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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electrolyte and water for vented lead acid accumulators – Part 2: Requirements for water

Électrolyte et eau pour accumulateurs plomb-acide ouverts – Partie 2: Exigences pour l'eau

IEC 62877-2:2016-01(en-fr)

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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 62877-2 has been prepared by IEC technical committee 21: Secondary cells and batteries.

The text of this standard is based on the following documents:

FDIS	Report on voting
21/875/FDIS	21/882/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62877 series can be found, under the general title *Electrolyte and water for vented lead acid accumulators* on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

ELECTROLYTE AND WATER FOR VENTED LEAD ACID ACCUMULATORS –

Part 2: Requirements for water

1 Scope

This part of IEC 62877 applies to water for use with vented lead-acid cells and batteries, i.e. water for preparation of electrolyte and for topping up cells or batteries.

The purity of refilling water has to meet higher requirements compared to filling electrolyte, because the impurities in the operating electrolyte will be gradually increased by regular addition of water.

This international standard lays down requirements of the composition, purity and properties of water in the absence of specific recommendations from the manufacturer.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62877-1, *Electrolyte and water for vented lead acid accumulators – Part 1: Requirements for electrolyte*

3 Terms and definitions

3.1
electrolyte
diluted sulfuric acid (H_2SO_4) for lead-acid accumulators. The electrolyte is prepared by mixing concentrated sulfuric acid or sulfuric acid with high density of d > 1,30 kg/l and purified water to achieve the density values specified by the battery manufacturer or specified in standards related to the type and battery design in question for a defined state of charge

Note 1 to entry: Concentrated sulfuric acid is a colorless, high corrosive and etching liquid–with a density 1,84 kg/l.

3.2
water
purified water (H_2O) used for the preparation of electrolyte for batteries and for the replacement (topping up) of water loss in the operating electrolyte due to decomposition of water by overcharging and evaporation

3.3
reference temperature
value specified by the battery manufacturer for the indication of properties, such as the nominal electrolyte density, the maximum electrolyte level and the nominal capacity of the battery. The value of the nominal temperature for the indication of parameters may differ depending on the battery type and application

3.4
impurities
In practical use, the electrolyte may include impurities which cause damage to the battery or reduce its power or its service life. Water added to the electrolyte will increase the level of impurities. The type and maximum allowed content of impurities of purified water are specified in the following tables

3.5
operating electrolyte
electrolyte present in the battery following the first filling. The values of density and impurities of the operating electrolyte may deviate from the values of the filling electrolyte due to impurity input from replenishment by water and to elution from e.g. separators, active materials and electrode grids

4 Physical and chemical requirements of water for lead-acid batteries

Water for the preparation of electrolyte or topping-up of batteries shall meet the physical requirements as given in Table 1. The chemical limit values as specified in Table 2 shall not be exceeded. Purified water in compliance with the requirements can be prepared from tap water by distillation or by means of ion exchangers.

Table 1 – Physical properties and requirements of purified water

Appearance	clear, colorless, odorless, free from oil drips
pH value	5 to 7
Electric conductivity at 20 °C	
– freshly prepared	≤ 10 µS/cm
– up to being filled into the cell	≤ 30 µS/cm

Table 2 – Chemical properties and requirements of purified water

Cons. No.	Impurities	mg/l max.	
		Limit value	comment
1	evaporation residue	10	
2	oxidable organic substances	20	calculated as $KMnO_4$
3	Lead (Pb), Antimony (Sb), Arsenic(As), Tin (Sn), Bismuth(Bi), Copper(Cu), Cadmium(Cd), Zink(Zn), Selenium (Se), Tellurium(Te),		
	– each element individually	0,1	
	– all together	0,5	
4	Iron(Fe), Cobalt(Co), Nickel(Ni), Chromium (Cr) , Manganese(Mn)		
	– each element individually	0,1	
	– all together	0,5	
5	Halogens	0,5	calculated as chloride
6	Nitrogen in the form of nitrate	2,0	
7	Nitrogen in the form of ammonia	40	

5 Storage of purified water

Water shall be stored in appropriate vessels, such as vessels made from glass, ebonite, polyethylene, polypropylene or other plastic materials. Hoses should be made of PVC, rubber or polyethylene.

The dissolution of metal ions out of metallic vessels is liable to occur. Vessels made of metal, shall therefore, not be used.

It is recommended that purified water should always be stored in airtight vessels because carbon dioxide (CO_2) which is absorbed from the air increases the electric conductivity of the purified water.

Bibliography

IEC 62485-2, *Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries*

IEC 62485-3, *Safety requirements for secondary batteries and battery installations – Part 3: Traction batteries*