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Safety requirements for power electronic converter systems and equipment

Part 1: General

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- Energy Networks Association
- Engineers Australia
- RMIT University
- University of Newcastle

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Australian Standard®

Safety requirements for power electronic converter systems and equipment

Part 1: General

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PREFACE

This Standard was prepared by the Standards Australia Committee EL-027, Power Electronics.

The objective of this Standard is to establish a common terminology and basis for the safety requirements of products that contain power electronic converters.

This Standard is identical with, and has been reproduced from IEC 62477-1, Ed 1.0 (2012), *Safety requirements for power electronic converter systems and equipment*, Part 1: *General*.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text 'this part of IEC 62477' and 'this International Standard' should read 'this Australian Standard'.

(b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian or Australian/New Zealand Standard*	
IEC		AS	
60068	Environmental testing	60068	Environmental testing
60068-2-52	Part 2-52: Tests—Test Kb: Salt mist, cyclic (sodium chloride solution)	60068.2.52	Part 2.52: Tests—Test Kb: Salt mist, cyclic (sodium chloride solution)
60068-2-68	Part 2-68: Tests—Test L: Dust and sand	60068.2.68	Part 2.68: Tests—Test L: Dust and sand
60068-2-78	Part 2-78: Tests—Test Cab: Damp heat, steady state	60068-2-78	Part 2.78: Tests—Test Cab: Damp heat, steady state
IEC/TS		AS/NZS	
60479	Effects of current on human beings and livestock	60479	Effects of current on human beings and livestock
60479-1	Part 1: General aspects	60479.1	Part 1: General aspects
IEC			
60990	Methods of measurement of touch current and protective conductor current	60990	Methods of measurement of touch current and protective conductor current

Only normative references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

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INTRODUCTION

This International Standard relates to products that include power electronic converters, with a rated system voltage not exceeding 1 000 V a.c. or 1 500 V d.c. It specifies requirements to reduce risks of fire, electric shock, thermal, energy and mechanical hazards, except functional safety as defined in IEC 61508. The objectives of this document are to establish a common terminology and basis for the safety requirements of products that contain power electronic converters across several IEC technical committees.

This standard has been developed with the intention:

- to be used as a reference document for product committees inside TC 22 in the development of product standards for power electronic converter systems and equipment;
- to replace IEC 62103 as a product family standard providing minimum requirements for safety aspects of power electronic converter systems and equipment in apparatus for which no product standard exists; and

NOTE The scope of IEC 62103 contains reliability aspects, which are not covered by this standard.

- to be used as a reference document for product committees outside TC 22 in the development of product standards of power electronic converter systems and equipment intended renewable energy sources. TC 82, TC 88, TC 105 and TC 114, in particular, have been identified as relevant technical committees at the time of publication.

Technical committees using this document should carefully consider the relevance of each paragraph in this document for the product under consideration and reference, add, replace or modify requirement as relevant. Product specific topics not covered by this document are in the responsibility of the technical committees using this document as reference document.

This group safety standard will not take precedence on any product specific standard according to IEC Guide 104. IEC Guide 104 provides information about the responsibility of product committees to use group safety standards for the development of their own product standards.

AUSTRALIAN STANDARD

Safety requirements for power electronic converter systems and equipment

Part 1: General

1 Scope

This part of IEC 62477 applies to Power Electronic Converter Systems (PECS) and equipment, their components for *electronic power conversion* and electronic power switching, including the means for their control, protection, monitoring and measurement, such as with the main purpose of converting electric power, with rated system voltages not exceeding 1 000 V a.c. or 1 500 V d.c.

This document may also be used as a reference standard for product committees producing product standards for:

- adjustable speed electric power drive systems (PDS);
- standalone uninterruptible power systems (UPS);
- low voltage stabilized d.c. power supplies.

For PECS for which no product standard exists, this standard provides minimum requirements for safety aspects.

This part of IEC 62477 has the status of a group safety publication in accordance with IEC Guide 104 for power electronic converter systems and equipment for solar, wind, tidal, wave, fuel cell or similar energy sources.

According to IEC Guide 104, one of the responsibilities of technical committees is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of their product standards.

This International Standard:

- establishes a common terminology for safety aspects relating to PECS and equipment;
- establishes minimum requirements for the coordination of safety aspects of interrelated parts within a PECS;
- establishes a common basis for minimum safety requirements for the PEC portion of products that contain PEC;
- specifies requirements to reduce risks of fire, electric shock, thermal, energy and mechanical hazards, during use and operation and, where specifically stated, during service and maintenance;
- specifies minimum requirements to reduce risks with respect to pluggable and permanently connected equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer.

This International Standard does not cover:

- telecommunications apparatus other than power supplies to such apparatus;
- functional safety aspects as covered by e.g. IEC 61508;
- electrical equipment and systems for railways applications and electric vehicles.

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