

# Specification for Standard cells

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The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

|                                                                                 |                                                                 |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------|
| British Industrial Measurement and Control Apparatus Manufacturers' Association | National Physical Laboratory (Department of Trade and Industry) |
| Department of Trade and Industry (British Calibration Service)                  | Radio Electronic Component Manufacturers' Federation            |
| Electrical Power Engineers' Association                                         | Scientific Instrument Manufacturers' Federation                 |
| Ministry of Defence, Navy Department                                            | Transmission and Distribution Association (B.E.A.M.A.)          |
| Ministry of Defence, Procurement Executive                                      |                                                                 |

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# Foreword

This British Standard has been prepared under the authority of the Electrical Industry Standards Committee. It is identical both in technical content and format with Publication 428 “*Standard cells*” of the International Electrotechnical Commission.

Because the text of an IEC Publication has been copied, it includes some minor material not appropriate to a British Standard.

For the purposes of this British Standard, the text of IEC Publication 428, given in this publication, is amended as follows.

**Terminology.** The words “British Standard” replace “Recommendation” wherever it appears.

**Cross-references.** The references to other IEC Recommendations are replaced by references to British Standards as follows:

| Subclause                 | Reference to IEC Publication                                                                                                           | Appropriate British Standard                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.1 f)<br>and<br>10.2 f) | Publication 51:1973<br>“ <i>Recommendations for direct acting indicating electrical measuring instruments and their accessories</i> ”. | BS 89 “ <i>Direct acting electrical indicating instruments</i> ”,<br>Part 1:1970 “ <i>Single purpose direct acting electrical indicating instruments and their accessories</i> ”. |
|                           | 10.1 and Table XI                                                                                                                      | 10.1 and Table 15                                                                                                                                                                 |

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## Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

**1.1** This recommendation applies to the following two types of standard cells used as electromotive force (e.m.f.) references, viz.:

- saturated standard cells;
- unsaturated standard cells.

**1.2** This recommendation does not apply to:

- cells used as international or national standards of e.m.f.;
- assemblies consisting of a temperature-controlled enclosure containing one or more standard cells;
- sources of e.m.f. intended to supply a current.

## 2 Definitions

For the purposes of this recommendation, the following definitions apply.

### 2.1

#### **saturated standard cell**

a cell used as an e.m.f. reference, having the negative electrode of cadmium amalgam and the positive one of mercury covered with a paste of  $\text{Hg}_2\text{SO}_4$  and a saturated aqueous solution of cadmium sulphate, the electrolyte remaining saturated throughout the operating temperature range of the cell by the presence of crystals of  $3 \text{ CdSO}_4 \cdot 8 \text{ H}_2\text{O}$

NOTE A small amount of sulphuric acid may be present in the electrolyte to improve the electrical stability of the cell.

### 2.2

#### **unsaturated standard cell**

a cell used as an e.m.f. reference, having the negative electrode of cadmium amalgam and the positive one of mercury covered with a paste of  $\text{Hg}_2\text{SO}_4$  and an unsaturated aqueous solution of cadmium sulphate, the electrolyte remaining unsaturated throughout the operating temperature range of the cell

NOTE 1 A small amount of sulphuric acid may be present in the electrolyte to improve the electrical stability of the cell.

NOTE 2 At the lower limit of this range, the electrolyte may become saturated.

### 2.3 Reference temperature range

#### 2.3.1

##### **for saturated standard cells**

that temperature range stated by the manufacturer within which the difference between the measured e.m.f. and the e.m.f. predicted by the formula given in Sub-clause 5.3 does not exceed 50 % of the value corresponding to the class index

#### 2.3.2

##### **for unsaturated standard cells**

that temperature range stated by the manufacturer within which the difference between the measured e.m.f. and the e.m.f. at the certification temperature does not exceed 50 % of the value corresponding to the class index

### 2.4

#### **certification value of e.m.f.**

a value of e.m.f. given on a calibration certificate

### 2.5

#### **certification temperature**

a temperature given on the calibration certificate as applying to a certification value of the e.m.f.

### 2.6

#### **temperature-hysteresis effect**

the residual difference between two or more values of the e.m.f. of the same cell measured at the same temperature before and after a specified temperature cycle of specified duration (See Appendix.)