



مجلس أبوظبي للجودة والمطابقة
ABU DHABI QUALITY & CONFORMITY COUNCIL



Abu Dhabi Certification Scheme for Interlocking Concrete Pavers

Assessment and Surveillance Plan

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Amendment Page

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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.

The 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 assessment facilities, expertise and resources, the Council is also engaged in promoting a culture of quality towards consumers. Additionally, the 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 Economic Vision 2030.

Products certified by the 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 QCC Working Group for Building Materials – Interlock Concrete Pavers was established with a view to improve the quality of interlocking pavers, a common hardscape surfaces for pedestrians and low-volume traffic in Abu Dhabi. In the first instance, the working group developed the Abu Dhabi Specification (ADS) for Interlocking Concrete Pavers ADS 15 / 2015 that was endorsed by the Standard Technical Committee during Q3 2015.

Based on this ADS, the QCC has now developed the Abu Dhabi Certification Scheme for Interlocking Concrete Pavers that enables manufacturers and suppliers to obtain voluntary certification of these products that satisfy desirable performance characteristics related to quality and safety requirements.

3 THE ABU DHABI TRUSTMARK

Products that achieve certification, through formal testing 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 in product promotion and merchandising.

The QCC's market surveillance inspectors actively ensure the integrity of the Trustmark 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. In this regard, the QCC recommends the application of the procedures defined in the Abu Dhabi Guideline ADG7/2015, which recommends the use of particular methods during installation and other relevant activities to help ensure quality of interlocking pavers. 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 standards and specifications have been used to define the required performance requirements within this Assessment and Surveillance Plan:

- **ASTM C88:** Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate
- **ASTM C150:** Standard Specification for Portland Cement
- **ASTM C293:** Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading)
- **ASTM C418:** Standard Test Method for Abrasion Resistance of Concrete by Sandblasting
- **ASTM C936:** Standard Specification for Solid Concrete Interlocking Paving Units
- **BS 812:** Testing aggregates. Method for determination of particle size distribution. Sieve tests
- **BS 1377:** Methods of test for soils for civil engineering purposes.
- **BS 6717:** Precast, Unreinforced Concrete Paving Blocks - Requirements and Test Methods
- **BS 7533:** Pavements constructed with clay, natural stone or concrete pavers. Code of practice for the construction of pavements of natural stone paving units and cobbles, and rigid construction with concrete block paving
- **BS EN 933:** Tests for Geometrical Properties of Aggregates
- **BS EN 1097:** Tests for Mechanical and Physical Properties of Aggregates
- **BS EN 12620:** Aggregates for Concrete
- **BS EN 1744:** Tests for Chemical Properties of Aggregates
- **AASHTO T 96-02:** Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

Familiarity and/or access to these documents, is expected of the applicant. In all cases, the most recent edition of the document shall apply.



5 CERTIFICATION REQUIREMENTS

5.1 General Requirements

In order to receive the QCC Trustmark, the product applying for certification must be assessed according to the QCC's criteria (clause 5.2).

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 available in the QCC Jawdah website: <http://jawdah.qcc.abudhabi.ae>. Applicants must register first before uploading all the application for certification documentation.

In addition, the applicant shall provide the following:

- Valid UAE Trade License
- Authorisation letter from the manufacturer to deal with the product(s) seeking certification (if applying on the manufacturers' behalf).

5.2 Specific Requirements

In order to demonstrate compliance, test reports must be provided from an ISO/IEC 17025 certified laboratory where the applicable test standards is within the scope of certification. The certification body which provided the ISO/IEC 17025 certification to the laboratory must be a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA). Alternatively, the testing facility shall have obtained QCC recognition based on the scope of the testing sought.

Test reports validity: In all cases, the test reports submitted must not be older than 12 months on the day of submission.

Physical testing analysis or equivalent: Test reports shall demonstrate applicability and traceability to the products sold in the UAE.

Use of alternative test standards: Test reports using alternative standards to those referenced will be considered and reviewed by the QCC to determine if the standard is equivalent to, and/or meets the intent of, the test standards required by relevant sections.

5.2.1 Constituent Materials Specifications

The constituent materials of the interlocking concrete pavers shall comply with the requirements outlined in Table 1.



Table 1. Constituent Materials Specifications

Material	Requirements	Design Mix	Standard / Specification ¹
Cement	The cement to be used in the manufacture of paving blocks shall be sulphate-resisting Portland cement Type-V, or ordinary Portland cement with partial cement replacement by supplementary cementitious materials such as fly ash and ground granulated blast-furnace slag (GGBS), and microsilica, etc.	The cement content shall be a minimum of 430 Kg/m ³	ASTM C150
Aggregates	The aggregates to be used in the manufacture of the paving blocks shall be crushed rocks from approved sources. The sand shall be washed and free from deleterious substances. The aggregate shall not contain harmful material such as coal, mica, shale or similar laminated materials which cause strength deterioration. Coarse and fine aggregates shall meet the requirements outlined in Tables 1a .	The combined grading shall satisfy the limits defined in Table 1b based on its diameter and shall have smooth, non-gap graded curve and central tendency	BS EN 12620:2002 +A1:2008.
Water	The water to be used in mixing and curing the precast concrete blocks shall be of drinking quality, clean and free from injurious substances of sewage, oil, acids, strong alkalis, vegetable matter, clay and other such substances harmful to the finished product	The water cement ratio shall be a maximum of 0.42	
Pigment	Pigment to be used in manufacturing of precast concrete interlocking blocks shall be in the form of dry, soft powder of mineral oxides and shall not contain chemical compounds capable of affecting adversely the setting and development of strength of the cement and other properties of the finished products and shall be compatible with other admixtures used in the same mix. Pigments can be used throughout the concrete or for the top layer only in double mix production. Surface protection against color fading or chemical attaches are possible, but must be specifically recommended by purchaser	Only mineral oxide type from reputable source with test certificates. The pigment content shall not exceed 10% by mass of cement	ASTM C979
Note: 1. Comparable test procedures would be accepted by the QCC after assessment on a case by case basis			



Table 1a. Aggregates Requirements for Interlocking Concrete Pavers

Properties	Test Method ¹	Permissible Limit	
		Coarse Aggregate	Fine Aggregate
Particle Size Distribution	BS EN 933-1:2012	As per BS EN 12620:2002+A1:2008	
Clay Silt & Dust	BS EN 933-1:2012	Max 1%	Max 3% passing 75 µm sieve
Organic Matter Content	BS 1377-3:1990	Nil	Nil
Water Absorption	BS EN 1097-6:2013	Max 1.5%	Max 2%
Relative Density	BS EN 1097-6:2013	Min 2.6	Min 2.6
Shell Content	BS EN 933-7:1998	Nil	Max 1%
Flakiness Index	BS EN 933-3:2012	Max 25%	N/A
Elongation Index	BS 812-105.2:1990	Max 25%	N/A
Soundness (Mg SO ₄) 5 cycles	ASTM C88-13	Max 5%	Max 5%
Sulphate Content (SO ₃)	BS EN 1744-1:2009+A1:2012	Max 0.3%	Max 0.3%
Chloride Content (Cl)	BS EN 1744-1:2009+A1:2012	Max 0.2%	Max 0.1%
Aggregate Crushing Value	BS EN 1097-2:2010	Max 25%	N/A
Los Angeles Abrasion	AASHTO T 96-02	Max 25%	N/A
Note: 1. Comparable test procedures would be accepted by the QCC after assessment on a case by case basis.			

Table 1b. Combined Aggregate Grading for Interlocking Concrete Pavers

Diameter	Limit (Percent Passing)
8.0 mm	100%
4.75 mm	72-82%
2.36 mm	41-61%
1.18 mm	25-46%
600 µm	16-31%
300 µm	8-17%
150 µm	3-8%
75 µm	0-3%



5.2.2 Physical & Mechanical Properties

The physical and mechanical properties of the concrete paving blocks shall conform to the requirements outlined in Table 2 taking into account the following criteria:

- At least 4 out of 5 of all tested specimens shall meet the specified average criteria for all physical and mechanical properties specified.
- The concrete paving block manufacturers may achieve the physical properties specified herein for their products through various means such as addition of mineral and/or chemical admixtures to the concrete mix for the paving blocks.
- Concrete paving blocks shall be adequately cured, as specified, so that they comply with all the physical and mechanical properties upon delivery to site.
- Durability Criteria:
 - a) AS/NZS 4456.10:2003, method B
 - b) Resistance to sodium sulphate and sodium chloride
 - c) Conduct the test for 40 cycles and record the total loss
 - d) Total loss after 40 cycles: < 1% of mass of specimen

Table 2. Physical & Mechanical Properties of Interlocking Concrete Pavers

Property	Requirements			Test Standard
	Average	Minimum	Maximum	
Bulk Density (min. 48 hrs. immersion)	> 2.375 T/m ³	2.330 T/m ³		
Bulk/Apparent Density Ratio (min. 48 hrs. immersion)	> 0.88	0.87		
Water Absorption (min. 48 hrs. immersion)			3% for aggressive exposure zones ¹ , and 4.5% for less aggressive exposure zones ²	ASTM C140
Compressive Strength (min. 48 hrs. immersion)	≥ 55 Mpa for aggressive exposure zones ¹ , and 49 Mpa for less aggressive exposure zones ²	47 Mpa for aggressive exposure zones ¹ , and 44 Mpa for less aggressive exposure zones ²		BS 6717:1993
Abrasion Resistance (for vehicular areas only)	Average thickness loss < 3 mm		Maximum volume loss = 150 mm ³ per 500 m	ASTM C418
			maximum volume loss 20,000 mm ³ per 5,000 mm ²	BS EN 1338
Flexural Strength	> 5 Mpa (Dry)	4.5 Mpa (Dry)		ASTM C293 / C293M: 10
Notes:				
1. Aggressive exposure zones are those areas where a shallow water table is known to be present. This underground water is generally brackish, where salt and other mineral content is capable of attacking Interlocking Concrete Pavers. This type of zone is generally found in Abu Dhabi City and other coastal areas throughout the Emirate.				
2. Less aggressive exposure zones have deeper water tables, comprising more fresh water. This type of zone is generally found in regions of Al Ain and Al Gharbia.				



5.2.3 Dimensional Tolerance

- The length or width of each unit shall not differ by more than $\pm 1.6\text{mm}$ from the designated dimensions.
- The height of each unit shall not differ by more than $\pm 3\%$ from the specified standard thickness.

5.3 Quality Management System Requirements

The manufacturer of the product (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).

5.4 Inspection and Verification Requirements

In addition to the documentation requirements outlined above, the interlocking concrete paving products applying for certification shall be subject to onsite inspection and verification activities performed by QCC recognized third-parties or other government entities including the municipalities who might require the producer to comply with additional requirements for their particular projects.

6 ASSESSMENT OF THE APPLICATION

The assessment is based on the submitted documentation defined in clauses 5.1, 5.2, 5.3 and 5.4, 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 A for diagram of the application-assessment process.

7 IDENTIFICATION AND LABELLING

Each certified product must be provided with an evident label bearing the Trustmark (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 available in the QCC Jawdah website:

<http://jawdah.qcc.abudhabi.ae>.

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

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

8.3 Market Surveillance

Products carrying the Trustmark will be subject to the following unannounced inspection activities by either QCC staff or authorized third parties:

- Annually, the QCC will undertake market surveillance activities to test certified products available in the Abu Dhabi market.
- 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 5.2.
- 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 the applicant required to perform testing of an agreed number of samples to verify compliance.
- 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 to the requirements of the QCC certification 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), new test reports shall be provided; 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.

9 SCHEDULE OF FEES

The applicant shall pay the necessary fees in accordance with the Schedule of Fees issued by the Abu Dhabi Executive Council, which is available in the QCC website (<http://jawdah.qcc.abudhabi.ae>) under the respective product certification scheme.



APPENDIX A - PRODUCT ASSESSMENT AND CERTIFICATION PROCESS

