



NSAI
Standards

Irish Standard
I.S. EN 61851-1:2011

Electric vehicle conductive charging system -- Part 1: General requirements (IEC 61851-1:2010 (EQV))

I.S. EN 61851-1:2011

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<i>This document replaces:</i> EN 61851-1:2001	<i>This document is based on:</i> EN 61851-1:2011 EN 61851-1:2001	<i>Published:</i> 19 August, 2011 17 April, 2001
This document was published under the authority of the NSAI and comes into effect on: 23 August, 2011		ICS number: 43.12
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
Údarás um Chaighdeáin Náisiúnta na hÉireann		

EUROPEAN STANDARD

EN 61851-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2011

ICS 43.120

Supersedes EN 61851-1:2001

English version

**Electric vehicle conductive charging system -
Part 1: General requirements
(IEC 61851-1:2010)**

Système de charge conductive pour
véhicules électriques -
Partie 1: Règles générales
(CEI 61851-1:2010)

Elektrische Ausrüstung von Elektro-
Straßenfahrzeugen -
Konduktive Ladesysteme für
Elektrofahrzeuge -
Teil 1: Allgemeine Anforderungen
(IEC 61851-1:2010)

This European Standard was approved by CENELEC on 2011-04-12. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

I.S. EN 61851-1:2011

EN 61851-1:2011

- 2 -

Foreword

The text of document 69/173/FDIS, future edition 2 of IEC 61851-1, prepared by IEC TC 69, Electric road vehicles and electric industrial trucks, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61851-1 on 2011-04-12.

This European Standard supersedes EN 61851-1:2001.

The main changes with respect to EN 61851-1:2001 are the following:

- revision of connector definitions and current levels (Clause 8);
- modification definition of pilot wire to pilot function;
- division of Clause 9 to create Clauses 9 and 11;
- Clause 9: specific requirements for inlet, plug and socket–outlet;
- Clause 11: EVSE requirements: the basic generic requirements for charging stations;
- renumbering of annexes;
- deletion of previous Annex A and integration of charging cable requirements into new Clause 10;
- Annex B becomes Annex A and is normative for all systems using a PWM pilot function with a pilot wire;
- Annex C becomes Annex B;
- replacement of previous Annex D (coding tables for power indicator) with B.4 in Annex B using new values;
- new informative Annex C describing an alternative pilot function system.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2014-04-01

Annexes ZA, ZB and ZC have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61851-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- IEC 60068-2-1:2007 NOTE Harmonized as EN 60068-2-1:2007 (not modified).
- IEC 60068-2-14:2009 NOTE Harmonized as EN 60068-2-14:2009 (not modified).
- IEC 60364-6:2006 NOTE Harmonized as HD 60364-6:2007 (modified).

I.S. EN 61851-1:2011

IEC 60947-1:2007	NOTE Harmonized as EN 60947-1:2007 (not modified).
IEC 60947-6-1:2005	NOTE Harmonized as EN 60947-6-1:2005 (not modified).
IEC 61140	NOTE Harmonized as EN 61140.
IEC 61851-21	NOTE Harmonized as EN 61851-21.
IEC 61851-22	NOTE Harmonized as EN 61851-22.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
-	-	Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 1: General requirements, frequency bands and electromagnetic disturbances	EN 50065-1	2001
IEC 60038 (mod)	2009	IEC standard voltages	FprEN 60038 ¹⁾	2011
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-2-75	1997	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2001
IEC 60276	-	Definitions and nomenclature for carbon brushes, brush-holders, commutators and slip-rings	EN 60276	-
IEC 60309-1	1999	Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements	EN 60309-1 + A11	1999 2004
IEC 60309-2	1999	Plugs, socket-outlets and couplers for industrial purposes - Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories	EN 60309-2 + A11	1999 2004
IEC 60364-4-41 (mod)	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41 + corr. July	2007 2007
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC/TR 60755	2008	General requirements for residual current operated protective devices	-	-
IEC 60884-1	2002	Plugs and socket-outlets for household and similar purposes - Part 1: General requirements	-	-

¹⁾ At draft stage.

I.S. EN 61851-1:2011

- 5 -

EN 61851-1:2011

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60884-2-5	1995	Plugs and socket-outlets for household and similar purposes - Part 2: Particular requirements for adaptors	-	-
IEC 60947-3	2008	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	2009
IEC 60950-1 (mod) + corr. August	2005 2006	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1 + A11 + A12	2006 2009 2011
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61000-6-1	2005	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments	EN 61000-6-1	2007
IEC 61000-6-3	2006	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light- industrial environments	EN 61000-6-3	2007
IEC 61008-1 (mod)	2010	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules	FprEN 61008-1	200X ¹⁾
IEC 61009-1 (mod)	2010	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules	FprEN 61009-1	200X ¹⁾
IEC 61180-1	1992	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	1994
IEC 62196-1	2003	Plugs, socket-outlets, vehicle couplers and vehicle inlets - Conductive charging of electric vehicles - Part 1: Charging of electric vehicles up to 250 A a.c. and 400 A d.c.	EN 62196-1	2003
ISO 6469-2	2009	Electrically propelled road vehicles - Safety specifications - Part 2: Vehicle operational safety means and protection against failures	-	-
ISO 6469-3	2001	Electric road vehicles - Safety specifications - Part 3: Protection of persons against electric hazards	-	-
SAE J1772	2010	Recommended practices: SAE Electric Vehicle and Plug In Hybrid Electric Vehicle Conductive Charge Coupler	-	-

Annex ZB
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

<u>Clause</u>	<u>Special national condition</u>
6.2	Germany In Germany the inline control box (EVSE) shall be in the plug or located within 2,0 m of the plug.
6.3.3, Note 3	Finland The use of adaptors from mode 1 socket outlets to mode 3 vehicle cable assembly, that maintain the overall safety requirements of this standard is allowed in Finland.
11.3.2, Note 1	Finland In Finland IPXXD is not required for mode 1.
11.3.2, Note 1	The Netherlands In The Netherlands IPXXD is not required for mode 1.

Annex ZC (informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC national member.

This European Standard does fall under LVD (2006/95/EC).

In the relevant CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

<u>Clause</u>	<u>Deviation</u>
---------------	------------------

2	United Kingdom
----------	-----------------------

IEC 60884-1 is not indispensable for the application of this document.

IEC 60884-1 is not applicable in UK.

The BS 1363 Series of standards applies to domestic socket-outlets, fused plugs, fused connection units, fused conversion plugs and to adaptors in the UK.

6.2	Germany
------------	----------------

Mode 1 cables without an in-cable RCD shall not be used but only Mode 1 cables **with** an in-cable RCD.

All Mode 1 cables **without** an in-cable RCD shall bear the following safety information: "Shall not be used in Germany".

Due to article 14 in the constitutional law of Germany which frames the preservation of status quo of existing electrical installations it cannot be ensured that fixed electrical installations at all times provide an RCD in Germany.

6.3.3	United Kingdom
--------------	-----------------------

IEC 60884-2-5 is not applicable in UK.

BS 1363-3 and BS 1363-5 apply to domestic adaptors and fused conversion plugs in the UK.

9.1	United Kingdom
------------	-----------------------

IEC 60884-1 is not applicable in UK.

The BS 1363 Series of standards applies to domestic socket-outlets, fused plugs, fused connection units, fused conversion plugs and to adaptors in the UK.

9.2	United Kingdom
------------	-----------------------

IEC 60884-1 is not applicable in UK.

The BS 1363 Series of standards applies to domestic socket-outlets, fused plugs, fused connection units, fused conversion plugs and to adaptors in the UK.

9.3	United Kingdom
------------	-----------------------

IEC 60884-1 is not applicable in UK.

The BS 1363 Series of standards applies to domestic socket-outlets, fused plugs, fused

connection units, fused conversion plugs and to adaptors in the UK.

11.6 United Kingdom

IEC 60884-1 is not applicable in UK.

The BS 1363 Series of standards applies to domestic socket-outlets, fused plugs, fused connection units, fused conversion plugs and to adaptors in the UK.

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions.....	9
4 General requirements	13
5 Rating of the supply a.c. voltage	13
6 General system requirement and interface	14
6.1 General description.....	14
6.2 EV charging modes.....	14
6.3 Types of EV connection using cables and plugs (cases A, B, and C).....	14
6.3.1 General description	14
6.3.2 Cord extension set	16
6.3.3 Adaptors	17
6.4 Functions provided in each mode of charging for modes 2, 3, and 4.....	17
6.4.1 Modes 2, 3 and 4 functions	17
6.4.2 Optional functions for modes 2, 3 and 4.....	17
6.4.3 Details of functions for modes 2, 3 and 4.....	18
6.4.4 Details of optional functions	18
6.4.5 Details of pilot function	18
6.5 Serial data communication.....	19
7 Protection against electric shock.....	19
7.1 General requirements.....	19
7.2 Protection against direct contact.....	19
7.2.1 General.....	19
7.2.2 Accessibility of live parts.....	19
7.2.3 Stored energy – discharge of capacitors.....	20
7.3 Protection against indirect contact	20
7.4 Supplementary measures.....	20
7.5 Provision for mode 4 EVSE	20
7.6 Additional requirements	21
8 Connection between the power supply and the EV	21
8.1 General.....	21
8.2 Contact sequencing.....	23
8.3 Functional description of a standard interface	23
8.4 Functional description of a basic interface	23
8.5 Functional description of a universal interface.....	23
9 Specific requirements for vehicle inlet, connector, plug and socket-outlet.....	24
9.1 General requirements.....	24
9.2 Operating temperature.....	24
9.3 Service life of inlet/connector and plug/socket-outlet.....	24
9.4 Breaking capacity.....	24
9.5 IP degrees.....	24
9.6 Insertion and extraction force	25
9.7 Latching of the retaining device	25
10 Charging cable assembly requirements.....	25

10.1	Electrical rating	25
10.2	Electrical characteristics	25
10.3	Dielectric withstand characteristics	25
10.4	Mechanical characteristics	25
10.5	Functional characteristics	25
11	EVSE requirements	26
11.1	General test requirements	26
11.2	Classification	26
11.3	IP degrees for basic and universal interfaces	26
11.3.1	IP degrees for ingress of objects	26
11.3.2	Protection against electric shock	27
11.4	Dielectric withstand characteristics	27
11.4.1	Dielectric withstand voltage	27
11.4.2	Impulse dielectric withstand (1,2/50 μ s)	28
11.5	Insulation resistance	28
11.6	Clearances and creepage distances	28
11.7	Leakage – touch current	28
11.8	Environmental tests	29
11.8.1	General	29
11.8.2	Ambient air temperature	29
11.8.3	Ambient humidity	29
11.8.4	Ambient air pressure	30
11.9	Permissible surface temperature	30
11.10	Environmental conditions	30
11.11	Mechanical environmental tests	30
11.11.1	General	30
11.11.2	Mechanical impact	30
11.12	Electromagnetic compatibility tests	31
11.13	Latching of the retaining device	31
11.14	Service	31
11.15	Marking and instructions	31
11.15.1	Connection instructions	31
11.15.2	Legibility	31
11.15.3	Marking of electric vehicle charging station	31
11.16	Telecommunication network	32
Annex A (normative) Pilot function through a control pilot circuit using PWM modulation and a control pilot wire		33
Annex B (informative) Example of a circuit diagram for a basic and universal vehicle coupler		39
Annex C (informative) Example of a method that provides the pilot function equivalent to a hard wired system		46
Bibliography		48
Figure 1 – Case "A" connection		15
Figure 2 – Case "B" connection		16
Figure 3 – Case "C" connection		16
Figure A.1 – Typical control pilot circuit		33
Figure A.2 – Simplified control pilot circuit		34

Figure A.3 – Typical charging cycle under normal operating conditions	36
Figure B.1 – Mode 1 case B using the basic single phase vehicle coupler	40
Figure B.2 – Mode 2 case B using the basic single phase vehicle coupler	41
Figure B.3 – Mode 3 case B using the basic single phase vehicle coupler	41
Figure B.4 – Mode 3 case C using the basic single phase vehicle coupler	42
Figure B.5 – Mode 3 case B using the basic single phase vehicle coupler without proximity push button switch S3	43
Figure B.6 – Diagram for current capability coding of the cable assembly	44
Figure B.7 – Mode 4 case C using the universal vehicle coupler	45
Figure C.1 – Example of a pilot function without a supplementary wire	46
Table 1 – Overview of the vehicle interface options and suggested contact ratings	22
Table 2 – Touch current limits	29
Table A.1 – EVSE control pilot circuit parameters (see Figures A.1 and A.2)	34
Table A.2 – Vehicle control pilot circuit values and parameters (see Figures A.1, A.2)	35
Table A.3 – Pilot functions	35
Table A.4 – description of connecting sequences as shown on Figure A.3	36
Table A.5 – Pilot duty cycle provided by EVSE	37
Table A.6 – Maximum current to be drawn by vehicle	37
Table A.7 – EVSE timing (see Figure A.3)	38
Table B.1 – Identification of components used with basic single phase connector	40
Table B.2 – Component values for all drawings	42
Table B.3 – Resistor coding for vehicle connectors and plugs	43
Table B.4 – Component description for Figure B.7 mode 4 case C	44

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –

Part 1: General requirements

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61851-1 has been prepared by IEC technical committee 69: Electric road vehicles and electric industrial trucks.

This second edition cancels and replaces the first edition published in 2001. It constitutes a technical revision.

The main changes with respect to the first edition of this standard are the following:

- revision of connector definitions and current levels (Clause 8);
- modification definition of pilot wire to pilot function;
- division of Clause 9 to create Clauses 9 and 11;
- Clause 9: specific requirements for inlet, plug and socket–outlet;
- Clause 11: EVSE requirements: the basic generic requirements for charging stations;
- renumbering of annexes;

- deletion of previous Annex A and integration of charging cable requirements into new Clause 10;
- Annex B becomes Annex A and is normative for all systems using a PWM pilot function with a pilot wire;
- Annex C becomes Annex B;
- replacement of previous Annex D (coding tables for power indicator) with B.4 in Annex B using new values;
- new informative Annex C describing an alternative pilot function system.

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

FDIS	Report on voting
69/173/FDIS	69/179/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 61851 series, under the general title: *Electric vehicle conductive charging system* can be found 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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –

Part 1: General requirements

1 Scope

This part of IEC 61851 applies to on-board and off-board equipment for charging electric road vehicles at standard a.c. supply voltages (as per IEC 60038) up to 1 000 V and at d.c. voltages up to 1 500 V, and for providing electrical power for any additional services on the vehicle if required when connected to the supply network.

Electric road vehicles (EV) implies all road vehicles, including plug in hybrid road vehicles (PHEV), that derive all or part of their energy from on-board batteries.

The aspects covered include characteristics and operating conditions of the supply device and the connection to the vehicle; operators and third party electrical safety, and the characteristics to be complied with by the vehicle with respect to the a.c./d.c. EVSE, only when the EV is earthed.

NOTE 1 Class II vehicles are not defined, but the lack of information for this type of vehicle means that the requirements for the standard are under consideration.

NOTE 2 This standard also applies to EVSE with on-site storage capability.

Requirements for specific inlet, connector, plug and socket-outlets for EVs are contained in IEC 62196-1:2003. Standard sheets for the vehicle connector and inlet are also under consideration. They will be incorporated in a separate part of standard IEC 62196.

This standard does not cover all safety aspects related to maintenance.

This standard is not applicable to trolley buses, rail vehicles, industrial trucks and vehicles designed primarily for use off-road.

2 Normative references

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

IEC 60038:2009, *IEC standard voltages*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 + 12 h cycle)*

IEC 60068-2-75:1997, *Environmental testing – Part 2: Tests – Test Eh: Hammer tests*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60276, *Definitions and nomenclature for carbon brushes, brush-holders, commutators and slip-rings*

IEC 60309-1:1999, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-