



HQ SINGAPORE CIVIL DEFENCE FORCE  
91 Ubi Avenue 4 Singapore 408827  
Website: <http://www.scdf.gov.sg>

Please quote our ref. no. in all future correspondences

Our Ref: SCDF/HAZ/14/03/02/01

DID: 68483312  
FAX: 68483318

25 January 2013

Attn: Suppliers / Distributors

Dear Sir/Madam,

## REGULATORY REQUIREMENTS FOR THE USAGE OF FLAMMABLE REFRIGERANT IN STAND-ALONE COMMERCIAL REFRIGERATION SYSTEM IN SINGAPORE

Reference to Annex A – S/No 1 of the circular on “Review on Use of Hydrocarbon Refrigerant in Singapore” ([http://www.scdf.gov.sg/content/scdf\\_internet/en/building-professionals/publications\\_and\\_circulars.html](http://www.scdf.gov.sg/content/scdf_internet/en/building-professionals/publications_and_circulars.html)) which outlines the policy on the use of flammable refrigerants in Singapore. Since Dec 2011, SCDF have received requests from the industry to consider allowing the usage of flammable refrigerants in certain categories of stand-alone commercial refrigeration equipment. SCDF subsequently engaged the relevant industry stakeholders to seek clarity on the safety standards and the safety control measures on the operations, servicing and disposal of such stand-alone commercial refrigeration equipment using flammable refrigerants.

2. After careful consideration, SCDF is prepared to allow the usage of flammable refrigerants in certain categories of stand-alone commercial refrigeration equipment subject to suppliers complying with SCDF conditions and regulatory requirements. This circular serves to inform all relevant parties on the conditions and regulatory requirements to comply in order to allow the usage of flammable refrigerants in stand-alone commercial refrigeration equipment (Refer to Annex A for details). This circular shall take immediate effect and suppliers have 3 months from the issuance of this circular to comply.

3 Please convey the contents of this circular to the parties concerned. For any inquiry or clarification, please contact MAJ Han Fook Kuang at Tel No.: 68481467 (e-mail: [Han\\_Fook\\_Kuang@scdf.gov.sg](mailto:Han_Fook_Kuang@scdf.gov.sg)) or CPT Jason Zhou at Tel. No.: 68483312 (e-mail: [Jason\\_Zhou@scdf.gov.sg](mailto:Jason_Zhou@scdf.gov.sg)).

Yours faithfully,

CPT JASON ZHOU  
HazMat Department  
for Commissioner  
Singapore Civil Defence Force

**CONDITIONS AND REGULATORY REQUIREMENTS FOR USAGE OF FLAMMABLE REFRIGERANT IN STAND-ALONE COMMERCIAL REFRIGERATION EQUIPMENT**

---

**1 SCOPE**

This document outlines the conditions and regulatory requirements to allow the safe usage of flammable refrigerants in stand-alone commercial refrigeration equipment. Stand-alone commercial refrigeration equipment is generally characterised by storing and displaying of food and beverages at different levels of temperature within retail settings such as supermarkets, cafes, bars and restaurants. These equipment would include, but not limited to, refrigerated display and storage cabinets, refrigerated trolley cabinets, plug-in display cabinets and beverage coolers.

**2 DEFINITION**

- 2.1 'Flammable refrigerant' –  
Refrigerant with a flammability classification of group 2 or 3 in accordance with International Organization for Standardization (ISO) 5149. For refrigerant blends which have more than one flammability classification, the most unfavourable classification shall be taken for the purpose of this definition.
- 2.2 'Stand-alone commercial refrigeration equipment' –  
Refrigeration equipment consists of systems where all refrigeration components are integrated and hermetically sealed (hereinafter referred as the **"equipment"** in this document).
- 2.3 'Recognized Certification Body (CB)' –  
Refer to third party independent body or centre that conducts conformity assessment for product and equipment. It is located in Singapore or based in partner country and is recognized by SCDF to conduct conformity assessment to meet the regulatory requirements.
- 2.4 'Service personnel' –  
Refer to personnel who are engaged by either the equipment supplier or user to provide after sale services, including but not limited to, delivery, servicing and disposal of the equipment.
- 2.5 'Suppliers' –  
Refer to commercial parties who sell, lease or supply the equipment directly to the end-users in Singapore.
- 2.6 'Equipment placement room' –  
Refer to a compartmentalized area, space or room in which the equipment is placed by the user for its intended usage.

## CONDITIONS AND REGULATORY REQUIREMENTS FOR USAGE OF FLAMMABLE REFRIGERANT IN STAND-ALONE COMMERCIAL REFRIGERATION EQUIPMENT

---

### 3 SAFETY REQUIREMENTS

#### 3.1 Risk Management for Usage of Flammable Refrigerants

- 3.1.1 The stand-alone commercial refrigeration equipment (hereinafter referred as “equipment” in this document) shall not carry more than 150 grams of flammable refrigerant per independent circuit and the refrigerant shall be hermetically sealed within the equipment.
- 3.1.2 The equipment shall comply with the latest applicable International Electrotechnical Commission (IEC) safety standards (eg. IEC 60335-2-89) for commercial refrigeration system.
- 3.1.3 The equipment shall be tested and certified for compliance to the latest applicable IEC safety standards for commercial refrigeration system through the recognized Certification Body (CB). All technical documents issued by recognised CBs shall be submitted to SCDF<sup>1</sup> for evaluation before flammable refrigerant is allowed to be used in the equipment. The list of recognized Certification Body (CB) can be found in **Appendix B**.

#### 3.2 Safety Awareness

- 3.2.1 The supplier shall be responsible to educate existing and potential users<sup>2</sup> on the inherent safety risks from the usage of flammable refrigerant in the equipment. The supplier shall take all such measures as may be reasonable and necessary to ensure the safe handling and usage of the equipment. These measures include, but not limited to, those outlined under Part 5 of this document.

### 4 ADVISORY LABEL REQUIREMENTS

#### 4.1 Advisory Label on the Front of Equipment

- 4.1.1 The advisory label shall be printed or affixed permanently on the front of the equipment on display at retail premises and shall be clearly visible to potential buyers when viewing the equipment.
- 4.1.2 For units delivered to buyer premise or any other location as determined by the buyer, the units shall also be affixed with the advisory label on the front of the equipment.
- 4.1.3 The advisory label shall comply with the design specifications outlined in **Appendix A1**. The advisory label shall be 90mm (length) by 90mm (height). The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi). An example is illustrated below.



<sup>1</sup> MAJ Han Fook Kuang, Fire Safety and Shelter Department, Office: 68481467

<sup>2</sup> Potential users refer to the personnel whom suppliers have approached or being approached by for potential interests and purchase of the equipment.

## CONDITIONS AND REGULATORY REQUIREMENTS FOR USAGE OF FLAMMABLE REFRIGERANT IN STAND-ALONE COMMERCIAL REFRIGERATION EQUIPMENT

---

### 4.2 Advisory Label for Service Personnel and Users

- 4.2.1 For service personnel, the advisory label shall be affixed permanently on or near the compressor unit of the equipment to indicate the flammability risks. The advisory label shall be clearly visible from the repair access area.
- 4.2.2 For users, the advisory label shall be affixed permanently on the internal compartment of the equipment that shall be clearly visible from the user access area.
- 4.2.3 The advisory label shall be accompanied with a triangular warning sign in accordance to latest applicable ISO standards (e.g. ISO 7010) for flammable material warning label. The perpendicular height of the triangular warning sign shall be at least 15mm. The name of the refrigerant (e.g. R-600a, Iso-butane) should also be included together with the triangular warning sign as shown below.



**Iso-butane  
(R-600a)**

- 4.2.4 The advisory label shall be accompanied with cautionary statements concerning the flammability risks, safe handling, servicing and disposal of the equipment. The cautionary statements should be provided in both English and Chinese languages.
- 4.2.5 The advisory label shall comply with the design specifications outlined in **Appendix A2**. The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi).
- 4.2.6 For equipment with existing labels which may contain other advisory messages from the supplier, the advisory label outlined in Part 4.2 may be provided either as a standalone label or may be combined with the existing labels.

**(Exception:** The advisory label design specifications outlined in Appendix A2 may be exempted for equipment with existing advisory labels containing similar warning sign and cautionary statements as outlined in Part 4.2.3 and 4.2.4.)

## 5 SAFETY CONTROL MEASURES

### 5.1 Duties of Supplier

- 5.1.1 Supplier shall provide equipment safety training/briefing and instruction manuals to users to ensure that the users are fully aware of the inherent safety risks posed by the flammable refrigerant and the essential safety precaution and procedures are adhered to at all times.
- 5.1.2 Supplier shall assist users to put in place a robust inspection and maintenance regime for the equipment in accordance to relevant safety standards and industry best practices.
- 5.1.3 Supplier shall assist users in carrying out servicing and disposal of the equipment in accordance to the relevant safety standards and industry best practices.

**CONDITIONS AND REGULATORY REQUIREMENTS FOR USAGE OF FLAMMABLE REFRIGERANT IN STAND-ALONE COMMERCIAL REFRIGERATION EQUIPMENT**

---

**5.2 Duties of User**

- 5.2.1 User shall ensure mechanical or natural ventilation system is available at the equipment placement room to prevent accumulation of flammable refrigerant during a leak.
- 5.2.2 User shall impose strict ignition control regime (e.g. "No Smoking" policy) and where practical, eliminate all potential ignition sources (eg. spark/naked flame) from the equipment placement room.
- 5.2.3 User shall engage trained service personnel to carry out any repair, servicing or disposal of the equipment. The service personnel shall be trained to handle equipment using flammable refrigerants and follow safety procedures in accordance to relevant safety standards and industry best practices.

**6 IMPLEMENTATION**

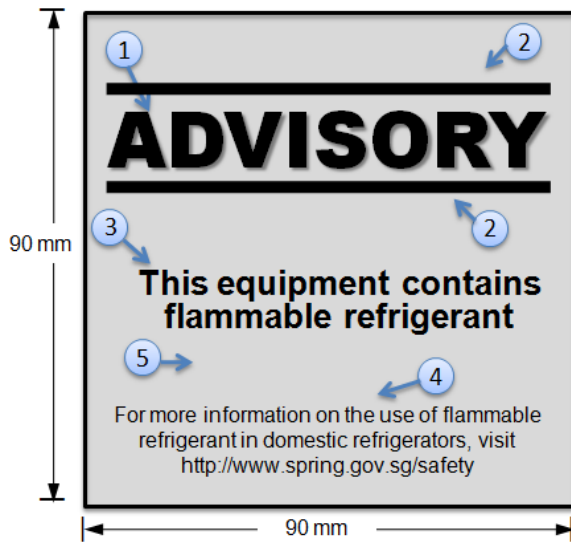
- 6.1 Supplier shall inform SCDF (Fire Safety and Shelter Department) of any modifications made to the equipment which may potentially affect the safe usage of flammable refrigerant or changes to the relevant IEC safety standards. Where necessary, SCDF may require a new certification and lab testing from the recognized CB to be submitted. The supplier shall be responsible for the full compliance of the safety requirements stipulated in Part 3, 4 and 5 of this document.
- 6.2 The information in this document is based on the present state of our knowledge. The relevant authorities reserve the rights to amend the content of this document at any time in future should there be a need to do so.

**7 REFERENCES**

- 7.1 International Electrotechnical Commission (IEC) 60335-2-89 standard
- 7.2 International Organization for Standardization (ISO) 3864-1 standard
- 7.3 Consumer Protection (Safety Requirements) Registration Scheme (CPS Scheme) Information Booklet (version 4.1) by SPRING Singapore
- 7.4 The Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee (RTOC) Assessment Report 2010

## Appendix A1

### Full Design Specifications for Advisory Label on the Front of Equipment



Tag	Description
1	Main Cautionary Sign. (Arial Black, Bold, Black; Size 40)
2	Two black bars (6 pt thickness) to border the cautionary sign.
3	A general information statement to indicate the presence of flammable refrigerant in the equipment. (Arial, Bold, Black; Size 18)
4	More information available at SPRING Singapore (Product Safety) website. (Arial, Black; Size 10)
5	The background color to be light grey. (color code #CCCCCC)

### Sample



Full Design Specifications for Advisory Label for Service Personnel and Users

Users:



Tag	Description
1	Hazard warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
2	Main cautionary sign in English and Chinese languages. (Arial Black, Bold, Black; Size 28)
3	Flammable material warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
4	The type of refrigerant is specified here. (Arial, Bold, Black; Size 14)
5	Cautionary statement on the use of flammable refrigerant is specified here. (Arial, Bold, Black; Size 14)
6	The safety precaution and advice are specified here. (Arial, Black; Size 12)
7	Cautionary statement translated in Chinese. (Adobe Heiti Std, Bold, Black; Size 14)
8	Safety precaution and advice translated in Chinese. (Adobe Heiti Std, Black; Size 12)
9	The background color to be light grey (color code #CCCCCC).
10	The background to be in white (color code #FFFFFF).

Sample



Service Personnel:



Tag	Description	Tag	Description
1	Hazard warning symbol in accordance to applicable ISO standard (eg. ISO 7010)	6	The safety precaution and advice are specified here. (Arial, Black; Size 12)
2	Main cautionary sign in English and Chinese languages (Arial Black, Bold, Black; Size 24)	7	Cautionary statement translated in Chinese. (Adobe Heiti Std, Bold, Black; Size 14)
3	Flammable material warning symbol in accordance to applicable ISO standard (eg. ISO 7010)	8	Safety precaution and advice translated in Chinese. (Adobe Heiti Std, Black; Size 12)
4	The type of refrigerant is specified here. (Arial, Bold, Black; Size 12)	9	The background to be light grey (color code #CCCCCC).
5	Cautionary statement on the use of flammable refrigerant is specified here. (Arial, Bold, Black; Size 14)	10	The background to be in white (color code #FFFFFF).

Sample





**Appendix B****Certification Body (Local)**

<b>No</b>	<b>Name of Certification Body</b>	<b>Address and Contact Person</b>
1	TUV SUD PSB Pte Ltd (Certification)	No. 1 Science Park Drive Singapore 118221 Contact person: Mr Desmond Soh (Product Manager) Tel: 68851268 Fax: 67759725 Email: testing@tuv-sud-psb.sg or desmond.soh@tuv-sud-psb.sg Website: www.tuv-sud-psb.com
2	Intertek Testing Services (S) Pte Ltd (Commercial and Electrical Division)	5 Pereira Road #06-01 Asiawide Industrial Building Singapore 368025 Contact person: Mr Christopher Hee Senior Manager Tel: 62827187 ext. 204 / 206 / 202 Fax: 62800840 Email: christopher.hee@intertek.com Website: www.intertek.com
3	UL International Singapore Pte Ltd	1 Maritime Square #11-03 Harbourfront Centre Singapore 099253 Contact person: Mr Leong Wei Beng (Acting Quality Manager) Tel: +65 6854 7943 Fax: +65 6271 3867 Email: weibeng.leong@sg.ul.com Website: www.ul-asia.com
4	TUV Rheinland (S) Pte Ltd	25 International Business Park #03-13/14 German Centre Singapore 609916 Contact person: Mr Than Soe Manager Tel: 65628750 DID: 62628748 Fax: 65628759 Email: ThanSoe@sin.tuv.com Website: www.tuv.com
5	Centre Testing International Pte Ltd	Blk 10 Ubi Crescent #03-26 (Room C) Ubi Techpark Singapore 408564 Contact person: Mr Fallight Hu Project Development Manager Tel: +65 6749 6013 Fax: +65 6742 5916 Email: fallight_hu@cti-cert.com Website: nil
6	TUV SUD PSB Pte Ltd	No. 1 Science Park Drive Singapore 118221

		Contact person: Mr Tan Lee Heng (Assistant Vice President) Tel: 68851350 / 68851366 Fax: 67745705 / 67746119 Email: enquiries@tuv-sud-psb.sg Website: www.tuv-sud-psb.com
7	TUV SUD PSB Pte Ltd	No. 1 Science Park Drive Singapore 118221 Contact person: Mr Tan Kim Heng (Assistant Vice President) Tel: 68851542 Fax: 67799303 Email: kim-heng.tan@tuv-sud-psb.sg

#### Certification Body (Foreign - MRA)

No	Name of Certification Body	Address and Contact Person
1	The Sixth Division, Bureau of Standards, Metrology and Inspection (BSMI), MOEA	No 4 Chinan Road Section 1, Taipei 100, Taiwan Contact person: Mr Shi-Chen WEI Chief, Section of Registration of Application and Certification Sixth Division, BSMI MOEA Tel: (Int'l +886-2) 2343-1850 Fax: (Int'l +886-2) 2321-1950 Email: b30pl@bsmi.gov.tw Website: bsmi.gov.tw
2	Vietnam Certification Body (QUACERT)	8 Hoang Quoc Viet Cau Giay District Hanoi, Vietnam Contact person: Mr Tran Van Vinh Director Email: vinh.tv@quacert.gov.vn Tel: + 84-4-7561025 Fax: + 84-4-7563188 Website: - nil -
3	UL International New Zealand Ltd, Christchurch	10 Vanadium Place, PO Box 9194, Christchurch, New Zealand Contact person: Mr Manuel Shimasaki Operations Manager, Australasia Tel: +64-3-339 1670 Fax: +64-3-339 1671 Email: enquiries@nz.ul.com Website: www.nz.ul.com
4	UL International New Zealand Ltd, Auckland	54 Tarndale Grove P O Box 300 330 Albany 0752 Auckland, New Zealand Contact person: Mr Ken Wilson Quality and Compliance Manager, Australasia Tel: +64-9-415 3355 Fax: +64-9-415 3356 Email: enquiries@nz.ul.com

		Website: <a href="http://www.nz.ul.com">www.nz.ul.com</a>
5	Intertek Testing Services Taiwan Ltd, (Safety Laboratory)	5F No. 423 Ruiguang Road Neihu District Taipei 114, Taiwan Contact person: Mr Gary Yunn (Manager, Quality System Dept) Tel: +886-2-6602-2705 Fax: +886-2-6602-2415 Email: <a href="mailto:admin@wakelabs.co.nz">admin@wakelabs.co.nz</a>
6	SGS Taiwan Ltd, (Electronics & Communication Lab)	No 134 Wu Kung Road WuKu Industrial Zone, Taipei Country 248, Taiwan Contact person: Mr Nelson Bai (Supervisor-QA) Tel: +886-2-2299-3279 ext 1458 Fax: +886-2-2299-9489 Email: <a href="mailto:nelson.bai@sgs.com">nelson.bai@sgs.com</a>
7	Aerospace Industrial Development Corporation, Electromagnetic Effects Laboratory	No 38-3, Jong-Ching Road, Salu Township, TaiChung County 433, Taiwan Contact person: Mr Marlon Huang Manager Tel: +886-4-2707 0001 ext 504797 Fax: +886-4-2624-4023 Email: <a href="mailto:Zenfong_huang@ms.aidc.com.tw">Zenfong_huang@ms.aidc.com.tw</a>
8	Guanyin Safety & EMC Testing Laboratory, Taiwan Electric Research & Testing Center	No 6-6, Rungung S. Road, Psauta Tsuen, Guanyin Shiang, Taoyuan, Taiwan Contact person: Mr Jimmy YEH Deputy Manager Tel: +886-3-483 9090 ext 7101 Fax: +886-3-483 8722 Email: <a href="mailto:jim@ms.tertec.org.tw">jim@ms.tertec.org.tw</a>
9	Lin Kou Laboratory, Taoyuan Branch of Bureau Veritas Consumer Products Services (Hong Kong) Limited	No 19 Hwa Ya 2nd Road Kwei Shan Taoyuan Taiwan (ROC) Contact person: Mr Ted WU Manager Tel: + 886-3-3183232 ext 1828 Fax: + 886-3-3185050 Email: <a href="mailto:ted@adt.com.tw">ted@adt.com.tw</a>
10	Korea Testing Laboratory (KTL)	222-13 Guro-3dong Gurogu Seoul 152-718 Korea Contact person: Mr Heun-Chan PARK Director, Quality Certification Center Tel: +82-3-860 1360 Fax: +82-3-860 1369 Email: <a href="mailto:phchan@wm.ktl.re.kr">phchan@wm.ktl.re.kr</a>
11	Korea Electric Testing Institute (KETI)	692-8 Kumjung-dong Kunpo-city Kyunggi-do 435-050 Korea Contact person: Mr Dong-In YOUK Director, Test & Certification Center Tel: +82-31-428 7562 Fax: +82-31-455 7150 Email: <a href="mailto:youkdi@keti.or.kr">youkdi@keti.or.kr</a>

12	EMC Research Institute (ERI)	66-6 Jeil-Ri Yangi-Myun Yongin-City Gyeonggi-Do 449-825 Republic of Korea Contact person: Mr Kyu-Hong JUNG Assistant Manager Strategy Planning Business Team Tel: +82-31-679 9558 Fax: +82-31-336 2427 Email: <a href="mailto:jkhong@eri.re.kr">jkhong@eri.re.kr</a>
13	Intertek Testing Services Hong Kong Ltd – Commercial & Electrical Division	2/F, Garment Centre 576 Castle Peak Road, Kowloon, Hong Kong Contact person: Mr Daniel K.K. Yau (Deputy General Manager) Tel: (852) 21738542 Fax: (852) 21738542 Website: <a href="http://www.etlsemko.com">www.etlsemko.com</a>
14	Singapore Electrical Testing Services (Clipsal International Pte Ltd)	97 Pioneer Road Singapore 639579 Contact person: Mr Wong Chee Kian (Laboratory Manager) Tel: 6861 9118 Fax: 6863 2760 Email: <a href="mailto:cheekian.wong@sets.com.sg">cheekian.wong@sets.com.sg</a> Website: <a href="http://www.sets.com.sg">www.sets.com.sg</a>
15	TÜV Rheinland Taiwan Ltd (Taichung Branch)	10F, No. 219, Min-Chuan Road, Taichung 403, Taiwan Contact person: Mr Allen Lin (Manager) Tel : 886 (04) 2301 9898 Ext 042 Fax: 886 04 2301 9696 Website: <a href="http://www.tuv.com">www.tuv.com</a>
16	Intertek Testing Services Shanghai Limited	Building No. 86 1198 Qinzhou Road (North) Shanghai 20023, China Contact person: Ms Leah Xu (Quality Manager) Tel: 86 21 6495 6565 Fax: 86 21 6495 6263 Email: <a href="mailto:leah.xu@intertek.com">leah.xu@intertek.com</a> Website: <a href="http://www.interteketlsemko.com">www.interteketlsemko.com</a>
17	Intertek Testing Services Shenzhen Ltd (Guangzhou Branch)	No.7-2 Guang Dong Software Science Park Caipin Road Guangzhou Science City, GETDD Guangzhou, China Contact person: Ms Fiona Fang (Quality Manager) Tel: 86-20 8396 6868 ext 503 Fax: 86-20 8222 8170 Email: <a href="mailto:fiona.fang@intertek.com">fiona.fang@intertek.com</a> Website: <a href="http://www.interteketlsemko.com">www.interteketlsemko.com</a>
18	CMA Industrial Development Foundation	Rm. 1302, Yan Hing

	Limited	Centre, 9-13 Wong Chuk Yeung Street, Fo Tan, Shatin, N.T, Hong Kong Contact person: Ms May S.K. Ng (Deputy Manager) Tel: (852) 26908297 Fax: (852) 22524297 Email: mayng@cmatcl.com Website: www.cmatcl.com
19	IMQ S.p.A	Via Quintiliano 43 I-20138 Milano, Italy Contact person: Ms Cristina Pulvirenti (Quality and Accreditations Manager) Tel. +39.02.50731 Fax +39.02.50991580 Email: cristina.pulvirenti@imq.it
20	SGS Hong Kong Limited	Room 2912, 29/F, Metropole Square, 2 On Yiu Street, Siu Lek Yuen, Shatin, N.T, Hong Kong Contact person:- Ms Candy Lau (Senior Manager) Tel. (852) 2774 7401 Fax: (852) 2766 3778 Email: Candy.Lau@sgs.com Website: www.hk.sgs.com
21	Centre Testing International (Shenzhen) Corporation	Building C, Hongwei Industrial Park Bao'an 70 District, Shenzhen, Guangdong, China Contact: Mr Fallight Hsu (Business Development Officer) Tel: 86-755-33683585 Fax: 86-755-33683385 Email: Fallight_Hsu@cticert.com Website: www.cti-cert.com
22	UL International New Zealand Ltd, Christchurch	10 Vanadium Place, PO Box 9194 Middleton, Christchurch, New Zealand Contact: Mr Peter Johnson (Quality Manager) Tel: 64-3-3391670 Fax: 64-3-3391671 Email: peter.johnson@nz.ul.com Website: www.ul.nz.com
23	UL International New Zealand Ltd	21 Tarndale Grove Albany, Auckland 0632 Auckland, New Zealand Contact: Mr Ken Wilson (Quality and Compliance Manager) Tel: 6494149580 Fax: 6494153356 Email: Ken.Wilson@nz.ul.com Website: www.nz.ul.com