.

Lead-acid batteries are used primarily as a power source for the starting of internal combustion engines, lighting and for auxiliary equipment of road vehicles. These batteries are all referred to as starter batteries.

This document is applicable to starter batteries for passenger cars and for commercial or industrial vehicles.

Battery housing and accessory parts according to this document do not provide any protection of the polypropylene against aging due to light. The parts are intended to be used within the engine compartment or within battery boxes where they are protected from light.

The purpose of this document is to define requirements for raw material used to produce housing and accessory parts for starter batteries, to define requirements of the physical properties of battery housing and to define uniform test procedures for validation.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50342-2, *Lead-acid starter batteries - Part 2: Dimensions of batteries and marking of terminals*

EN 50342-4, *Lead-acid starter batteries - Part 4: Dimensions of batteries for heavy vehicles*

EN ISO 527-1, *Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

IEC 60050-482, *International Electrotechnical Vocabulary – Part 482: Primary and secondary cells and batteries*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

battery case

container for the plate pack or packs and electrolyte of a cell or cells made of a material impervious to the electrolyte

[SOURCE: IEC 60050-482-02-14]

3.2

cell lid

battery lid

part used to close the case normally having holes for filling, topping-up, gas escape, terminals, etc

[SOURCE: IEC 60050-482-02-15]

3.3**battery housing**

entity made of a battery case and a battery lid, intended to be welded together

3.4**battery accessory**

item coming on top of the battery housing (i.e. handles, plugs, etc.)

3.5**raw material**

material defined by the substance used for the production of the battery housing and accessories

Note 1 to entry: It can be polypropylene (PP), polyethylene (PE) or a mixture of both. Raw material can be either a virgin material or a recycled, regenerated or regrind material.

3.6**hold-down**

ledge at the lower part of the battery case for fixation within vehicle

Note 1 to entry: See EN 50342-2 and EN 50342-4 for dimensions.

4 General

This document provides test procedures and requirements for poly material, battery components and complete batteries. To prove compliance with this document the tests according Annex A shall be passed.

5 Properties of raw materials**5.1 General**

The examination of the raw materials should be performed in accordance to the specifications shown in Annex B. If not agreed otherwise, the results need to be documented in a corresponding material specification.

Test methods are based on international ISO standards. The needed specimens for the individual examination are given in Annex B.

The specimens shall be stored before starting any test for at least 4 days at $(23^{\circ} \pm 0,5)^{\circ}\text{C}$ and shall be tested within 3 months.

Annex C recommends possible test procedures for the material properties taken out of the battery housing, without being normative.

5.2 Resistance against chemical substances

The purpose of this test is to check if chemical substances which might be present in the vicinity of batteries and have some chemical affinity to PP can significantly weaken the material properties.

The test shall be carried out on specimens 5A according to EN ISO 527-2. The specimens are prepared by injection moulding and shall be aged at 100°C for 4d before starting the test.

Each sample shall be weighed and all samples for one liquid are treated together under reflux at a temperature and time according to Table 1.

In Annex E a laboratory equipment for heat treatment under reflux is depicted.

For statistical reasons the test shall be carried out on at least 6 samples

After treatment each sample shall be dried, weighed and tested on tensile strength at yield according to EN ISO 527-1.

The maximum change in weight and tensile strength at yield compared to the initial data, before treatment with chemicals, is given in Table 1.

Table 1 — Resistance against chemicals

Substance	Test temperature °C	Test time h	Maximum change in weight %	Maximum change in tensile at yield %
Synthetic motor oil	70	72	10	- 20
Gasoline ^a > 95 ROZ	70	72	10	-30
Diesel ^b	70	72	20	-30
Biodiesel ^c (Rape seed methyl ester)	70	72	15	-30
Brake fluid DOT 4	70	72	1	±5
Cooling agent (Commercial mixture)	70	72	< 0,5	±5
Sulfuric acid 1,28 g/ml at 25 °C	70	1 000	< 0,5	±5
^a According to EN 228 ^b According to EN 590 ^c According to EN 14214				

6 Production of battery housings

6.1 General

The test procedures in this section are intended to check characteristics of battery cases and battery lids during production. They might be used to judge the quality after injection moulding of these components.

These tests are not relevant any more for finished batteries after completion of the production process.

6.2 Test on disruptive strength

6.2.1 General

Purpose of this test is to prove an injection quality without risk of acid leakage by small holes.

6.2.2 Apparatus

Commercial high voltage generator with test electrodes. In most cases this are two adjacent plates. Electrodes with brush design can be beneficial. The electric field is higher on the surface of a tip but decreases with square of distance. The setup of the system shall be checked and confirmed by experiment.

The voltage shall be adjustable up to (25 ± 2) kV DC or AC sinus peak to peak with a frequency of (50 ± 10) Hz. The maximum output current of the generator shall be adjustable to a current limit ≤ 1 mA.

6.2.3 Procedure

The sample to be tested shall be dry. It shall be positioned between the test electrodes in a way, that one electrode contacts the internal side, the other the outer side of the sample.

The applied voltage shall be adjusted to generate an electric field strength of at least 5 kV / mm up to about 10 kV / mm.

To find the operation threshold a test sample e.g. a battery case with a drilled hole of $(1,0 \pm 0,1)$ mm in diameter can be used. The electric field is adjusted until the set current limit is reached.

6.2.4 Requirement

No disruptive discharge – the current stays below the adjusted set current limit.

6.3 Warm storage

6.3.1 General

Purpose of this test is to prove the thermal stability of the battery components.

The test discovers any internal tensions inside the parts after the injection moulding process which might result in a warping of the container.

6.3.2 Apparatus

Temperature test chamber with sufficient power. The air temperature shall be recovered to the target temperature within 10 min after the sample part have been inserted.

6.3.3 Procedure

The sample part is placed into the preheated temperature test chamber at (120 ± 2) °C in a way that it is not mechanically stressed. It shall not touch other samples or the walls of the temperature test chamber. Samples should be evenly distributed to the available space.

After 2 h of storage the samples shall be removed from the temperature test chamber and shall be cooled to room temperature.

6.3.4 Requirements

The surface shall remain even and no change of the original colour shall occur.

In case of battery cases any deformation of the cell walls shall be less than 1,5 % referred to the width of the cells. The deformation shall be measured at the centre of the cell wall.

Changes in overall dimensions in length width and height shall be less than 1,5 %.

6.4 Heat resistance test

6.4.1 General

Purpose of this test is to secure, that during a normal battery life even under elevated temperatures as they may occur in hot climate regions or for batteries mounted near the engine, there will be no degradation of the PP material. Degradation during battery life would result in a damage of the container and acid loss.

The test is carried out preferably with welded lids and containers (battery housings), but single containers and lids can be used as well.

6.4.2 Apparatus

Temperature test chamber with forced air circulation and sufficient power. The air temperature shall be recovered to the target temperature within 10 min after the sample part have been inserted. In addition, an exhaust system need to be considered as hazardous gases might evolve.