

 GOVERNMENT OF DUBAI	Organization/Unit: إدارة مختبر دبي المركزي Dubai Central Laboratory Department	الوحدة التنظيمية:	 بلدية دبي DUBAI MUNICIPALITY
	Document Title: Guidelines for Factory Production Control Plan for Solar Collector and SWHS	عنوان الوثيقة:	
	Doc Ref. DM-DCLD-RD-DP21-2084 (IC)	رقم الوثيقة :	

Issue Date	Rev. No.	Summary Of Amendments
17-03-2013	0	First draft
22-04-2013	0	Final Draft
20-05-2013	1	Issue for use
13-07-2016	2	Change the frequency of leakage test on the finished solar collector and heat pipes in addition to the change of section name
28-06-2017	3	Inclusion of the requirements for certification of solar water heating systems
28-05-2019	4	Updated as per new DM template and logo

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1. INTRODUCTION

1.1 This document details the steps that shall be taken by Solar Collector/ Solar water heating system 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, 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-DP21-2178 (IC): Specific Rules for Certification of Solar Collectors (As per BS EN 12975-1 with Amd. 1:2010) Through Factory Assessment
- 3.3 DM-DCLD-RD-DP21-2199(IC): Specific Rules for Certification of Thermal Solar water heating systems and Components – Factory Made Systems as per BS EN 12976-1 Through Factory Assessment

4. RESPONSIBILITIES

- 4.1 Solar Collector/Solar water heating system Manufacturers - Responsible for the preparation and effective implementation of an internal factory production control system, including documentation and recording of the results.
- 4.1 DM-Certification Body - Responsible for the approval of the manufacturer's internal production quality control plan.

5. DEFINITIONS

- 5.1 Manufacturer – Solar Collector / Solar water heating system factories
- 5.2 Finished product - Different types of solar collectors / solar water heating systems
- 5.3 DM Certification Body – Products Conformity Assessment Section-Dubai Central Lab. Department

6. GENERAL REQUIREMENTS AND PROVISIONS

6.1 The manufacturer shall establish Factory Production Control System (Product Quality Assurance Plan) conforming to Table (1), including procedures for ensuring proper controlling and monitoring of all inspections carried out for, raw materials, production and process, and finished product.

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

A.1 Inspection and testing of incoming raw materials for collectors				
Sr. No.	MATERIALS	METHOD	REQUIREMENTS	FREQUENCY
1	Pipe	Visual check and Measurement	No Damage and pipes shall conform to factory's specification for dimensional tolerance	Each delivery
2	Absorber sheet	Visual Inspection Independent tests or evaluation of test results from supplier	No damage Factory's Specification for optical characteristics (solar absorbance and thermal emittance)	Each Delivery
3	Absorber	Visual Inspection Independent tests or evaluation of test results from supplier	No damage Factory's Specification for optical characteristics (solar absorbance and thermal emittance and proper connection between absorber sheet and pipes (maybe a mechanical test)	Each delivery Pressure/leakage tests shall be done on 100% of absorbers either by the supplier or the manufacturer
4	Pipe grid	Visual Inspection Independent tests or evaluation of test results from supplier	No damage Factory's Specification for pipe grids	Each delivery Pressure/leakage tests shall be done on 100% of absorbers either by the supplier or the manufacturer
5	Reflector material, reflector shape (if the finished reflector is delivered)	Document check or direct test for shape (eg: master shape)	Factory's specification for solar reflectance and shape	Each delivery (document check) or less frequency if it is tested

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6	Heat pipes	Test for check performance (may be done by heat pipe manufacturer)	Factory's specification	Each delivery from suppliers or based on internal factory's QC plan (if produced by the manufacturer)
7	Heat transfer sheet	Measurement	Factory's specification	Defined frequency by the factory
8	Glass tubes (assembly of absorber and glass cover)	As per Specific Test Method	Factory's specification	Each Delivery
9	Glazing	Measurement Independent tests or evaluation of test results from supplier	Factory's Specification for dimensional tolerances and optical characteristics (solar transmittance)	Each Delivery
10	Insulation	Visual Inspection Independent tests or evaluation of test results from supplier Weight measurement Dimension measurement Outgasing test (only for flat plate collectors)	No Damage Factory's Specification for density and thermal conductivity Manufacturer's method	Each Delivery Each Delivery Each Delivery
11	Casing			
11.1	Material of frame elements	Visual check Measurement (verify product is inside tolerance)	Factory's specification	Each Delivery

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11.2	Material of rear panel	Visual check Measurement (verify product is inside tolerance)	Factory's specification	Each Delivery
11.3	Hydraulic Connections (Whenever applicable)	Visual check Measurement (verify product is inside tolerance)	Factory's specification	Each Delivery
11.4	Sealant	Test reports and visual check	Factory's specification	Each Delivery

A.2 Inspection and testing of incoming raw materials for storage tanks

12	All Types	General appearance Dimensional	Factory's specification	On each unit for the manufacturer and on each batch delivery in case of subcontracting
		Tightness	Using water : 1.5 times the manufacturer's stated maximum individual working pressure. Using air : Pressure according to manufacturer specification	On each unit On each unit
12.1	Stainless steel type	Anticorrosion treatment of welds	Factory's specification	On each unit
12.2	Internal protective coating by enamilling type	Monitoring of oven temperature		Continuous
		Monitoring of oven temperature Homogeneity OR Destructive control to check enamel quality		Continuous
		Monitoring of oven time		Weekly
		Coating thickness		Continuous
		General appearance		By sampling
12.3	Other type of protective coating	Coating thickness		On each unit
		General appearance	On each unit	

Note: The subcontractor shall provide records of the checks performed on the tanks.

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12.4	Manufactured Insulation	General appearance	Factory's specification	On each batch delivery by sampling (Test can be performed by the supplier if the factory don't have the right equipment)
		Dimensional		
		Density or thermal conductivity		
12.5	Storage tank (Subcontracted intermediate product)	General appearance	Factory's specification	On each batch delivery by sampling
		Dimensional		
		Leaktightness	Using water : 1.5 times the manufacturer's stated maximum individual working pressure Using air : Pressure according to manufacturer specification	On each unit On each unit

Note: The subcontractor shall provide records of the checks performed on the cylinders

12.6	Heat exchangers	Independent tests or evaluation of test results from supplier	Pressure according to manufacturer specification	On each unit
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A.3 Inspection and testing during manufacturing of collectors

Sr. No.	PROCESS	METHOD	REQUIREMENTS	FREQUENCY
1	Cutting of pipe	Measurement	Manufacturer specification for dimensions	At the beginning of each production order
2	Cutting of absorber sheet	Measurement	Manufacturer specification for dimensions	At the beginning of each production order
3	Cutting of frames	Measurement	Manufacturer specification for dimensions	At the beginning of each production order
4	Connection of pipe to absorber	Visual (Recommended but not obligatory) mechanical test with manufacturer's method	Proper welding	Each absorber Manufacturer's specification
5	Absorber	Visual check	No damage	Each absorber

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6	Reflector Material	Visual check	No damage	Each collector
7	Assembly	Visual	Proper assembly	Each collector
8	Sealing	Visual	Proper sealing	Each collector
9	Leakage	Manufacturer method for pressure test	Manufacturer method	Collector shall be tested as per the manufacturer's quality plan
10	Release of each collector	Visual or manufacturer's method	Manufacturer method	Each collector

Note :For inspections and test on the final storage tanks; the same requirements under A2 (clause 12.1 to 12.3) above is applicable in addition to the below requirements;

Component	Method	Requirements	Frequency	Comments
Manufactured insulation	General appearance	Factory's specification	On each unit	
	Dimensional			
	Density or thermal conductivity			
Insulation produced by injection	Injection time	Factory's specification	Periodic sampling, after prolonged stoppage and change of injection products	The storage conditions of Isocyanate and Polyol components shall comply with the supplier's instructions.
	Temperature/Hygrometry			
	General appearance			
	Density			

Note:

The result of product inspection and testing shall be recorded. The record shall contain the product identification, date and time of manufacturer and for each property the test methods, the test results, the inspection result and the identification of the person carrying out the inspection.

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