



# Advisory Circular

## AC43-12

Revision 1

22 May 2024

### Non-aeronautical lead acid and reconditioned batteries

#### General

Civil Aviation Authority (CAA) Advisory Circulars (ACs) contain information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rule.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

#### Purpose

This AC describes an acceptable means of compliance with Civil Aviation Rule Part 43, *General Maintenance Rules*, relating to the use of non-aeronautical lead acid batteries in aircraft.

#### Related Rules

AC43-12 relates to Part 43, specifically rule 43.51(b) and Appendix A.1(2).

#### Change Notice

Revision 1 is a general update of this AC, to align with current AC format and update technical information. This Revision has also deleted the Acceptable Standards section, added advice about using reconditioned batteries, added a Further Resources section, and added a Version History.

#### Version History

The history of revisions is detailed in the table below:

Revision No.	Effective Date	Summary of Changes
AC43-12, Rev 0	3 March 1997	Initial issue
AC43-12, Rev 1	22 May 2024	Aligns with current AC format Deletes the Acceptable Standards section Updates technical information Adds advice about using reconditioned batteries Adds a Further Resources section Adds a Version History

## Table of Contents

Rules and risks .....	3
Modification information .....	4
Further resources .....	4

## Rules and risks

### ***Non-aeronautical lead acid batteries***

Under Part 91, *General Operating and Flight Rules*, operators are required to ensure that their aircraft is maintained in an airworthy condition. Part 43 contains requirements for maintenance that must be complied with to assure this airworthiness. Part 43 includes the requirement that approved parts be used and that an aircraft remain in its original or properly modified condition.

Non-aeronautical lead acid batteries may be approved for installation in the following aircraft types:

- Non-aerobatic aircraft operating under VFR only, and
- Gliders.

The conditions for fitting a non-aeronautical lead acid battery include:

- batteries complying with the applicable standards in the manufacturer's guidelines or relevant standards association such as Standards New Zealand, and
- a modification for the fitment of the battery being raised for approval in accordance with Part 21, *Certification of Products and Parts*.

There are, however, greater risks in using non-aeronautical batteries for aircraft, primarily that non-aeronautical batteries are not accompanied with standards for airworthiness, such as Instructions for Continuing Airworthiness (ICAs), because they were not designed for that purpose. Therefore, there is a greater likelihood that they are not fit for purpose and the onus for ensuring they are falls on the operator.

### ***Reconditioned batteries***

Some operators have also asked about whether it is acceptable to use reconditioned batteries. While rules 43.51(b) and Appendix A.1(2) don't prohibit these batteries, there are some drawbacks to using them. Reconditioned batteries:

- are unlikely to have a capacity equal or greater than 80% of their original new rating, or if they do have an 80% capacity rating remaining:
  - are unlikely to meet this at the next inspection interval, and
  - will not stay acceptable for very long, and
- may not be accompanied with documents, like ICAs, to show they can meet acceptable technical data (ATD) standards, so the operator needs to demonstrate the batteries are acceptable and have been installed by an appropriately trained person, and/ or
- may not be airworthy, given that there are no consistent standards for reconditioning batteries.

## Modification information

The following factors must be addressed in the modification package submitted for approval in accordance with Part 21:

- Installation:
  - Mounting and restraint should be provided appropriate for the aircraft's type of operation
  - There should be clear and permanent identification of battery lead polarity
  - Suitable insulation should be fitted to either the battery or surrounding aircraft structure to prevent any exposed terminal or inter-cell connector coming into contact with the aircraft structure
  - A load analysis should be provided to check that the battery provides adequate capacity for the anticipated electrical loads, and
  - Appropriate aircraft weight and balance should be calculated.
- Maintenance:
  - Terminals, preferably non-interchangeable terminals, should provide good continuing contact with the battery terminals, and
  - Suitable access should be provided to allow maintenance tasks to be carried out in-situ or the battery should be readily removable for inspection or servicing.
- Operation:
  - There should be adequate venting, draining, and acid proofing provided for the battery compartment, and
  - When the battery being used is of the lead acid paste or gel cell type, there is no requirement for a battery compartment drain.

## Further resources

Because battery technology is fast-changing, it is important to do thorough research before purchasing or modifying batteries.

The following guides may be useful:

- <https://www.standards.govt.nz/shop/asnzs-4029-22000/>
- [https://www.sae.org/standards/content/j537\\_201604/](https://www.sae.org/standards/content/j537_201604/)
- [https://www.sae.org/standards/content/j2185\\_201801/?src=j537\\_201604](https://www.sae.org/standards/content/j2185_201801/?src=j537_201604)
- <https://www.usaid.gov/energy/powering-health/technical-standards/lead-acid-batteries>
- <https://webstore.iec.ch/publication/59834>
- <https://www.standards.govt.nz/shop/asnzs-2401-21995/>