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INTERNATIONAL STANDARD

colour inside

Lead-acid starter batteries –
Part 4: Dimensions of batteries for heavy vehicles

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LEAD-ACID STARTER BATTERIES –

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60095-4 has been prepared by IEC technical committee 21: Secondary cells and batteries.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) values of "tolerance", in particular for European batteries;
b) update of figures for USA and Asian batteries.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
21/1087/FDIS	21/1091/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 60095 series, published under the general title *Lead-acid starter batteries*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

LEAD-ACID STARTER BATTERIES –

Part 4: Dimensions of batteries for heavy vehicles

1 Scope

This part of IEC 60095 is applicable to lead-acid batteries used for starting, lighting and ignition of heavy trucks, commercial vehicles, busses and agricultural trucks.

The object of this document is to specify global requirements of the main dimensions of starter batteries for Europe, North America and East Asia.

This document comprises 12 types of "preferred types" of batteries.

This document specifies dimensions of 4 types of batteries each for Europe (types A, B, C and D2), North America (types 4D, 8D, 31T, 31A) and East Asia (types E41, F51, G51, H52).

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.

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

IEC 60095-1, *Lead-acid starter batteries – Part 1: General requirements and methods of test*

IEC 60417:2002, *Graphical symbols for use on equipment*

ISO/IEC 10646, *Information technology – Universal coded character set (UCS)*

ISO 1043-1, *Plastics – Symbols and abbreviated terms – Part 1: Basic polymers and their special characteristics*

ISO 11469, *Plastics – Generic identification and marking of plastics products*

3 Terms and definitions

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

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

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

4 Common features

4.1 Labelling

The batteries shall be marked in accordance with IEC 60095-1.

4.2 Marking of polarity

4.2.1 General

The batteries shall carry the marking of polarity, at least of the positive terminal.

4.2.2 Marking of positive terminals

This marking shall take the form of the symbol '+' either on the upper surface of the positive terminal or on the lid adjacent to the positive terminal.

4.2.3 Marking of negative terminals

If the negative polarity is also marked, the marking shall take the form of the symbol '–', either on the upper surface of the negative terminal or on the lid adjacent to the negative terminal.

As an alternative, the wording "POS" and "NEG" is permitted for the North American market only.

4.2.4 Design and dimensions of marking

The symbols used for marking the terminals shall be in accordance with IEC 60417-5005:2012-10 for the positive polarity and IEC 60417-5006:2012-10 for the negative polarity.

The dimensions of the marking shall be according to Figure 1.

The polarity symbols may be either indented or embossed by 0,4 mm ± 0,1 mm.

Dimensions in millimetres

Figure 1 – Marking of polarity

4.3 Marking of plastic material

Injection moulded battery components need to be marked according to ISO 11469 and ISO 1043-1. The marking shall be placed on the bottom of the battery container or on one short side near the ledge.

According to ISO 11469 and ISO 1043-1 the minimum marking for polypropylene-polyethylene copolymer is >PP< or >PP/PE<.

In addition, it is possible to show the recycling symbol with number 7 (Unicode character 'RECYCLING SYMBOL FOR TYPE-7 PLASTICS' (U+2679) according to ISO/IEC 10646) and the term "Other".

The recommended thickness is (0,3 ± 0,1) mm. The height of the marking characters shall be between 5 mm and 7 mm.

An example for this marking is shown in Figure 2.

OTHER

>PP/PE<

IEC

Figure 2 – Marking of polypropylene-polyethylene copolymer battery components

Producers are encouraged to consult the regulations of the target market.

It is permissible to use the number coding 7 or 07 for PP/PE and the addition of "other" to cover additives to the plastic material.

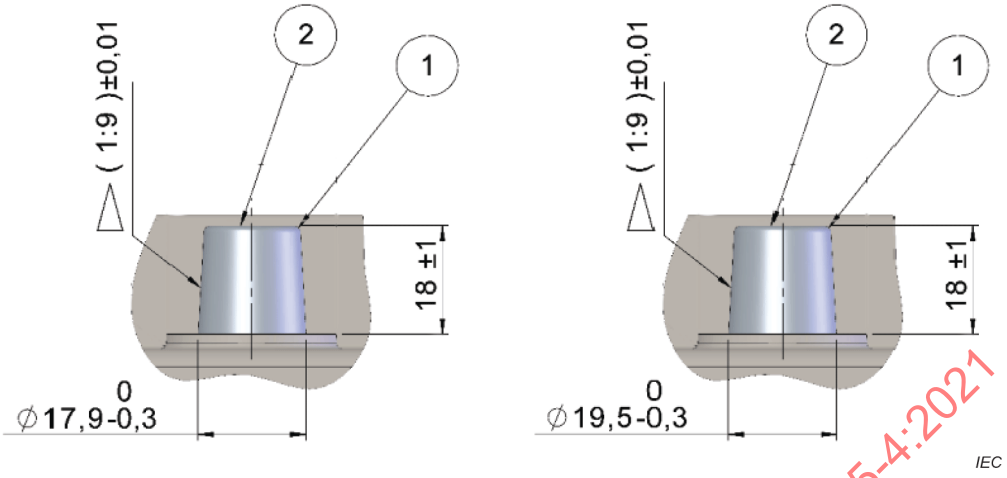
4.4 Dimensions and design

All dimensions are in millimetres and sometime also in inches when mentioned in brackets. Details of the design that are not indicated in the generic drawings have to be chosen appropriately. The illustrations in this document, especially those of the design of the lids, handles, ribs, ledges, vent caps and their locations are not mandatory.

4.5 Dimensions of terminals

The dimensions of the tapered positive and negative terminal shall be according to Figure 3.

Dimensions in millimetres



Key

1 Edge with radius

2 Convex or concave surface design permitted within height dimensions of (18^{+1}_{-2}) mm related to the centre of the terminal

Figure 3 – Dimensions of positive (on the right) and negative (on the left) terminal

4.6 Recommendation for new development

For future new developments of heavy vehicles, it is strongly recommended to use only batteries from this document.

5 European types

5.1 General

This applies to the series of lead-acid starter batteries for heavy trucks, widely and predominantly used in Europe. In the following, the series is designated as "EU". The EU series comprises four types.

5.2 Fastening

All types are intended for fastening by the upper part of the battery only.

This fastening shall be realized at a level defined by the dimension "h_1" in the figures. The configuration shall permit the fitting of an angle-iron frame, both legs of which are 20 mm wide, for the major part of the lid's four sides.

5.3 Dimensions

The main dimensions are represented by symbols, as indicated in Figure 4 and Figure 5. The dimensions according to the symbols shall be in accordance with Table 1.

Table 1 – EU series – Dimensions of batteries

Dimensions in millimetres

Type	Length				Width			Height	
	l	l_1	l_2	l_3	b	b_1	b_2	h	h_1
D2	349^{+0}_{-5}	344^{+0}_{-8}	--	--	175^{+0}_{-4}	162^{+4}_{-4}	--	235^{+0}_{-4}	213^{+0}_{-4}
A	513^{+0}_{-4}	475^{+0}_{-3}	482^{+2}_{-2}	200^{+4}_{-4}	188^{+2}_{-2}	178^{+0}_{-2}	86^{+1}_{-1}	223 max	195^{+0}_{-3}
B	513^{+0}_{-4}	475^{+0}_{-3}	482^{+2}_{-2}	200^{+4}_{-4}	222^{+2}_{-2}	210^{+0}_{-2}	102^{+1}_{-1}	223 max	195^{+0}_{-3}
C	518^{+0}_{-8}	475^{+0}_{-3}	482^{+4}_{-2}	200^{+4}_{-4}	274^{+2}_{-2}	265^{+0}_{-2}	130^{+1}_{-1}	242 max	216^{+0}_{-3}
The length, width and height symbols refer to Figure 4 and Figure 5.									

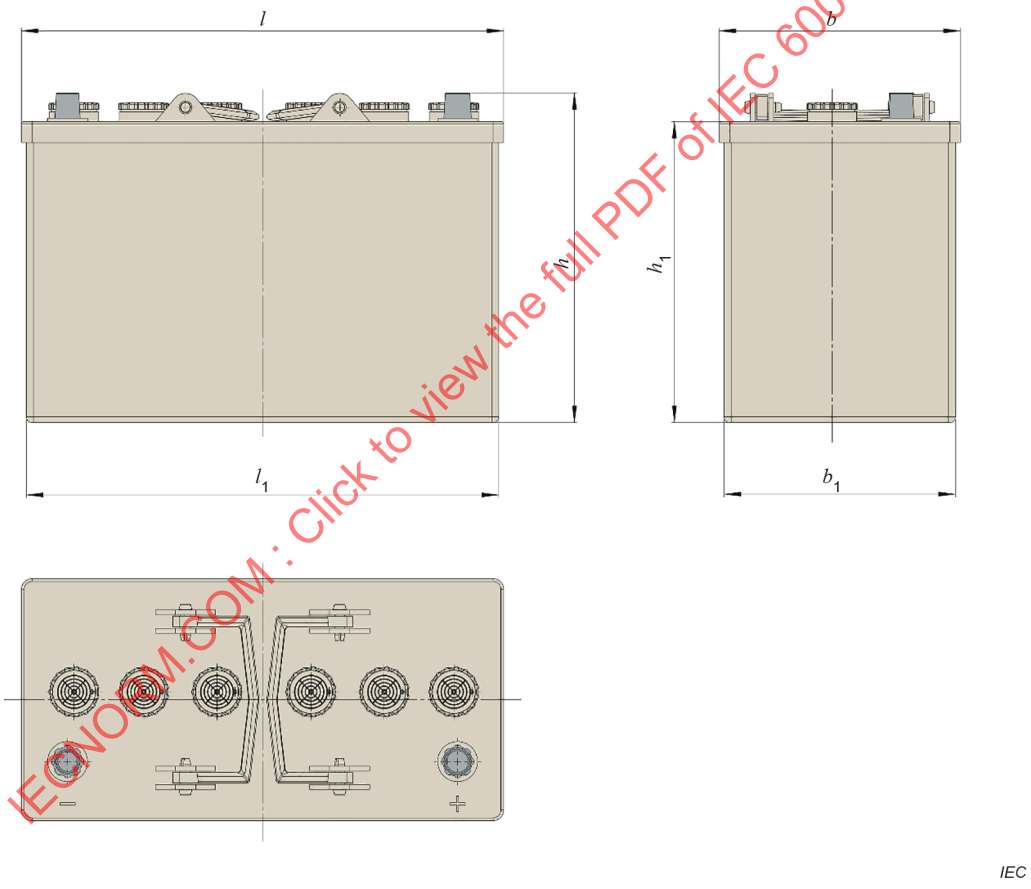


Figure 4 – EU series – Type D2

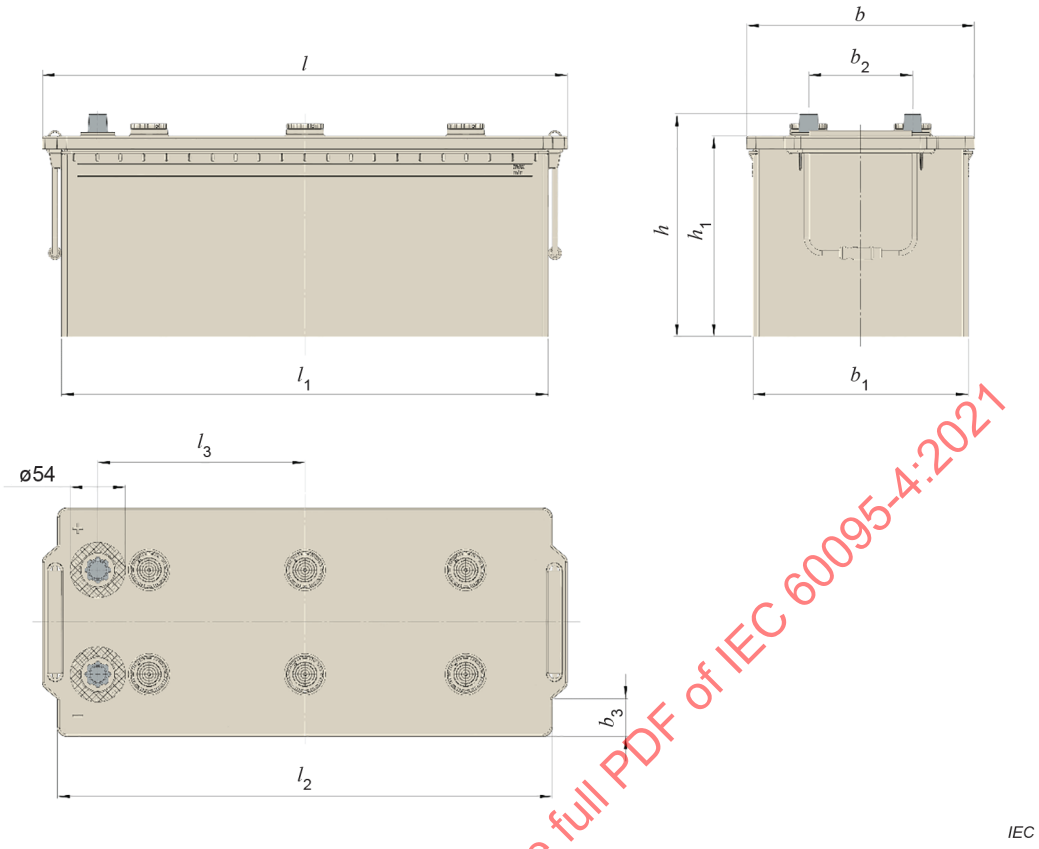


Figure 5 – EU series – Types A, B, C

6 North American types

6.1 General

6.1.1 Overview

This applies to the series of lead-acid starter batteries for heavy trucks, widely and predominantly used in North America. In the following, the series is designated as "AM". The AM series comprises four types.

6.1.2 Fastening

All of these batteries are intended for fastening to the vehicles by means of a hold-down device engaging with the upper part of the battery (for example a metal frame), connected to the support platform.

6.1.3 Terminal configuration, polarity

The types of the AM series have terminal configurations as shown in the battery drawings in Figure 6, Figure 7, Figure 8 and Figure 10. The polarity shall be as shown in the figures.

6.1.4 Terminal dimensions

The dimensions are shown in Figure 3 and Figure 9.

6.2 Dimensions

The main dimensions are represented by symbols as indicated in Figure 6, Figure 7, Figure 8 and Figure 10. The dimensions according to the symbols typically are in accordance with Table 2.

Table 2 – AM series – Dimensions of batteries

Dimensions in millimetres

Type	Length (overall)	Width	Height	
	l	b	h_1	h
4D	527^{+0}_{-4}	222^{+0}_{-4}	230^{+0}_{-4}	250^{+0}_{-4}
8D	527^{+0}_{-4}	283^{+0}_{-4}	230^{+0}_{-4}	250^{+0}_{-4}
31T	330^{+0}_{-4}	173^{+0}_{-4}	219^{+0}_{-4}	240^{+0}_{-4}
31A	330^{+0}_{-4}	173^{+0}_{-4}	219^{+0}_{-4}	240^{+0}_{-4}

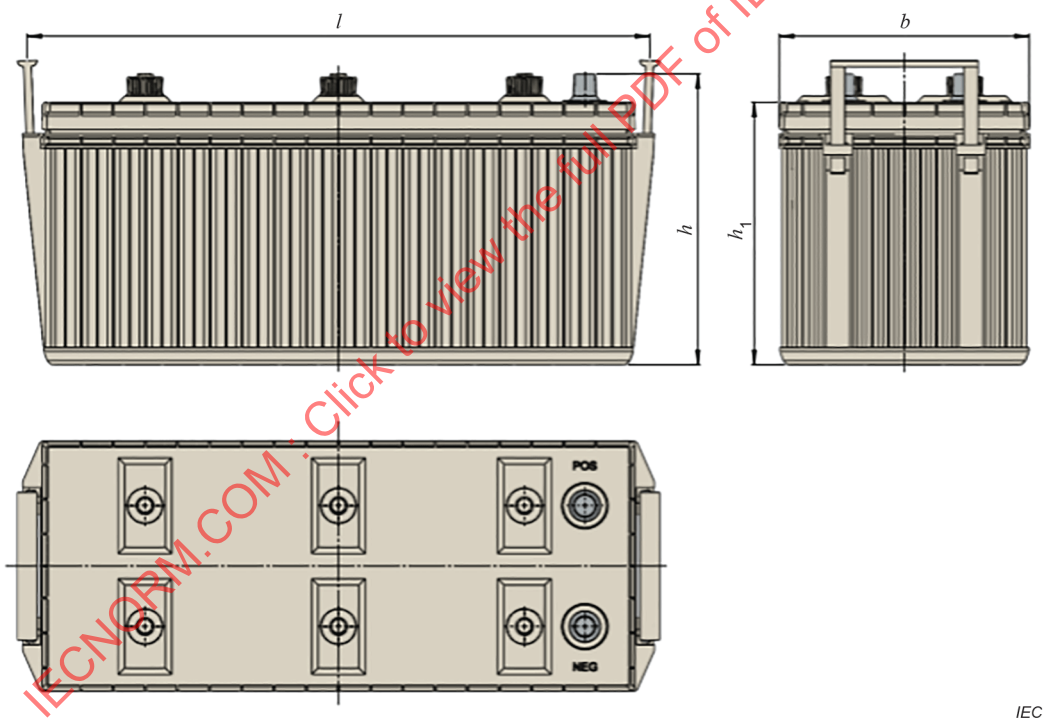


Figure 6 – AM series – Type 4D

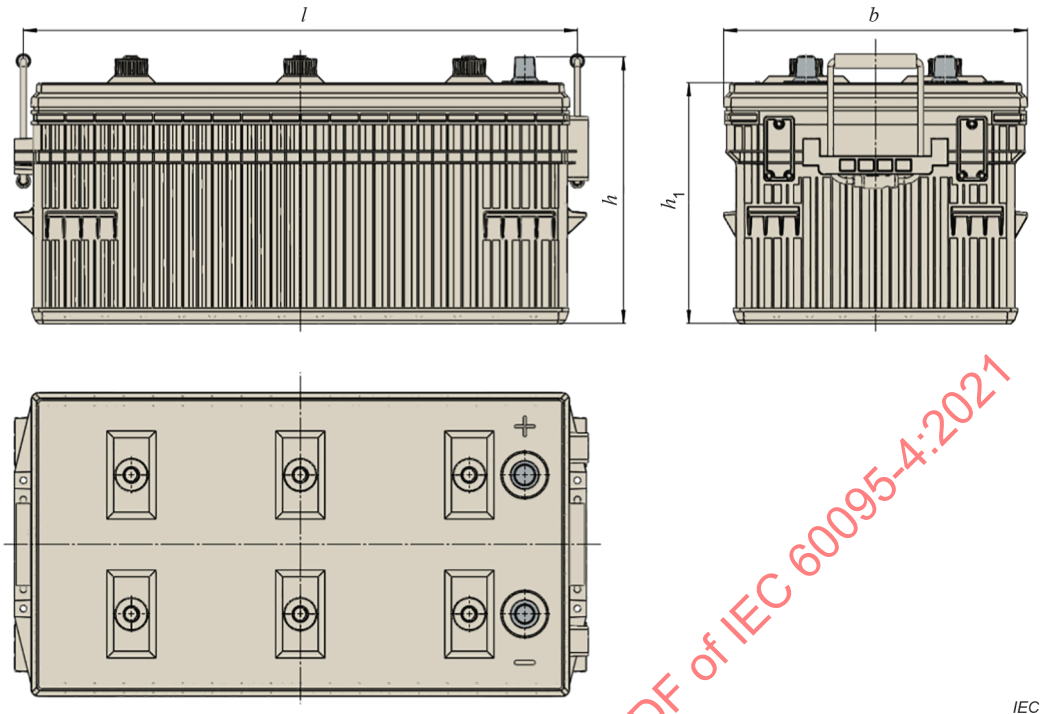
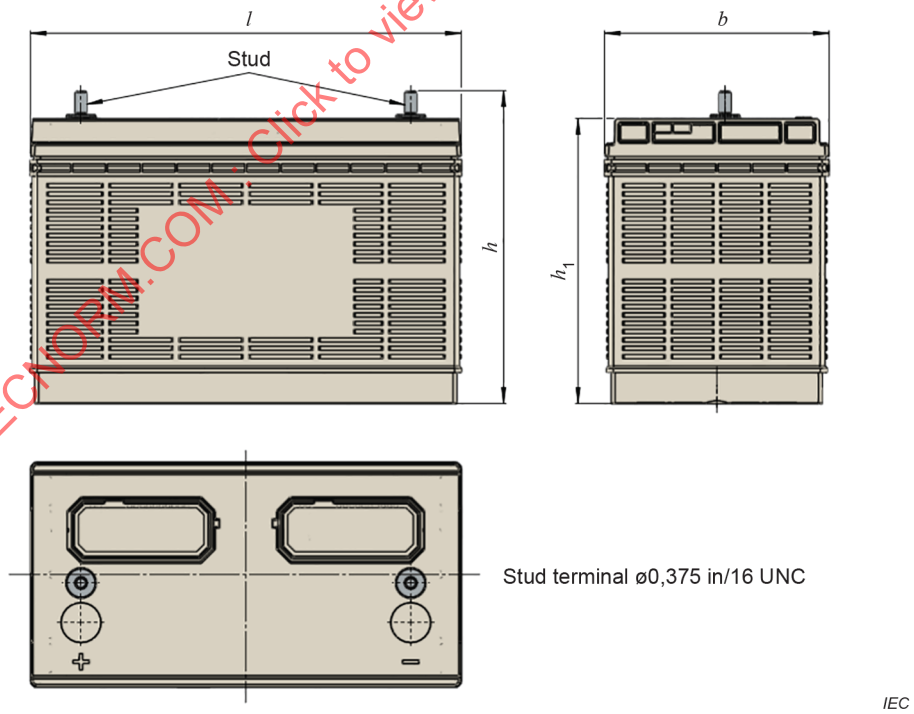


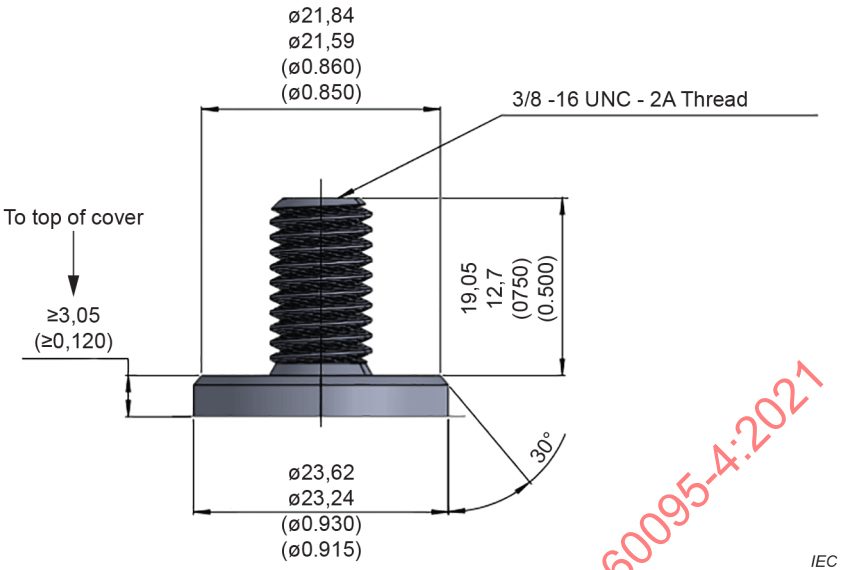
Figure 7 – AM series – Type 8D



NOTE "3/8 – 16 UNC" is according to ANSI ASME B.1.1.

Figure 8 – AM series – Type 31T

Dimensions in millimetres



CAUTION – STUD LENGTH, CABLE EYELET THICKNESS AND TERMINAL NUT MUST BE COMPATIBLE TO INSURE RELIABLE CONNECTIONS.
CONSULT BATTERY SUPPLIER FOR SPECIFIC STUD LENGTH.

NOTE 1 "3/8 – 16 UNC-2A" is according to ANSI ASME B.1.1.

NOTE 2 Dimensions are given in millimetres and, in brackets, in inches.

Figure 9 – Dimensions of stud terminal

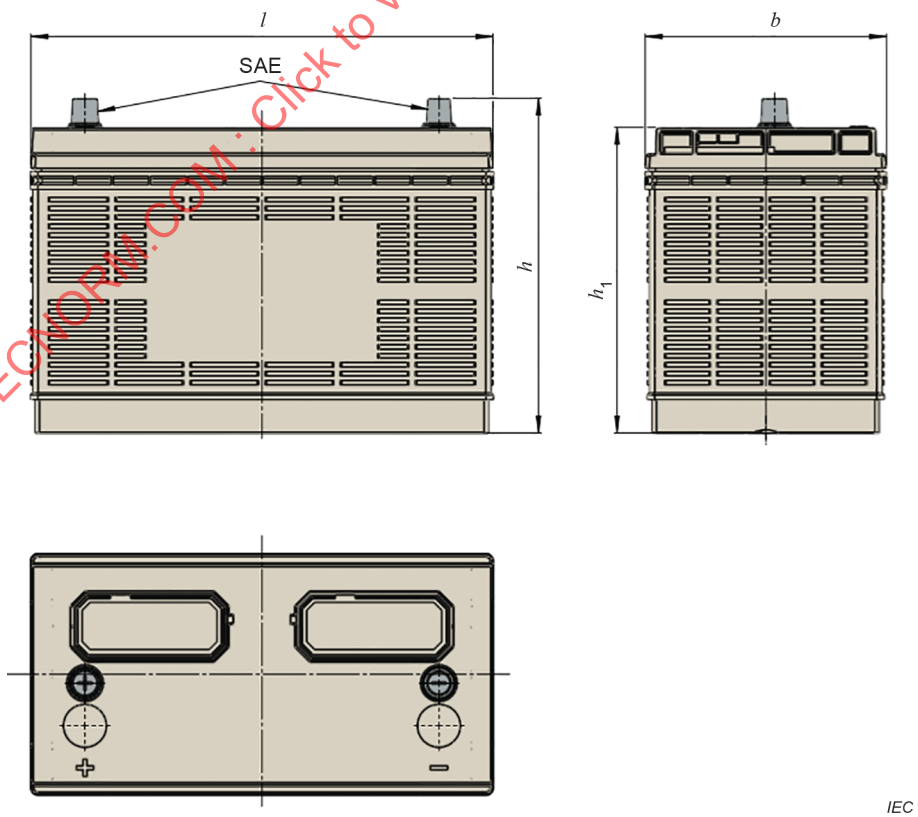


Figure 10 – AM series – Type 31A

7 East Asian types

7.1 General

7.1.1 Overview

This applies to the series of lead-acid starter batteries for heavy trucks, widely and predominantly used in East Asia. In the following, the series is designated as "AS". The AS series comprises four types.

7.1.2 Fastening

All batteries are intended for fastening to the vehicle by means of a hold-down device engaging with the upper part of the battery (for example a metal frame), connected to the support platform.

7.1.3 Terminal configuration, polarity

Type E41 has the polarity as shown in Figure 11. Types F51, G51 and H52 are shown in Figure 12.

7.1.4 Terminal dimensions

The dimensions of the tapered terminals shall be as shown in Figure 3.

7.2 Dimensions

The main dimensions are represented by symbols as indicated in Figure 11 and Figure 12.

The dimensions according to the symbols shall be in accordance with Table 3.

Table 3 – AS series – Dimensions of batteries

Dimensions in millimetres

Type (for micro-cycle applications)	Type (for lead-acid starter batteries)	Length		Width		Height	
		l	l_1	b	b_1	h_1	h
U	E41	410^{+0}_{-5}	394 max.	176^{+0}_{-5}	173 max.	213^{+0}_{-7}	234 max.
V	F51	505^{+0}_{-5}	502 max.	182^{+0}_{-5}	181 max.	213^{+0}_{-7}	257 max.
W	G51	508^{+0}_{-5}	505 max.	222^{+0}_{-5}	221 max.	213^{+0}_{-7}	257 max.
X	H52	521^{+0}_{-5}	500 max.	278^{+0}_{-5}	267 max.	220^{+0}_{-7}	270 max.