AS 3865—1991
(Incorporating Amendment No. 1)

Australian Standard®

Calculation of the effects of short-circuit currents

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Australian Electrical and Electronic Manufacturers Association

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PREFACE

This Standard was prepared by the Standards Australia Committee on power switchgear, for the calculation of the effects of short-circuit currents in both high and low voltage equipment, busbar systems and assemblies.

This Standard incorporates Amendment No. 1 (July 2003). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

It is based on IEC 865 (1986), *Calculation of the effects of short-circuit currents*, and on IEC document 73(Secretariat)30, *Revision of IEC Publication 865* (1986). Acknowledgment is made of the assistance received from these sources.

This Standard is set out in a different format from that of IEC 865, with Sections 1 and 4 added.

This Standard is not technically equivalent to IEC 865, as Section 3 has been substantially amended to cover the thermal effects of short-circuit currents on the basis of the joule integral (I^2t).

It is intended to be used in conjunction with AS 3851, *The calculation of short-circuit currents in three-phase a.c. systems.*

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies standardized procedures for the determination of the effects of short-circuit currents on a.c. electrical equipment by either—

(a) separate calculations for the electromagnetic and thermal effects, when test results are not available; or

(b) when test results are available for other than the required system conditions, by interpolation.

NOTE: These standardized procedures are adjusted for practical requirements and contain simplifications with a margin of safety. Testing at the required rating, more precise detailed methods of calculation, or both, may be used.

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS	
3008	Electrical installations—Selection of cables
3008.1	Part 1: Cables for alternating voltages up to and including 0.6/1 kV
3851	The calculation of short-circuit currents in three-phase a.c. systems
IEC	
949	Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects.

1.3 DEFINITIONS For the purpose of this Standard the definitions given in AS 3851 and those below apply:

1.3.1 Main conductor—conductor or the composite arrangement of a number of conductors which carries the total current in one phase.

1.3.2 Sub-conductor—a conductor which carries a portion of the total current in one phase and is part of the main conductor.

1.3.3 Support—an insulating device between a main conductor and the earthed structure or between main conductors.

NOTE: Under the action of electromagnetic forces between conductors, in the given position, the support may be exposed to bending, tension, and compression.

1.3.4 Fixed support—support which does not permit angular movement of the conductor at the supported point.

1.3.5 Simple support—support which permits angular movement of the conductor.

1.3.6 Connecting piece—any additional mass within a span which does not belong to the uniform conductor material. This includes, among other things, spacers, stiffening elements, bar overlappings and branchings.

1.3.7 Spacer—mechanical element between rigid or flexible conductors which, at the point of installation, prevents the movement of sub-conductors towards each other.

1.3.8 Stiffening element—spacer intended to prevent any movement between rigid sub-conductors at its point of installation.

1.3.9 Fixing device—part by means of which conductors are directly or indirectly fixed. This includes fixing clamps, support insulators and substructures.

1.3.10 Short-circuit tensile force (F_t)—maximum tensile force reached in a flexible conductor during a short-circuit.

1.3.11 Drop force (F_f)—maximum value of the tensile force in a flexible conductor which occurs when a span drops down after an out-swing.

1.3.12 Short-circuit duration (T_{k1})—duration of the first short-circuit current flow.