



STANDARD FOR CERTIFICATION

No. 2.9

TYPE APPROVAL PROGRAMME NO. 7-473.30/31 /
MED A.1/3.30/54

Gas Detector System, Portable/Fixed Oxygen Analysis and Gas Detection Equipment

SEPTEMBER 2011

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CHANGES

This document replaces the October 2009 issue.

Main Changes:

- **Section 2.3 and 2.5.3.2 and 5**
 - Updated with reference to the current international standards.
- **Table 5-1**
 - Added requirement for labelling/marketing and instruction manual
- **Table 5-4**
 - Changed EN 50104:2002 to EN 50104:2010 and added all relevant test items in the new standard related to design.
- **Table 5-5**
 - Changed EN 50104:2002 to EN 50104:2010 and added all relevant test items in the new standard related to performance.
- **Table 5-7**
 - Added all relevant test items in the new standard related to design.
- **Table 5-8**
 - Added all relevant test items in the new standard related to performance.

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1. Scope

Type approval is a programme for certifying that a product type is in conformity with a set of predetermined requirements. In the following, the term “type approval” is used for both DNV type approval and MED type examination

The requirements are based on relevant standards as outlined in section 2.3 below.

The procedure for assessment of conformity of manufactured products (production) is part of the scope for the type approval programme.

2. Conformity Assessment of Design of Product Type

2.1 Procedure

Type approval procedure consists of the following elements:

- application for type approval of the product
- design assessment
- type testing
- certificate retention survey.

2.2 Documents to be submitted

The following documentation shall be submitted to the local DNV office, either using a common electronic format (*e.g. Acrobat(.pdf) or MS Word (.doc)*) and protocol (e-mail or CD), or hard copies in paper (triplicate):

- functional description
- system block diagrams
- user interface documentation
- power supply arrangement
- arrangement and layout
- instrument and equipment list
- circuit diagrams
- test procedures
- test reports
- documentation related to software if applicable (including software version numbers).

For details, please refer to DNV Rules for Classification, Pt.4 Ch.9 Sec.1 Control and Monitoring Systems.

All the documents submitted shall be marked in accordance with the manufacturer's QA-system and shall be prepared for easy reference to the various elements asked for.

When applying for a type approval an Application for Type Approval, Form No.: 86.02a / 43.44a, as applicable, shall be duly filled in and submitted.

2.3 Design requirements

The gas detector system shall comply with relevant requirements of the following publications:

- The Rules for Classification of Ships/High Speed, Light Craft and Naval Surface Craft Pt.4 Ch.9 - Control and Monitoring Systems.
- DNV Standard for Certification No. 2.4 - Environmental test specification for instrumentation and automation equipment.

Electrical apparatus for oxygen analysis and gas detection equipment (fixed and portable):

- Regulations of SOLAS 74 and the relevant resolutions and circulars of the IMO, as applicable:
 - Reg. II-2/4
 - Reg. VI/3
 - IMO Res. MSC.98(73)-(FSS Code) 15.

Specification for open path apparatus for the detection of combustible or toxic gases and vapours:

- **EN 60079-29-4 (2010), Performance requirements of open path detectors for flammable gases.**

Portable oxygen analysis and gas detection equipment should be tested in accordance with:

- EN 60945 (2002)
- IEC 60092-504 (2001)
- IEC 60533 (1999)

and as applicable to:

- a) Category 1: (safe area):
 - EN 50104 (2010)
 - EN 60079-29-1 (2007).
- b) Category 2: (explosive gas atmospheres):
 - EN 50104 (2010)
 - EN 60079-29-1 (2007)
 - IEC 60079-0 (2004)
 - IEC 60079-1 (2007)
 - IEC 60079-10 (2002)
 - IEC 60079-11 (2006)
 - IEC 60079-15 (2005)
 - IEC 60079-26 (2006)

as amended.

Fixed oxygen analysis and gas detection equipment should be tested in accordance with:

- EN 60945 (2002)
- IEC 60092-504 (2001)
- IEC 60533 (1999),

and as applicable:

- EN 50104 (2010)
- EN 60079-29-1 (2007)

as amended.

Publications may be obtained at:

- www.imo.org, IMO Publications
- www.iec.ch, IEC Publications
- www.cenelec.eu, EN Publications
- www.mared.org, Marine Equipment Directive.

2.4 Requirements for identification of type of product with certificate

The manufacturer is to specify type, type number, model, etc., which completely identifies the product and its components according to drawings/equipment specification.

All optional features for which type approval is requested are to be listed, either by separate type numbers or by suffixes to the equipment's basic type number.

All drawings and descriptions are to be marked with drawing reference number, item name, issue date, etc., which identify the documentation as such.

In addition all software modules installed per hardware unit shall be specified with names and version numbers.

The final product shall be provided with visible marking, giving at least the following information:

- identification of manufacturer
- equipment type number or model identification
- serial number
- power consumption/supply voltage

2.5 Elements of type approval

2.5.1 Application for type approval

The initial stage includes filling in a formal DNV application form asking for type approval of the product(s). The application form shall be forwarded to the local DNV station together with product documentation and proposed test programs.

2.5.2 Design assessment

The second stage involves DNV assessment of the requested documentation (ref. section 2.2) and verification that the product design is in conformance with the requirements (ref. section 2.3.).

2.5.3 Type testing (TT)

When the design assessment has been completed by DNV, including approval of all test procedures, the type testing may commence.

The type testing comprises:

- visual inspection
- performance type testing
- environmental type testing.

The type testing shall be performed by a recognized laboratory holding valid accreditations from a recognized organisation for the applicable tests.

Alternatively for visual inspection and environmental type testing only, the presence of a DNV surveyor or an independent expert from a recognised authority may be accepted following the approval of the responsible approval centre in DNV.

All the type testing shall be documented in accordance with EN 45001 (ISO 17025).

It is *the manufacturer's responsibility* to make sure that the type testing is performed in accordance with approved test procedures.

2.5.3.1 Visual inspection

The product will be visually inspected for good workmanship, conformity with the manufacturer's drawing and specifications, and the DNV Rules for Classification as applicable.

2.5.3.2 Performance type testing

Tests shall be carried out to verify that the performance of the test sample conforms to the applicable requirements. The performance type tests shall as a minimum include those specified in EN 60079-29-1:2007 for electrical apparatus for measurement and detection of combustible gases (fixed and portable), EN 50104:2010 for electrical apparatus for detection and measurement of oxygen and EN 60079-29-4:2010 for open path apparatus for the detection of combustible or toxic gases and vapours.

2.5.3.3 Environmental type testing

Tests shall be carried out to verify that the test sample conforms to the requirements of Rules for Classification of Ships, DNV Standard for Certification No. 2.4. Prior to testing the laboratory shall be verified and accepted by DNV. Guidance for form of test report is EN 45001 (ISO 17025).

2.5.4 Routine tests (RT)

The routine tests, including commissioning tests on board, constitute the final production control and the manufacturers standard RT are to be described in the submitted documentation. These tests are normally carried out by the manufacturer or his representative unless otherwise is stated on the type approval certificate.

2.5.5 Initial Type Approval Survey

An initial TA survey may have to be carried out to confirm that the manufacturer has a production line and quality control for consistent production of the applicable product(s) for which TA is requested.

2.6 Type approval certificate

When the design assessment and type testing are successfully completed, a type approval certificate will be issued to the manufacturer for the conformity of the design of the product type.

2.6.1 Certification retention survey

Certificate retention survey is required in front of renewal of type approval certificate. The objective is to verify that the product has not been altered with respect to design and functions covered by the type approval.

2.6.2 Renewal of type approval certificate

At least three months before the period of validity expires, the certificate-holder has to apply for renewal of the certificate.

Upon receipt of the request for renewal, DNV will perform a certificate retention survey as stated above.

The certificate retention survey report will constitute the basis for renewal of the type approval and the issuance of a new certificate.

3. EC Conformity Assessment Procedure

3.1 EU Certification Scheme

3.1.1 Definitions

Notified Body (NB): means an organisation designated by the competent national administration of a Member State to undertake conformity assessment procedures of equipment specified in the EU directive on marine equipment. Such equipment may then be used on board ships registered in any Member State within the European Economic Area (EEA).

Conformity Assessment Procedures: means those procedures necessary to obtain an EC Type-Examination Certificate, QS-Certificate of Assessment - EC, Certificate of Conformity - EC and the manufacturer's Declaration of Conformity necessary for affixing the mark of conformity. The conformity assessment is subdivided into modules which relate to the design and production phases.

Modules: The certification scheme specifies different modules to be followed. There is a variety of modules covering the design and production phases, and the manufacturer may choose between different modules, dependent on type of product, the nature of the risk involved etc.

3.2 Entry into force of EU Directive on Marine Equipment

The 4th Amendment of Council Directive 96/98/EC which entered into force 2009.07.21 (Directive 2008/67/EC), includes the above product, and detailed testing standards have already been worked out. The standards are specified in 2.3.

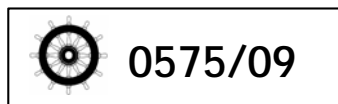
3.3 CE Marking (Wheel marking)

CE marking (mark of conformity, a ship wheel) of this product may be carried out by DNV as Notified Body.

The Directive is mandatory for the products when they are put onboard new or existing ships not previously carrying such equipment, or where it replaces equipment previously carried onboard, when the ship is flying the flag of any EEA (EU + EFTA) member state.

The manufacturer or its authorised representative established within the community shall affix the wheel mark to each product and draw up a written declaration of conformity at the end of the production phase.

The wheel shall be followed by the DNV identification number as Notified Body when involved in the production control phase, and by the last two digits of the number of the year in which the mark is affixed. See example below:



4. Certification of Gas Detector System, Portable/Fixed Oxygen Analysis and Gas Detection Equipment according to the EU Directive on Marine Equipment

For certification of such equipment the EU Directive will require compliance with Modules B + D, or Modules B + E, or Modules B + F.

The DNV type approval will satisfy the EC type-examination required in Module B.

A summary of Modules B, D, E and F is also made below.

On request, further details of these EU Modules will be given by the local DNV surveyor.

4.1 Design Phase

4.1.1 Module B (Type-Examination)

DNV's type approval procedure is considered to be equal to Module B (EC type-examination) referred to in the EU Council Directive on Marine Equipment.

Renewal of an EC type-examination certificate (validity 5 years) will be based on a statement from the manufacturer confirming that no change has been made to the design of the product.

4.2 Production Phase

For the production phase the manufacturer may choose between modules D, E or F.

If modules D or E are chosen, DNV as the Notified Body may approve his quality system (QS) and will then arrange with the necessary details, making it possible to affix wheel mark.

For all modules, the manufacturer shall draw up a declaration of conformity and affix the mark of conformity.

4.2.1 Module D (Production Quality Assurance)

If the manufacturer operates a QS for production and testing equivalent to the requirements in EN ISO 9001 (2000), Module D may be used.

DNV has to assess the QS and issue an audit report. This assessment consist of 2 main elements:

- a) assessment of quality system documentation
- b) quality system audit at the manufacturer's premises.

DNV will issue a QS - Certificate of Assessment - EC.

The production quality control system is subject to annual DNV audits.

4.2.2 Module E (Product Quality Assurance)

If the manufacturer operates a QS for inspection and testing equivalent to the requirements in EN ISO 9001 (2000), Module E may be used.

DNV has to assess the QS and issue an audit report. This assessment consist of 2 elements:

- a) assessment of quality system documentation
- b) quality system audit at the manufacturer's premises.

DNV will issue a QS - Certificate of Assessment - EC.

The product quality control system is subject to annual DNV audits.

4.2.3 Module F (Product Verification)

Necessary measures shall be taken by the manufacturer, in order that the manufacturing process ensures conformity of the products with the type as described in the EC type-examination certificate (Module B).

DNV as the Notified Body will carry out the appropriate examinations and tests in order to check the conformity of the product with the requirements of the International instruments either by:

- examination and testing of every product, or
- by examination and testing of products on a statistical basis.

DNV will issue a Certificate of Conformity - EC.

5. Test Specification

The minimum test procedures are specified in the following publications:

Electrical apparatus for measurement and detection of combustible gases (portable):

- EN 60079-29-1:2007, Performance requirements of detectors for flammable gases
- EN 60079-0:2004, Explosive atmospheres - General requirements
- EN 60079-1:2007, Explosive atmospheres - Equipment protection by flameproof enclosures “d”
- EN 60079-10:2002, Explosive atmospheres - Electrical installations inspection and maintenance
- EN 60079-11:2006, Explosive atmospheres - Equipment protection by intrinsic safety “i”
- EN 60079-15:2005, Electrical apparatus for explosive gas atmospheres - Construction, test and marking of type of protection “n” electrical apparatus
- EN 60079-26:2006, Explosive atmospheres - Equipment with equipment protection level (EPL) Ga.

Electrical apparatus for measurement and detection of combustible gases (fixed):

- EN 60079-29-1:2007, Performance requirements of detectors for flammable gases.

Electrical apparatus for detection and measurement of oxygen:

- **EN 50104:2010, Performance requirements and test methods.**

Specification for open path apparatus for the detection of combustible or toxic gases and vapours (not for EC type examination):

- **EN 60079-29-4:2010, Performance requirements of open path detectors for flammable gases.**

DNV Standard for Certification No. 2.4, Environmental test specification for instrumentation and automation equipment.

Tests are to be carried out at test sites approved by the Society. The manufacturer shall, unless otherwise agreed, set up the equipment and ensure that it is operating normally before type testing commences.

5.1 Electrical apparatus for measurement and detection of combustible gases (fixed/portable)

Table 5-1 Design requirements - Electrical apparatus for measurement and detection of combustible gases (fixed/portable):

No	Item	Description of requirement	TT	Comments
A.1	EN 60079-29-1:2007/4.2.9	In the design of software - controlled apparatus, special account shall be taken of the risks arising from faults in the programme.		
A.2	EN 60079-29-1:2007/4.2	Construction		
A.3	EN 60079-29-1:2007/4.3	Labelling and marking		
A.4	EN 60079-29-1:2007/4.4	Instruction manual		

Table 5-2 Performance tests - Electrical apparatus for measurement and detection of combustible gases (fixed/portable):

No	Test	Specification of test	TT	Comments
P.1	Unpowered storage	EN 60079-29-1:2007/5.4.2		
P.2	Preparation and verification calibration and adjustment	EN 60079-29-1:2007/5.4.3		
P.3	Alarm set point(s) alarm	EN 60079-29-1:2007/5.4.6		
P.4	Pumping rate	EN 60079-29-1:2007/5.4.11		
P.5	Warm-up time	EN 60079-29-1:2007/5.4.15		
P.6	Time of response	EN 60079-29-1:2007/5.4.16		
P.7	Minimum time of operation	EN 60079-29-1:2007/5.4.17 EN 60079-29-1:2007/5.4.22		
P.8	Addition of sampling probe	EN 60079-29-1:2007/5.4.22		
P.9	Field calibration kit	EN 60079-29-1:2007/5.4.26		
P.10	High gas concentration above measuring range (LEL only).	EN 60079-29-1:2007/5.4.18		
P.11	Orientation.	EN 60079-29-1:2007/5.4.12,		
P.12	Drift Short/medium term tests for continuous duty apparatus Test on spot reading apparatus.	EN 60079-29-1:2007/5.4.4.1, EN 60079-29-1:2007/5.4.4.2, EN 60079-29-1:2007/5.4.4.5,		
P.13	Audible alarm level.	IMO resolution A.830(19)		
P.14	Signal characteristics.	IMO resolution A.830(19)		

Table 5-3 Environmental tests - Electrical apparatus for measurement and detection of combustible gases (fixed/portable):

No	Test	Specification of test	TT	Comments
E.1	Dry heat test	SfC 2.4, 3.7		
E.2	Damp heat test	SfC 2.4, 3.8		
E.3	Cold test	SfC 2.4, 3.9		
E.4	Vibration test	SfC 2.4, 3.6		
E.5	Conducted Low Frequency Immunity	SfC 2.4, 3.14.4		
E.6	Electric Fast Transient/Burst Immunity	SfC 2.4, 3.14.5		
E.7	Electric Slow Transient/Surge Immunity	SfC 2.4, 3.14.6		
E.8	Conducted Radio Frequency Immunity	SfC 2.4, 3.14.7		
E.9	Radiated Electromagnetic Field Immunity	SfC 2.4, 3.14.8		
E.10	Electrostatic Discharge Immunity Test	SfC 2.4, 3.14.9		
E.11	Radiated Emission Test	SfC 2.4, 3.14.11		
E.12	Conducted Emission Test	SfC 2.4, 3.14.12		
E.13	Protection (enclosure)	IEC 60529		

5.2 Oxygen detection and measurement

<i>No</i>	<i>Item</i>	<i>Description of requirement</i>	<i>TT</i>	<i>Comments</i>
A.1	EN 50104:2010/4.2.1	General construction		
A.2	EN 50104:2010/4.2.2	Indicating devices		
A.3	EN 50104:2010/4.2.3	Alarm and output functions		
A.4	EN 50104:2010/4.2.4	Fault signal		
A.5	EN 50104:2010/4.2.5	Adjustments		
A.6	EN 50104:2010/4.2.6	Battery-powered apparatus		
A.7	EN 50104:2010/4.2.7	Stand-alone gas detection apparatus for use with separate control units		
A.8	EN 50104:2010/4.2.8	Separate control units for use with stand-alone gas detection apparatus		
A.9	EN 50104:2010/4.2.9	Apparatus using software and/or digital technologies		Ref. EN 50271

<i>No</i>	<i>Test</i>	<i>Specification of test</i>	<i>TT</i>	<i>Comments</i>
P.1	Unpowered storage of the apparatus	EN 50104:2010/5.4.2		
P.2	Calibration curve	EN 50104:2010/5.4.3.2		
P.3	Repeatability	EN 50104:2010/5.4.3.3		
P.4	Drift	EN 50104:2010/5.4.4.1		
P.5	Alarm set point(s), increasing oxygen concentration	EN 50104:2010/5.4.6.2/3		
P.6	Alarm set point(s) decreasing oxygen concentration	EN 50104:2010/5.4.6.4/5		
P.7	Temperature	EN 50104:2010/5.4.7		
P.8	Pressure	EN 50104:2010/5.4.8		
P.9	Humidity	EN 50104:2010/5.4.9		
P.10	Air velocity	EN 50104:2010/5.4.10		
P.11	Flow rate	EN 50104:2010/5.4.11		
P.12	Orientation	EN 50104:2010/5.4.12		
P.13	Drop test	EN 50104:2010/5.4.14		
P.14	Warm up time	EN 50104:2010/5.4.15		N/A to spot-reading apparatus
P.15	Time of response	EN 50104:2010/5.4.16		N/A to spot-reading apparatus
P.16	Minimum time to operate	EN 50104:2010/5.4.17		Spot-reading apparatus
P.17	Battery capacity	EN 50104:2010/5.4.18		
P.18	Addition of sampling probe	EN 50104:2010/5.4.21		
P.19	Dust	EN 50104:2010/5.4.22		
P.20	Poisons and other gases	EN 50104:2010/5.4.23		
P.21	Field verification kit	EN 50104:2010/5.4.24		
P.22	Operation at or below the lower limit of the measuring range	EN 50104:2010/5.4.25		
P.23	Verification of software and digital components	EN 50104:2010/5.4.26		Ref. EN 50271
P.24	Information for use	EN 50104:2010/6		
P.25	Audible alarm level	IMO resolution A.830(19)		
P.26	Signal characteristics	IMO resolution A.830(19)		

<i>No</i>	<i>Test</i>	<i>Specification of test</i>	<i>TT</i>	<i>Comments</i>
E.1	Dry heat test	SfC 2.4, 3.7		
E.2	Damp heat test	SfC 2.4, 3.8		
E.3	Cold test	SfC 2.4, 3.9		
E.4	Vibration test	SfC 2.4, 3.6		
E.5	Conducted Low Frequency Immunity	SfC 2.4, 3.14.4		

No	Test	Specification of test	TT	Comments
E.6	Electric Fast Transient/Burst Immunity	SfC 2.4, 3.14.5		
E.7	Electric Slow Transient/Surge Immunity	SfC 2.4, 3.14.6		
E.8	Conducted Radio Frequency Immunity	SfC 2.4, 3.14.7		
E.9	Radiated Electromagnetic Field Immunity	SfC 2.4, 3.14.8		
E.10	Electrostatic Discharge Immunity Test	SfC 2.4, 3.14.9		
E.11	Radiated Emission Test	SfC 2.4, 3.14.11		
E.12	Conducted Emission Test	SfC 2.4, 3.14.12		
E.13	Protection (enclosure)	IEC 60529		

5.3 Open path apparatus for the detection of combustible or toxic gases and vapours

The following 3 tables are not applicable for MED type examination, but DNV type approval only.

Table 5-7 Design requirements - Open path apparatus for the detection of combustible or toxic gases and vapours

No	Test	Specification of test	TT	Comments
A.1	EN 60079-29-4:2010/4.1.1	All parts of the open path gas detection apparatus intended for use in potentially combustible atmospheres shall comply with the appropriate regulations for explosion protection.		
A.2	EN 60079-29-4:2010/4.1.2	Electrical assemblies and components		
A.3	EN 60079-29-4:2010/4.1.3	Optical radiation produced by the equipment shall conform to the requirements given in IEC 60825-1.		
A.4	EN 60079-29-4:2010/4.2.1	General construction.		
A.5	EN 60079-29-4:2010/4.2.2	Indicating devices.		5
A.6	EN 60079-29-4:2010/4.2.3	Alarm or output functions.		
A.7	EN 60079-29-4:2010/4.2.4	Fault signals.		
A.8	EN 60079-29-4:2010/4.2.5	Adjustments.		
A.9	EN 60079-29-4:2010/4.3	Software-controlled equipment, items: — conversion errors — software — data transmission — self-test routines — functional concept		

Table 5-8 Performance tests - Open path apparatus for the detection of combustible or toxic gases and vapours

No	Test	Specification of test	TT	Comments
P.1	Initial preparation and procedures	EN 60079-29-4:2010/5.4.1		
P.2	Unpowered storage	EN 60079-29-4:2010/5.4.2		
P.3	Calibration curve (not applicable to alarm only equipment with fixed settings).	EN 60079-29-4:2010/5.4.3		
P.4	Stability	EN 60079-29-4:2010/5.4.4		
P.5	Alarm reliability.	EN 60079-29-4:2010/5.4.5		
P.6	Temperature variation.	EN 60079-29-4:2010/5.4.6		
P.7	Water vapour interference.	EN 60079-29-4:2010/5.4.7		
P.8	Vibration.	EN 60079-29-4:2010/5.4.8		
P.9	Drop test (portable/transportable equipment).	EN 60079-29-4:2010/5.4.9		
P.10	Alignment	EN 60079-29-4:2010/5.4.10		
P.11	Time of response.	EN 60079-29-4:2010/5.4.11		
P.12	Minimum time to operate (spot reading equipment).	EN 60079-29-4:2010/5.4.12		
P.13	Battery capacity (portable continuous duty equipment.)	EN 60079-29-4:2010/5.4.13		

Table 5-8 Performance tests - Open path apparatus for the detection of combustible or toxic gases and vapours

<i>No</i>	<i>Test</i>	<i>Specification of test</i>	<i>TT</i>	<i>Comments</i>
P.14	Beam block fault.	EN 60079-29-4:2010/5.4.18		Acc. to Corrigendum 1, fourth line in subclause 5.2.4.3 is corrected from "10 mm/s" to "10 cm/s +/- 5 cm/s"
P.15	Partial obscuration.	EN 60079-29-4:2010/5.4.19		
P.16	Long range operation.	EN 60079-29-4:2010/5.4.20		
P.17	Direct solar radiation (applicable for equipment intended for outdoor use).	EN 60079-29-4:2010/5.4.21		
P.18	Labelling and marking.	EN 60079-29-4:2010/7.1		
P.19	Instruction manual.	EN 60079-29-4:2010/7.2		
P.20	Audible alarm level.	IMO resolution A.830(19)		
P.21	Signal characteristics.	IMO resolution A.830(19)		

Table 5-9 Environmental tests - Open path apparatus for the detection of combustible or toxic gases and vapours

<i>No</i>	<i>Test</i>	<i>Specification of test</i>	<i>TT</i>	<i>Comments</i>
E.1	Dry heat test	SfC 2.4, 3.7		
E.2	Damp heat test	SfC 2.4, 3.8		
E.3	Cold test	SfC 2.4, 3.9		
E.4	Vibration test	SfC 2.4, 3.6		
E.5	Conducted Low Frequency Immunity	SfC 2.4, 3.14.4		
E.6	Electric Fast Transient/Burst Immunity	SfC 2.4, 3.14.5		
E.7	Electric Slow Transient/Surge Immunity	SfC 2.4, 3.14.6		
E.8	Conducted Radio Frequency Immunity	SfC 2.4, 3.14.7		
E.9	Radiated Electromagnetic Field Immunity	SfC 2.4, 3.14.8		
E.10	Electrostatic Discharge Immunity Test	SfC 2.4, 3.14.9		
E.11	Radiated Emission Test	SfC 2.4, 3.14.11		
E.12	Conducted Emission Test	SfC 2.4, 3.14.12		
E.13	Protection (enclosure)	IEC 60529		