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| | Document Title: Guidelines for Factory Production Control System for Block Factories | عنوان الوثيقة: | |
| | Doc Ref. DM-DCLD-RD-DP21-2090 (IC) | رقم الوثيقة : | |

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| Issue Date | Rev. No. | Summary Of Amendments |
|------------|----------|--|
| 04-03-2010 | 0 | First draft |
| 21-03-2010 | 1 | Issue for use |
| 01-02-2011 | 2 | Revised (frequency of testing and other test requirements) Including of DMS 1: PART 5, Removing the year of issuance of the standard (always refer to latest edition) |
| 20-02-2019 | 3 | Adding frequency of SRI independent testing |
| 25-12-2019 | 4 | Adding requirements for AAC Blocks. (DMS 1: PART 3-2011) and aligning with new numbering |
| 16-07-2020 | 5 | Removing the requirements of all materials testing frequency in table A.2.1 as these |
| 10-11-2020 | 6 | requirements have been modified in the standard specification (DMS1 all parts) to address the frequency and testing as per the approved internal quality testing plan of the factory. Revised to include the provision of waiving the testing requirements for cement, admixtures, supplementary cementitious materials and polystyrene insert if supplied by DCLD-CQPS certified source. Include the additional requirements of AAC blocks as per the updated DMS 1 Part 3: 2020. |
| 04-10-2022 | 7 | Changing section name and replace HOU to CPQSM |
| 27-03-2023 | 8 | Restructured to align with the new formatting of all documents. Use of New DM Logo |

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1. INTRODUCTION

1.1 This document details the steps that shall be taken by Block Manufacturers under the factory assessment scheme, in establishing and documenting a system of production quality control to ensure that the finished product will conform to a specified requirement.

2. SCOPE

2.1 The established factory production system shall consists of procedures, regular inspection and tests and the utilization of the results to control raw and other incoming materials ,equipments , the production process and the finished products .

3. REFERENCE DOCUMENTS

- 3.1 DM-DCLD-RD-DP21-2001 (IC): General rules for the DM Third-party product certification system through factory assessment
- 3.2 DM-DCLD-RD-DP21-2169 (IC): Specific Rules for Certification of Precast Concrete Masonry Blocks (as per DMS 1: Part 1) through Factory Assessment
- 3.3 DM-DCLD-RD-DP21-2170 (IC): Specific Rules for Certification of Precast Concrete Filler Blocks (as per DMS 1: Part 2) through Factory Assessment
- 3.4 DM-DCLD-RD-DP21-2172 (IC): Specific Rules for Certification of Precast Concrete Paving Blocks (as per DMS 1: Part 4) through Factory Assessment
- 3.5 DM-DCLD-RD-DP21-2174 (IC): Specific Rules for Certification of Concrete-Polystyrene Sandwich Masonry Blocks (as per DMS 1: Part 5) through Factory Assessment
- 3.6 DM-DCLD-RD-DP21-2173 (IC): Specific Rules for Certification of Autoclaved Aerated Concrete Masonry Units as per DMS 1 Part 3) through Factory Assessment

4. RESPONSIBILITIES

- 4.1 Block factory quality control department
- Responsible for the preparation and effective implementation of an internal production quality control System, including documentation and recording of the results.
- 4.2 DM-Certification Body (DCLD-CQPS)
- Responsible for the approval of the manufacture internal production quality control

5. DEFINITIONS

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- Manufacturer - Block Factory.
- Finished product: Different Types and shapes of Blocks.
- DM–Certification Body – Certification and Quality Control of Products Section – DCLD-CQPS -Dubai Central Lab. Department (DCLD)

6. GENERAL REQUIREMENTS AND PROVISIONS

- 6.1 The manufacturer shall establish Production Quality Control System(Product Quality Assurance Plan) conforming to Table (1), including procedures for ensuring proper controlling and monitoring of all inspections carried out for equipment's, raw materials, production and process, and finished product.
- 6.1.1 Equipment inspection shall conform to A.1 of Table (1).
- 6.1.2 Materials inspection shall conform to A.2 of Table (1).
- 6.1.3 Production process inspection shall conform to A.3 of Table (1).
- 6.1.4 Finished Product Inspection shall conform to A.4 of Table (1).
- 6.2 The manufacturer shall maintain and keep all records of inspection, sampling and testing.
- 6.3 The action to be taken when control values or acceptable criteria are not met shall be given; actions shall be recorded and documented.
- 6.4 Durability aspects for all blocks shall be in compliance with the related requirements of DMS 1 standards.

Table (1) Internal Quality Control Plan (Product Quality Assurance Plan)

| A.1 Equipment Inspection | | | | |
|--|---|---|--|--|
| Subject | | Aim | Method | Frequency |
| A.1.1 Testing and measuring equipment | | | | |
| All testing and measuring equipment's | | Correct functioning and accuracy | Calibration, traceable to approved standards or norms | On (re)installation, after major repair or once per year |
| A.1.2 Storage and production equipment | | | | |
| 1 | Storage of materials | Absence of contamination | Visual inspection or other appropriate method | -On installation -Weekly |
| 2 | Weighing or volumetric batching equipment's | Correct functioning and according to manufacturer's declared accuracy | Visual inspection and calibration, traceable to approved standard or norms | -On installation -Weighing-once a year -Volumetric-Twice a year -In case of doubt |
| 3 | Mixers | Wear and correct functioning | Visual inspection | Daily |
| 4 | Moulds | Cleanliness and conditions | Visual inspection | Daily |
| 5 | Curing chamber or Autoclave | Correct functioning according to manufacturer's operational manual and internal instruction | Visual inspection or other appropriate method | Daily |
| 6 | Dosing and mixing systems | Correct functioning according to manufacturer's | Visual inspection or other appropriate method | Daily |

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| | | operational manual and internal instruction | | |
| 7 | Cutting machines | Cleanliness and conditions | Visual Inspection | Daily |

A.2 Materials Inspection

A.2.1 All materials

| | | | | |
|---|--|--|--|---|
| 1 | Cement (All types) | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan (Where all used cement sources in the production is certified by DCLD-CQPS, this requirement can be waived) |
| 2 | Aggregates | Conformity with Block manufacturer's requirements. | -Visual inspection and appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 3 | Aluminum (Powder/Paste) | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 4 | Quick Lime (Powder) | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria (Conforming to the requirements BS 890) | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 5 | Silica Sand / Fly Ash (Type C) for AAC Blocks | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 6 | Gypsum | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 7 | Other Supplementary cementitious materials (Silica Fume, Ground Granulated Blast Furnace Slag (GGBS), or Fly Ash) for Masonry Blocks | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan (Where all used supplementary cementitious materials sources in the production is certified by DCLD-CQPS, this requirement can be waived) |
| 8 | Admixture | Conformity with Block manufacturer's requirements. | Appropriate acceptance criteria | As per the defined testing frequency in the factory's internal product quality assurance plan (Where all used admixture sources in the production is certified by DCLD-CQPS, this requirement can be waived) |
| 9 | Pigments (whenever applicable) | Conformity with Block manufacturer's requirements. | Appropriate acceptance criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |

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| 10 | Water | Conformity with Block manufacturer's requirements. | Appropriate test method or acceptable criteria | As per the defined testing frequency in the factory's internal product quality assurance plan |
| 11 | Polystyrene insert- for sandwich blocks | Conformity with Block manufacturer's requirements. | Visual inspection to verify that the insert is certified by DCLD-CQPS and bears the DCLD Mark | As per the defined testing frequency in the factory's internal product quality assurance plan (Where all used Polystyrene insert sources in the production is certified by DCLD-CQPS, this requirement can be waived) |

A.3 Production Process Inspection

| | | | | |
|---|---|---|--|-------|
| 1 | Mixture composition | Conformity with intended composition/mixture values | -Visual on weighing equipments -Checking against production process documents | Daily |
| 2 | Fresh concrete | Correct mixing | -Visual check | Daily |
| 3 | Production | Conformity with documented factory procedures | Checking actions against factory procedures | Daily |
| 4 | AAC Blocks Production (Raw materials preparation / Dosing and mixing process/Casting, rising and curing /Demoulding and cutting | Conformity with documented factory procedures | Checking actions against factory procedures | Daily |

A.4 Finished Product Inspection

| Subject | Aim | Method/Criteria | Frequency |
|-------------------------------|---------------------------------|--|--|
| A.4.1 Product Testing | | | |
| A.4.1.1 Paving Blocks | | | |
| 1 | Visual checking | Shall conform to Clause 7 of DMS 1:Part 4 | Visual -Daily |
| 2 | Size (Work size and dimensions) | Shall conform to Clause 4.2 of DMS 1:Part 4 | Annex A of DMS 1: Part 4 One test per machine per production day |
| 3 | Chloride and sulphate | Shall conform to Clause 5.4 of DMS 1:Part 4 | BS 1881:Part 124 One test quarterly and for every change of materials source |
| 4 | Compressive strength | Shall conform to Clause 5.1 of DMS 1:Part 4 | Annex A of DMS 1: Part 4 One test per machine per production day |
| 5 | Water absorption | Shall conform to Clause 5.2 of DMS 1:Part 4 | Annex C of DMS 1: Part 4 One test monthly |
| 6 | Abrasion resistance | Shall conform to Clause 5.3 of DMS 1:Part 4 | Test methods as per Clause 5.3 of DMS 1: Part 4 One test yearly |
| 7 | Solar Reflective Index (SRI) | Shall conform to Clause 5.6 of DMS 1: Part 4 | ASTM E1980 One test yearly for paving blocks having Class 1 colors (> 29 SRI) |
| A.4.1.2 Masonry Blocks | | | |

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| 1 | Visual checking | Shall conform to Clause 5.1 of DMS 1:Part 1 | Visual | Daily |
| 2 | Sizes (Work size and dimensions) | Shall conform to Clause 5.2 of DMS 1:Part 1 | BS EN 772: Part 16 | One test per machine per production day |
| 3 | Net Density | Shall conform to Clause 5.3 of DMS 1:Part 1 | BS EN 772: Part 13 | One test monthly and for every change of materials source |
| 4 | Chloride and sulphate | Shall conform to Clause 5.4 of DMS 1:Part 1 | BS 1881:Part 124 | One test quarterly and for every change of materials source |
| 5 | Compressive strength | Shall conform to Clause 5.5 of DMS 1:Part 1 | BS EN 772: Part 1 or Annex A of DMS 1: Part 1 | One test per machine per production day |
| 6 | Drying shrinkage | Shall conform to Clause 5.6 of DMS 1:Part 1 | ASTM C 426 | One test quarterly |
| 7 | Thermal conductivity (whenever applicable) | Shall conform to Clause 5.7 of DMS 1:Part 1 | Test methods as per Clause 5.7 of DMS 1: Part 1 | One test yearly |

A.4.1.3 Filler Blocks

| | | | | |
|---|--|---|--|---|
| 1 | Visual checking | Shall conform to Clause 5.1 of DMS 1:Part 2 | Visual | -Daily |
| 2 | Size (Work size and dimensions) | Shall conform to Clause 5.2 of DMS 1:Part 2 | BS EN 772: Part 16 | One test per machine per production day |
| 3 | Net Density | Shall conform to Clause 5.3 of DMS 1:Part 2 | BS EN 772: Part 13 | One test monthly and for every change of materials source |
| 4 | Chloride and sulphate | Shall conform to Clause 5.4 of DMS 1:Part 2 | BS 1881:Part 124 | One test quarterly and for every change of materials source |
| 5 | Compressive strength | Shall conform to Clause 5.5 of DMS 1:Part 2 | BS EN 772: Part 1 or Annex A of DMS 1: Part 2 | One test per machine per production day |
| 6 | Drying shrinkage | Shall conform to Clause 5.6 of DMS 1:Part 2 | ASTM C 426 | One test quarterly |
| 7 | Thermal conductivity (whenever applicable) | Shall conform to Clause 5.7 of DMS 1:Part 2 | Test methods as per clause 5.10 of DMS 1: Part 2 | One test yearly |

A.4.1.4 Concrete Polystyrene Sandwich Blocks

| | | | | |
|---|------------------------------------|--|---|---|
| 1 | Visual checking | Shall conform to Clause 6.1& 6.3 of DMS 1:Part 5 | Visual | Daily |
| 2 | Size (Work size and dimensions) | Shall conform to Clause 6.2 of DMS 1:Part 5 | BS EN 772: Part 16 | One test per machine per production day |
| 4 | Chloride and sulphate | Shall conform to Clause 6.4 of DMS 1:Part 5 | BS 1881:Part 124 | One test quarterly and for every change of materials source |
| 5 | Compressive strength | Shall conform to Clause 6.5 of DMS 1:Part 5 | BS EN 772: Part 1 or Annex A of DMS 1: Part 5 | One test per machine per production day |
| 7 | Thermal conductivity of the blocks | Shall conform to Clause 6.6 of DMS 1:Part 5 | Test methods as per clause 6.6 of DMS 1: Part 5 | One test yearly |

A.4.1.5 Autoclaved Aerated Concrete Masonry Blocks

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| 1 | Gross Density | Shall conform to Clause 5.1 of DMS 1:Part 3 | BS EN 772: Part 13 | One test monthly and for every change of materials source |
| 2 | Chloride and Sulphate content | Shall conform to Clause 5.2 of DMS 1:Part 3 | BS 1881: Part 124 | One test monthly and for every change of materials source |
| 3 | Drying Shrinkage | Shall conform to Clause 5.3 of DMS 1:Part 3 | BS EN 680 | One test quarterly and for every change of materials source |
| 4 | Thermal Conductivity | Shall conform to Clause 5.4 of DMS 1:Part 3 | Test methods as per ASTM C 518 (Clause 5.4 of DMS 1:Part 3) | One test yearly and for every change of materials source |
| 5 | Size (Work size and Dimensions) | Shall conform to Clause 8.1 of DMS 1:Part 3 | BS EN 772-16 | One test per machine per production day |
| 6 | Normalized Compressive Strength | Shall conform to Clause 8.2 of DMS 1:Part 3 | BS EN 772 Part 1 | One test per machine per production day |
| 7 | Durability Aspect | Shall conform to Clause 6 of DMS 1:Part 3 | Shall continue to provide satisfactory strength confirming to clause 8.2 of DMS 1:Part 3 | Visually |
| 8 | Visual Aspects | Shall conform to Clause 7 of DMS 1:Part 3 | Shall be sound and free of defects as described in Clause 7.1 and 7.2 of DMS 1:Part 3 | Visually |

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