

مشروع نهائي

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الدهانات و الورنيشات – الدهانات المستحلبة
للأعمال الداخلية والخارجية

**Paints and Varnishes – Emulsion Paints for Interior and Exterior
Uses**

يعتمد:

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تاريخ الاعتماد : / / هـ، الموافق / / ٢٠٢٠ م
صفة الإصدار :

تقديم

المديرية العامة للمواصفات والمقاييس جهاز التقييس الوطني بالسلطنة أنشئت بموجب المرسوم السلطاني رقم ١٩٧٦/٣٩، ومن مهامها إعداد المواصفات القياسية العمانية واللوائح الفنية إستناداً للمرسوم السلطاني رقم ١ / ٨٧

وقد قامت دائرة المواصفات بالمديرية بإعداد المواصفة القياسية العمانية رقم OS 197/2020، الخاصة بـ" الدهانات و الورنيشات – الدهانات المستحلبة للأعمال الداخلية والخارجية" – "Paints and Varnishes – Emulsion Paints for Interior and Exterior Use"، وقد تم إعداد المشروع باللغتين العربية والإنجليزية بعد إستعراض المواصفات القياسية العربية والأجنبية والدولية والمؤلفات المرجعية، والقوانين ذات الصلة.

وقد اعتمدت هذه المواصفة كمواصفة قياسية عمانية ملزمة، بتاريخ // هـ، الموافق // م، على أن تلغي المواصفة القياسية العمانية رقم (OS 197/1990) وتحل محلها.

Paints and Varnishes – Emulsion Paint for Interior and Exterior Uses

1 – SCOPE AND FIELD OF APPLICATION :

This Omani Standard specifies performance requirements and appropriate methods of test for emulsion paints for interior and exterior use applied by brush, roller or spray techniques. It covers matte, gloss and semi gloss emulsion paints which can be applied to non-metallic substances classified into the following three types covering different circumstances where the paint may be applied.

A - for interior/exterior gloss and semi-gloss

B - for interior/exterior matte emulsion paints

It also specifies requirements for the marking of containers which may be of a range of nominal capacities. The exterior paints are also suitable for interior use

2- COMPLEMENTRY REFERNCES :

- 2.1 ISO 15528 paints and varnishes and raw materials for paints and varnishes -sampling
- 2.2 ISO 1513 paints and varnishes examination and preparation of sampling for testing.
- 2.3 ISO 3251 “Paints, varnishes and plastics-Determination of non- volatile- matter content”.
- 2.4 ISO 1524 “Paints, varnishes and printing inks -- Determination of fineness of grind ”
- 2.5 ISO 3668 "Paints and varnishes- Visual comparison of the color of paints"
- 2.6 ISO 3856 -1 “paints and varnishes – determination of " soluble " metal content – part1: determination of lead content - flame atomic absorption spectrometric method and dithizone spectrophotometric method”.
- 2.7 -ISO 9117-1 "Paints and varnishes -- Drying tests -- Part 1: Determination of through-dry state and through-dry time"
- 2.8 ISO 2812-2 " Paints and varnishes- Determination of resistance to liquids-part 2: water immersion method"
- 2.9 ISO 3248 " Paints and varnishes- Determination of the effect of heat"
- 2.10 GSO 1236 “ Method of tests for Paints and Varnishes-Determination of alkali resistance (immersion test)”.
- 2.11 ISO 2810 " Paints and Varnishes-Natural weathering of coatings- Exposure and assessment".
- 2.12 ISO 1519 Paints & varnishes- Bend test (cylindrical mandrel)

- 2.13 ASTM D 2486 " Method of test of scrub resistance for wall paints "
- 2.14 ISO 6504-3 "Paints and varnishes --Determination of hiding power -- Part 3:
Determination of contrast ratio of light- coloured paints at a fixed spreading rate.
- 2.15 ISO 16474-3 Paints and varnishes – Methods of exposure to laboratory light sources -- Part 3:
Fluorescent UV lamps
- 2.16 ISO 2813 " Paints and varnishes -- Determination of gloss value at 20 degrees, 60
degrees and 85 degrees
- 2.17 ASTM D2574 Standard Test Method for Resistance of Emulsion Paints in the Container
to Attack by Microorganisms"
- 2.18 SASO 2194 "Paints and varnishes- Method for testing Consistency of the paints by
stomer viscometer"

3 – DEFINITIONS :

3.1 Emulsion paint:

A paint containing an emulsion Binder, Pigment, Extender, Additives and water.

3.2 Emulsion binder:

A stabilized dispersion of a suitable polymer resin in a water phase.

3.3 Vehicle:

The liquid portion of the paint in which the pigment is dispersed and it is composed of the binder, additives and the thinner if any.

3.4 Binder:

The non-volatile portion of the “Vehicle” of a paint. It binds or cements the pigments particles together and the paint film as a whole to the material to which it is applied.

3.5 Thinner:

Volatile liquids added to paints or varnishes to facilitate application and to aid penetration by lowering gather viscosity. They should be completely miscible with the paints or varnish at ordinary temperature and should not cause precipitation of the non-volatile portion either in the container or in the film during drying. For some purposes thinner containing a small proportion of non-volatile material may be used.

3.6 Pigment:

The insoluble dispersed particles in a paint which give the dried film its characteristic properties of colour and opacity.

3.7 Opacity:

The ability of a coat of paint to obscure (hide) an underlying surface.

3.8 Drying time:

The time which elapses between the application of a coat of paint and the attainment of a specified dry state.

3.9 Lifting:

Failure caused by the swelling of a dry film of paint or varnish when another coat is applied over it an usually manifested by wrinkled appearance.

4 – CHARACTERISTICS AND REQUIREMENTS :**4.1 Composition:**

The emulsion paint shall consist of pigments with suitable extenders in suitable proportion in a medium consisting of any suitable stable synthetic polymer emulsion in water with other suitable ingredients as may be necessary to produce a material so as to satisfy the requirements of this standard.

4.2 Condition in container:

The material shall have no evidence of biological growth, levering, skinning, and putrefaction, hard settling of the pigment, lumps, or corrosion of the container. Any settled pigment shall be readily dispersible in the liquid medium by stirring with paddle to produce smooth homogeneous emulsion paints, free from persistent foam. The material shall have no irritating or offensive odor.

4.3 Non-volatile content:

The percent of non-volatile content of the gloss and semi – gloss emulsion paint shall not be less than 40% by weight and the percent of non-volatile content of the matte emulsion paint shall not be less than 50% by weight. When the paint is tested according to clause (2.3).

4.4 Consistency:

The paint shall be in such a condition that stirring readily produces a smooth uniform mixture of good consistency. It shall have a minimum 80 KU viscosity for mat emulsion paints and 70-120 KU viscosity for gloss and semi-gloss emulsion paints at 25 °C. When the paint is tested according to clause (2.18)

4.5 Colour :

The colour of the paint shall be close to the approved reference sample. When the paint is tested according to clause (2.5).

4.6 Thinning:

The paint shall have tendency to mix readily with water if necessary to a smooth and homogeneous state with minimum amount of foaming. Foaming if any shall dissipate rapidly.

4.7 Fineness of grind:

The particle size of the paint shall be less than 50 µm. When the paint is tested according to clause (2.4)

4.8 Lead content:

The lead content shall not exceed 0.009% of the total mass of the paint. When the paint is tested according to clause (2.6)

4.9 Application properties:

The material after recommended thinning shall be suitable for application by brush, spray, or roller. The resulting paint film shall not show pigment flocculation, foaming, coarseness or other undesirable characteristics. The paint film shall also produce no

lifting, softening or any other defects upon recoating of a previously painted surface after 2 hours of air drying. When a film of the paint has dried for the specified drying period, it shall have, smooth, firmly adherent and substantially free from brush marks or sagging or wrinkling, and shall in no way be inferior as regards finish to a film prepared in the same way and the same time from the approved reference sample.

4.10 Drying time:

- The paint shall have surface drying time not more than 30 minutes for matte emulsion paints and not more than 1 hour for gloss and semi-gloss emulsion paints. The paint shall become hard-dry in a time not more than 3 hours for matte emulsion paints and not more than 5 hours for gloss and semi-gloss emulsion paints (wet film thickness of 100 µm on glass panel) under temperature of 23 ± 2 °C and percentage humidity of $(50 \pm 5)\%$ with air circulation and without exposing to the sun, when the paint is tested according to clause (2.7).

4.11 Scrub resistance:

The paint film applied on the panel test shall exhibit a minimum scrub resistance when exposed to 1500 scrub cycles for type A for interior/exterior gloss and semi-gloss

- 800 scrub cycles for type B exterior matte emulsion paints
- 400 scrub cycles for type B for interior matte emulsion paints

When the paint is tested according to clause (2.13)

4.12 Alkali resistance (white and pastel shades):

The paint film shall show no change in hue, lightness, gloss and any other surface defects after 24 hours when alkali resistance test is carried out using 1 % of Sodium Hydroxide solution when tested according to clause (2.10).

4.13 Heat stability:

The viscosity of the paint shall not change more than 5% of the original and shall show no coagulation flocculation or discolorations after carrying out the test of heat stability when tested according to clause (2.9)..

4.14 Freezing and melting:

The paint shall not change when exposed to low temperature ($-9\text{ }^{\circ}\text{C}$) for 16 hours and normal temperature ($25 \pm 3\text{ }^{\circ}\text{C}$) for 16 hours.

The paint shall not change the viscosity more than 10% of the original value and shall not shows no clotting or integrate or decrease in the scrub resistance. After the test is finished the paint shall be dry to give smooth and coordinated texture when applied to a wallboard.

4.15 Odour:

The odour of the paint shall not be putrid or otherwise offensive or irritating before, during and after application. There shall be no residual odour after 24 hours of drying.

4.16 Dry opacity (white and pastel shades):

The paint film when applied to 150 μm bar coated applicator shall give a minimum dry film contrast ratio after placed on black and white chart paper allow to dry overnight when tested according to clause (2.14).

Table (1)
Dry opacity according to type and class of the paint

Type of paint Class	Matte	Semi-gloss	Gloss
A	-	>90%	>90%
B	95%	-	-

4.17 Accelerated weathering:

4.17.1 The paint layer shall show no blisters, chalking, discoloration, or any abnormal appearance after 300 hours of accelerated weathering when tested according to clause (2.15). The test should not exceed 5%. If there any changes, they shall not exceed 5% and this test is done only for interior matt emulsions.

4.17.2 Criteria for Accelerated weathering test:

- **Application rods:** Aluminum rods in a suitable size and treated with chromate
- **Application:** By the application machine (wire rod or hollow mold) with a thickness of 150 microns.
- **Drying Time: 7 days, Temperature: (23 \pm 2) $^{\circ}\text{C}$, Humidity: (50 \pm 5)%**, followed by 72 hours in temperature of (40 \pm 20) $^{\circ}\text{C}$.
- **Type of lamps: UVB lamps.**
- **Test Duration: according to clause (2.15).**

4.18 Resistance to biological growth:

The paint in container shall show no fungus growth for a period of 12 months at 40 °C when tested according to clause (2.17).

4.19 Keeping properties:

The paint when stored under normal storage conditions at temperature not exceeding 38 ± 1 °C in the original sealed containers, shall retain properties specified in this standard for a period of not less than 12 months.

4.20 Gloss:

When a fine paint film is applied on a glass panel of (15 cm x 10 cm x 2 mm) dimensions by a hollow mass of 150 µm thickness or by application wire and let to dry for 24 hours under (25 ± 1) °C and humidity of 70 %, shall show a specular gloss as mentioned in table (2) below:

Table (2)
Gloss Value for Emulsion Paints

Emulsion Paint Category	Measured Angle	Gloss Value
matte emulsion paint	85 °	<10
semi-gloss emulsion paint	60°	25-40
gloss emulsion paints	60°	>55

4.21 Flexibility and adhesion:

When applying a thin layer of paint by a hollow block with 150 micrometers thickness, or wire rod application on a plate of tin after scratching it lightly, removing all the fat, and leaving it to dry for 7 days at a temperature of (25 ± 1) ° C and relative humidity of not more than 70%, it shall bear the curvature test by using a handle with 6 mm thickness (for internal use Paints) and 3 mm (for external use paints). Also the thin layer of paint shall be strongly adherent without any cracking or peeling when tested according to clause (2.12).

5- SAMPLING :

- 5.1 Take a representative sample of the paint not less than 500 ml according to the methods mentioned in ISO 15528 paints and varnishes and raw materials for paints and varnishes -sampling.
- 5.2 Sample shall be prepared to tests according to the methods mentioned in ISO 1513 paints and varnishes examination and preparation of sampling for testing.

6- METHODS OF TESTING:

- 6.1 The following tests shall be carried out on the filled containers selected according to item 5.1 after carrying out the visual examination of the labeling information.
 - 6.1.1 Determination of non-volatile content

- 6.1.2 Determination of colour
- 6.1.3 Determination of fineness of grind
- 6.1.4 Determination of lead content
- 6.1.5 Determination of drying time
- 6.1.6 Determination of scrub resistance
- 6.1.7 Determination of alkali resistance
- 6.1.8 Determination of heat stability
- 6.1.9 Determination of dry opacity
- 6.1.10 Determination of resistance to accelerated weathering
- 6.1.11 Determination of the apparent brightness
- 6.1.12 Determination of Flexibility and adhesion
- 6.1.13 Determination of microorganisms resistance

7- PACKING :

The paints shall be packed in suitable, clean air-tight containers, the containers shall be filled as to have an ullage for 15% maximum.

The allowed tolerance should be ± 2 % of the content.

8- LABELLING:

Each container shall be legibly and indelibly marked in Arabic or Arabic and English by the following information:

- 8.1 The name and the type of the paint as classified.
- 8.2 The name of the manufacturer or his trade mark.
- 8.3 Country of origin.
- 8.4 The colour of the paint should be shown on the container.
- 8.5 If the paints manufacture is under license it should be mentioned.
- 8.6 Batch number.
- 8.7 Date of production (month-year).
- 8.8 Volume in liter or mass in kilograms.
- 8.9 Application instruction
- 8.10 Any warning information concerning the paint.
- 8.11 Warning: Do not use this container for keeping food stuff.

REFERENCES

المراجع :

- Omani standard No. 197/1990
 "Paints and varnishes-Emulsion Paints"
 Directorate General for Standards &
 Metrology, Ministry of Commerce &
 Industry, Sultanate of Oman
 Saudi Arabian Standard No. 470/2016
 "Paints and varnishes-Emulsion Paints"
 Saudi Arabian Standards Organization
- Part (1303) from US legalization of
 Consumer Products Commission to reduce
 lead content from 0.006% to 0.009

- المواصفه القياسيه العمانيه رقم ١٩٧ / ١٩٩٠
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 "الدهانات والورنيشات-الدهانات المستحلبه"
 الهيئة العربية السعوديه للمواصفات والمقاييس
- البند (1303) من التشريع الأمريكي الخاص
 بمفوضية حماية المستهلك المتعلق بتعديل نسبة تركيز
 الرصاص في الأصباغ من 0.06% إلى 0.009%