



ExMC/312/DV  
May 2006

**INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) SCHEME  
FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR  
USE IN EXPLOSIVE ATMOSPHERES  
(IECEx SCHEME)**

**Ex Management Committee, ExMC**

**TITLE: IECEx Assessment Report for acceptance of *VTT Technical Research  
Centre of Finland* as an IECEx Test Laboratory (ExTL)**

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**INTRODUCTION**

**This document contains the IECEx Assessment Report for the acceptance of *VTT Technical Research Centre* as an IECEx Test Laboratory (ExTL) within the IECEx Scheme.**

**The report is hereby submitted for voting.**

**Please consider the assessment report, which is issued for final vote 2006 07 08**

*Chris Agius*  
**IECEx Secretariat**

<b>Address:</b> IECEx Secretariat SAI Building 286 Sussex Street Sydney 2000 Australia	<b>Tel:</b> +61 2 8206 6940 <b>Fax:</b> +61 2 8206 6272 <b>Email:</b> <a href="mailto:chris.agius@iecex.com">chris.agius@iecex.com</a> <b>Internet:</b> <a href="http://www.iecex.com">www.iecex.com</a>
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# IECEx ASSESSMENT REPORT (TEST LABORATORY – ExTL)

## Type of Assessment:

Initial assessment for Candidate ExTL

X

## 1. OBJECT AND FIELD OF APPLICATION

1.1 **Country:**  
Finland

1.2 **Name of Candidate TL**  
VTT Technical Research Centre of Finland

1.3 **Members of the Assessment Team**

On site:  
Jim Munro: Lead Assessor  
Heinz Berger: Assessor

Off site  
Vijay Varma

1.4 **Place And Date Of Assessment**

VTT  
Otakaari 7 B  
ESPOO  
27<sup>th</sup> - 30<sup>th</sup> September 2005

1.5 **Assessment References**

Document:  
i) IECEx 02 Second Edition  
ii) IECEx Operational Document OD/003  
iii) IECEx Operational Document OD/009  
iv) ISO/IEC 17025:1999  
v) IECEx Technical Guidance Documents  
vi) ExTAG decision sheets  
vii) ExTL application documents

1.6 **Scope of Application**

Product Category	Standard
General Requirements	IEC 60079-0
Pressurised Enclosures "p"	IEC 60079-2
Powder Filling "q"	IEC 60079-5
Oil Immersion "o"	IEC 60079-6
Increased Safety "e"	IEC 60079-7
Intrinsic Safety "i"	IEC 60079-11
Type "n" Protection	IEC 60079-15
Type "m" Protection (encapsulation)	IEC 60079-18
Intrinsically Safe Systems	IEC 60079-25



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Group II Zone "0" Electrical Apparatus	IEC 60079-26
Apparatus for combustible dust atmospheres	IEC 61241-1-1
Combustible dust - General requirements	IEC 61241-0
Combustible dust - Protection by Enclosures "tD"	IEC 61241-1
Combustible dust – Type of protection "pD"	IEC 61241-4
Combustible dust – Type of protection "mD"	IEC 61241-18

Note: Since the original application was received VTT have altered their scope application as follows-

- delete IEC 60079-1,
- add IEC 60079-5, IEC 60079-6 and IEC 60079-25.

**1.7 Candidate TL Persons Interviewed**

Hannu Hossi	Service Manager
Risto Sulonen	Senior Research Scientist
Martti Siirola	Research Scientist
Pertti Kokkonen	Research Engineer
Jari Kettunen	Research Engineer

**1.8 Legal Entity Of The Candidate TL**

Same as for ExCB

**1.9 Associated ExCB**

The ExTL is integral with the ExCB. There are staff common to both operations with separation of roles achieved by procedures.

**1.12 Financial Support**

VTT is a state owned non-profit organisation.

**1.13 History**

Since its establishment over 60 years ago, VTT has become an important centre of technological expertise and developer of new technologies. The development path of Finland as a whole as well as the events and phenomena of each era are reflected in VTT's history. It reveals one of the keys to VTT's success: the organisation has always been able to meet challenges by adapting to changes in its environment.

VTT's six decades

1940s: President Ryti signs the Act on the Technical Research Centre of Finland  
1950s: The Post-war era  
1960s: VTT becomes Finland's biggest research institute  
1970s: Reorganised research centre moves to Otaniemi  
1980s: Research programmes serving the needs of industry  
1990s: Electronics and information technology research as the engine of development  
2000-2004: Strategic technology themes steer research

VTT started Ex- Testing in 1981, was accepted as a testing laboratory under the old EU directive and became ATEX Notified Body in 2000.

For detail on the above listed decades can be seen in the Internet under

<http://www.vtt.fi/vtt/inbrief/history/index.htm>



## 2. ORGANISATION

### 2.1 Names, Titles and Experience of the Senior Executives

Hannu Hossi	Service Manager	31 years
Risto Sulonen	Senior Research Scientist	25 years

### 2.2 Name, Title and Experience of the Quality Management Representative

Henry Weckman (for Services)	Senior Research Scientist	30 years
Risto Sulonen (for Ex Services)	Senior Research Scientist	25 years

### 2.3 Name and Title of Nominated Principal Contact

Risto Sulonen	Senior Research Scientist
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### 2.4 Employees

Risto Sulonen  
Matti Siirola  
Jari Kettunen  
Pertti Kokkonen

### 2.5 Organisational Structure

VTT is in the process of changing the organisational structure. The new structure took effect on January 1<sup>st</sup>, 2006. The charts presented reflect the new situation. See Annex A for the VTT overall organisation. The ExTL has become part of the organisation unit "Expert Services". See Annex B for the organisation chart of the Expert Services. Annex C shows the organisation chart of the Ex Team.

## 3. RESOURCES

There are adequate resources at VTT to carry out the work. This includes staff, test facilities and support systems. Environmental tests, including dust and water tests to IEC 60529, are normally carried out in another area of VTT.

## 4. TEST METHODS

VTT test procedures are currently written in Finnish and cover all the major test operations. For other aspects the requirements in the standards are used as the basis for carrying out the work, although in some cases these are supplemented by additional guidance material, for example PTB guidance material on testing Ex e motors. The ExTAG Decision Sheets and IECEx Scheme operational documents are also used by VTT in carrying out the work.

## 5. TEST REPORTS AND RECORDS

### 5.1 Test Reports Issued

The number of test reports issued under the ATEX directive in the preceding four years for each type of protection is as follows:

Product Category	Standard*	2002	2003	2004	2005	Total
General Requirements	IEC 60079-0	102	156	92	81	431
Pressurised Enclosures "p"	IEC 60079-2	12	31	13	22	78
Powder Filling "q"	IEC 60079-5	0	0	0	0	0
Oil Immersion "o"	IEC 60079-6	0	0	0	1	1
Increased Safety "e"	IEC 60079-7	69	74	49	37	229
Intrinsic Safety "i"	IEC 60079-11	16	41	24	13	94
Type "n" Protection	IEC 60079-15	7	23	21	8	59



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Type "m" Protection (encapsulation)	IEC 60079-18	3	8	4	8	23
Intrinsically Safe Systems	IEC 60079-25	0	0	0	0	0
Group II Zone "O" Electrical Apparatus	IEC 60079-26	5	14	10	8	37
Apparatus for combustible dust atmospheres	IEC 61241-1-1	0	9	5	2	16
Combustible dust - General requirements	IEC 61241-0	0	0	0	2	2
Combustible dust - Protection by Enclosures "tD"	IEC 61241-1	0	0	0	2	2
Combustible dust – Type of protection "pD"	IEC 61241-4	0	0	0	0	0
Combustible dust – Type of protection "mD"	IEC 61241-18	0	0	0	0	0

\* Mainly using equivalent EN-standard

## 5.2 Test Records

Test records were in general found to be very good. However, one instance was found of test data being written on to a scrap of paper for later transcription to the formal test record (see below).

## 6. CALIBRATION

There is a list of all equipment. This list also indicates which ones are in calibration. Calibration is mostly done externally by accredited facilities (example sighted of calibration of digital multimeter by Agilent Technologies with Swedac accreditation).

There is some internal calibration, for example of a temperature data logger and of flow measurement devices for dust testing. The calibration process, including equipment used for the flow measurement devices was checked and found to be satisfactory.

## 7. DOCUMENTATION

### 7.1 Quality Manual

The quality manual was reviewed as part of the ExCB assessment and found to be satisfactory. However, it is noted that major organisational restructure will also see the manual changed.

### 7.2 Document Change Control

This was found to be satisfactory. TO-001 in the Quality Manual deals with the document handling and change control. Documents concerning testing and certification are stored for 25 years.

## 8. CONFIDENTIALITY

Clause 22 of the VTT employment contract deals with confidentiality issue. Evidence was given during the assessment.

## 9. NATIONAL ACCREDITATION

Accreditation is held from FINAS as a testing laboratory to ISO/IEC 17025 (No T136 – Annex D). The accreditation schedule should be updated to include all standards listed under the scope, noting that a re-accreditation assessment is due by September 2006.

VTT also has accreditation as an inspection body to ISO/IEC 17020 (No I018).

## 10. RECOGNITION AND AGREEMENTS

No co-operation agreement is in force

## 11. INTERNAL AUDIT AND PERIODIC REVIEW

Under the current organisation (until December 31<sup>st</sup>, 2005) Quality Manual procedures TO-002 and TO-003 are dealing with internal audits.

Internal audit reports for 2004 and 2005 were presented during the assessment as well as the audit plan for 2005.

Corrective actions are listed on the VTT Intranet and carefully controlled by responsible personnel.

With the restructured organisation of VTT on January 1<sup>st</sup>, 2006, which occurred after the on-site assessment all manuals and procedures have been updated.

## 12. COMPLAINTS MECHANISM

Quality Manual procedure TO-003 is dealing with the complaint issue. Complaints are listed in the VTT Intranet. In the event that the complaint cannot be solved through VTT internal channels, the customer can call on the Advisory Board described in Clause 2.7.2 of the ExCB report.

## 13. SPECIAL FACTS TO BE NOTED

Jim Munro carried out a preliminary assessment of VTT on 16 and 17 June 2005.

The assessment included witnessing VTT carrying out temperature rise tests on a luminaire, IP6X and IPX4 tests, and tests on a power supply using the intrinsic safety spark test apparatus.

Copies of additional supporting information for this assessment have been provided to applicant and the IECEx Secretariat. These include:

- Details of issues raised and how these have been resolved.
- Technical guidance documents for Ex i, Ex e and Dust.
- Checklist for ISO/IEC 17025.
- Photographs of the facility.

## 14. COMMENTS

Some issues were found during the assessment that required rectification. These included IP testing, control of testing in other areas of VTT, some calibration matters and improvements to intrinsic safety spark testing. All these have been dealt with to the satisfaction of the assessment team.

Observations were also made in relation to improving the procedures for temperature rise measurement and these are being taken into account by VTT.

## 15. RECOMMENDATION

Based on the initial assessment performed on 27<sup>th</sup> to 30<sup>th</sup> September 2005, and in the successful resolution of follow-up actions confirmed by the Assessment Team VTT is recommended for acceptance into the IECEx scheme as a Testing Laboratory (ExTL).



**ExMC/312/DV**  
**May 2006**

**Jim Munro**  
**Lead Assessor**

**Heinz Berger**  
**Assessor**

**Vijay Varma**  
**Assessor**

**26 April 2006**

**Annexes**

**Annex A: VTT Overall Organisation Chart**  
**Annex B: VTT Expert Services Organisation Chart**  
**Annex C: VTT Ex Team Organisation Chart**  
**Annex D: Accreditation Certificate from FINAS**

Erkki KM Leppävuori, Director General

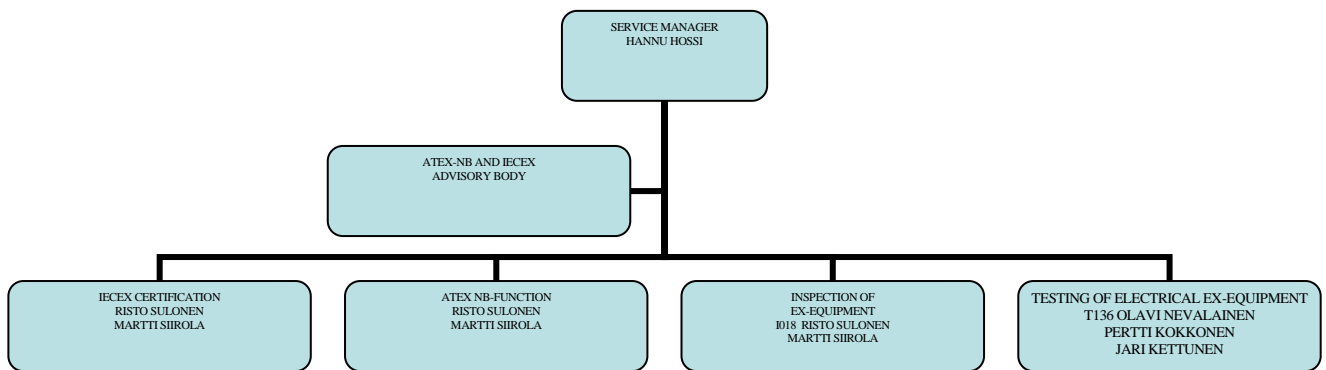
# ORGANISATION

## 1.1.2006



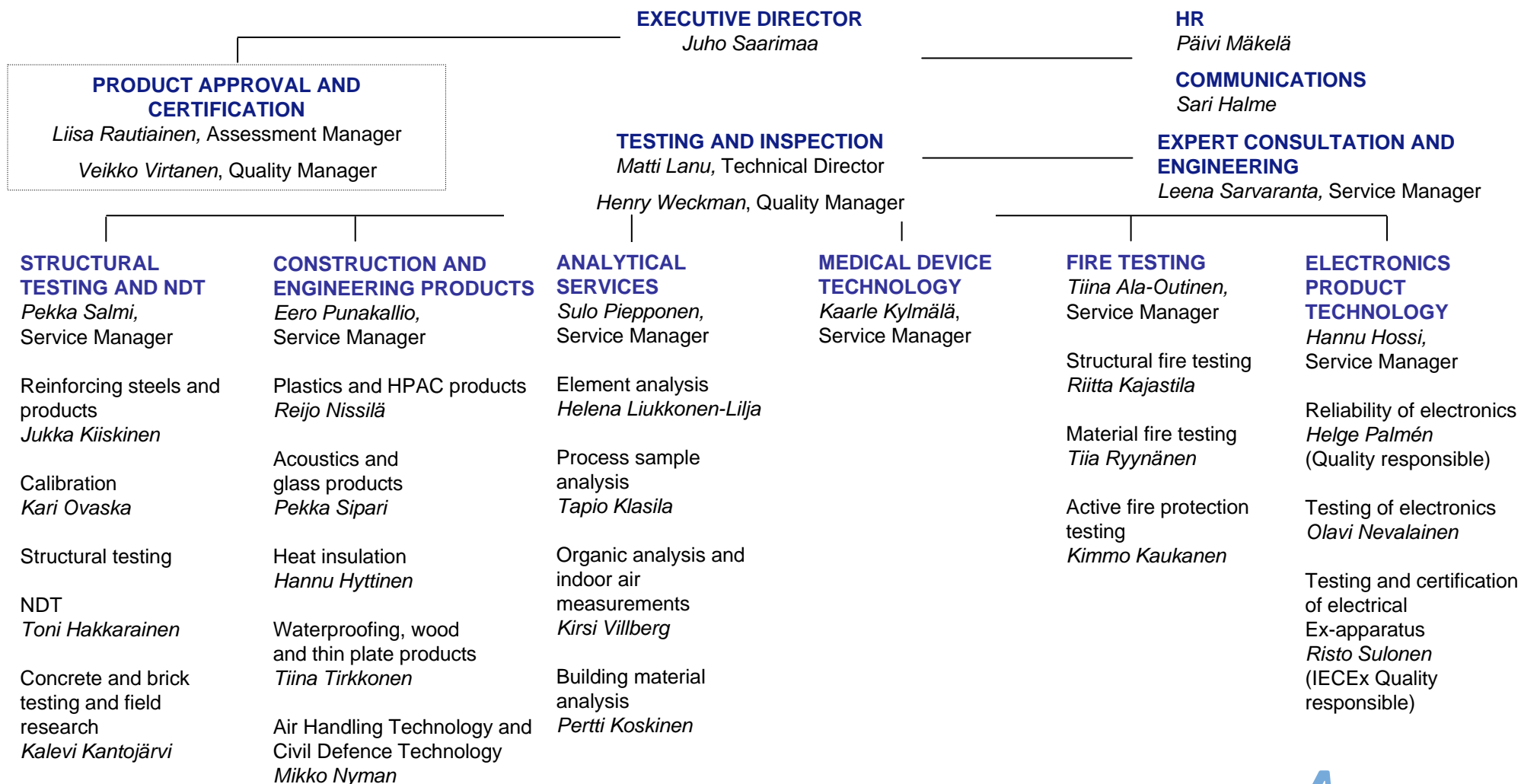


## ANNEX B



## ANNEX C

## ORGANISATION OF EXPERT SERVICES 1.1.2006



# FINAS

## AKKREDITOINTITODISTUS

### ACCREDITATION CERTIFICATE

VTT TUOTTEET JA TUOTANTO  
SÄHKÖ- JA ELEKTRONIIKKATUOTTEET

ESPOO

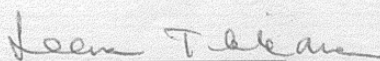
on Mittatekniikan keskuksen akkreditoima testauslaboratorio T136  
päätöksellä T136/A04/2002.  
Päätös on voimassa 29.09.2006 asti.

is Testing Laboratory No. T136 accredited by  
the Centre for Metrology and Accreditation.  
The accreditation is based on Decision T136/A04/2002, valid until 29.09.2006.

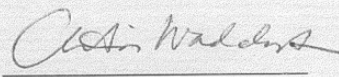
Toimielin täyttää seuraavan standardin vaatimukset:  
The above body conforms to the requirements of the following Standard:

SFS-EN ISO/IEC 17025

Helsinki 13.12.2002



Leena Tikkanen



Christina Waddington



MITTATEKNIIKAN KESKUS  
CENTRE FOR METROLOGY AND ACCREDITATION

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**AKKREDITOITU TESTAUSLABORATORIO**  
**ACCREDITED TESTING LABORATORY**



**VTT TUOTTEET JA TUOTANTO,  
SÄHKÖ- JA ELEKTRONIIKKATUOTTEET**

**VTT INDUSTRIAL SYSTEMS,  
ELECTRICAL AND ELECTRONIC PRODUCTS**

**T136 (EN ISO/IEC 17025)**

Tunnus Code	Laboratorio Laboratory	Osoite Address	Puh./fax/e-mail/www Tel./fax/e-mail/www
T136	VTT Tuotteet ja tuotanto Sähkö- ja elektroniikkatuotteet  VTT Industrial Systems, Electrical and Electronics Products	(Otakaari 7 B, Espoo) PL 13071 02044 VTT  (Otakaari 7 B, Espoo) P.O.Box 13071 FIN-02044 VTT FINLAND	Puhelin: (09) 4561 Telefax: (09) 456 7042 E-mail: etunimi.sukunimi@vtt.fi www.vtt.fi  Phone int.: +358 9 4561 Telefax int.: +358 9 456 7042 E-mail: forename.surname@vtt.fi www.vtt.fi

Tekninen vastuhenkilö: Technical manager: Varavastuuhenkilö: Substitute of technical manager	Testausalat Fields of testing
Tapani Timonen Raoul Kempe	Ajoneuvojen valaisimien ja heijastimien testaus Testing of motor vehicle lamps and retro-reflectors
Olavi Nevalainen Jari Heikkinen	Tuotteiden ympäristöolosuhdetestaus Environmental testing of products
Paul Lindström Risto Sulonen	Räjähdyssuojattujen sähkölaitteiden testaus Testing of explosion protected electrical apparatus

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PÄTEVYYSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mitta-alue Type of test, measured range	Testausmenetelmä Test method
Ajoneuvojen valaisimien ja heijastimien testaus Testing of motor vehicle lamps and retro-reflectors		
Ajoneuvojen valaisimet Motor vehicle lamps	Tyyppihyväksyntätestit Type approval tests	Seuraavat EY-direktiivit ja ECE-säännöt ja näihin tehdyt muutokset määritellyssä dokumentissa T136-170 Following EC-directives and ECE regulations as amended as defined in in-house document T136-170
1. Lasilinssillä varustetut lähi- ja kaukovalaisimet 1. Motor vehicle headlamps incorporating lenses of glass material	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric - Valoteknillisten ominaisuuksien käyttöstabiilisuustesti - Test for stability of photometric performance in operation	Council Directive 76/761/EEC ECE Regulation No 1, except Annex 7 ECE Regulation No 5, except Annex 6 ECE Regulation No 8, except Annex 6 ECE Regulation No 20, except Annex 6 ECE Regulation No 31, except Annex 7
2. Takarekisterikilven valaisimet 2. Devices for the illumination of rear registration plates of motor vehicles and their trailers	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	Council Directive 76/760/EEC ECE Regulation No 4
3. Suuntavalaisimet 3. Direction indicator lamps for motor vehicles and their trailers	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	Council Directive 76/759/EEC ECE Regulation No 6
4. Etu- ja takavalaisimet, ääri- ja jarruvalaisimet 4. Front and rear position (side) lamps, end-outline marker lamps and stop lamps	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	Council Directive 76/758/EEC ECE Regulation No 7

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PÄTEVYYSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mitta-alue Type of test, measured range	Testausmenetelmä Test method
5. Etusumuväläisimet 5. Front fog lamps for motor vehicles	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests - Valoteknillisten ominaisuuksien käyttöstabiilisuustesti - Test for stability of photometric performance in operation	Council Directive 76/762/EEC ECE Regulation No 19
6. Peruutusväläisimet 6. Reversing lamps for motor vehicles and their trailers	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	Council Directive 77/539/EEC ECE Regulation No 23
7. Takasumuväläisimet 7. Rear fog lamps for motor vehicles	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests - Lämmönkestotestit - Heat resistance test	Council Directive 77/538/EEC ECE Regulation No 38
8. Pysäköintiväläisimet 8. Parking lamps for motor vehicles	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	Council Directive 77/540/EEC ECE Regulation No 77
9. Sivuväläisimet 9. Side-marker lamps for motor vehicles	- Valoteknilliset testit - Photometric tests - Värimittaukset - Colorimetric tests	ECE Regulation No 91

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PÄTEVYYSSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mittausalue Type of test, measured range	Testausmenetelmä Test method
Ajoneuvojen heijastimet Motor vehicle retro-reflectors	Tyyppihyväksyntätestit Type approval tests	Seuraavat EY-direktiivit ja ECE-säännöt ja näihin tehdyt muutokset määritellyssä sisäisessä dokumentissa T136-170 Following EC-directives and ECE regulations as amended as defined in in-house document T136-170
1. Ajoneuvojen heijastimet 1. Retro-reflecting devices for power driven vehicles and their trailers	<ul style="list-style-type: none"> <li>- Dimensioiden mittaus</li> <li>- Dimension measurement</li> <li>- Valoteknilliset testit</li> <li>- Photometric tests</li> <li>- Värimittaukset</li> <li>- Colorimetric tests</li> <li>- Lämmönkestotestit</li> <li>- Heat resistance tests</li> <li>- Ulkoisten rasitusten kestopestit</li> <li>- Tests of resistance to external agents</li> </ul>	Council Directive 76/757/EEC ECE Regulation No 3
2. Varoituskolmiot 2. Advance-warning triangles	<ul style="list-style-type: none"> <li>- Dimensioiden mittaus</li> <li>- Dimension measurement</li> <li>- Valoteknilliset testit</li> <li>- Photometric tests</li> <li>- Värimittaukset</li> <li>- Colorimetric tests</li> <li>- Lämmönkestotestit</li> <li>- Heat resistance tests</li> <li>- Mekaaniset testit</li> <li>- Mechanical tests</li> <li>- Ulkoisten rasitusten kestopestit</li> <li>- Tests of resistance to external agents</li> </ul>	ECE Regulation No 27, except paragraphs 10 and 12 of Annex 5

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PÄTEVYYSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mittaustalue Type of test, measured range	Testausmenetelmä Test method
3. Heijastavat renkaat 3. Retro-reflective tyres for two-wheeled vehicles	<ul style="list-style-type: none"> <li>- Dimensioiden mittaust</li> <li>- Dimension measurement</li> <li>- Valoteknilliset testit</li> <li>- Photometric tests</li> <li>- Värimittaukset</li> <li>- Colorimetric tests</li> <li>- Lämmönkestotestit</li> <li>- Heat resistance tests</li> <li>- Ulkoisten rasitusten kestopestit</li> <li>- Tests of resistance to external agents</li> </ul>	ECE Regulation No 88
Tuotteiden ympäristötestaus Environmental testing of products		
Sähkö- ja elektroniikkalaitteet Electrical and electronic equipment	Kylmä Cold	EN 60068-2-1 (IEC 60068-2-1)
	Kuiva lämpö Dry heat	EN 60068-2-2 (IEC 60068-2-2)
	Jatkuva kostea lämpö Damp, heat, steady state	EN 60068-2-3 (IEC 60068-2-3)
	Tärinä, sinimuotoinen Vibration (sinusoidal)	EN 60068-2-6 (IEC 60068-2-6)
	Lämpötilan vaihtelu Change of temperature	EN 60068-2-14 (IEC 60068-2-14) Ei menetelmä NC No method Nc
	Isku Shock	EN 60068-2-27 (IEC 60068-2-27)
	Jyskytys Bump	EN 60068-2-29 (IEC 60068-2-29)
	Vaihteleva kostea lämpö Damp heat, cyclic	EN 60068-2-30 (IEC 60068-2-30)
	Vapaa pudotus Free fall	EN 60068-2-32 (IEC 60068-2-32)
	Jatkuva kostea lämpö, ensisijaisesti laitteille Damp heat, steady state, primarily for equipment	EN 60068-2-56 (IEC 60068-2-56)
	Tärinä, laajakaistainen satunnaistärinä ja ohjeet Vibration, broad-band random (digital control) and guidance	EN 60068-2-64 (IEC 60068-2-64)



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PÄTEVYYSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mitta-alue Type of test, measured range	Testausmenetelmä Test method
	Jatkuva kostea lämpö, kiihdytetty testi, ensijaisesti komponenteille <i>Damp heat, steady state, primarily intended for components</i>	EN 60068-2-67 (IEC 60068-2-67)
	Sähkölaitteiden kotelointiluokat (IP-koodi) <i>Electrical equipment, Classification of degrees of protection provided by enclosures (IP Code)</i>	EN 60529 IEC 60529 Pölysuojaus: IP5X ja IP6X Vesisuojaus: IPX1 – IPX7 <i>Dust protection: IP5X and IP6X Water protection: IPX1 to IPX7</i>
<b>Räjähdyssuojattujen sähkölaitteiden testaus</b> <i>Testing of explosion protected electrical apparatus</i>		
<b>Räjähdyssuojattuihin tiloihin tarkoitettujen sähkö-laitteiden räjähdyssuojaus</b> <i>Explosion protection of electrical apparatus for potentially explosive atmospheres</i>	<b>Tyypinhyväksyntätestit</b> <i>Type approval tests</i>	
Yleiset vaatimukset <i>General requirements</i>		EN 50 014 (IEC 60 079-0), lukuun ottamatta kohdan 23.4.7.5 koetta <i>except the test in item 23.4.7.5</i>
Öljytäyteinen rakenne "o" <i>Oil immersion "o"</i>		EN 50 015 (IEC 60 079-6)
Suojatuuletettu rakenne "p" <i>Pressurized apparatus "p"</i>		EN 50 016 (IEC 60 079-2)
Hiekkatäyteinen rakenne "q" <i>Powder filling "q"</i>		EN 50 017 (IEC 60 079-5), lukuun ottamatta kohdan 12.3 (5.1.3) koetta <i>except the test in item 12.3 (5.1.3)</i>
Räjähdyssuojattujen kestävä rakenne "d" <i>Flameproof enclosure "d"</i>		EN 50 018 (IEC 60 079-1), lukuun ottamatta testausta asetyleenillä ja kohdan 19.3.2 koetta <i>except testing with acetylene and the test in item 19.3.2</i>
Varmennettu rakenne "e" <i>Increased safety "e"</i>		EN 50 019 (IEC 60 079-7)

# ANNEX D

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PÄTEVYYSALUE SCOPE OF ACCREDITATION		
Testattava materiaali / tuote Material / product tested	Testityyppi, mittaustalue Type of test, measured range	Testausmenetelmä Test method
Luonnostaan vaaraton rakenne "i" <i>Intrinsic safety "i"</i>		EN 50 020 (IEC 60 079-11), lukuun ottamatta kipinäkoestusta yli 2 A virralla <i>except spark ignition test with the current exceeding 2 A</i>
Suojausrakenne "n" <i>Type of protection "n"</i>		EN 50 021 (IEC 60 079-15, lukuun ottamatta kohdan 19.3 koetta) <i>except the test in item 19.3)</i>
Massaan valettu rakenne "m" <i>Encapsulation "m"</i>		EN 50 028 (IEC 60 079-18)
Kaivosvalaisimet <i>Caplamps for mines susceptible to firedamp</i>		EN 62013-1 (IEC 62013-1)
Exi -järjestelmät <i>Intrinsically-safe electrical systems "i"</i>		EN 50 039
Sähköstaattiset käsikäyttöiset ruiskumaalauslaitteet <i>Electrostatic hand-held spraying equipment</i>		EN 50 050
Pölyräjähdysvaarallisiin tiloihin tarkoitettut koteloinnilla suojatut sähkölaitteet <i>Electrical apparatus protected by enclosure for use in the presence of combustible dust</i>		EN 50 281-1-1 (IEC 61241-1-1)
Ryhmän II, laiteluokan 1 G sähkölaitteet <i>Electrical apparatus of equipment group II, category 1 G</i>		EN 50 284
Ryhmän I, laiteluokan M1 laitteet, jotka on tarkoitettu pysyvän toiminnassa ilmaseoksissa, joissa räjähdysvaaran aiheuttaa kaivoskaasu ja/tai hiilipöly <i>Group I, Category M1 equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust</i>		EN 50303
Suojausrakenne "pD" <i>Type of protection "pD"</i>		IEC 61241-4