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Pigments, dyestuffs and extenders — Terminology —

Part 2: Classification of colouring materials according to colouristic and chemical aspects

Pigments, colorants et matières de charge — Terminologie — Partie 2: Classification des matières colorantes en fonction de leurs propriétés coloristiques et chimiques

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 256, *Pigments, dyestuffs and extenders*.

ISO 18451 consists of the following parts, under the general title *Pigments, dyestuffs and extenders — Terminology*:

— *Part 1: General terms*

— *Part 2: Classification of colouring materials according to colouristic and chemical aspects*

Introduction

In accordance with ISO 18451-1, it depends on the individual application as to whether a substance is to be considered as a pigment or as an extender. Substances like aluminium silicate, barium sulfate and calcium carbonate are taken into consideration in Clauses 2 and 3.

In addition to the examples of the colouring materials, the designation in accordance with the Colour Index[1)] has been included. However it is to be noted that for a number of the given designations of colouring materials (which are partly collective designations) not only one designation in accordance with the Colour Index is possible, even if in this part of ISO 18451 only one Colour Index designation is given.

In the "Classification scheme" in Clause 2, some spaces are empty. Corresponding colouring materials are either without practical importance or they do not exist for physical reasons.

Inorganic dyestuffs, e.g. those for use with enamel, glass, ceramics and food, have been only mentioned in Clauses 2 and 3 but not classified in accordance with certain aspects. The reason for this is that up to now such colouring materials are excluded from the work of ISO/TC 256.

1) The Colour Index (briefly: C.I.) is a work of reference existing since 1925, and comprising all usual colouring materials and dyestuff chemicals being used as their basis. It is accepted as a standard work in the field of pigment and dyestuff chemistry.

Pigments, dyestuffs and extenders — Terminology —

Part 2: Classification of colouring materials according to colouristic and chemical aspects

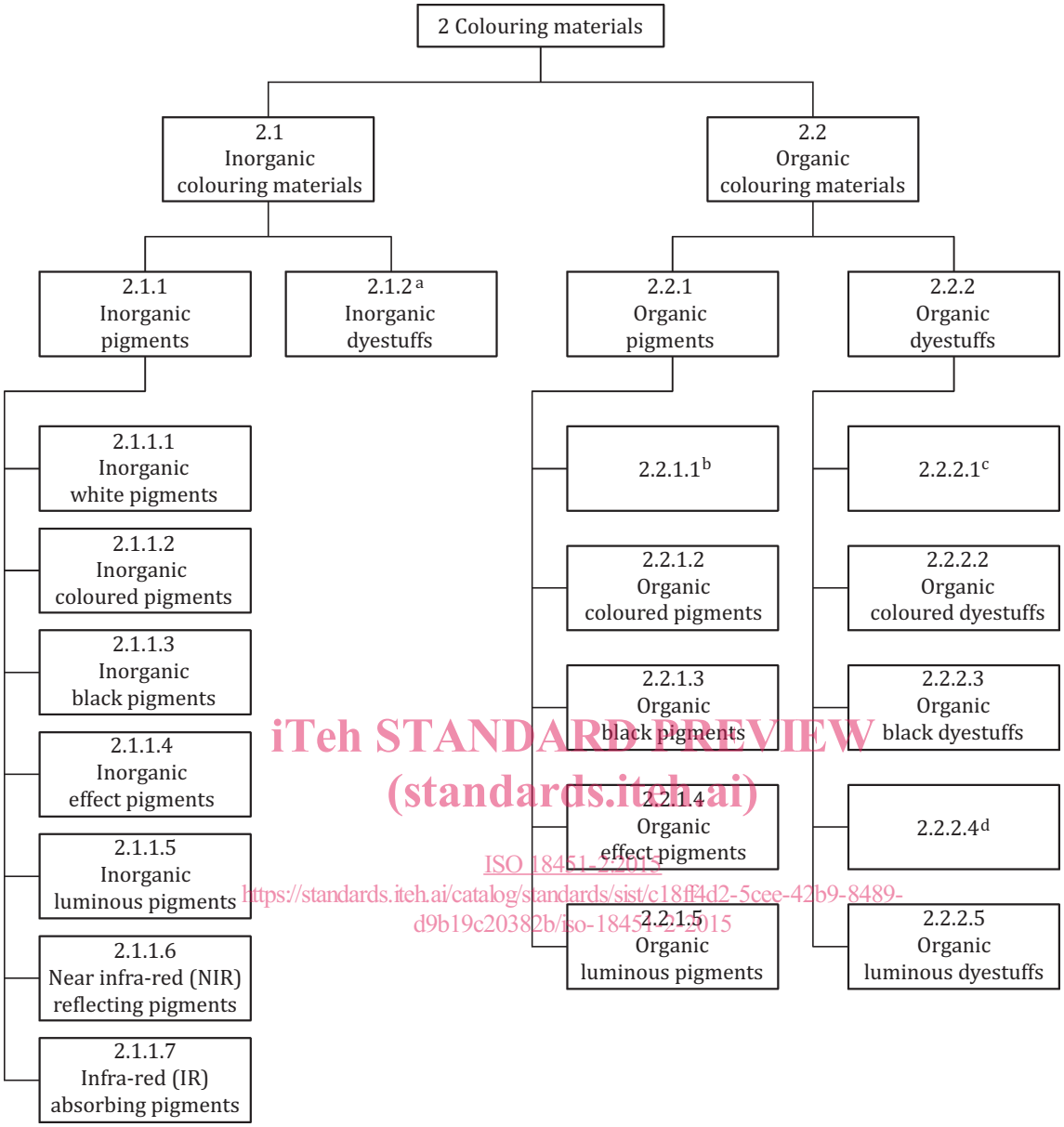
1 Scope

This part of ISO 18451 applies for the industry producing colouring materials and the consumer who uses the products of this industry. In this part of ISO 18451, the colouring materials are classified in accordance with colouristic and chemical aspects.

Some dyestuffs for use in the ceramics and food industries are listed as examples.

2 Classification of inorganic and organic colouring materials in accordance with colouristic aspects

Inorganic and organic colouring materials are classified in accordance with colouristic aspects as given in Figure 1.



Key

a See Introduction.

b Corresponding products (“organic white pigments”) are at present without practical importance.

c Corresponding products (“organic white dyestuffs”) do not exist for physical reasons.

d Corresponding products (“organic effect dyestuffs”) do not exist for physical reasons.

Figure 1 — Classification of inorganic and organic colouring materials in accordance with colouristic aspects

The above classification is based on optical effects the reasons of which are given in the following.

White pigments The optical effect is based on light scattering, independent on the wavelength.

Coloured pigments The optical effect is based on light absorption, dependent on the wavelength, combined with light scattering.

Coloured dyestuffs The optical effect is based on light absorption, dependent on the wavelength.

Black colouring materials The optical effect is based on light absorption, independent on the wavelength, in the visual range of light.

Effect pigments The optical effect is based at least on one of the following effects:

— in the case of metallic flake pigments on the directed reflectance of mainly flat shaped and aligned metallic pigment particles;

— in the case of nacreous pigments on the directed reflectance of mainly flat shaped and aligned transparent small plates;

— in the case of interference pigments on the phenomenon of light interference.

Luminous colouring materials The optical effect is based on their ability to absorb radiation and to emit it as light of greater wavelength without delay with regard to time (fluorescence) or with delay with regard to time (phosphorescence).

Examples regarding the classification in accordance with colouristic aspects are given in Table 1.

Table 1 — Classification of inorganic and organic colouring materials in accordance with colouristic aspects

No.	Colouring material	Colour index[a]	
2.1	**Inorganic colouring materials**		
2.1.1	**Inorganic pigments**		
2.1.1.1	**Inorganic white pigments**		
	Aluminium silicate[a]	Pigment White 19	77004
	Barium sulfate[a]	Pigment White 21	77120
	Calcium carbonate[a]	Pigment White 18	77220
	Lithopone	Pigment White 5	77115
	Titanium dioxide	Pigment White 6	77891
	Zinc oxide/zinc white	Pigment White 4	77947
	Zinc sulfide	Pigment White 7	77975
2.1.1.2	**Inorganic coloured pigments**		
	Bismuth vanadate	Pigment Yellow 184	771740
	Cadmium yellow	Pigment Yellow 37	77199
	Chromium yellow	Pigment Yellow 34	77603
	Chromium titanium yellow	Pigment Brown 24	77310
	Iron oxide yellow	Pigment Yellow 42	77492
	Nickel titanium yellow	Pigment Yellow 53	77788
	Praseodymium yellow[e]	Pigment Yellow 159	77997
	Cadmium orange	Pigment Orange 20	77202
	Molybdate orange	Pigment Red 104	77605
	Titanium zinc tin oxide	Pigment Orange 82	
	Cadmium red	Pigment Red 108	77202
	Cerium sulfide	Pigment Red 265	77283 : 2
	Iron oxide red	Pigment Red 101	77491
	Molybdate red	Pigment Red 104	77605
	Ultramarine red	Pigment Violet 15	77007
	Zirconium iron pink[b]	Pigment Red 232	77996
	Manganese violet	Pigment Violet 16	77742
	Ultramarine violet	Pigment Violet 15	77007
	Cobalt blue	Pigment Blue 28	77346
	Iron blue	Pigment Blue 27	77510
	Ultramarine blue	Pigment Blue 29	77007
	Vanadium blue[b]	Pigment Blue 71	77998
	Chromium oxide green	Pigment Green 17	77288
	Cobalt green	Pigment Green 50	77377

[a] See Introduction and Bibliography.

[b] Corresponding products ("organic white pigments") are at present without practical importance.

[c] Corresponding products ("organic white dyestuffs") do not exist for physical reasons.

[d] Corresponding products ("organic effect dyestuffs") do not exist for physical reasons.

[e] Predominantly used in the ceramic industry.

Table 1 *(continued)*

No.	Colouring material	Colour index[a]	
	Chromium iron brown	Pigment Brown 29	77500
	Iron oxide brown	Pigment Brown 6	77691
	Manganese brown	Pigment Yellow 164	77899
	Manganese titanium rutile	Pigment Yellow 164	
	Zinc iron brown	Pigment Yellow 119	77496
	Umber	Pigment Brown 7	77491
2.1.1.3	**Inorganic black pigments**		
	Cobalt chromium iron black	Pigment Black 27	77502
	Iron oxide black	Pigment Black 11	77499
	Manganese ferrite black	Pigment Black 26	
	Carbon black	Pigment Black 6 + 7	77266
	Spinel black	Pigment Black 28	77428
2.1.1.4	**Inorganic effect pigments**		
	Black:		
	Graphite plates	—	—
	Molybdenum sulfide	—	—
	Magnetite on mica	—	—
	Metallic (silvery, bronze):		
	Hiding:		
	Aluminium	Pigment Metal 1	77000
	Bronze (Cu, Zn)	Pigment Metal 2	77400
	Titanium dioxide on aluminium		
	Semi-transparent:		
	Iron titanate on mica	—	—
	Transparent:		
	Titanium dioxide on aluminium oxide	—	—
	Titanium dioxide on mica	—	—
	Bismuth oxichloride	Pigment White 31	77163
	Coloured hiding:		
	Fire-coloured metal bronze	Pigment Metal 2	77400
	Iron oxide on aluminium	—	—
	Organic pigments on aluminium	—	—
	Coloured semi-transparent:		
	Iron oxide or iron oxide/ aluminium	—	—

[a] See Introduction and Bibliography.

[b] Corresponding products (“organic white pigments”) are at present without practical importance.

[c] Corresponding products (“organic white dyestuffs”) do not exist for physical reasons.

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