SPECIFICATION FOR PAINTS AND VARNISHES FOR INTERIOR AND EXTERIOR OF BUILDINGS AND VEHICLE REFINISHING PRODUCTS

Revision History

Issue Date	Revision	Revision Description
18/06/2013	01	Issue for Use
30/08/2015	02	- Title of DMS (Front Page) and Page(i) - Page (iii) EC Directive 2004/42/EC amended and Amendments table deleted - Clause 1Scope of First Paragraph added and products not covered a,b and d deleted - Clause 3 Definitions of coating and other categories added - Clause 4.1 and 4.2 test method and Table 1 VOC limit for paints and varnishes amended,Table 2 added for vehile refinishing products. - Clause 4.5.2.4 Table deleted. - Clause 5.1 to 5.5 deleted. - Clause 6 changed to clause 5 and 5.1 added. - Publication referred to: The clause 12 (SCAQMD 304 -91 method) was added.
26/09/2016	03	In Publication referd to piont 12 the standard “SCAQMD 304-91” was replaced by Dubai Municipality standard “ DMS 0033”

Title of DMS: Specification for Paints and Varnishes for Interior and Exterior of Buildings and Vehicle Refinishing Products

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Foreword

With a view to have a comprehensive set of Dubai Municipality Standards (DMS) which would be consistent and fulfill local needs and yet be at par with International requirements, Dubai Central Laboratory is developing standards taking guidance as much possible from international and regional norms.

This DMS Specification for Paints and Varnishes for Indoor and for Exterior of Buildings and Vehicle Refinishing Products provides for the following:

- Calls for the use of substances with reduced health risks to human and low environmental impacts;
- Sets the criteria for the constituents properties, and limits, of this group of products, to reduce the release of toxic substances and to minimize environmental impact as per international standards;
- Takes into consideration the requirements of:
  - EC Directive 2004/42/EC concerning VOC reduction for decorative paints and varnishes,
  - EC Directive 1999/45/EC Dangerous Preparation Directive,
  - EC Directive 2001/58/EC Safety Data Sheet Directive.

Paints and varnishes conforming to this standard can be satisfactorily applied for indoor purposes and on exteriors of buildings.The standard is issued after validation.

This procedure combines essential features and specification requirements of international practices. It has been developed in such a way as to provide as much information about the operating characteristics of the measurand. Attempts have been made to make the contents user friendly.

1 Scope

The purpose of this standard is to limit the total content of VOC's, Heavy metals, Formaldehyde and other toxic substances in certain paints,coatings, varnishes, and vehicle refinishing products in order to prevent or reduce air pollution resulting from the contribution of VOCs to the formation of tropospheric ozone.

This DM standard applies to indoor paints and varnishes and shall comprise of indoor decorative paints and varnishes, wood stains and related products, for do-it-yourself and professional users, and that primarily developed for indoors use and marketed as such.

This standard also covers paints used on the exterior of buildings.Among all other things, this includes, floor coatings and floor paints; products which are tinted by distributors at the request of amateur or professional decorators; decorative paints in liquid or paste formulas which may have been pre-conditioned, tinted or prepared by the manufacturer to meet consumers needs, including primers (and undercoats) of such product systems.

This standard also covers VOC requirements for vehicle refinishing products.
The following products are not covered by this standard:

a) Wood preservation products;
b) Specialty products, including specific stain blockers and high performance penetrating primers;

2 References

This standard incorporates provisions from other references. These references are cited undated at the appropriate points in the text, but latest edition of these references applies (including amendments). In case any reference is shown as dated, then that specific edition shall be used. The titles of these references are listed in the last page.

3 Definitions

3.1 **Coating -** 'Coating' means any preparation, including all the organic solvents or preparations containing organic solvents necessary for its proper application, which is used to provide a film with decorative, protective or other functional effect on a surface;

3.2 **Paint -** A pigmented coating material, in liquid or in paste or powder form, which when applied to a substrate, forms an opaque film having protective, decorative or specific technical properties.

3.3 **Varnish -** A clear coating material which when applied to a substrate forms a solid transparent film having protective, decorative or specific technical properties.

Note: After application, the paint or varnish dries to a solid, adherent and protective coating.

3.4 **Volatile Organic Compound -** Any organic compound with, a boiling point lower than or equal to 250 °C at atmospheric pressure.

3.5 **'matt coatings for interior walls and ceilings'** means coatings designed for application to indoor walls and ceilings with a degree of gloss ˜ 25@60°.

3.6 **'glossy coatings for interior walls and ceilings'** means coatings designed for application to indoor walls and ceilings with a degree of gloss > 25@60o.

3.7 **'coatings for exterior walls of mineral substrate'** means coatings designed for application to outdoor walls of masonry, brick or stucco;

3.8 **'interior/exterior trim and cladding paints for wood, metal or plastic'** means coatings designed for application to trim and cladding which produce an opaque film. These coatings are designed for either a wood, metal or a plastic substrate. This subcategory includes undercoats and intermediate coatings;

3.9 **'interior/exterior trim varnishes and woodstains'** means coatings designed for application to trim which produce a transparent or semi-transparent film for decoration and protection of wood, metal and plastics. This subcategory

includes opaque woodstains. Opaque woodstains means coatings producing an opaque film for the decoration and protection of wood, against weathering, as defined in EN 927-1, within the semi-stable category;

3.10 **'minimal build woodstains'** means woodstains which, in accordance with EN 927-1:1996, have a mean thickness of less than 5µm when tested according to ISO 2808: 1997, method 5A;

3.11 **'primers'** means coatings with sealing and/or blocking properties designed for use on wood or walls and ceilings;

3.12 **'binding primers'** means coatings designed to stabilise loose substrate particles or impart hydrophobic properties and/or to protect wood against blue stain;

3.13 **'one-pack performance coatings'** means performance coatings based on film- forming material. They are designed for applications requiring a special performance, such as primer and topcoats for plastics, primer coat for ferrous substrates, primer coat for reactive metals such as zinc and aluminium, anticorrosion finishes, floor coatings, including for wood and cement floors, graffiti resistance, flame retardant, and hygiene standards in the food or drink industry or health services;

3.14 **'two-pack performance coatings'** means coatings with the same use as one-performance coatings, but with a second component (e.g. tertiary amines) added prior to application;

3.15 **'multicoloured coatings'** means coatings designed to give a two-tone or multiple-colour effect, directly from the primary application;

3.16 **'decorative effect coatings'** means coatings designed to give special aesthetic effects over specially prepared pre-painted substrates or base coats and subsequently treated with various tools during the drying period.

3.17 **'Vehicle refinishing - preparatory and cleaning'** means products designed to remove old coatings and rust, either mechanically or chemically, or to provide a key for new coatings:

(i) preparatory products include gunwash (a product designed for cleaning spray-guns and other equipment), paint strippers, degreasers (including anti-static types for plastic) and silicone removers;

(ii) 'precleaner' means a cleaning product designed for the removal of Surface contamination during preparation for and prior to the application of coating materials;

3.18 **'Vehicle refinishing - Bodyfiller/stopper'** means heavy-bodied compounds designed to be applied to fill deep surface imperfections prior to the application of the surfacer/filler;

3.19 **'Vehicle refinishing – primer'** means any coating that is designed for application to bare metal or existing finishes to provide corrosion protection prior to application of a primer surfacer:

(i) 'surfacer/filler' means a coating designed for application immediately prior to the application of topcoat for the purpose of corrosion resistance, to ensure adhesion of the topcoat, and to promote the formation of a uniform surface finish by filling in minor surface imperfections;

(ii) 'general metal primer' means a coating designed for application as primers, such as adhesion promoters, sealers, surfacers, undercoats, plastic primers, wet-on-wet, non-sand fillers and spray fillers;

(iii) 'wash primer' means coatings containing at least 0,5 % by weight of phosphoric acid designed to be applied directly to bare metal surfaces to provide corrosion resistance and adhesion; coatings used as weldable primers; and mordant solutions for galvanised and zinc surfaces;

3.20 **'Vehicle refinishing - topcoat'** means any pigmented coating that is designed to be applied either as a single-layer or as a multiple-layer base to provide gloss and durability. It includes all products involved such as base coatings and clear coatings:

(i) **'base coatings'** means pigmented coatings designed to provide colour and any desired optical effects,but not the gloss or surface resistance of the coating system;

(ii) **'clear coating'** means a transparent coating designed to provide the final gloss and resistance properties of the coating system;

3.21 **'Vehicle refinishing - special finishes'** means coatings designed for application as topcoats requiring special properties, such as metallic or pearl effect, in a single layer, high-performance solid-colour and clear coats, (e.g. anti-scratch and fluorinated clear- coat), reflective base coat, texture finishes (e.g. hammer), anti-slip, under-body sealers,anti-chip coatings, interior finishes; and aerosols.

4 Requirements

4.1 White pigments

When Titanium dioxide is used as a white pigment; the Titanium dioxide pigment used shall be tested and complied with BS EN ISO 591-1:2000 or any equivalent test method.

Note: This requirement does not apply to varnishes and wood stains

4.2 Volatile Organic Compounds (VOCs)

4.2.1 When tested according to BS EN ISO 11890-1 or any equivalent test method, the VOC content shall not exceed the limits given in Table (1) for the Paints and Varnishes [one limit for solvent based (SB) and one for water based (WB) are defined]

4.2.2 When tested according to BS EN ISO 11890-1 or any equivalent test method, the VOC content shall not exceed the limits given in Table (2) for the Vehicle Refinishing Product depends upon the coatings.

Table 1: Maximum Volatile Organic Compounds (VOC's) Content Limit Values for Paints and Varnishes

#	Product subcategory	Type	VOC g/l (*)
1	Interior matt walls and ceilings paint (Gloss < 25@60°C)	WB SB	30 30
2	Interior glossy walls and ceilings paint (Gloss > 25@60°C)	WB SB	100 100
3	Exterior walls of mineral substrate	WB SB	40 430
4	Interior /exterior trim and cladding paints for wood and metal	WB SB	130 300
5	Interior /exterior trim varnishes and woodstains, including opaque woodstain	WB SB	130 400
6	Interior /exterior minimal build woodstains	WB SB	130 700
7	Primers	WB SB	30 350
8	Binding Primers	WB SB	30 750
9	One-pack performance coatings	WB SB	140 500
10	Two pack reactive performance coatings for specific end use such as floors	WB SB	140 500
11	Multi colored coatings	WB SB	100 100
12	Decorative effect coatings	WB SB	200 200

Notes:

1. WB: water-based; SB: solvent-based
2. The limit values are as per the EC Directive 2004/42/EC concerning VOC reduction for decorative paints and varnishes
3. * ready to use

Table 2. Maximum VOC Content Limit Values for Vehicle Refinishing Products

#	Product Subcategory	Coatings	VOC, g/l (*)
1	Preparatory and cleaning	Preparatory	850
		Pre-cleaner	200
2	Bodyfiller/stopper	All types	250
3	Primer	Surfacer/filler and general (metal) Primer	540
		Wash primer	780
4	Topcoat	All types	420
5	Special finishes	All types	840
(*) g/l of ready for use product. Except for subcategory (1) any water content of the product ready for use should be discounted.			

4.3 Heavy Metals

The following heavy metals or their compounds shall not be used as an ingredient of the product (whether as a substance or as part of any preparation used): cadmium, lead, chromium(VI), mercury, and arsenic.

It is accepted that ingredients may contain traces of these metals deriving from impurities in the raw materials and/or manufacturing process.

The maximum level detected of these elements shall be:

- Cadmium: 500 mg/kg when tested according to BS 3900 B9 or any equivalent test method.
- Lead: 100 mg/kg when tested according to BS 3900 B6 or ASTM E1613 or any equivalent test method.
- Chromium(VI): 500 mg/kg when tested according to BS 3900 B10 or any equivalent test method.
- Mercury: 100 mg/kg when tested according to BS 3900 B16 or any equivalent test method.
- Arsenic: 100 mg/kg when tested according to BS 4404 or any equivalent test method.

4.4 Dangerous substances

4.4.1 The product shall not be classified as very toxic, toxic, dangerous to the environment, carcinogenic, toxic for reproduction or mutagenic in accordance with EC Dangerous Preparation Directive (DPD) 1999/45/EC .The producer shall provide a declaration of compliance with this criterion, together with list of hazardous material, CAS number and Risk Phrases, in addition to other related documentation [such as material safety data sheets (MSDS)] as per the EC Safety Data Sheet Directive (SDS) 2001/58/EC

The Safety Data Sheet provides detailed information about the chemicals health , safety and environmental properties in order for the user to ensure safe use and handling.

4.4.2 **Alkyl phenolethoxylates (APEOs):** APEOS shall not be used. The producer shall provide a declaration of compliance with this criterion together with the method of verification.

4.4.3 **Glycol ethers:** Diethylene glycol methyl ether (DEGME) shall not be used. The producer shall provide a declaration of compliance with this criterion together with the method of verification.

4.4.4 **Isothiazolinone compounds:** The content of isothiazolinone compounds in the product shall not exceed 500 mg/kg. The content of the mixture of 5-chloro-2-methyl-2H-isothiazol-3-one and 2-methyl-2H-isothiazol-3-one (3:1) shall not exceed 15mg/kg.

The producer shall provide a declaration of compliance with this criterion, indicating the amounts (if used) together with the method of verification.

4.4.5 **Formaldehydes:** The content of free formaldehyde present in the product shall not exceed 10 mg/kg. Formaldehyde donators may only be added in such quantities as will ensure that the resulting total content of free formaldehyde not exceed the stated amount.

The producer shall provide a declaration of compliance with this criterion, indicating the amounts present (if any) as measured by the Merckoquant method. In-can concentration of formaldehyde determined by the acetyl-acetone method, in which case the concentration measured shall not exceed 100ppm. Other equivalent tests may be used.

5 Consumer information

5.1 The spreading rate,wet scrub resistance,resistance to water,adhesion, abrasion and other relevant information of the product to be declared by the manufacturer.

5.2 The following information shall appear on the packaging or attached to the packaging:

- The type of substrate and conditions of use for which the product is intended. This shall include advice on preparatory work, etc., such as correct substrate preparation, advice on outdoor use (where appropriate), or temperature,
- Recommendations for cleaning tools and appropriate waste management (in order to limit water pollution). These recommendations shall be adapted to the type of product in question and field of application in question and may make use of pictograms if appropriate,
- Recommendations concerning product storage conditions after opening (in order to limit solid waste), including safety advice if appropriate,
- Recommendations on preventive protection measures for the painter, particularly in relation to working in closed rooms or high solid paints.
- The quantity of the paint filled in the can with a tolerance of 1%

Publications referred to

1 ASTM E1613-12 Standard Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques

2 ISO 591-1:2000 Titanium dioxide pigments for paints -- Part 1: Specifications and methods of test

3 BS 3900: B6 Methods for Paints and varnishes - part B6: Determination of Total Lead Content

4 BS 3900: B9 Methods for Paints and varnishes - part B9: Determination of Soluble Cadmium Content

5 BS 3900: B10 Methods for Paints and varnishes - part B10: Determination of Chromium(VI) Content of solid matter

6 BS 3900: B16 Methods for Paints and varnishes - part B16: Determination of Total Mercury Content

7 ASTM D6191-97(2014) Standard Test Method for Measurement of Evolved Formaldehyde from Water Reducible Air-Dry Coatings

8 BS EN 13300 Paints and Varnishes –Waterbased coating Materials and Coating Systems for Interior Walls and Ceilings- Classification

9 BS EN 15528 Paint, Varnishes and Raw Materials for Paints and Varnishes – Sampling

10 BS EN ISO 11890-1 Paints and varnishes. Determination of volatile organic compound (VOC) content. Part 1: Difference method

11 ISO 11890-2 Paint and Varnishes –Determination of volatile organic compound (VOC) content -- Part 2: Gas-chromatographic method.

12 DMS 0033 - 2016 Determination Of Volatile Organic Compounds (Voc) Content In Various Materials Or Coatings By Difference Method

13 EC Directive 2004/42/EC Concerning VOC reduction for decorative paints and varnishes,vehicle refinishing products

14 EC Directive 1999/45/EC Dangerous Preparation Directive

15 EC Directive 2001/58/EC Safety Data Sheet Directive