

Technical Guide

# TECHNICAL GUIDE FOR PAINTS AND VARNISHES FOR INTERIOR AND EXTERIOR OF BUILDINGS AND VEHICLE REFINISHING PRODUCTS

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Technical Guide

REVISION HISTORY

Issue Date	Revision	Revision Description
18/06/2013	01	Issue for Use
30/08/2015	02	<ul style="list-style-type: none"> <li>Title of (Front Page) and Page(i)</li> <li>Page (iii) EC Directive 2004/42/EC amended, and Amendments table deleted.</li> <li>Clause 1 Scope of First Paragraph added and products not covered a, b and d deleted.</li> <li>Clause 3 Definitions of coating and other categories added.</li> <li>Clause 4.1 and 4.2 test method and Table 1 VOC limit for paints and varnishes amended, Table 2 added for vehicle refinishing products.</li> <li>Clause 4.5.2.4 Table deleted.</li> <li>Clause 5.1 to 5.5 deleted.</li> <li>Clause 6 changed to clause 5 and 5.1 added.</li> </ul> <p>Publication referred to: The clause 12 (SCAQMD 304 -91 method) was added.</p>
26/09/2016	03	In Publication referred to point 12 the standard "SCAQMD 304-91" was replaced by "DMS 0033"
17/07/2024	04	ISSUE FOR USE

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## Technical Guide

### FOREWORD

To ensure the health and safety of all the stakeholders as the primary aim of the government, the Dubai Municipality-Dubai Central Laboratory Department (DM-DCLD), in addition to other regulatory departments within DM, are working jointly for the creation, formulation, and development of a comprehensive set of unified Dubai Municipality Technical Guides (TG), and ensuring their suitability with the local environmental conditions, drawing guidance with some International and Regional Norms to consistently meet the local, regional, and international standards.

The Technical Guide (TG), 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 and regional norms.
- 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.
  - 2023 Al Sa'fat Dubai Green Building System-2nd edition clauses [404.01] and/or [404.02], [304.01], [304.04] [304.07], [701.04] and related clauses in 2021- Dubai Building Code.

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

## Technical Guide

Combining essential features and specification requirements of international practices, the Technical Guide (TG) 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 content user-friendly.

This Technical Guide publication does not cover all the necessary provisions of a contract and the users are responsible for its correct application.

Compliance with this DM requirements cannot confer immunity from legal obligations, neither it does allow the use and/or delivering the Low Emitting Materials directly to the construction sites within the emirate of Dubai; unless all other set DM requirements are fully met and complied with.

## Technical Guide

### 1 SCOPE

The purpose of the Technical Guide for Paints and Varnishes for Interior and Exterior of Buildings and Vehicle Refinishing Products is to limit the total content of Volatile Organic Compounds (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.

It 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 guide 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 consumer's needs, including primers (and undercoats) of such product systems.

The VOC requirements for vehicle refinishing products are also addressed.

The following products are not covered by this Technical Guide:

- Wood preservation products.
- Specialty products, including specific stain blockers and high-performance penetrating primers.

### 2 DEFINITIONS

#### 2.1 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.

#### 2.2 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.

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### **2.3 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.

### **2.4 VOLATILE ORGANIC COMPOUND**

Any organic compound with a boiling point lower than or equal to 250 °C at atmospheric pressure.

### **2.5 MATT COATINGS FOR INTERIOR WALLS AND CEILINGS**

Coatings designed for application to indoor walls and ceilings with a degree of gloss  $\leq 25@60^\circ$ .

### **2.6 GLOSSY COATINGS FOR INTERIOR WALLS AND CEILINGS**

Coatings designed for application to indoor walls and ceilings with a degree of gloss  $> 25@60^\circ$ .

### **2.7 COATINGS FOR EXTERIOR WALLS OF MINERAL SUBSTRATE**

Coatings designed for application to outdoor walls of masonry, brick, or stucco.

### **2.8 INTERIOR/EXTERIOR TRIM AND CLADDING PAINTS FOR WOOD, METAL OR PLASTIC**

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.

### **2.9 INTERIOR/EXTERIOR TRIM VARNISHES AND WOOD STAINS**

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 wood stains.

### **2.10 OPAQUE WOOD STAINS**

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.

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### **2.11 MINIMAL BUILD WOOD STAINS**

Wood stains 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.

### **2.12 PRIMERS**

Coatings with sealing and/or blocking properties designed for use on wood or walls and ceilings.

### **2.13 BINDING PRIMERS**

Coatings designed to stabilize loose substrate particles or impart hydrophobic properties and/or to protect wood against blue stain.

### **2.14 ONE-PACK PERFORMANCE COATINGS**

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 aluminum, 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.

### **2.15 TWO-PACK PERFORMANCE COATINGS**

Coatings with the same use as one- performance coatings, but with a second component (e.g. tertiary amines) added prior to application.

### **2.16 MULTICOLORED COATINGS**

Coatings designed to give a two-tone or multiple-color effect, directly from the primary application.

### **2.17 DECORATIVE EFFECT COATINGS**

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.



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### 2.18 VEHICLE REFINISHING PREPARATORY AND CLEANING

Products designed to remove old coatings and rust, either mechanically or chemically, or to provide a key for new coatings:

- Preparatory products include gun wash (a product designed for cleaning spray-guns and other equipment), paint strippers, degreasers (including anti-static types for plastic) and silicone removers;
- **Pre-cleaner** means a cleaning product designed for the removal of Surface contamination during preparation for and prior to the application of coating materials.

### 2.19 VEHICLE REFINISHING - BODY FILLER/STOPPER

Heavy-bodied compounds designed to be applied to fill deep surface imperfections prior to the application of the surfacer/filler.

### 2.20 VEHICLE REFINISHING – PRIMER

Any coating that is designed for application to bare metal or existing finishes to provide corrosion protection prior to application of a primer surfacer:

- **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;
- **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.
- **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 galvanized and zinc surfaces.

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### 2.21 VEHICLE REFINISHING – TOPCOAT

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:

- **Base Coatings** means pigmented coatings designed to provide color and any desired optical effects, but not the gloss or surface resistance of the coating system.
- **Clear Coating** means a transparent coating designed to provide the final gloss and resistance properties of the coating system.

### 2.22 VEHICLE REFINISHING - SPECIAL FINISHES

Coatings designed for application as topcoats requiring special properties, such as metallic or pearl effect, in a single layer, high-performance solid-color 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.

## 3 REFERENCES

This Technical Guide incorporates provisions from other references, which are cited and updated at the appropriate points in the text, but the latest edition applies (including amendments). If any reference is shown as dated, then that specific edition shall be used. The titles of these references are listed on the last page of this guide.

## 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*

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### 4.2 VOLATILE ORGANIC COMPOUNDS (VOCs)

**4.2.1** When tested according to 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 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	30
		SB	30
2	Interior glossy walls and ceilings paint (Gloss > 25@60°C)	WB	100
		SB	100
3	Exterior walls of mineral substrate	WB	40
		SB	430
4	Interior /exterior trim and cladding paints for wood and metal	WB	130
		SB	300
5	Interior /exterior trim varnishes and wood stains, including opaque wood stain	WB	130
		SB	400
6	Interior /exterior minimal build wood stains	WB	130
		SB	700
7	Primers	WB	30
		SB	350
8	Binding Primers	WB	30
		SB	750
9	One-pack performance coatings	WB	140
		SB	500

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10	Two pack reactive performance coatings for specific end use such as floors	WB	140
		SB	500
11	Multicolored coatings	WB	100
		SB	100
12	Decorative effect coatings	WB	200
		SB	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	Body filler/stopper	All types	250
3	Primer	Surfacer/filler and general (metal)	540
		Primer	
		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.

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### **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 E3203 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 chemical's health, safety and environmental properties to ensure safe use and handling by the user.

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### **4.4.2 ALKYL PHENOL ETHOXYLATES (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 does 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 is 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.

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### 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%

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### 6 PUBLICATIONS REFERRED TO

ASTM D6191	STANDARD TEST METHOD FOR MEASUREMENT OF EVOLVED FORMALDEHYDE FROM WATER REDUCIBLE AIR-DRY COATINGS
ASTM E3203-21	STANDARD TEST METHOD FOR DETERMINATION OF LEAD IN DRIED PAINT, SOIL, AND WIPE SAMPLES BY INDUCTIVELY COUPLED PLASMA-OPTICAL EMISSION SPECTROSCOPY (ICP-OES)
BS 3900: B6	METHODS FOR PAINTS AND VARNISHES - PART B6: DETERMINATION OF TOTAL LEAD CONTENT
BS 3900: B9	METHODS FOR PAINTS AND VARNISHES - PART B9: DETERMINATION OF SOLUBLE CADMIUM CONTENT
BS 3900: B10	METHODS FOR PAINTS AND VARNISHES - PART B10: DETERMINATION OF CHROMIUM (VI) CONTENT OF SOLID MATTER
BS 3900: B16	METHODS FOR PAINTS AND VARNISHES - PART B16: DETERMINATION OF TOTAL MERCURY CONTENT
BS 4404	METHOD FOR THE DETERMINATION OF ARSENIC (SILVER DIETHYLDITHIOCARBAMATE PROCEDURE)
BS EN 13300	PAINTS AND VARNISHES – PAINTS AND VARNISHES FOR INTERIOR WALLS AND CEILINGS — CLASSIFICATION
BS EN ISO 11890-1	PAINTS AND VARNISHES. DETERMINATION OF VOLATILE ORGANIC COMPOUND (VOC) AND/OR SEMI VOLATILE ORGANIC COMPOUNDS (SVOC) CONTENT. PART 1: GRAVIMETRIC METHOD FOR VOC DETERMINATION



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BS EN ISO 11890-2	PAINT AND VARNISHES –DETERMINATION OF VOLATILE ORGANIC COMPOUND (VOC) CONTENT AND/OR SEMI VOLATILE ORGANIC COMPOUNDS (SVOC) CONTENT PART 2: GAS-CHROMATOGRAPHIC METHOD.
DMS 0033 - 2016	DETERMINATION OF VOLATILE ORGANIC COMPOUNDS (VOC) CONTENT IN VARIOUS MATERIALS OR COATINGS BY DIFFERENCE METHOD
EC DIRECTIVE 1999/45/EC	DANGEROUS PREPARATION DIRECTIVE
EC DIRECTIVE 2001/58/EC	SAFETY DATA SHEET DIRECTIVE
EC DIRECTIVE 2004/42/EC	CONCERNING VOC REDUCTION FOR DECORATIVE PAINTS AND VARNISHES, VEHICLE REFINISHING PRODUCTS
EN ISO 4618	PAINTS AND VARNISHES — VOCABULARY <a href="https://www.iso.org/obp/ui/#iso:std:iso:4618:ed-3:v1:en">HTTPS://WWW.ISO.ORG/OBP/UI/#ISO:STD:ISO:4618:ED-3:V1:EN</a>
ISO 591-1:2000	TITANIUM DIOXIDE PIGMENTS FOR PAINTS -- PART 1: SPECIFICATIONS AND METHODS OF TEST
ISO 2808	PAINTS AND VARNISHES — DETERMINATION OF FILM THICKNESS
ISO 15528	PAINT, VARNISHES AND RAW MATERIALS FOR PAINTS AND VARNISHES – SAMPLING