



1. SCOPE

This document informs and supplements CSIRO's requirements for evaluation for conformity of a domestic smoke alarm in accordance with AS 3786-2015.

AS 3786-2015 is a reference document to the *Building Code of Australia (BCA) Volumes 1 and 2*, and will subsequently supersede AS 3786-1993 (incorporating amendments 1 to 4) for this purpose.

AS 3786-2015 is an adoption of ISO 12239, with modifications that vary several specified requirements. Many of the ISO 12239 test methods and requirements related to product function and performance have been derived from EN 14604.

It is provision of this document that a proportion of the documentation submitted as evidence of conformity with AS 3786-2015 shall be records and reports from prior testing in accordance with EN 14604 or ISO 12239. The suitability of the submitted evidence of conformity will be determined in accordance with CSIRO's Recognition Framework, in conjunction with comparison to the results of tests applied by CSIRO's Laboratory and those applied by the external agency (laboratory).

Whilst this document recognises a relationship between AS 3786-2015, ISO 12239 and EN 14604, it requires that specified critical functions of a smoke alarm be validated by CSIRO and evidenced directly in accordance with AS 3786-2015.

Where prior evaluation of the smoke alarm has not taken place in accordance with either EN 14604 or ISO 12239, a suitable test plan developed by CSIRO will be required, that encompasses all the physical testing and inspection requirements of a full evaluation.

2. REFERENCED DOCUMENTS

Relevant parts of the following documents are referenced for the purposes of this document as detailed in Table 1.

Table 1. List of documents referenced by this document.

AS 3786-2015	Smoke alarms using scattered light, transmitted light or ionization
AS 3786-1993 +A1:1995 +A2:1995 +A3:2001 +A4:2004	Smoke alarms
EN 14604:2005 +Cor 1:2008	Smoke alarm devices
ISO 12239:2010	Smoke alarms using scattered light, transmitted light or ionization
AS ISO/IEC 17025-2005 +A1:2006	General requirements for the competence of testing and calibration laboratories
AS/NZS 60065:2012	Audio, video and similar electronic apparatus - Safety requirements (IEC 60065, Ed.7.2 (2011) MOD)

3. DIFFERENCES IN REFERENCED DOCUMENTS TO AS 3786-2015

AS 3786-2015 differs from both EN 14604 and ISO 12239 in several areas, as outlined below in Table 2. Evidence of conformity to the specified requirements identified in Table 2 must be sourced from a recognised agency (laboratory) or CSIRO's laboratory.

Table 2. Key differences in requirements of referenced documents (Standards) related to domestic smoke alarms.

Clauses	Title	AS 3786-2015	ISO 12239:2010	EN 14604:2005
4.11	<i>Service- Disconnect facility</i>	Disconnect facility	Not required	Not required
4.22	<i>Marking</i>		Varied	
5.10	<i>Corrosion test</i>	21 days	4 days	4 days ¹

¹ Some European jurisdictions specify additional test requirements, including a corrosion test of 21 days duration, during evaluation of smoke alarms, and therefore EN 14604 may include these requirements in a future revision or amendment. Some evaluation programs conducted by external laboratories may therefore include, or have included, some or all of the noted variations between AS 3786-2015 and EN14604 and ISO 12239. For example, VdS (Germany) require that smoke alarms meet additional requirements including a 21 day corrosion test as documented in [VdS 3131](#).

Clauses	Title	AS 3786-2015	ISO 12239:2010	EN 14604:2005
5.15	EMC tests	EN 50130-4:2010 ²	EN50130-4 ³	EN50130-4:1995
5.25	Electrical safety	AS/NZS 60065:2012 (various clauses)	IEC 60065:2001 (various clauses)	EN 60065:2002 (various clauses)

4. EVALUATION FOR CONFORMITY

Technical Verification with the requirements of this document shall reference the schedule as detailed in Table 3.

4.1. Critical Functions

Domestic smoke alarms operate by detecting airborne smoke particles, typically either by a light scattering or ionisation technique, and immediately emit an alert signal through the operation of an inbuilt sounder. Detection of smoke followed by generation of an alarm signal are considered to be the two critical functions of a domestic smoke alarm.

To validate the evidence of conformity provided in the form of test reports from a recognised agency, critical functions of each model of smoke alarm shall be verified by CSIRO through evaluation in accordance with clauses 5.3 (*Initial sensitivity*) and 5.18 (*85 dBA sound output*).

Results of critical function tests to clauses 5.3 and 5.18 shall provide:

1. Demonstration that critical functional performance of the submitted product(s) is within the specified requirements of AS 3786-2015, and
2. Data which is sufficient to ensure that the product submitted for evaluation to AS 3786-2015 is identical to the product previously evaluated. Once correspondence to prior evaluation is suitably demonstrated, the detail in the supplied test report(s) may then be accepted as demonstrating conformity to the remainder of requirements of AS 3786-2015 where appropriate.

Additional tests shall be necessary if differences are identified between AS 3786-2015 and prior evaluations conducted in accordance with EN 14604 or ISO 12239 (see Section 3)

For mains-powered smoke alarms, conformance with the relevant parts of AS/NZS 60065:2012, as required by clause 5.25 (*Electrical safety*), shall be verified by CSIRO as suitably documented, relevant, and complete. Where necessary, CSIRO may co-ordinate an electrical safety assessment at a suitable external laboratory.

Evaluation to Clause 5.25 (via assessment to AS/NZS 60065:2012) ensures that the submitted product meets electrical safety requirements for smoke alarms in Australia and New Zealand. It remains the responsibility of the *Responsible Supplier* to ensure that any and all further electrical safety requirements are met. More information may be obtained from the Electrical Regulatory Authorities Council⁴.

4.2. Marking and Data

The requirements of AS 3786-2015 vary significantly from EN 14604 and ISO 12239 to the extent that clauses 4.22 (*Marking*) and 4.23 (*Data*) require mandatory evaluation by CSIRO's laboratory.

Furthermore, it is anticipated that the product(s) being submitted for evaluation by CSIRO may be designated differently to those designated and reported by prior evaluations. Such changes to product labelling, packaging and point-of-sale information (e.g. Instruction Manual) shall require re-evaluation to clause 4.22 (*Marking*) and 4.23 (*Data*).

² AS 3786-2015 requires evidence of conformity to the latest version of EN50130-4, which is currently the 2010 revision. Smoke alarms evaluated to either the EN or ISO standard may have been subjected to EMC tests in accordance with an earlier revision of EN50130-4.

³ Undated reference, where the latest edition applies. Therefore, depending on the date of evaluation, either the 1995 or 2010 revision of EN50130-4 may have applied.

⁴ More information is available at www.erac.gov.au

4.3. Evaluation Schedule

Recognising prior evaluation, plus evaluation of critical conformity elements of AS 3786-2015, the schedule detailed in Table 3 shall be applied.

Table 3. AS 3786-2015 conformity evaluation schedule.

Notes:

1. Critical functions are denoted in **bold** text.
2. Results of critical function tests applied by CSIRO shall be compared to results recorded in the test report produced by the recognised agency.
3. Evidence of conformity to Clause 3.5 of AS 3786-1993 may be suitable if obtained from CSIRO within the last five (5) years from date of application.

Clauses	Title	Source of evidence of conformity
4	<i>General</i>	-
4.1 to 4.10	Various	Validated evaluation by a recognised agency
4.11	<i>Service-Disconnect facility</i> (variation from ISO & EN smoke alarm standards)	CSIRO
4.12 to 4.21	Various	Validated evaluation by a recognised agency
4.22	<i>Marking</i>	CSIRO (required if varied for Australian specific model)
4.23	<i>Data</i>	CSIRO (required if varied for Australian specific model)
4.34	<i>Software</i>	Validated evaluation by a recognised agency
5	<i>Tests</i>	-
5.1	<i>General</i>	-
5.2	<i>Directional Dependence</i>	Validated evaluation by a recognised agency
5.3	<i>Initial sensitivity</i>	CSIRO (See Note 2, above) and comparison to validated evaluation by a recognised agency.
5.4	<i>Repeatability</i>	Validated evaluation by a recognised agency
5.5	<i>Air Movement</i>	Validated evaluation by a recognised agency
5.6	<i>Dazzling</i>	Validated evaluation by a recognised agency
5.7	<i>Dry Heat (operational)</i>	Validated evaluation by a recognised agency
5.8	<i>Cold (operational)</i>	Validated evaluation by a recognised agency
5.9	<i>Damp heat (operational)</i>	Validated evaluation by a recognised agency
5.10	<i>Sulfur dioxide (SO₂) corrosion</i>	Validated evaluation by a recognised agency (may or may not have been included in prior evaluation program, see Footnote 1 above)
5.11	<i>Impact (operational)</i>	Validated evaluation by a recognised agency
5.12	<i>Vibration, sinusoidal (operational)</i>	Validated evaluation by a recognised agency
5.13	<i>Vibration, sinusoidal (endurance)</i>	Validated evaluation by a recognised agency
5.14	<i>Extended temperature (operational) – Optional</i>	Validated evaluation by a recognised agency (optional)
5.15	<i>EMC tests</i>	Validated evaluation by a recognised agency (CSIRO Fire Systems may co-ordinate if necessary, see Footnote 2 above)
5.16	<i>Fire sensitivity</i>	Validated evaluation by a recognised agency
5.17	<i>Battery-low condition</i>	Validated evaluation by a recognised agency
5.18	<i>85 dBA sound output</i>	CSIRO (See Notes 2 and 3, above) and comparison to validated evaluation by a recognised agency
5.19	<i>Sounder durability</i>	Validated evaluation by a recognised agency
5.20	<i>Interconnectable smoke alarms</i>	Validated evaluation by a recognised agency
5.21	<i>Alarm silence means</i>	Validated evaluation by a recognised agency

Clauses	Title	Source of evidence of conformity
5.22	<i>Variation in supply voltage</i>	Validated evaluation by a recognised agency
5.23	<i>Polarity reversal</i>	Validated evaluation by a recognised agency
5.24	<i>Secondary power source</i>	Validated evaluation by a recognised agency
5.25	Electrical safety	CSIRO (via co-ordination with an external electrical safety laboratory, where necessary)
5.26	<i>Sequence timing for smoke alarms with voice</i>	Validated evaluation by a recognised agency

Substantial extensions to CSIRO's laboratory infrastructure have commenced that will extend product evaluation capabilities and enable the provision of services covering the full range of tests specified by AS 3786-2015. Pending completion of these capital works late 2015, evidence of conformity to clauses 5.10 and 5.16 shall be sourced from recognized external agencies (laboratories).

4.4. Suitability of External Evidence

Assessment of the suitability of external agencies (laboratory) evidence shall be conducted in accordance with the CSIRO Recognition Framework.

Evidence of conformity, in the form of endorsed test reports written in English, are required to be submitted in full. Where test reports were originally produced in a language other than English, certified translations may be supplied instead. Submitted external test reports must provide sufficient detail to describe the product being evaluated in full and in detail, and establish that an evaluation schedule was designed and applied to each model or variant of smoke alarm submitted to the external agency.

External evidence can only be accepted where verification between the product submitted for evaluation and the specimens in the endorsed test report is considered a critical requirement. Where external reports do not provide sufficient product identification, additional evaluation to specified requirements (testing) may be required.

4.5. Certificates of Conformity

Certificates, such as those published by a Conformity Assessment Body, do not provide direct and sufficient detail for the purposes of evaluation for conformity to AS 3786-2015.

4.6. Normative References

For the purpose of evaluation to AS 3786-2015, the revisions of normative references that shall apply are given in Table 4.

Table 4. Versions of normative references which shall apply to the evaluation for conformity of smoke alarms to AS 3786-2015.

Normative Reference	Title	Version
AS 60068	Environmental testing—Tests	
AS 60068.1	Part 1: General	2003
AS 60068.2.1	Test A: Cold	2003
AS 60068.2.2	Test B: Dry heat	2003
AS 60068.2.6	Test Fc: Vibration (sinusoidal)	2003
AS 60068.2.42	Test Kc: Sulphur dioxide test for contacts and connections	2004
AS 60068.2.78	Test Cab: Damp heat, steady state	2003
AS IEC 61672	Electroacoustics—Sound level meters	
AS IEC 61672.1	Part 1: Specifications	2004
AS/NZS 60950	Information technology equipment—Safety	
AS/NZS 60950.1	Part 1: General requirements (IEC 60950-1, Ed. 2.0 (2005), MOD)	2011
AS 60065	Audio, video and similar electronic apparatus—Safety requirements (IEC 60065, Ed. 7.2 (2011) MOD)	2012
ISO 209	Aluminium and Aluminium Alloys—Chemical Composition	2007
ISO 2919	Radiological protection—Sealed radioactive sources—General requirements and classification	2012

Normative Reference	Title	Version
ISO 7240	Fire detection and alarm systems	
ISO 7240-3 or AS 7240.3 ⁵	Part 3: Audible alarm devices	2014
ISO 7731	Ergonomics—Danger signals for public and work areas—Auditory danger signals	2003
ISO 8201	Acoustics—Audible emergency evacuation signal	1987
EN 50130	Alarm Systems	
EN 50130-4	Part 4: Electromagnetic Compatibility—Product Family Standard: Immunity Requirements for Components Of Fire, Intruder, Hold Up, CCTV, Access Control and Social Alarm Systems	2010

4.7. Errors contained in AS 3786-2015

The published version of AS 3786-2015 contains errors that are demonstrably incorrect and not present in earlier public drafts of the Standard. As the errors result in unintended and inappropriate divergence between AS 3786-2015 and the EN and ISO standards, the following text which forms part of Clause 5.12.3 “Vibration, sinusoidal (operational), Mounting of specimen” – shall be disregarded:

The specimen shall be mounted on a rigid fixture as specified in Clause 5.1.4, except that it shall not be supplied with power during conditioning.

The above text of Clause 5.12.3 shall be replaced by the following:

The specimen shall be mounted on a rigid fixture as specified in Clause 5.1.4 and connect it to its power source as specified in Clause 5.1.3.

5. REPORTING

The evaluation for conformity report shall include relevant information specified as follows:

- A statement of conformity with reference to AS 3786-2015 and unambiguous designation of the following:
 - all models selected and evaluated in accordance with this document.
- All other information in accordance with the reporting requirements of Australian Standard AS ISO/IEC 17025-2005.

⁵ ISO 7240-3 was adopted as Australian Standard AS ISO 7240.3 in 2014.