AS 1046.3—1991
IEC 27-3 (1989)

Australian Standard®

# Letter symbols for use in electrotechnology

# Part 3: Logarithmic quantities and units

[IEC title: Letter symbols to be used in electrical technology
Part 3: Logarithmic quantities and units]

This Australian Standard was prepared by Committee TE/13, Symbols, Units and Quantities for Electrotechnology. It was approved on behalf of the Council of Standards Australia on 9 May 1991 and published on 12 July 1991.

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The Association of Consulting Engineers, Australia
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# PREFACE

This Standard was prepared by the Standards Australia Committee on Symbols, Units and Quantities for Electrotechnology. It is identical with and has been reproduced from IEC 27-3 (1989), *Letter symbols to be used in electrical technology*, Part 3: *Logarithmic quantities and units*.

This Standard is the third part of a series which deals with letter symbols used in the electrical field, viz.:

AS
1046 *Letter symbols for use in electrotechnology*
1046.1 Part 1: *General*
1046.2 Part 2: *Telecommunications and electronics*
1046.3 Part 3: *Logarithmic quantities and units*
1046.4 Part 4: *Symbols for quantities to be used for rotating electrical machines.*

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(i) *Decimal marker* Substitute a full point for a comma as a decimal marker.

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| *Reference to International Standard* | | *Australian Standard* | |
|---|---|---|---|
| IEC | | AS | |
| 50 | International electrotechnical vocabulary (IEV) | 1852 | International electrotechnical vocabulary |
| 50(702) | Chapter 702: Oscillations, signals and related devices (in preparation) | — | |
| ISO | | | |
| 31 | General principles concerning quantities, units and symbols | 2900 | Quantities, units and symbols |
| 31-11 | Part 11: Mathematical signs and symbols for use in the physical sciences and technology | 2900.11 | Part 11: Mathematical signs and symbols for use in the physical sciences and technology |
| 2382 | Data processing — Vocabulary | 1189 | Data processing — Vocabulary |
| 2382-16 | Part 16: Information theory | 1189.16 | Part 16: Information theory |

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STANDARDS AUSTRALIA

# Australian Standard

# Letter symbols for use in electrotechnology

## Part 3: Logarithmic quantities and units

SCOPE AND INTRODUCTION

This standard applies to logarithmic quantities and units.

Quantities that can be expressed as the logarithm of a dimensionless quantity, such as the ratio of two physical quantities of the same kind, can be regarded and treated in different ways. In many cases, differences in principle do not affect the practical treatment.

Logarithmic quantities are here treated in a way that makes it possible, for example, to express the attenuation of a certain linear two-terminal network by the equally valid expressions $A$ = 4,6 nepers = 4,0 bels = 40 decibels, where 4,6, 4,0 and 40 are regarded as numerical values and "neper", "bel" and "decibel" as units with specified relationships.

The fact that this standard is based on certain principles and assumptions implies no opinion whether any other principle or assumption is "right" or "wrong". This standard relates to the handling of logarithmic quantities, without regard to their interpretation or specific application.

The fact that only some logarithmic quantities are particularly dealt with here does not imply that other logarithmic quantities do not exist. It is possible that other logarithmic quantities will be particularly dealt with in a later edition or separately.

## 1. **Logarithmic quantities**

### 1.1 *General*

*logarithmic quantity*

A quantity expressed as the logarithm of the ratio of two quantities of the same kind (two voltages, two powers, two frequencies) or as the logarithm of any dimensionless quantity. For a complete definition of a logarithmic quantity, the base of the logarithm shall be specified.

In the set of logarithmic quantities can also be included quantities which are derivatives of a logarithmic quantity, or quotients of a logarithmic quantity and another quantity. An example of such a derivative is the attenuation coefficient (see Sub-clause 4.3).

The logarithmic quantities particularly dealt with here are transmission path quantities, levels, frequency intervals and decision content.

For transmission path quantities and levels, one must deal with two sets of the quantities to whose ratios the logarithmic quantities correspond, namely field quantities and power quantities.

*Field quantity* is a quantity such as voltage, current, sound pressure, electric field strength, velocity and charge density, the square of which in linear systems is proportional to power.

*Power quantity* is power or a quantity directly proportional to power, e.g. energy density, acoustic intensity and luminous intensity.