

Australian Standard[®]

**PAINTS AND RELATED
MATERIALS—MICACEOUS
IRON OXIDE PIGMENT**

This Australian standard was prepared by Committee CH/3, Paints and Related Materials. It was approved on behalf of the Council of the Standards Association of Australia on 17 January 1986 and published on 7 April 1986.

The following interests are represented on Committee CH/3:

Australian Federation of Consumer Organizations
Australian Paint Manufacturers Federation
Australian Retailers Association
Confederation of Australian Industry
Department of Defence
Government Paint Committee
National Association of Australian State Road Authorities
National Association of Testing Authorities, Australia
Oil and Colour Chemists Association, Australia
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IRON OXIDE PIGMENT**

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PREFACE

This standard was prepared by the Association's Committee on Paints and Related Materials at the request of Australian Iron and Steel Pty Ltd who pointed to the critical nature of the composition and form of micaceous iron oxide when used in paints designed to protect iron and steel from corrosion and to provide long-term resistance to outdoor weathering.

The provisions of this standard are similar to those stipulated for micaceous iron oxide in ISO 1248 but they go much further with respect to lamellar form.

Methods of test have been referred to or drawn from relevant Australian Standards where they exist. Otherwise, they consist of adaptations of the ISO methods referred to in ISO 1248—Iron Oxide Pigments for Paints modified to only a minor extent in the technical sense. For purposes of future reference these ISO standards comprised the following:

- ISO 787 General Methods of Test for Pigments and Extenders
 Part 2: Determination of Matter Volatile at 105°C
 Part 3: Determination of Matter Soluble in Water—Hot Extraction Method
 Part 4: Determination of Acidity or Alkalinity of the Aqueous Extract
 Part 7: Determination of Residue on Sieve—Water Method—Manual Procedure
 Part 10: Determination of Density—Pyknometer Method
 Part 13: Determination of Water-soluble Sulphates, Chlorides and Nitrates

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FOREWORD

Micaceous iron oxide (MIO), also known as specular haematite, is a refined mineral ore consisting essentially of iron(III) oxide (Fe_2O_3). It is grey with a metallic sheen. The term 'micaceous' stems from the similarity between the structure of the particles and the crystalline structure of mica.

Depending on the location of the ore deposits, MIO may differ considerably in purity, size and shape.

The distinguishing feature of MIO is the tabular crystalline structure which can be easily fractured to give very thin platelets or lamellar fragments. When used as a pigment in paint, these thin platelets generally orientate themselves in overlapping layers with their thinnest cross-sections parallel to the coated substrate. This orientation produces an increase in resistance to water permeation through the paint film, reduces ultraviolet degradation of the vehicle and provides mechanical reinforcement to the paint film.

MIO pigmented paints have been widely and successfully used for many years to provide protection to steel from corrosion and long-term resistance to outdoor weathering.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
PAINTS AND RELATED MATERIALS—MICACEOUS IRON OXIDE PIGMENT

1 SCOPE. This standard specifies requirements for micaceous iron oxide pigment (MIO) used primarily in paints for imparting corrosion resistance and long term durability to steel.

2 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

AS 1580	Methods of Test for Paints and Related Materials Specification 101.4 Conditions of Test, Temperature Controlled
AS 2162	Code of Practice for the Use of Volumetric Glassware
AS 2798	Paints and Related Materials—Extenders
AS 2831	Thermometers—Solid Stem—Long and Short—for Precision Use
ISO 842	Raw Materials for Paints and Varnishes—Sampling
ISO 3262	Extenders for Paints

3 PROPERTIES. The properties of a representative sample of MIO, selected in accordance with ISO 842, shall be in accordance with specifications contained in Table 1.

4 FORM.

4.1 General. The form (i.e. structure, shape and size) of a representative sample of micaceous iron oxide shall be that of a grey iron oxide with a metallic sheen and of an essentially laminar nature complying with the requirements of Clauses 4.2 and 4.3.

4.2 Structure. When a test portion of the pigment is viewed under a scanning electron microscope using

a magnification of about $\times 250$, the structure of the particles shall correspond to the typical lamellar structure shown in Fig. 1. It shall **not** correspond to the amorphous granular structure illustrated in Fig. 2.

4.3 Shape, size and colour. When a test portion of the pigment is viewed by means of an optical microscope using a magnification of about $\times 200$ and transmitted light, the particles shall be seen to consist of sharply defined, angular, ruby red crystals with clearly defined fracture planes as shown in Fig. 3. The particles shall **not** correspond to those illustrated in Fig. 4.

5 PACKAGING AND LABELLING.

5.1 Packaging. The MIO shall be supplied in sound, sealed packages, and shall exhibit no damage by moisture or other agents.

5.2 Labelling. The following information shall be legibly and durably marked on each package or container or on a label securely affixed thereto:

- (a) Name or registered mark of the manufacturer/supplier.
- (b) Identification and/or description of the contents.
- (c) Origin of contents including the name of the Australian agent(s) or distributor(s), if the MIO is imported.
- (d) Mass of the contents, in kilograms.
- (e) Information required by any appropriate statutory authority.

NOTE: Manufacturers who place the number of this Australian standard on MIO containers, on packaging or on literature related thereto should ensure that the product is manufactured to comply with the standard.

TABLE 1
PROPERTIES OF ACCEPTABLE MIO

Property	Required values	Test method
Iron content, as Fe ₂ O ₃	≥ 85% (m/m)	Appendix A
Water-soluble matter	≤ 0.5% (m/m)	Appendix B
Water-soluble chlorides and sulphates, as (Cl ⁻ + SO ₄ ²⁻)	≤ 0.1% (m/m)	Appendix C
Matter volatile at 105°C	≤ 1% (m/m)	Appendix D
pH of aqueous extract	≥ 6.5, ≤ 8.0	Appendix E
Loss on ignition at 1000°C (see also Clause F1)	≤ 1.5% (m/m)	Appendix F
Residue on 106µm sieve	≤ 0.1% (m/m)	Appendix G
Density at 25 ± 1°C	≥ 4700 kg/m ³	Appendix H*

* Refer also to NOTE of Clause H1 of Appendix H.