



مجلس أبوظبي للجودة والمطابقة
ABU DHABI QUALITY & CONFORMITY COUNCIL



Abu Dhabi Certification Scheme for LED Exterior Lighting Fixtures (Luminaries)

Assessment and Surveillance Plan



TABLE OF CONTENTS	Pages
ABOUT THE ABU DHABI QUALITY AND CONFORMITY COUNCIL	4
FOREWORD	4
SCOPE	4
REFERENCES	6
CERTIFICATION REQUIREMENTS	6
ASSESSMENT OF APPLICATION	7
PRODUCT SPECIFICATION	8
IDENTIFICATION AND LABELING	8
SURVEILLANCE / AUDIT PROCEDURES	8
APPENDIX 1	9
APPENDIX 2	9
APPENDIX 3	15
APPENDIX 4	16



Amendment Page

To ensure that each controlled copy of this ASP contains a complete record of amendments, the Amendment Page is updated and issued with each set of revised/new pages of the document.

<u>Amendment</u>			<u>Discard</u>		<u>Insert</u>	
<u>No</u>	<u>Date</u>	<u>*Sections Changed</u>	<u>Page(s)</u>	<u>Issue no</u>	<u>Page(s)</u>	<u>Issue no</u>
1	01/07/2013	Scheme launched	-	-	15	1.0
2	31/10/2013	2 – Scope and Appendix 2, Addition of Hazardous Area Luminaires category Appendix 2, Changes to Minimum CRI-ratings in section 1 table Added LM-82-12 to LED Useful Life requirements test methods	-	-	14	2.0



About the Abu Dhabi Quality and Conformity Council

The Abu Dhabi Quality and Conformity Council (QCC) was established by law No. 3 of 2009, issued by His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE.

QCC is responsible for the development of Abu Dhabi Emirate's Quality Infrastructure, which enables industry and regulators to ensure that products, systems and personnel can be tested and certified to UAE and International Standards.

Products certified by QCC receive the Abu Dhabi Trustmark. The Trustmark is designed to communicate that a product or system conforms to various safety and performance standards that are set by Abu Dhabi regulators.

1 FORWARD

The LED Exterior Lighting Fixture Conformity Scheme, developed through consultation with regulators and industry, enables suppliers of LED exterior lighting fixtures to obtain voluntary certification of products that meet quality criteria designed to satisfy the standards or equivalent outlined by the Department of Municipal Affairs. The scheme has been specified for the types of light fixtures listed under Section 2 - SCOPE to ensure their efficient usage. Relevant municipalities or the Department of Transport may impose further requirements not specified within this conformity scheme, for example regarding, aspects of design, manufacturing, installation, calculations of road lighting contribution, in order to qualify products for use in projects.

Products that achieve certification, through formal evaluation against the scheme criteria, will be granted a Certificate of Conformity and licensed to bear the Abu Dhabi **Trustmark** in product promotion and merchandising. The Certificate of Conformity enables developers to present evidence of meeting standards as specified for Abu Dhabi's built environment.

The Trustmark indicates that select products meet Abu Dhabi specifications and, if required, UAE standards. The Quality and Conformity Council's market surveillance inspectors actively ensure that the integrity of the Trustmark is maintained through market sampling and testing of products bearing the Trustmark.

2 SCOPE

This document defines the conditions, processes and specifications for certification of the types of LED exterior luminaries as listed below;



Types of LED Exterior Luminaries:

<u>Fixture Type/Use</u>		<u>General Description</u>
1.	Street Light Fixture	Lighting Fixture/head for mounting on a separate pole for the specific design for lighting roadways or parking areas with roadway lighting optics and gear.
2.	Roadway Tunnel Light Fixture	Lighting Fixture for mounting under a tunnel or underpass ceiling bare soffit or recessed within a tunnel ceiling system for the specific design for lighting roadways with roadway lighting optics and gear.
3.	General Column Fixture	Lighting Fixture combined with an integral decorative pole above 1.2m in height for the specific design for lighting pathways and pedestrian areas.
4.	Bollard	Vertical Lighting Fixture up to 1.2m in height for the specific design for lighting pathways and pedestrian areas.
5.	In-ground (buried)	(US often called In-grade) Fixture mounted flush to the surface of the finished ground level with cast or buried housing and components
6.	Floodlight	Directional surface-mounted fixture with any beam angle (including spotlight applications) for direct illumination purposes. Has some form of mounting bracket, spike or components and can be oriented to face upwards, downwards or sideways to suit application.
7.	Sports Application Floodlight	Directional surface-mounted fixture with any beam angle for direct area illumination purposes. Has some form of mounting bracket or components, is generally oriented to aim downwards from separate poles and must be impact resistant to associated sport balls or equipment.
8.	Bulkhead	Any surface wall-recessed or wall-semi-recessed fixture not falling into another specific category
9.	Underwater Fixture	Fixture of any type for permanent underwater installation
10	Special	Can be linear decorative string lighting, special projectors or light-art/bespoke fixtures that are to be located outdoors
11	Hazardous Area Luminaires	Area Specific – Zone 1 or Zone 2 protection (or equivalent)



3 REFERENCES

See APPENDIX 2: Abu Dhabi Requirements on LED Exterior Lighting Fixtures (Luminaries)

4 CERTIFICATION REQUIREMENTS

4.1 General requirements

The general requirements are contained in the following QCC documents:

- Terms and conditions for general use of the Trustmark;
- Terms and conditions for certification of products and licence of the Trustmark.

4.2 Technical File Requirements

In order to gain certification, the applicant shall submit a complete application form as laid out in APPENDIX 1 and pursue either process A, B or C as outlined below.

Process A: The applicant who wants to pursue process A shall submit the following documents:

- A complete application form
- A valid Emirates Conformity Assessment Scheme certificate (if applicable)
- A test reports from QCC recognised laboratory/ies
- A valid product certificate from a QCC recognised certification body. The certificate must certify conformity with the requirements of a type 5 scheme as mentioned in ISO/IEC 17067:2013 section 5.
- Company profile including a profile of the manufacturing facility/ies
- Samples of the product (If requested)

Process B: The applicant who wants to pursue process B shall submit the following documents:

- A complete application form
- A valid Emirates Conformity Assessment Scheme certificate (if applicable)
- A technical file (see APPENDIX 1), including, where applicable, test report(s)/certificate(s), no older than 12 months on the day of submission issued by laboratories accredited to ISO/IEC 17025:2005 by an accreditation signatory of the ILAC MRA or a laboratory recognised by QCC
- Samples of the product (if required)
- Company profile including a profile of the manufacturing facility/ies
- Valid ISO 9001:2008 certificate of the manufacturing facility/ies (see below)

Process C: The applicant who wants to pursue process C shall submit the following documents:

- A complete application form
- A valid Emirates Conformity Assessment Scheme certificate (if applicable)



- A technical file of the luminaire specifications (see APPENDIX 1)
- Company profile including a profile of the manufacturing facility/ies
- Valid ISO 9001:2008 certificate of the manufacturing facility/ies (see below)

4.3 Quality Management System (QMS) Requirements

Process A: No additional requirement.

Process B and C: The manufacturer (not the importer, or distributor, or retailer) must be certified according to ISO 9001:2008, the certificate being issued by a certification body accredited according to ISO/IEC 17021:2011 by an accreditation body signatory of the IAF MLA.

4.4 Factory Production Control (FPC)

No requirements.

5 Assessment of Application

Process A: No additional requirements. A QCC representative will review the application and all the submitted documents formally, i.e. for completeness and correctness and check the identity of the product. If it is found compliant he/she will submit his recommendation to the Certification Committee.

Process B: A QCC representative will review the application and all the submitted documents formally, i.e. for completeness and correctness. The submitted sample will be inspected and (if deemed necessary) subjected to verification testing to assure that they are identical to the one described in the test report. Where this can be confirmed, a favourable recommendation to the Certification Committee will be issued.

Process C: The applicant who pursues process C will need to go through formal and technical product assessment. This will include the following as well as any other conformity assessment activity as deemed necessary by the Certification Committee:

- a. A duly authorized QCC representative shall take four (4) pieces of test samples per type per model to be submitted to testing; two (2) pieces to be tested in-plant witnessed by a duly authorized QCC representative, and the other (2) pieces to be sent to a QCC appointed testing laboratory/ies for testing. Laboratory testing shall be conducted only upon the satisfactory results of the in-plant tests.
- b. The test sample(s) shall be taken randomly either in the production or warehouse.
- c. Test sample(s) for independent test shall be packed/sealed and signed in the presence of the QCC representative and shall be shipped within two (2) working days to the QCC accredited/recognized testing laboratory/ies by the manufacturer and/or assembler.
- d. The authorized QCC representative shall ensure that request for test form is properly filled-up and signed.



- e. Prior to testing, there shall be no preparation, modification or adjustment, special quality control, testing or assembly procedure in any manner on a test sample or any parts and sub-assemblies thereof that is not normally performed during production and assembly.

When all these steps have been completed satisfactorily a favourable recommendation to the Certification Committee will be issued.

6 PRODUCT SPECIFICATION

Approved product specifications, clearly detailing the components and materials utilised in the manufacturing of the product covered under the certification, shall be retained by the applicant and QCC. These product specifications shall consist of a list of components / constituents / suppliers, as applicable, and shall be reviewed and stamped by QCC.

7 IDENTIFICATION AND LABELLING

Each certified product may be provided with an evident label (depending on product and subject to agreement). Where this is not possible the immediate packaging of the unit for sale shall be marked in accordance with brand guidelines specified in the Terms and Conditions of use of the Trustmark.

The certified product shall be dispatched with a copy of the conformity certificate.

8. SURVEILLANCE AND AUDIT

Proof of continued compliance must be provided if (i) a referenced standard has changed; or (ii) the product has been modified; or (iii) annually following issuance of the first certificate, whichever comes first.

Process A: The continued validity of the certificate and designation status of the certification body is to be demonstrated.

Process B: In cases (i) or (ii) a new test report is to be submitted and the accreditation status of the NCB/CBTL is to be demonstrated. In case (iii) an affidavit by the supplier and the manufacturer that the production system has not been modified and the specification of the product remains unchanged. In all cases the continued validity of the ISO 9001:2008 certification needs to be shown.

Process C: In cases (i) or (ii) a new test report is to be submitted, in case (iii) an affidavit by the supplier and the manufacturer that the production system has not been modified and the specification of the product remains unchanged. In all cases the continued validity of the ISO 9001:2008 certification needs to be shown.

APPENDIX 1: Summary of Documentation Required for Application for Certification of LED Exterior Lighting Fixtures (Luminaries)



The following shall be submitted in addition to the application form and the documents requested therein (all data in SI units):

- Photometric test data in standard format (IES or EULUMDAT)
- Detailed physical description of the fixture including dimensions
- Details of the driver(s)
- Full light source lamp specification
- All certificates/test reports as required for the respective sections of APPENDIX 2
- Reliability reports to JEDEC JESD22-A108D or equivalent (tests at +85°C)

APPENDIX 2: Abu Dhabi Requirements on LED Exterior Lighting Fixtures (Luminaries)

All lumen figures quoted and used shall be **Deliver (Hot) Lumen** i.e. the light is in thermal equilibrium within the luminaire.

All stated criteria shall also apply to coloured/RGB LED fixtures with the exception of the nominal CCT rating and minimum CRI values as these refer only to white-sourced fixtures.

White LEDs shall be from a manufacturer of LEDs with **ANSI/NEMA/ANSI C78.377-2011** – (American National Standard for Chromaticity of Solid State Lighting Products) or a similar equivalent International Standard.

The nominal Correlated Colour Temperature (CCT) ANSI standard LED colours accepted are 2700K, 3000K, 3500K, 4000K, 4500K, 5000K and 5700K.

1. Whole Luminaire Efficacy and Minimum Colour Rendering Index

Specifications:

Minimum Luminaire Efficacy and associated Minimum Colour Rendering (CRI – Colour Rendering Index) rating shall be as follows:

Fixture Type	Minimum Luminaire Efficacy*	Minimum CRI-rating
Street Light Fixture	≥ 75 lm/W	65
Roadway Tunnel Light Fixture	≥ 75 lm/W	65
General Column Fixture	≥ 50 lm/W	80
Bollard	≥ 50 lm/W	80
In-ground (buried)	≥ 50 lm/W	80
Floodlight	≥ 50 lm/W	80
Sports Application Floodlight	≥ 75 lm/W	60
Bulkhead	≥ 50 lm/W	80
Underwater Fixture	≥ 50 lm/W	80
Special	≥ 50 lm/W	80
Hazardous Area Luminaires	≥ 50 lm/W	70

*Minimum luminaire efficacy is given as lumen Output (lm) over input power (W) at standard laboratory conditions. All tests to be taken at 230V.

**Test method/reporting:**

Perform IES LM-79-08 tests (Sections 11 and 12) or equivalent IEC/International standards. Declare colour correlated temperature (CCT).

2. Optical Control, Photometry & Lamp Source Replacement**Specifications:**

The luminaire shall be fitted with optical refractors, diffusers and/or reflectors. Different optics shall be proposed to exactly suit the specific application the fixture is intended for.

The LEDs shall be removable/replaceable without any possible risk to maintaining luminaire photometry and without the need to demount the fixtures for sake of future upgrading/maintenance requirements.

Test method/reporting:

Written descriptions of optical control shall be provided.

Independent laboratory IES or EULUMDAT photometric test reports shall be submitted for the luminaire photometric files used in any lighting calculations. For LED fixtures, or for LED components used within conventional fixtures, the source testing should conform to IES LM-79-08 standards or equivalent IEC/International standards.

3. Thermal Management**Specifications:**

The LED modules shall be mounted in such a way to ensure excellent heat dissipation. The design of the luminaire shall be such that there is a direct thermal path from the LED junctions to the atmosphere thus providing a thermal transfer effect throughout the life of the luminaire. The thermal solution shall be proprietary and designed by the lighting manufacturer to enable the luminaires to work efficiently in Abu Dhabi climatic conditions. The luminaire shall be provided with a demonstrated ventilation arrangement allowing heat to be dissipated to the atmosphere. The luminaire shall be designed to prevent collection of debris by proven and stated means. The design shall be such that the luminaire shall be self-cleaning in normal operation.

The whole fixture with all components (including LEDs and drivers) shall operate between -20°C, ambient temperature (Ta) and +50°C (+60°C for roadway tunnel fixtures) and be suitable for storage between -20°C and 80°C.

All low-level lighting fixtures must have elements/components and glass suitably temperature rated for touch. Refer to the guidelines of IEC 60598-1 *Luminaires – Part 1: General requirements and tests*, IEC 60598-2-3 *Luminaires – Part 2-3: Particular requirements – Luminaires for road and street lighting* and IEC 60598-2-13 *Luminaires – Part 2-13: Particular requirements – Ground recessed luminaires – Annex A – Guide for good installation practice*. For maximum operating temperatures:



- In normally non-accessible areas (according to wiring rules) – No temperature limit
- In restricted accessible areas (e.g. pedestrian and pedal cycles access restricted only) <100°C
- In all other accessible areas (e.g. carriageways, parking) 65-80°C
- In particular areas (where working temperatures may cause injuries, e.g. nurseries, swimming pools) <40°C

Test method/reporting:

Written descriptions of thermal management strategies, thermal solution design and ventilation shall be provided.

Provide test report/calculations on percentage depreciation of light output at +50°C (+60°C for roadway and tunnel fixtures) using IES LM-82-12 or IES LM-79-08 or an equivalent IEC/International standard.

Written descriptions of components/glass temperature ratings shall be provided.

4. Street Lighting Fixture Mounting

Specifications:

Street Lighting Fixtures shall be provided with a heavy-duty rugged cast aluminium (or proven equivalent material) adjustable slip fitter mountable to suit any proposed pole application from either below or from the side.

Test method/reporting:

Written descriptions of lighting fixture mounting design shall be provided.

5. Ingress Protection

Specifications:

The luminaire gear and LED optical-unit components shall be externally fully rated to the minimum IP (Ingress Protection) rating and IK (Mechanical Strength) rating as set out in the table below for each specific fixture-type and have proven means of negating internal condensation build-up for their application and be able to operate in high relative humidity.

<u>Fixture Type</u>	<u>Minimum IP-rating</u>	<u>Minimum IK-rating</u>
Street Light Fixture	IP-65 (66 for the driver/components)	IK07
Roadway Tunnel Light Fixture	IP-65 (66 for the driver/components)	IK07
Column Fixture	IP-65	IK07
Bollard	IP-65 (top and bottom)	IK07
In-ground (buried)	IP-67 (top and bottom)	IK08
Floodlight	IP-66	IK07



Sports Application Floodlight	IP-66	IK08
Bulkhead	IP-65	IK07
Underwater Fixture	IP-68 (including all connections)	IK10
Specials	IP-65-68 (to suit type/application)	IK07
Hazardous area luminaires	IP-65 (Zone 2 and 22, Ex n protection class)	IK07
	IP-67 (Zone 1 and 21, Ex e, Ex d, protection class)	IK08

Any glass diffusers or components must have a minimum **IK08** rating.

For any fixtures intended for operation pointed upwards as an option and/or having optical components on the top of fixture, the design must be suitably IP rated for their upwards orientation and be proven the design does not allow water and debris to collect on the glass/synthetic cover.

Test method/reporting:

IP rating determined by IEC 60529 or equivalent International Standard

IK rating determined by IEC 62262 or equivalent International Standard

Written description of design characteristics negating water and debris collection for fixtures intended to point upwards and/or with optical components on the top of the fixture.

6. Copper Content and Corrosion Resistance, Synthetic materials

Specification:

All Aluminium Die-cast components shall have a maximum copper content of 1% by mass for proved and demonstrated corrosion resistance. Where different metallic materials are used together, then proof of avoidance of electrolysis with any touching dissimilar metals must be assured.

All synthetic materials shall be 100% UV Stable and scratch resistant

Test method/reporting:

Provide written confirmation of aluminium component copper content, UV stability and scratch resistance of synthetic materials in the form of supplier technical reports.

7. Driver Technical Requirements

Specifications:

Within the fixture the drivers shall meet the following requirements:

- 7.1** Case Temperature (T_c) rating -40°C to $+80^{\circ}\text{C}$ at a minimum 95% Relative Humidity (RH). Luminaires with open drivers need to prove Luminaire ambient of 50°C maximum (60°C maximum for roadway tunnel fixtures) in equivalence with this requirement.
- 7.2** Input voltage; capable of 120-277 volt, single phase.
- 7.3** Drivers shall have a Power Factor (PF) of $L \geq 0.90$.



- 7.4 Power supplies shall be of UL Class 1 or 2 output or conform to IEC 61347-2-13 or a similar International standard.
- 7.5 Surge protection must satisfy the requirements of IEEE/ANSI C62.41.2-2002, Scenario I Location Category C or an international equivalent.
- 7.6 Drivers shall comply with FCC 47 CFR part 18 non-consumer RFI.EMI standards or equivalent.
- 7.7 Drivers shall be Restriction of Hazardous Substances (RoHS) compliant.
- 7.8 Drivers shall have a Total individual luminaire Harmonic Distortion (THD) of: $\leq 20\%$ in accordance with ANSI C82.77-2002 or equivalent.

Test method/reporting:

Provide LED driver manufacturer data sheets, test reports and/or certification documentation demonstrating conformity to the above requirements.

8. LED Luminaire Useful Life Requirements

Specifications:

Demonstrate 50,000 hour useful life of the luminaire based on the simplified B20-L70 threshold at ambient temperature (T_a) of 35°C (annual average night time temperature for Abu Dhabi Emirate).

Test method/reporting:

Provide lumen maintenance report from the LED chip manufacturer following IES LM-80 (including IES TM-21 reported lifetime for the luminaire) or IES LM-82 or equivalent IEC/international standards.

9. Luminaire Photobiological Safety

Specification:

Luminaire must comply with Photobiological Safety of lamps and lamp systems in accordance with the requirements of IEC 62471 or ANSI/IES RP-27.3-2007.

Test Method:

Provide test results for IEC 62471, ANSI/IES RP-27.3-2007 or equivalent International standards.

10. LED Luminaire Vibration testing for roadway tunnel fixtures

Specification:

Test whole fixture/luminaire as per IEC 60068-2-6 or equivalent international standard. Test method specifics to be determined by the supplier dependent on the potential vibration exposure.

Test method/reporting:

Provide test results for IEC 60068-2-6 or equivalent International standard





APPENDIX 3: Referenced standards and guidance documents

ISO/IEC guide 67:2004 Conformity assessment – fundamentals of product certification

ISO/IEC 17025:2005 General requirements for the testing and calibration of laboratories

ISO 9001:2008 Quality management systems – Requirements

ISO/IEC 17021:2011 Conformity assessment – Requirements for bodies providing audit and certification of management systems

JEDEC JESD22-A108D Temperature, bias and operating life

ANSI/NEMA/ANSLG C78.377-2011 Specifications for the Chromaticity of SSL products

IES LM-79-08 Approved method: Electrical and Photometric measurements of solid-state lighting products

IES LM-80-08 Approved method for measuring Lumen Maintenance of LED light sources

IES LM-82-12 Characterization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature

IEC 60598-1 Luminaires – General requirements and tests

IEC 60598-2-3 Luminaires – Particular requirements - Luminaires for road and street lighting

IEC 60598-2-13 Luminaires – Part 2-13: Particular requirements – Ground recessed luminaires – Annex A – Guide for good installation practice

IEC 60529 Degrees of protection provided by enclosures (IP Code)

IEC 62262 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK Code)

IEC 62471 Photobiological safety of lamps and lamp systems

ANSI/IESNA RP-27.3-2007 Recommended practice for photobiological safety for lamps – Risk group classification and labelling

IEC 60068-2-6 Environmental testing – Part 2-6: Tests – test Fc: Vibration (sinusoidal)

IESNA TM-21-11 Projecting long term maintenance of LED light sources

IEEE/ASNI C62.41.2-2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

FCC 47 CFR part 18 Industrial, Scientific and Medical equipment

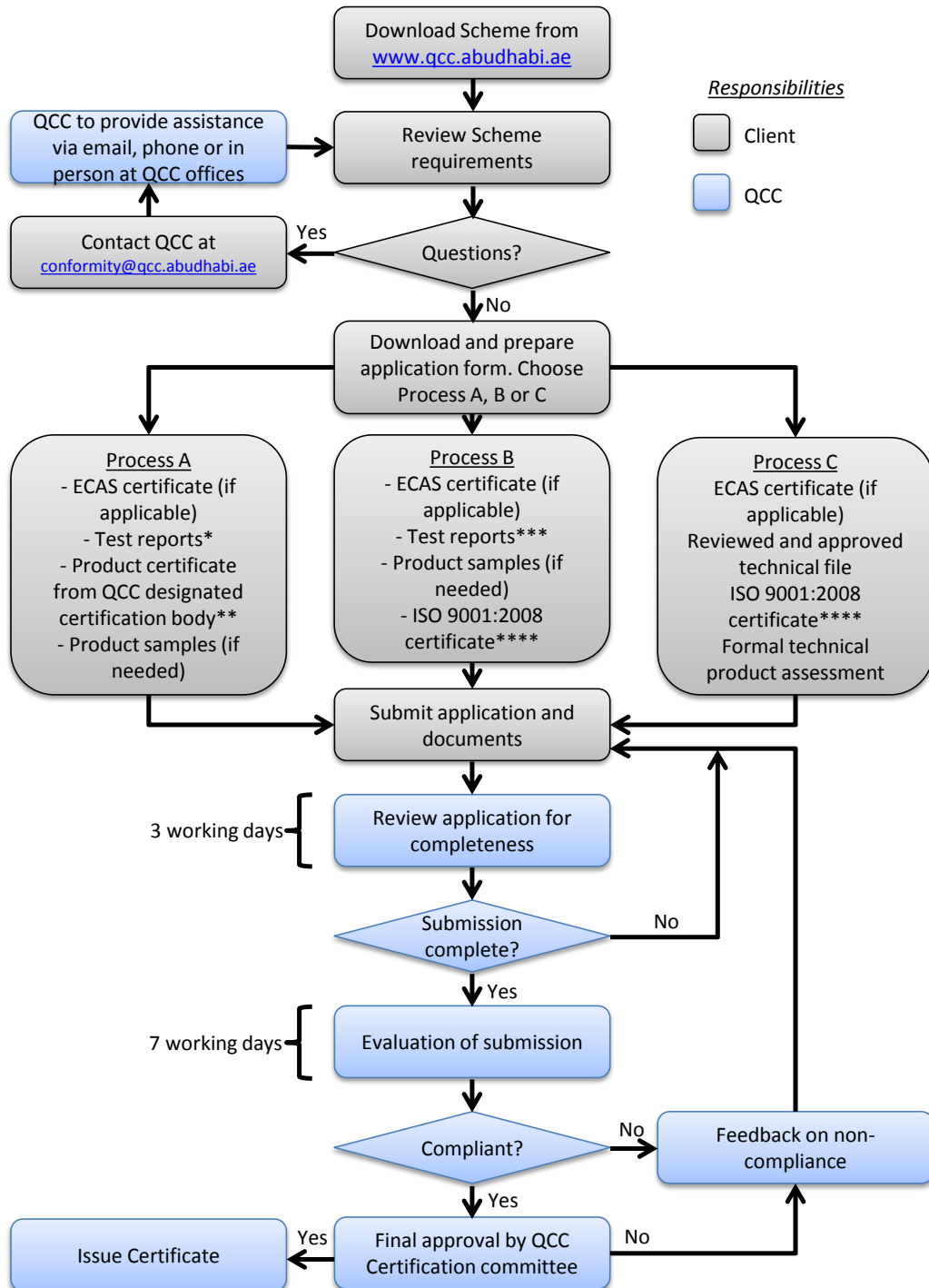
ANSI C82.77-2002 Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment

UL Class 1 and 2 power output Refer to UL standards 1012 (Class 1) and 1310 (Class 2)

IEC 61347-2-13 Lamp control gear - Part 2-13: Particular requirements for D.C. or A.C. supplied electronic control gear for LED modules



APPENDIX 4: Application Process



* Test results must come from a QCC designated laboratory

** Under a system 5 scheme or higher in the terminology of ISO/IEC guide 67:2004

*** Test reports must be from laboratories accredited to ISO/IEC 17025:2005 by a signatory of the ILAC MRA or a laboratory recognised by QCC

**** Issued by a certification body accredited to ISO/IEC 17021:2011 by a signatory of the IAF MLA