



مجلس أبوظبي للجودة والمطابقة  
ABU DHABI QUALITY & CONFORMITY COUNCIL



# Abu Dhabi Certification Scheme for Air/Water-cooled Chillers

## Assessment and Surveillance Plan

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### 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	16/11/2014	Scheme launched	-	-	11	1.0

## **1 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 and ruler of Abu Dhabi.

QCC consists of a council of regulators that facilitate the provision of quality infrastructure in line with global standards. This quality infrastructure enables industry and regulators to ensure that products, systems and personnel can be tested and certified to UAE and International Standards. In addition to supporting regulators and government organizations through offering quality and conformity facilities, expertise and resources, the council is also engaged in promoting a culture of quality towards consumers. Additionally, QCC is responsible for raising the quality of local products and ensuring exports meet international standards to improve interactions with global trade and integration into the global economy, as envisioned by Abu Dhabi Vision 2030.

Products certified by QCC receive the Abu Dhabi Trustmark. The Trustmark is designed to communicate that products, personnel or systems conform to various safety, quality and performance standards that are set by Abu Dhabi regulators.

## **2 FOREWORD**

The Air/Water-cooled Chiller Certification Scheme, enables manufacturers, suppliers and distributors of Air/Water-cooled chillers to obtain voluntary certification of products that meet quality and performance specifications suitable for the Emirate of Abu Dhabi. These specifications incorporate the following requirements:

- Minimum energy performance requirements for water chilling packages effective 1/1/2010 as defined by ANSI/ASHRAE/IES Standard 90.1.2013 (SI Edition) Table 6.8.1-3.
- Air-Conditioning, Heating, and Refrigeration Institute (AHRI) standard 551/591 for performance rating of water-chilling and heat pump water-heating packages using the vapour compression cycle. Alternative testing procedures may be acceptable as outlined below.
- Abu Dhabi Urban Planning Council (UPC) Estidama requirements for 0 ozone depletion potential (ODP) refrigerants.
- Abu Dhabi International Energy Conservation Code (AD-IECC) Section 503.2.3, as issued by the Abu Dhabi Department of Municipal Affairs in 2013.

It is anticipated that implementation of this certification scheme will significantly benefit the Emirate of Abu Dhabi by reducing energy consumption and maintenance expenses, as well as ensuring compliance with the Montreal Protocol on substances that deplete the ozone layer.

The scope of the certification scheme includes specifically 50 Hz Air-cooled and Water-cooled Chillers listed in the provisions of ANSI/AHRI standard 551/591

### **3 THE ENVIRONMENTAL TRUSTMARK**

Products that achieve certification, through formal evaluation against the QCC certification scheme criteria defined in this document, will be granted a Certificate of Conformity and are licensed to bear the Abu Dhabi Trustmark for Environmental Performance in product promotion and merchandising. The Certificate of Conformity enables manufacturers, distributors and suppliers of air/water-cooled chillers to present evidence of meeting appropriate standards for Abu Dhabi's built environment.

The QCC's market surveillance inspectors actively ensure the integrity of the Trustmark for Environmental Performance is maintained through market surveillance and testing of products bearing the Trustmark.

Advisory note: A number of factors additional to the characteristics addressed in this assessment and surveillance plan may influence the performance of products, e.g. installation, maintenance, modification, incorrect operation. Such factors are beyond the scope of the third party product certification described in this document. QCC recommends that suitable precautions, such as the use of competent and/or accredited/approved building designers, air conditioning installers, commissioners and building maintenance managers, to improve the likelihood of continued compliance of installed products.

The requirements herein may from time to time be varied by the issue of one or more 'QCC Notices' issued as controlled documents to certificate holders.

### **4 REFERENCES**

The following documents are referenced within this Assessment and Surveillance Plan:

- AHRI Standards 551/591 (SI)-2011 with Addendum 3
- AHRI Air-Cooled Chillers Operations Manual (ACCL-OM), January 2014
- AHRI Water-Cooled Chillers Operations Manual (WCCL-OM), January 2014
- AHRI Certification Program General Operations Manual, October 2013
- ANSI/ASHRAE/IES Standard 90.1.2013 (SI Edition)
- Abu Dhabi International Energy Conservation Code (AD-IECC), 2013
- The Pearl Rating System for Estidama: Building Rating System – Design and Construction V 1.0, April 2010
- QCC-QP-CSS/PCS-F01 Application, Terms and Conditions, and License for Certification

## 5 CERTIFICATION REQUIREMENTS

### 5.1 General Requirements

In order to receive the Trustmark for Environmental Performance, the product applying for certification must be assessed according to QCC's criteria (clause 5.2) and shown to meet the requirements of AHRI standard 551/591 (SI)-2011.

The general requirements for certification, along with the terms and conditions for QCC certification of products and license of the Trustmark are contained in the application form QCC-QP-CSS/PCS-F01, which can be downloaded from the QCC website at:

<http://www.qcc.abudhabi.ae/English/Activities/Documents/Application%20form%20and%20Terms%20and%20Conditions.pdf>

### 5.2 Specific Requirements

- In order to gain certification, the applicant shall provide summary evidence that the product(s) applying for certification currently hold a valid AHRI conformity certificate
- Provide information in regarding the AHRI selection notice, defining the 20% of the applicants Basic Model Groups (BGMs) selected for qualification testing during AHRI certification
- Provide details as to which form of Qualification testing was selected: Witness testing at the manufacturers' facility or testing by an independent third-party laboratory contracted by AHRI
- If witness testing at the manufacturers' facility is selected, provide details regarding the AHRI approval of the witness testing facility and scheduled re-approval date
- Provide a summary of all certified data generated in accordance with the AHRI standard 551/591 (SI) by completing the form included in Appendix 2.
- Demonstrate compliance with the minimum efficiency requirements as outlined in the Table 1 below. These requirements are based on ANSI/ASHRAE/IES Standard 90.1.2013 (SI Edition) table 6.8.1-3 that defines efficiency requirements for water chilling packages effective 1/1/2010. These values are also incorporated in the Abu Dhabi International Energy Conservation Code (AD-IECC) Section 503.2.3, as issued by the Abu Dhabi Department of Municipal Affairs in 2013. Test procedures and calculations shall follow the requirements of AHRI 551/591 (SI).
- Demonstrate that the refrigerant(s) used by the product(s) applying for certification have an ozone depletion potential (ODP) of zero in accordance with the Estidama Building Rating System – Design and Construction V1.0 credit RE-R3: Ozone Impacts of Refrigerants and Fire Suppression Systems
- Provide an UAE Trade license of the applicant
- Provide an authorisation letter from the manufacturer to authorise the applicant to deal with the product (if applying on the manufacturers' behalf)

**Table 1. QCC chiller certification minimum energy efficiency requirements**

Equipment Type	Size Category	Minimum Efficiency (COP)	
	(kW)	Full Load	IPLV
Air-cooled chillers <sup>1</sup>	<528	≥2.826	≥3.694
	≥528	≥2.826	≥3.768
Water cooled chillers, positive displacement	<264	≥4.513	≥5.588
	≥264 and <528	≥4.542	≥5.724
	≥528 and <1055	≥5.177	≥6.070
	≥1055	≥5.678	≥6.519
Water cooled chillers, centrifugal	<1055	≥5.553	≥5.907
	≥1055 and <2110	≥6.112	≥6.412
	≥2110	≥6.176	≥6.531

Note: 1. Air-cooled chillers without condenser must be rated with matching condensers and comply with air-cooled chiller efficiency requirements.

### 5.3 Demonstration and acceptance of alternative certifications

Demonstration of certification through alternative certification programs other than AHRI 551/591 (SI) shall be considered by QCC provided suitable evidence is supplied by the applicant of the ability for the product to meet the minimum efficiency (COP) requirements given in the Table 1 in clause 5.2. Where an applicant chooses to supply test evidence of chiller efficiency independent of an established certification programme, the following additional requirements shall be met;

- The testing laboratory used for chiller efficiency measurement shall be certified to ISO/IEC 17025 within the scope of the testing performed
- The ISO/IEC 17025 certification shall be issued by a certification body signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA)

Acceptance of certification through alternative programs is at the discretion of QCC after subsequent review of evidence of equivalence of the proposed certification with AHRI 551-591 (SI) is supplied by the applicant.

### 5.4 Quality Management System Requirements

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 17021:2012 by an accreditation body signatory to the International Accreditation Forum Multilateral Recognition Agreement (IAF MLA).

## **6 ASSESSMENT OF THE APPLICATION**

The assessment is based on the submitted documentation defined in clauses 5.2 and 5.3, including additional product information such as; product specifications, product descriptions and product photo documentation, which is evaluated for consistency, completeness and overall quality. Refer to APPENDIX 1 for diagram of the application-assessment process.

## **7 IDENTIFICATION AND LABELLING**

Each certified product must be provided with an evident label bearing the Trustmark for Environmental Performance (depending on product and subject to agreement with the QCC Communications department) in accordance with brand guidelines specified in the Application, Terms and Conditions and License for Certification (QCC-QP-CSSPCS-F01.03).

## **8 SURVEILLANCE / AUDIT PROCEDURES**

### **8.1 General**

At a minimum, the surveillance and audit requirements listed under this section shall be applied to the certified product(s) on an annual basis. When the validity of a certificate is to be demonstrated; this includes the validity of the accreditation of the certificate issuer.

### **8.2 Quality Management System Audits**

Proof of continued compliance (certification) is to be presented to QCC annually or 30 days after expiry of the submitted ISO 9001:2008 certificate (whichever comes first).

### **8.3 Testing and Inspection**

Products carrying the Trustmark of Environmental Performance will be subject to the following unannounced inspection activities:

- Annually, QCC will sample the integer less than or equal to the square root of the total number of products from the applicant certified by this scheme.
- Samples can be inspected i) on-site at installed locations of Abu Dhabi government/municipal owned buildings, ii) at point of entry to the Abu Dhabi Market, and/or iii) at the manufacturers facility.
- Samples will be assessed for compliance to selected specific requirements given in Clause 5 including review of the current AHRI certification status and verification monitoring in accordance to clause 9.2.2 of the AHRI Air-Cooled or Water-cooled Chiller operating manuals.
- The sampling schedule will target previously untested products on a year-on-year basis to ensure eventual testing of all certified products.

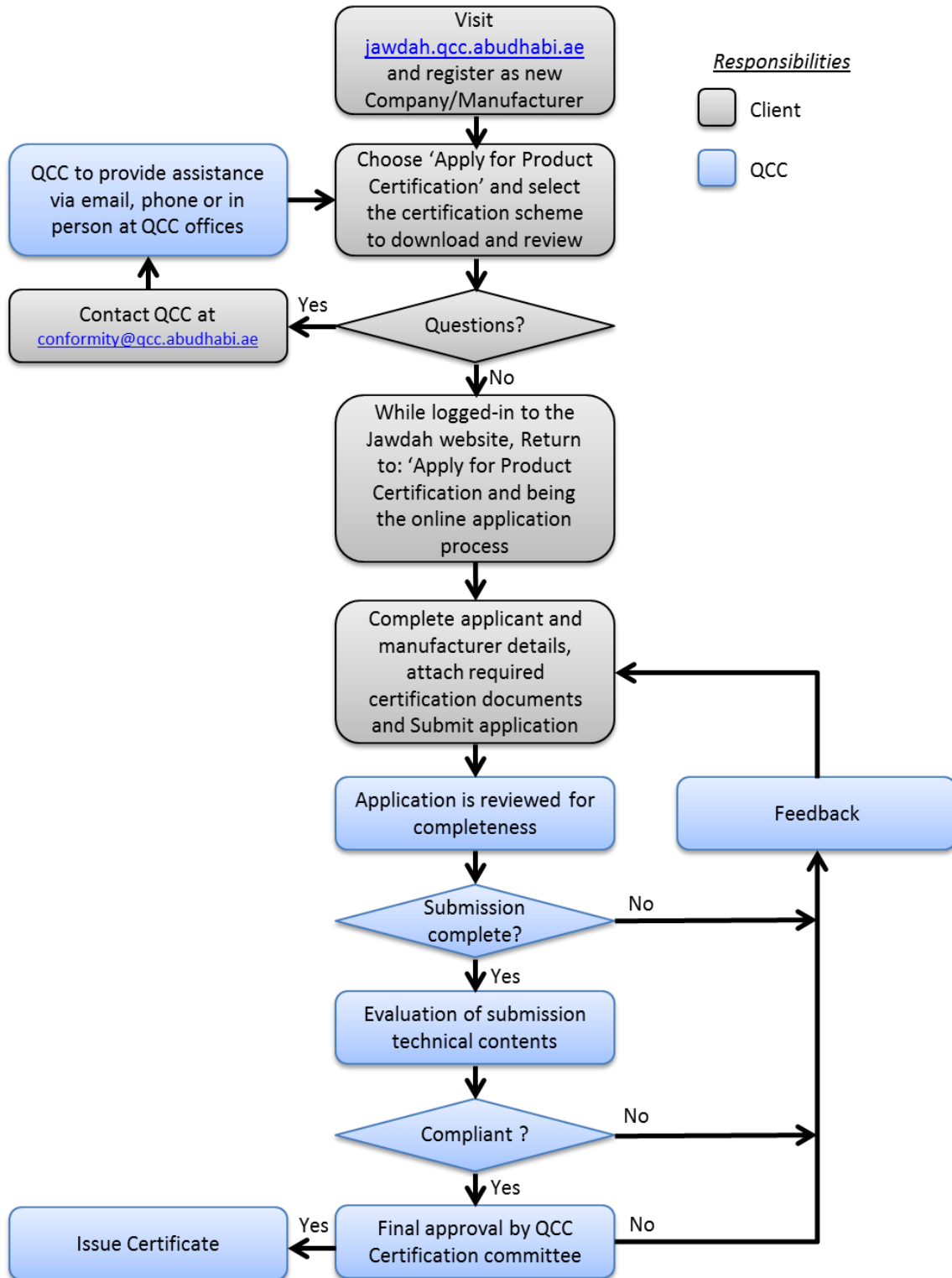


- If any product fails to meet the certification requirements during inspection the product certification in question will be withdrawn and there will immediately be an additional round of sampling and assessment of the integer less than or equal to the square root of the total number of products certified by this scheme from the applicant.
- If one of these additional samples also fails to meet the certification specifications, the certification status of all products from the applicant will be reviewed.



Proof of continued compliance must be provided if; i) a referenced standard listed in clause 4 has changed, or ii) the product has been modified, or iii) annually following issuance of the first certificate, whichever comes first.

In cases i) or ii), the continued validity of the AHRI certificate shall be demonstrated; in case iii) an affidavit shall be provided by the applicant and the manufacturer that the production system has not been modified and the specification of the product remains unchanged.

**APPENDIX 1: Product assessment and certification process**



## APPENDIX 2: Test certification data

 مجلس أبوظبي للجودة والمطابقة ABU DHABI QUALITY AND CONFORMITY COUNCIL			
 <b>QCC PRODUCT CERTIFICATION SCHEME</b>			
<b>Abu Dhabi Certification Scheme for Air/Water-cooled Chillers</b>			
Manufacturers, suppliers and distributors of Air/Water-cooled chillers shall complete this form in support of their application for voluntary certification of products that meet QCC's quality and performance specifications.			
Product seeking Trustmark Certification:		Date:	
Manufacturer:	Condenser Model No.:	Air Cooled <input type="checkbox"/> or Water Cooled <input type="checkbox"/>	
Capacity (kW):	Evaporator Model No.:	Refrigerant:	
<b>Data to be recorded during the test</b>			
<b>1. Compressor / Evaporator (all Condenser types)</b>			
a. Temperature of water entering evaporator:	<input type="text"/> °C	b. Temperature of water leaving evaporator:	<input type="text"/> °C
c. Chilled water flow rates, measure in kg/s:	<input type="text"/> and reported in L/s: <input type="text"/>		
d. Total power input to water chilling package:	<input type="text"/> kW		
e. Measured and corrected evaporator water pressure drop (inlet to outlet):	<input type="text"/> kPa		
f. Electrical power input to controls and auxiliary equipment (if not included in d):	<input type="text"/> kW		
<b>2. Water-cooled Condenser</b>			
g. Temperature of water entering condenser:	<input type="text"/> °C	h. Temperature of water leaving condenser:	<input type="text"/> °C
i. Condenser water flow rates, measure in kg/s:	<input type="text"/> and reported in L/s: <input type="text"/>		
j. Measured and corrected condenser water pressure drop (inlet to outlet):	<input type="text"/> kPa		
k. Electrical power input to controls and auxiliary equipment (if not included in d):	<input type="text"/> kW		
<b>3. Air-cooled Condenser</b>			
l. Dry-bulb temperature of air entering condenser:	<input type="text"/> °C		
m. Condenser fan motor power consumption shall be included in d			
n. Barometric pressure:	<input type="text"/> kPa		
<b>General information to be recorded</b>			
o. Unit voltage <input type="text"/>	p. Unit frequency <input type="text"/>	q. Compressor rotational speed, for open type compressors <input type="text"/> rpm	
r. Actual voltage <input type="text"/>	and actual current <input type="text"/>	for each phase of electrical input into the water chilling package	
s. Motor nameplate data:			
t. Test log details			
Date: <input type="text"/>	Time: <input type="text"/>	Location: <input type="text"/>	
Ambient temperature at test site: <input type="text"/> °C		Signatures:	
Name of test supervisor:	<input type="text"/>		
Names of test witnesses:	<input type="text"/>		
	<input type="text"/>		
	<input type="text"/>		
<b>Test results</b>		<b>For official use only:</b>	
	kW	W/W	YES NO
At 100% capacity; cooling output:	<input type="text"/>	COP: <input type="text"/>	All documentation has been provided and is deemed acceptable: <input type="checkbox"/> <input type="checkbox"/>
At 75% capacity; cooling output:	<input type="text"/>	COP: <input type="text"/>	Test results demonstrate compliance with certification scheme: <input type="checkbox"/> <input type="checkbox"/>
At 50% capacity; cooling output:	<input type="text"/>	COP: <input type="text"/>	
At 25% capacity; cooling output:	<input type="text"/>	COP: <input type="text"/>	
		IPLV: <input type="text"/>	
- Provide objective evidence to demonstrate that unit can operate safely for at least two hours at 52°C ambient conditions. - Provide a letter statement of how many years, as a minimum can the unit operate under the Abu Dhabi climatic conditions.		Comments: <input type="text"/> <input type="text"/> <input type="text"/>	