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**Pigments, dyestuffs and extenders —  
Terminology —**

**Part 1:  
General terms**

*Pigments, colorants et matières de charge — Terminologie —*

*Partie 1: Termes généraux*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 256, *Pigments, dyestuffs and extenders*.

This second edition cancels and replaces the first edition (ISO 18451-1:2015), which has been technically revised. The main changes compared to the previous edition are as follows:

- the definition for colour difference (3.21) has been aligned with ISO 18314-4;
- the definition for extender (3.34) has been aligned with ISO 3262-1;
- the definitions for full shade (3.41) and mass tone (3.69) have been interchanged to align them with the practical use and with definitions in other standards, e.g. ISO 787-25;
- a note has been added to definitions 3.34 (extender) and 3.81 (nanoextender) concerning the use of the term “filler” as synonym for “extender” in some industries, e.g. rubber and paints;
- the terms nanomaterial (3.82), engineered nanomaterial (3.82.1), manufactured nanomaterial (3.82.2) and incidental nanomaterial (3.82.3) have been added;
- “may” has been changed to “can” in several notes;
- the text has been editorially revised.

A list of all parts in the ISO 18451 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at <https://www.iso.org/members.html>.

In addition to text written in the official ISO languages (English, French or Russian), this document gives text in German. This text is published under the responsibility of the member body for Germany (DIN) and is given for information only. Only the text given in the official languages can be considered as ISO text.

# Pigments, dyestuffs and extenders — Terminology —

## Part 1: General terms

### 1 Scope

This document defines terms that are used in the field of pigments, dyestuffs and extenders.

For some terms, reference is made to ISO 4618 in which also terms and definitions for colourants are given, relating to their use in coating materials.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### **abrasiveness**

property of *pigments* (3.96) or *extenders* (3.34) and their preparations to cause wear at the used apparatus by mechanical action

#### 3.2

##### **aluminium pigment**

*pigment* (3.96) consisting essentially of finely divided pure aluminium Al 99,5

Note 1 to entry: The aluminium particles have lamellar form.

#### 3.3

##### **apparent density after tamping**

ratio of mass to volume of a powder after compressing (e.g. by tamping or vibration) under specified conditions

#### 3.4

##### **barite**

naturally occurring barium sulphate, BaSO<sub>4</sub>

#### 3.5

##### **binder demand**

amount of a binder or binder solution that is required to obtain, under specified dispersion conditions, a mass of defined rheology

#### 3.6

##### **bismuth vanadate pigment**

yellow inorganic *pigment* (3.96) consisting of bismuth vanadate with or without isomorphous inclusion of bismuth molybdate

3.7

**blanc fixe**

synthetic barium sulphate, produced by a precipitation process

Note 1 to entry: Naturally occurring barium sulphate is called *barite* (3.4).

3.8

**bleeding**

*migration* (3.76) of a *colourant* (3.19) from a material into another material being in contact with it

3.9

**blooming**

*migration* (3.76) of a *colourant* (3.19) to the surface of the coloured material

3.10

**cadmium pigment**

inorganic coloured pigment consisting essentially of cadmium zinc sulphide (yellow pigments) or of mixed crystals of cadmium sulphide and cadmium selenide (red pigments)

3.11

**calcined clay**

**calcined aluminium silicate**

aluminium silicate ( $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ ), lamellar, mainly amorphous in structure as determined by X-ray diffraction, produced from natural clay by thermal dehydration, consisting partly of crystalline mullite  $3(\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2)$

3.12 Calcite terms

3.12.1

**calcite**

**crystalline calcium carbonate**

<mineralogy> calcium carbonate of trigonal crystal structure

3.12.2

**calcite**

**crystalline calcium carbonate**

<pigments> designation for *extenders* (3.34) produced from calcareous spar of marble or for precipitated calcitic calcium carbonates

3.13

**carbon black**

*pigment* (3.96) synthetically produced by thermally oxidative cracking of aromatic oils and gases

Note 1 to entry: It is distinguished between carbon black and industrial carbon black.

3.14

**ceramic decoration colour**

preparation consisting of coloured or colourless glass powder and inorganic *pigments* (3.96) for coating of ceramics or glass by melting at temperatures above 450 °C

3.15

**chalking**

appearance of a loosely adherent fine *powder* (3.98) on the surface of a film or pigmented plastic arising from the degradation of the binder

3.16

**chroma**

difference of a *colour* (3.20) from an achromatic colour of the same lightness

**3.17****chromium oxide pigment**

inorganic coloured pigment consisting essentially of chromium (III) oxide ( $\text{Cr}_2\text{O}_3$ ) in the form of a dry powder

**3.18****CIC-pigment****coloured inorganic complex pigment**

coloured pigment, rutile or spinell based, produced by replacement of titanium in the rutile lattice or aluminium or magnesium in the spinel lattice through other atoms

Note 1 to entry: Such pigments are incorrectly named mixed phase pigments.

**3.19****colourant**

generic term for all colouring substances

Note 1 to entry: Colourants comprise *pigments* (3.96) which are insoluble in the medium as well as *dyestuffs* (3.30) which are soluble in the medium.

Note 2 to entry: A colourant can contain the pure chemical substance and/or a surface treatment and/or additives.

Note 3 to entry: A colourant can also contain traces of impurities, which can originate from raw materials and/or the production processes.

Note 4 to entry: In order to improve application properties, a colourant can contain additives.

**3.20****colour**

sensation resulting from the visual perception of light of a given spectral composition by the human eye

Note 1 to entry: The use of the German word "Farbe" alone, i.e. not in combinations of words, for coating materials is deprecated.

Note 2 to entry: A colour is characterized by *hue* (3.49), *saturation* (3.106) or *chroma* (3.16), and *lightness* (3.65).

Note 3 to entry: It is distinguished between chromatic and achromatic colours.

[SOURCE: ISO 4618:2014, 2.58, modified — Note 3 to entry has been added.]

**3.21****colour difference**

$\Delta E^*$

parameter of the perceived difference between two *colours* (3.20)

Note 1 to entry: The colour difference is defined by  $\Delta E_{ab}^*$  in the CIELAB colour space (see ISO 11664-4) or  $\Delta E_{uv}^*$  in the CIELUV colour space (see ISO/CIE 11664-5). For small colour differences between  $0 < \Delta E_{ab}^* < 5$  it is recommended to use the DIN 990 formula (see DIN 6176) for industrial applications, because the CIELAB colour difference  $\Delta E^*$  is not visually uniform.

Note 2 to entry: Since differences in trichromatic colour measuring systems do not or only approximately correspond to the perception of colour difference, currently different equations are being used in order to calculate colour differences from tristimulus values (colour difference formulas). ISO 11664-4 and DIN 6176 recommend specific colour difference equations.

**3.22****colour strength equivalent**

reciprocal of the *relative tinting strength* (3.105) of a *pigment* (3.96)

Note 1 to entry: It indicates how many parts of a sample are colouristically equivalent to 100 parts of a reference sample. In other words, the colour strength equivalent of a weaker *pigment* (3.96) is greater than 100.

### 3.23 Compound terms

#### 3.23.1

##### **compound**

<pigments> mixture of *pigments* (3.96) and/or *extenders* (3.34), ready for use

#### 3.23.2

##### **compound**

<plastics> moulding material, ready for use, containing all the *colourants* (3.19), *extenders* (3.34) and additives

#### 3.24

##### **core pigment**

*pigment* (3.96), the mostly inorganic core of which is enveloped with one or more (mostly inorganic) substances so that its optical properties are hardly effected by the material of the shell but its application properties are improved

#### 3.25

##### **corrosion-inhibiting pigment**

##### **anticorrosive pigment**

*pigment* (3.95) that inhibits or avoids, in priming coats on metals, the corrosion of the metal surface, normally by chemical or physicochemical action

#### 3.26

##### **depth of shade**

measure for the intensity of a colour perception that increases with increasing *chroma* (3.16) and decreases with increasing *lightness* (3.65)

Note 1 to entry: Colourations having the same depth of shade appear to be prepared using the same concentrations of colourants having the same *tinting strength* (3.122).

#### 3.27

##### **dispersibility**

property of a *pigment* (3.96) or *extender* (3.34) characterized by its ability to be wetted, separated and distributed in a medium

Note 1 to entry: The dispersibility depends on its wettability and on the number and strength of the adhering areas between the components of the *agglomerates* (3.94.3).

Note 2 to entry: As a measure of the dispersibility under specified dispersion conditions, e.g. the speed of the *tinting strength* (3.122) development and/or the decrease of the *fineness of grind* (3.37) can be taken.

#### 3.28

##### **dispersing**

separation of the *agglomerates* (3.94.3) of the *pigment* (3.96) or *extender* (3.34) powder into smaller particles [*agglomerates* (3.94.3), *aggregates* (3.94.2) and *primary particles* (3.94.1)] and their wetting by the medium at the same time

Note 1 to entry: Occasionally, separation of *aggregates* (3.94.2) and breaking, for example, of needle-shaped *primary particles* (3.94.1) also takes place. Furthermore, a statistically uniform distribution of the *particles* (3.94) formed in this way to all volume elements of the medium is a part of the dispersing process.

#### 3.29

##### **dolomite**

natural calcium magnesium carbonate containing between 1,18 and 1,23 parts by mass of CaCO<sub>3</sub> to 1 part by mass of MgCO<sub>3</sub>



**3.30****dyestuff**

*colourant* (3.19), soluble in the application medium

Note 1 to entry: *Colourants* (3.19) for glass, ceramics and vitreous enamel that are dissolved in the glass phase are also called “Lösungsfarben” in German language. In these cases, oxides of transition elements are used.

Note 2 to entry: In German usage, in the pharmaceutical and foodstuffs fields, the term “Farbstoff” is used as a synonym for “colourant”.

**3.31****earth pigment**

*pigment* (3.96) produced from earths, e.g. by classification, if necessary with additional thermal treatment

**3.32****effect pigment**

platelet-like *pigment* (3.96) that confers not only *colour* (3.20) but additional properties such as iridescence (interference at thin layers), angle dependency of colour (colour travel, colour flop, light-dark flop), or texture

Note 1 to entry: See also *metal effect pigment* (3.72), *nacreous pigment* (3.78), and *interference pigment* (3.51).

**3.33****electro chromic pigment**

*pigment* (3.96) which changes its *colour* (3.20) depending on the electric current or the voltage

**3.34****extender**

material in granular or powder form, practically insoluble to somewhat soluble in the application medium and used to modify or influence certain physical properties

Note 1 to entry: The German terms “Extender”, “Extenderpigment”, “Pigmentextender” or “Verschnittmittel” should be avoided.

Note 2 to entry: Whether a given substance is to be considered as *pigment* (3.96) or extender depends on its application.

Note 3 to entry: In some industries, such as rubber industries, “extender” is also called “filler” (see ISO 1382). In coatings industries, the term “extender” is preferred, because in ISO 4618, “filler” is defined as “coating material with a high proportion of extender, intended primarily to even out irregularities in substrates to be painted and to improve surface appearance”.

**3.35****fastness**

stability of the *colour* (3.20)

Note 1 to entry: For characterization of the respective stress, the term fastness, e.g. of a coating, is used in word combinations such as light fastness, acid fastness, solvent fastness. The acid fastness, for example, of a coating is the stability of the *colour* (3.20) of the coating under the influence of acids.

**3.36****final level of dispersion**

*level of dispersion* (3.62) when it has become constant under the defined conditions

Note 1 to entry: The final level of dispersion of a *pigment* (3.96) depends on the binder system in which it is dispersed, on the dispersion process and on the composition of the milling base.

**3.37****fineness of grind**

measure for the largest solid particles in a liquid matrix

Note 1 to entry: The term fineness of grind is not to be confused with the term grain hardness.

**3.38**

**floating**

separation of one or more *pigments* (3.96) from a coloured coating material, causing streaks or areas of uneven *colour* (3.20) on the surface of the coat

[SOURCE: ISO 4618:2014, 2.121]

**3.39**

**flooding**

movement of *pigment* (3.96) particles in a liquid coating producing a *colour* (3.20) which, although uniform over the whole surface, is markedly different from that of the freshly applied wet film

Note 1 to entry: See *leafing* (3.61).

[SOURCE: ISO 4618:2014, 2.123]

**3.40**

**food dyestuff**

substance that gives *colour* (3.20) to a foodstuff or restores the colour of a foodstuff

**3.41**

**full shade**

*colour* (3.20) of a *mass tone system* (3.70) in optically infinite (hiding) layer

**3.42**

**functional extender**

*extender* (3.34), when applied in the application medium, processes or enhances specific functions due to its physical or chemical properties

Note 1 to entry: Examples for physical properties are: elasticity, durability, hardness, anti-fatigue.

**3.43**

**functional pigment**

*pigment* (3.96), when applied in the application medium, possesses specific functions due to its unique physical or chemical properties rather than only colouring

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Note 1 to entry: Examples for specific functions are: UV absorption, electric properties such as conductivity, anti-corrosion properties, photocatalytic properties, function as barrier pigment, infrared absorption or infrared reflection.

**3.44**

**goniochromatic pigment**

*effect pigment* (3.32) showing an angle-dependent colour change between different interference colours

**3.45**

**heat stability**

resistance to a heat treatment of the *colour* (3.20) of the test specimens under specified conditions of test

**3.46**

**heavy-metal containing pigment**

*pigment* (3.96) containing heavy metal(s) as constituent

Note 1 to entry: Heavy metals are all metals having a density greater than 4,5 g/cm<sup>3</sup>.

**3.47**

**hiding power**

ability of coating to obliterate the *colour* (3.20) or *colour differences* (3.21) of the *substrate* (3.115)

Note 1 to entry: The use of the German expressions “Deckkraft” und “Deckfähigkeit” should be avoided.

Note 2 to entry: The term “coverage” is ambiguous because it is used in some instances to refer to hiding power and in others to mean spreading rate. The more precise terms hiding power and spreading rate should always be used.