Hong Kong Council of Testing and Certification

Latest Development of Product Certificate for Construction Materials – Product Certification for Paint Product

Presented by : John K.M. Ho

Date : 13 November 2015

Current issues faced by suppliers and users

- Testing results of a paint sample provide little information about the quality of the production system.

- There are different acceptance criteria for paint products adopted in the industry.

INTRODUCTION

- HKTIC develops the product certification scheme for paint products by forming a Technical Committee with members from manufacturers, users, academic institutions, trade association, professional bodies, laboratories and certification bodies.
- With the scheme, international recognized certification that covers the management system of production plants, manufacturing process and quality assurance of the paint products can be provided.
- Development of the scheme helps standardizing the acceptance criteria to be adopted in the industry and reducing duplication of testing on same product for different projects.

PAINT PRODUCTS COVERED BY THE SCHEME

Major categories of paint products:

- **Emulsion paint**
- **Synthetic paint**
- **Multi-layer acrylic paint**

Subject to the market response, other paint products may be included in future edition.

Product certification Scheme

Table 1 — Building a product certification system

Elements [a] of product certification system		Product certification systems [b, c, d]							
		1a	1b	2	3	4	5	6	N[e]
1)	**Selection**[f] **(sampling), as applicable**	x	x	x	x	x	x		
2)	**Determination**[f,g] **of characteristics, as applicable, by:** a) **testing** (ISO/IEC 17025) b) **inspection** (ISO/IEC 17020) c) **design appraisal** d) **assessment of services**	x	x	x	x	x	x	x	
3)	**Review**[f,g] **(evaluation)**	x	x	x	x	x	x	x	
4)	**Decision on certification** Granting, maintaining, extending, suspending, withdrawing certification	x	x	x	x	x	x	x	
5)	**Licensing (attestation**[f]**)** Granting, maintaining, extending, suspending, withdrawing the right to use certificates or marks		x	x	x	x	x	x	
6)	**Surveillance**, as applicable by: a) testing or inspection of samples from the open market b) testing or inspection of samples from the factory c) quality system audits combined with random tests or inspections d) assessment of the production process or service			x	x	x	x	x	

The Administrative Regulations of PCCS-PP cover the following aspects:

1. Introduction
2. General definitions
3. Prerequisites for participation
4. Procedures for application and Certification
5. Obligations of Certified Paint Manufacturers
6. Surveillance Assessment and Recertification Assessment
7. Suspension and withdrawal of Certification
8. Information on Certified Paint Manufacturers
9. Appeals against decisions
10. Changes to the Regulations
11. Complaints
12. Confidentiality
13. Experience and qualification of Lead Auditors and Technical Auditors

The Technical Regulations of PCCS-PP cover the following aspects:

1. Introduction
2. Quality System
3. Certified paints manufacturers' quality responsibilities
4. Technical definitions
5. Requirements of paints
6. Evaluation of conformity
7. Audit Testing
8. Marking and labelling

PREREQUISITES FOR PARTICIPATION

Preparation before the application:

The applicant shall ..

1. Establish and maintain a documented quality system accordance to ISO 9001 and apply to the paint product manufacturing plant.
2. Nominate a management office for overall management of paint production and supplies for the plant
3. Demonstrate the ability to comply with the regulation of the Scheme

CERTIFICATION ASSESSMENT

To assess the manufacturing system and quality of paint products :

1.An assessment team will perform the on-site assessment of the plant

2.Sample(s) of paint products will be collected and tested for parameters listed in Technical Part of the Scheme

3.Certification will be granted to the applicant if the quality system and plant operation comply with the requirements and the testing results of production sample fulfill the acceptance criteria listed in Technical Part of the Scheme

REQUIREMENT FOR PAINT PRODUCT

1. The paint product to be certified shall comply with the Volatile Organic Compounds Regulation, Chapter 311 Air Pollution Ordinance of HKSAR.
2. The performance requirements for emulsion paint, synthetic paint and multi-layer acrylic paint shall be in accordance with Table 1, Table 2 and Table 3 respectively.
3. The Scheme for the evaluation of conformity includes the following tasks :
   - Initial Type Tests (ITT)
   - Plant Production Control (PPC) Tests
   - Audit Testing (AT)
4. The tests shall be conducted by a HOKLAS or its MRA partners accredited test laboratory. The results shall be reported in HOKLAS endorsed test certificates or equivalent.

Product certification Scheme

Initial type test, plant production control test and Audit Testing frequency

Type of Paint	Test requirement	Initial type test (ITT)	Plant production control test (PPC)	Audit Testing (AT)	
				(Surveillance)	(Recertification)
Emulsion paint	See Table 1	Y	Full set with one test item excluded (1)	Y	Y
Synthetic paint	See Table 2	Y	Full set	Y	Y
Multi-layer acrylic paint	See Table 3	Y	Full set with three test items excluded (2)	Y	Y

(ITT) and (AT) tests: “Y” means one full set of tests according to the Table relevant to the type of paint.

Plant production control test (PPC) shall be conducted at least once in every twelve months.

“Full set” means that one full set of tests according to the Table relevant to the type of paint.

Remark: (1) Full set of tests in Table 1 except Algal resistance.
Remark: (2) Full set of tests in Table 3 except (a) Resistance to humid atmospheres containing sulphur dioxide; (b) Resistance to fungal growth and (c) Resistance to algal growth.

Table 1 – Quality and Performance Requirements for Emulsion Paint

Items	Test Method	Acceptance Criteria
(1)Viscosity, (procedure B)	ASTM D562-10	Min. 75 KU, Max 95 KU; or Purchaser's specified values
Hiding Power (Contrast Ratio)% i.BS 04E53 (BS4800) ii.All other colours	BS EN ISO 2814:2006	Min. 60; for coloured paints to BS 04E53 (BS 4800) Min. 75; for paints of other colours
Drying time – Hard drying	BS EN ISO 9117-1:2009	Max. 1 hour or refer to product specification
Fineness of Grind, (μm)	BS EN ISO 1524:2013	Max. 40μm
Gloss (at 85° specular reflection), units	BS EN ISO 2813:2000	Min. 15, Max. 50; or Purchaser's specified values
Wet Scrub resistance, cycles	PSB SS5 Part F5:2003	Min. 1,500 cycles A dry film of the paint shall withstand the specified cycles of scrubbing without exposing the contrasting colour of the undercoat to a total length of more than 10mm in the direction of the stroke.
(2)Accelerated weathering, (hour)	ASTM G154-12a ("Cycle 2" in "Table X2.1 – Common Exposure Conditions" to be adopted except that UVA-340 lamp should be used in place of UVB-313)	Min. 500 hours After the specified hours of testing there shall be no signs of checking, blistering or cracking, and the loss of gloss shall not be more than 30% of the original gloss. In addition, there shall be little change or no change in colour, and any change in colour shall be equivalent to a degree of contrast of not less than grade four of the grey scale conforming to BS 1006: 1992.
(2) Resistance to algal growth	Refer to ANNEX I	Resistance Index = 0 at Day 28 for algal resistance

Table 2 – Quality and Performance Requirements for Synthetic Paint

Items		Test Method	Acceptance Criteria
Preliminary examination of paint	Surface skin	BS EN ISO 1513:2010	No surface skin
	Consistency		No gelling
	Colour separation into layers		No colour separation
	Settling		No hard settling
	Extraneous matter		No extraneous matter
Drying times	Surface drying (hour)	BS EN ISO 9117-3:2010	< = 4
	Hard drying (hour)	BS EN ISO 9117-1:2009	< = 18
Fineness of grind (µm)		BS EN ISO 1524:2013	< = 25
Hiding power (contrast ratio %)		BS EN ISO 2814:2006	Solvent base: > = 85 Water base: > = 60
Specular gloss	60°	BS EN ISO 2813:2000	Solvent base: > = 80 Water base: > = 50
(1)Viscosity	Solvent based: by Flow Cup No. 6 (sec)	BS EN ISO 2431:2011	45 – 60
	Water based: by Viscometer (KU)	ASTM D562-10	75 - 85
Bending		BS EN ISO 1519:2011	No coating crack at 3mm mandrel
Scratch (g)		BS EN ISO 1518-1:2011	> = 600
Accelerated Weathering		ASTM G154-12a (“Cycle 2” in “Table X2.1 – Common Exposure Conditions” to be adopted except that UVA-340 lamp should be used in place of UVB-313)	Min. 300 hours After the specified hours of testing there shall be no signs of checking, blistering or cracking, and the loss of gloss shall not be more than 30% of the original gloss. In addition, there shall be little change or no change in colour, and any change in colour shall be equivalent to a degree of contrast of not less than grade four of the grey scale conforming to BS 1006: 1992.

Table 3 – Quality and Performance Requirements for Multi-layer Acrylic Paint

Items	Test Method	Acceptance Criteria		Remarks
		With Texture Coat (Fine texture: min 0.9 kg/m^2; Medium texture: min. 1.3 kg/m^2)	Without Texture Coat (min. 0.45kg/m^2)	
Low temperature stability	Clause 5.5 JIS A6910-1988 or Clause 7.5 JIS A6909:2003	No lumps and free from separation and aggregation of the composing materials		Respective samples of primer coating, main coating and top coating shall be taken for testing separately
Change in consistency	Clause 5.6 JIS A6910-1988 or Clause 7.7 JIS A6909:2003	± 15%	Not applicable	Only main coating shall be tested.
Cracking resistance due to init. stage drying	Clause 5.7 JIS A6910-1988 or Clause 7.8 JIS A6909:2003	No cracking shall occur	Not applicable	
Adhesion strength	Clause 5.8 JIS A6910-1988 or Clause 7.9 JIS A6909:2003	Standard condition > = 0.7 N/mm^2 Immersion in water > = 0.5 N/mm^2		
Repeated warming and cooling	Clause 5.9 JIS A6910-1988 or Clause 7.10 JIS A6909:2003	No peeling cracking and blistering and remarkable discoloration and degradation in luster on the surface	No remarkable discoloration and degradation in luster on the surface	
Permeability	Clause 5.10 JIS A6910-1988 or Clause 7.12 JIS A6909:2003	< = 0.5 ml	< = 0.8 ml	
Impact resistance	Clause 5.11 JIS A6910-1988 or Clause 7.14 JIS A6909:2003	Cracking, remarkable deformation and peeling shall not occur	Not applicable	
Weather resistance	ASTM G154-12a	Cracking and peeling shall not occur and the discoloration shall be No. 3 or over in grey scale according to JIS A6910-1988		The test conditions: Fluorescent UV Lamp: UVA-340nm Cycle: 24 hours UV at 60°C Total exposure time: 250 hrs
Determination of resistance to humid atmos. containing SO2	BS EN ISO 3231:1998	No blistering, loss of adhesion, rust staining, change of colour, embrittlement and other signs of deterioration	No rust staining and change of colour	The amount of sulphur dioxide to be used in testing is one litre. The test cycle to be 12 cycles
Resistance to fungal growth	Refer to ANNEX I	Resistance Index < = 1 at Day 28 for fungal resistance		
Resistance to algal growth		Resistance Index = 0 at Day 28 for algal resistance		

Reassessment of the paint product certificate

- The certificate is valid for three years.
- Within the three years period, surveillance assessment will be arranged at least very nine months
- Certified manufacturer has to comply to the scheme requirement of all aspects. Plant control sample testing shall be carried out at least once every 12 months. (testing items shall refer to Part 2 of the scheme)

Further Progress

1. PCCS-PP will be officially launched in December 2015.
2. Manufacturers and suppliers of paint products are encouraged to apply for the product certification for their paint products.
3. Certification bodies are encouraged to pursue HKCAS accreditation for the product certification service in accordance with PCCS-PP.
4. Laboratories are encouraged to pursue HOKLAS accreditation for the tests specified in PCCS-PP.

~ THANKS ~