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

**Part 1:
General terms**

*Pigments, colorants et matières de charge — Terminologie —
Partie 1: Termes généraux*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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 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.

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, BaSO₄

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 (Cr_2O_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 spinell 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**

ΔE^*

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

Note 1 to entry: The colour difference is defined by ΔE_{ab}^* in the CIELAB colour space (see ISO 11664-4) or ΔE_{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 ΔE^* 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 *tinging 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 *tinging 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 CaCO₃ to 1 part by mass of MgCO₃

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

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/cm³.

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.

[SOURCE: ISO 4618:2014, 2.138]

3.48

hiding power value

numerical value of the *hiding power* (3.47), as determined using a defined method

3.49

hue

type of *chroma* (3.16) of a *colour* (3.20)

Note 1 to entry: The hue is designated in daily life by words such as red, yellow, green, blue, violet, etc.

3.50

inclusion pigment

pigment (3.96), the colouring component of which is included in a coat of high thermal and chemical resistance

Note 1 to entry: The coat renders it possible that the colouring component can be used at much higher temperatures. Furthermore, the resistance, e.g. to acids and alkalies, will be improved essentially.

3.51

interference pigment

pearlescent pigment

effect pigment (3.32), the effect of which is based completely or predominantly on the phenomenon of interference, e.g. *pearlescent pigment*, fire-coloured metal bronze

Note 1 to entry: Interference pigments can be coated with one or more layers.

3.52

intrinsic hardness

hardness of the primary particle of a *pigment* (3.96) or *extender* (3.34) as a property of the material

Note 1 to entry: Only indirect conclusions to the practically effective intrinsic hardness can be made, for example, from abrasion tests.

Note 2 to entry: In the case of inorganic pigments, the Mohs hardness is often given as a reference value for the intrinsic hardness.

3.53

iron blue pigment

pigment (3.96) formed by the reaction of iron salts with cyanoferrate(II) or cyanoferrate(III) ions and followed, if necessary, by treatment with oxidizing agents

3.54

iron oxide pigment

pigment (3.96) consisting of natural or synthetic iron oxides, if necessary with additions of extenders

3.55

kaolinite

main constituent of *natural clay* (3.89)

3.56

lake

pigment (3.96) produced by precipitation of a dissolved organic *dye stuff* (3.30) with a precipitating agent

Note 1 to entry: Lake is not "Lack" as commonly used in German language but a *colourant* (3.19). In Austrian and Swiss usage, the German expression "Farblack" is not usual.

3.57 Lake pigment terms

3.57.1

lake pigment

<type 1> *pigment* (3.96) produced by precipitation of a sulphone or carbonic acid-containing azo dyestuff with one or more suitable metal salts

Note 1 to entry: Lake pigments predominantly contain metal cation magnesium, calcium, strontium, barium, aluminium or manganese.

3.57.2

lake pigment

<type 2> *pigment* (3.96) produced by precipitation of a basic *dyestuff* (3.30) with heteropoly acids

3.58

lead chromate pigment

yellow, orange or red *pigment* (3.96) consisting of lead chromate with or without lead sulphate and/or lead molybdate

Note 1 to entry: Designations in common use for lead chromate pigments are, for example, chrome yellow, molybdate orange and molybdate red.

3.59

lead chrome green pigment

inorganic *pigment* (3.96) produced from *lead chromate pigments* (3.58) and *iron blue pigments* (3.53) without additions of *extenders* (3.34) and other *colourants* (3.19)

3.60

lead chrome/phthalocyanine pigment

pigment (3.96) produced from *lead chromate pigments* (3.58) and phthalocyanine blue pigments without additions of other *colourants* (3.19)

3.61

leafing

flooding (3.39) of *effect pigments* (3.32) to the surface of a coating material shortly after application

[SOURCE: ISO 4618:2014, 2.149]

3.62

level of dispersion

extent to which *pigment* (3.96) particles have been separated, distributed and stabilized by milling in a binder system under defined conditions

3.63

light fastness

resistance to colour changes due to exposure to light, without direct atmospheric effects (therefore, not "weather resistance")

Note 1 to entry: Light fastness commonly is evaluated by visual assessment using standard reference colour standards (or by instrumental assessment).

3.64

lightening power

ability of a *pigment* (3.96) to increase the *lightness* (3.65) of a coloured, grey or black medium

3.65

lightness

intensity of a light perception as it is inseparably connected with each colour perception

Note 1 to entry: Definition aligned to CIELAB.

3.66

lithopone™

white pigment obtained by combined precipitation of zinc sulphide (ZnS) and barium sulphate (BaSO₄)

3.67**luminance factor**

measure of the *lightness* (3.65) of *surface colours* (3.116)

Note 1 to entry: Generally, this luminance factor is 100 times the reflectance factor, R_v . Depending on the object and the measuring geometry 100 times the reflectance, ρ , or the transmittance factor, T , can be taken as the luminance factor. The luminance factor is connected with the tristimulus values by the luminance coefficients.

3.68**luminous pigment**

pigment (3.96) that absorbs radiation and emits light (of higher wavelength)

Note 1 to entry: This effect is called luminescence.

Note 2 to entry: The optical effect is based on its ability to absorb radiation and to emit light of higher wavelength with temporal delay (phosphorescence) or without temporal delay (fluorescence).

3.69**mass tone**

colour (3.20) of a *mass tone system* (3.70) in a non-hiding layer

3.70**mass tone system**

pigmented system, containing one *pigment* (3.96) only

3.71**masterbatch**

preparation which, in a solid polymer carrier, contains substances [*colourants* (3.19), *extenders* (3.34), additives] in much higher concentration than in the moulded component or semi-finished product to be produced using this preparation

Note 1 to entry: The substances are present either completely dispersed or dissolved.

3.72**metal effect pigment**

platelet-like *pigment* (3.96) consisting of metal

Note 1 to entry: Metal effect pigments can be orientated in parallel and show then metallic gloss due to light reflection at the flakes.

3.73**metal pigment**

pigment (3.96) consisting of metals or metal alloys

EXAMPLE Zinc dust pigment.

3.74**mica**

alkali-containing hydrated aluminium silicates in lamellar form

EXAMPLE Muscovite, biotite and phlogopite.

Note 1 to entry: Not to be confused with *micaceous iron oxide* (3.75).

3.75**micaceous iron oxide**

refined mineral or synthetic product consisting essentially of iron (III) oxide (Fe_2O_3)

Note 1 to entry: Micaceous iron oxide has lamellar form and is grey in *colour* (3.20) with metallic gloss.

3.76

migration

transfer of a *colourant* (3.19) from a medium coloured with it to the surface [*blooming* (3.9)] or into another medium [*bleeding* (3.8)]

3.77

muscovite

natural lamellar hydrated potassium aluminium silicate

Note 1 to entry: Muscovite can be used as raw material for *effect pigments* (3.32).

3.78

nacreous pigment

gloss *pigment* (3.96) consisting of transparent flakes with high refractive index

Note 1 to entry: Nacreous pigments can be orientated in parallel and show then nacreous lustre as characterized by multiple reflection. Nacreous pigments that also show interference colours are also called pearl pigment or *interference pigment* (3.51).

3.79

nanodispersion

material in which *nano-objects* (3.82) are dispersed in a continuous phase of a different composition

Note 1 to entry: Nanodispersions comprise *nanosuspensions* (3.87) and *nanoemulsions* (3.80).

Note 2 to entry: Gaseous matrices are excluded (solid and liquid drops in gases are “aerosols”).

[SOURCE: ISO 4618:2014, 2.165]

3.80

nanoemulsion

nanodispersion (3.79) with a liquid matrix and at least one or more liquid *nano-objects* (3.83)

[SOURCE: ISO 4618:2014, 2.166]

3.81

nanoextender

extender (3.34) made of *nano-objects* (3.83)

Note 1 to entry: In some industries, such as rubber industries, “nanoextender” is also called “nanofiller”. In coatings industries, the term “nanoextender” 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”.

[SOURCE: ISO 4618:2014, 2.167, modified — Note 1 to entry has been added.]

3.82

nanomaterial

material with any external dimension in the *nanoscale* (3.86) or having internal structure or surface structure in the nanoscale

Note 1 to entry: This generic term is inclusive of *nano-object* (3.83) and nanostructured material.

Note 2 to entry: See also 3.82.1 to 3.82.3.

[SOURCE: ISO/TS 80004-1:2015, 2.4]

3.82.1

engineered nanomaterial

nanomaterial (3.82) designed for specific purpose or function

[SOURCE: ISO/TS 80004-1:2015, 2.8]

3.82.2**manufactured nanomaterial**

nanomaterial (3.82) intentionally produced to have selected properties or composition

[SOURCE: ISO/TS 80004-1:2015, 2.9]

3.82.3**incidental nanomaterial**

nanomaterial (3.82) generated as an unintentional by-product of a process

Note 1 to entry: The process includes manufacturing, bio-technological or other processes.

Note 2 to entry: See “ultrafine particle” in ISO/TR 27628:2007, 2.21.

[SOURCE: ISO/TS 80004-1:2015, 2.10]

3.83**nano-object**

material with one, two or three external dimensions in the *nanoscale* (3.86)

Note 1 to entry: This is a generic term for all discrete objects in the *nanoscale* (3.86).

[SOURCE: ISO 4618:2014, 2.169]

3.84**nanopigment**

pigment (3.96), made of *nano-objects* (3.83)

[SOURCE: ISO 4618:2014, 2.170]

3.85**nanopowder**

particulate material only composed of *nano-objects* (3.83)

Note 1 to entry: Nanopowder can include *agglomerates* (3.94.3) and/or *aggregates* (3.94.2) in the *nanoscale* (3.86) (largest dimension ≤ 100 nm).

3.86**nanoscale**

size range from approximately 1 nm to 100 nm

[SOURCE: ISO 4618:2014, 2.171]

3.87**nanosuspension**

heterogeneous mixture of materials comprising a liquid and finely dispersed solid *nano-objects* (3.83)

Note 1 to entry: As examples, nanosuspension can apply to either suspensions of *nanopigments* (3.84) or *nanooxtenders* (3.81) (minerals), or to polymeric nanosuspensions.

[SOURCE: ISO 4618:2014, 2.173]

3.88**natural calcium carbonate****calcium carbonate**

calcium carbonate produced by beneficiation of geological deposits of chalk, calcareous spar or marble

3.89

natural clay
clay

natural hydrated aluminium silicate

natural occurring hydrated aluminium silicates with lamellar crystal structure, predominantly consisting of kaolinite of chemical composition $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ | $\text{Al}_4((\text{OH})_8/\text{Si}_4\text{O}_{10})$

Note 1 to entry: In common use, natural clay is also called china clay.

3.90

natural silica

natural ground quartz

ground *quartz* (3.101) consisting of the low-temperature modification of quartz with a theoretical density of 2,65 g/cm³

Note 1 to entry: Particularly fine ground natural quartz is called quartz powder.

3.91

near-infrared reflecting pigment

NIR reflecting pigment

pigment scattering near-infrared radiation in the wavelength range above the visible range up to 2 500 nm

Note 1 to entry: This spectral range comprises the non-visible part of the solar radiation (except UV).

Note 2 to entry: The term “IR-reflective” is mistakable and should be avoided because it also includes the mid infrared or “thermal” infrared. Many technical pigments, which are designed to be solar reflective, reflect near infrared but absorb mid infrared. The absorption of mid infrared is important for the emission of heat resulting from the incomplete reflection of solar radiation in the near infrared.

3.92

non leafing

enrichment of *effect pigments* (3.32) on the lower level of a freshly applied base coat

3.93

oil absorption value

quantity of refined linseed oil that is absorbed under defined conditions by a sample of *pigment* (3.96) or *extender* (3.34)

Note 1 to entry: The oil absorption value can be expressed either on a volume/mass basis or on a mass/mass basis.

[SOURCE: ISO 4618:2014, 2.178]

3.94

particle

distinguishable *pigment* (3.96) or *extender* (3.34) unit, which can have any structure

Note 1 to entry: Differentiations between the terms specified in 3.94.1 to 3.94.3 cannot always be formulated with a desired clarity in practice; often there are no clear distinctions. In Figures 1 to 3, the terms specified under 3.94.1 to 3.94.3 are being defined with the example of rectangular, spherical, rod-shaped, and irregularly shaped particles in a highly schematized way.

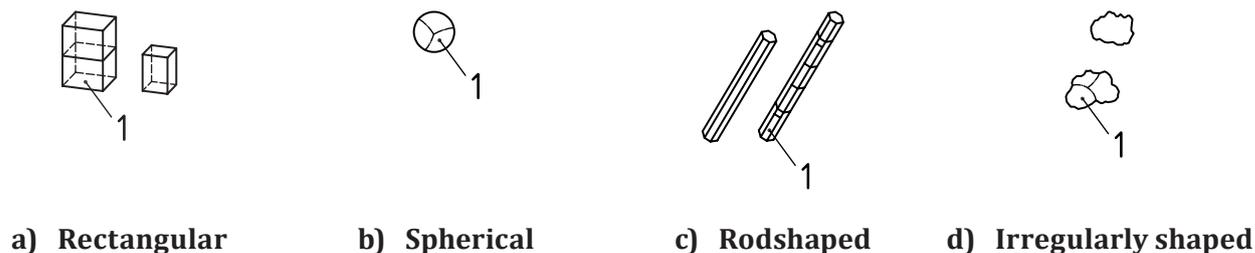
3.94.1

primary particle

single particle

means of appropriate physical procedures (e.g. by means of light microscope, electron microscope) recognizably as individual detectable particle

Note 1 to entry: See Figure 1.

**Key**

1 coherently scattered grid areas (crystallites)

Figure 1 — Primary particles

Note 2 to entry: In special cases, a crystalline primary particle can be a single crystal or consist of several, with appropriate radiation (e.g. X-ray) definable, coherently scattered grid areas (crystallites).

3.94.2**aggregate**

unit grown together of facially contiguous *primary particles* (3.94.1), which surface is smaller than the sum of surfaces of the primary particles

Note 1 to entry: See [Figure 2](#).

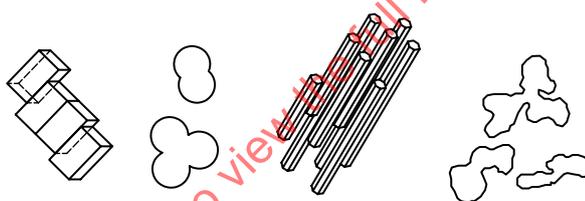


Figure 2 — Aggregates

3.94.3**agglomerate**

unit not grown together of *primary particles* (3.94.1) and/or *aggregates* (3.94.2) contiguous, e.g. on corners and edges, which total surface does not basically deviate from the sum of the single surfaces

Note 1 to entry: See [Figure 3](#).

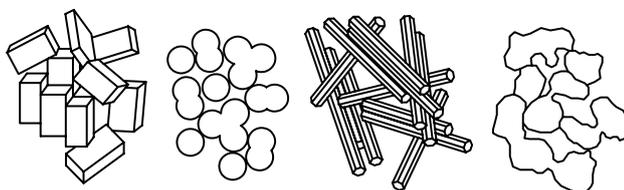


Figure 3 — Agglomerates

3.94.4**flocculate**

in suspensions (e.g. in pigment binder systems) appearing *agglomerate* (3.94.3), which can be divided by means of low shear forces

3.95**particle size**

geometrically measured value for the identification of spatial expansion of a *particle* (3.94)

3.96

pigment

colourant (3.19) consisting of *particles* (3.94), insoluble in the application medium (e.g. coating material or plastic)

Note 1 to entry: Pigments can be further described on the basis of their chemical composition, their optical or technical properties, e.g. inorganic pigment, organic pigment, coloured pigment, white pigment, *effect pigment* (3.32), *corrosion-inhibiting pigment* (3.25), magnetic pigment.

Note 2 to entry: Pigments for ceramics, glass and vitreous enamels are called stains.

Note 3 to entry: Whether a given substance is to be considered as pigment or *extender* (3.34) depends on its application.

3.97

pigment preparation

preparation in which at least one *pigment* (3.96) is dispersed in a carrier

EXAMPLE Mill paste.

Note 1 to entry: The carrier envelopes the pigment completely and is compatible with the intended application medium. The pigment is present at a higher concentration as is the case at the later application.

Note 2 to entry: The preparation can contain, for example, dispersing agents, *extender* (3.34), binder, plastic, solvent, plasticizer or their mixtures.

3.98

powder

quantity of single unbound *particles* (3.94)

Note 1 to entry: Unbound refers to non-covalent and/or non-ionic chemical bond.

3.99

precious-metal containing decoration colour

preparation consisting of precious metals and organic and inorganic metal and precious metal compounds

Note 1 to entry: A precious-metal containing decoration colour contains no glass powder or only small amounts of it.

Note 2 to entry: In contrast to ceramic decoration colours, precious-metal decoration colours are always supplied together with the application additives added. All application additives evaporate or burn during melting and are no longer detectable in the coating.

3.100

precipitated calcium carbonate

calcium carbonicum praecipitatum

CCP

synthetic calcium carbonate, consisting of trigonal crystals [such as those of *calcite* (3.12.1, 3.12.2)] or rhombic bipyramidal crystals (like those of aragonite) or vaterite or amorphous particles or mixtures of the modifications listed before

3.101

quartz

crystalline silica

Note 1 to entry: See also *natural ground quartz* (3.90).

3.102**reactive pigment**

pigment (3.96) that in coatings reacts with the binder, the substrate or with agents penetrating from outside

EXAMPLE Corrosion protection pigment.

3.103**red lead**

red orange-red *corrosion-inhibiting pigment* (3.25) consisting of lead orthoplumbate (Pb_3O_4) and lead (II) oxide (PbO)

3.104**relative scattering power**

percentage ratio of the scattering index of the white pigment under test to the scattering index of a reference white pigment

3.105**relative tinting strength****relative colour strength**

percentage ratio of the *tinting strength* (3.122) of the *colourant* (3.19) under test related to the tinting strength of a reference colourant

3.106**saturation**

proportion of the *chroma* (3.16) to the *lightness* (3.65)

3.107**scattering power**

ability of a pigmented medium to partly diffuse the incident light

3.108**shade**

small chromatic amount of a near white or achromatic specimen by which the *colour* (3.20) of the specimen differs from ideal white or (ideal) achromatic

3.109**silica**

silica obtained by wet-chemical and thermal or pyrogenic methods that is characterized as amorphous by X-ray or electron diffraction

3.110**specific surface area**

absolute surface area of the sample divided by the sample mass

3.111**stability**

ability of a material to resist against change of its properties when stressed or exposed

Note 1 to entry: Type and extent of the exposure as well as the change of properties are to be agreed.

3.112**stain**

pigments for ceramics, glass and vitreous enamels

3.113**standard depth of shade****SD**

depth of shade (3.26) level laid down by convention

3.114

strontium chromate pigment

yellow inorganic *pigment* (3.96) produced from chromium(VI) and strontium compounds of the composition SrCrO_4 , without additions of *extenders* (3.34) and organic *colourants* (3.19)

Note 1 to entry: Strontium chromate pigment is an active *corrosion inhibiting pigment* (3.25).

3.115

substrate

surface to which the coating material is applied or is to be applied

[SOURCE: ISO 4618:2014, 2.244]

3.116

surface colour

colour (3.20) of a non-self-luminous object, i.e. of an object that requires an illuminating radiation to be seen

Note 1 to entry: The term should be used in this meaning only. Thus, surface colour is not a *colourant* (3.19).

3.117

surface-coated pigment

pigment (3.96), the *particles* (3.94) of which are coated with additional materials

EXAMPLE Silica and aluminium oxide hydrate on titanium dioxide pigment.

3.118

surface-treated pigment

pigment (3.96), the surface of which has been treated chemically or physically

Note 1 to entry: The surface treatment influences the properties of the pigments

- during handling (e.g. with regard to dust formation) and/or
- during processing [e.g. *dispersibility* (3.27), storage stability] and/or
- the properties of the pigmented finished product [e.g. *stability* (3.111)].

3.119

talc

natural lamellar hydrated magnesium silicate

3.120

tamping volume

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

3.121

thermochromic pigment

pigment (3.96) the *colour* (3.20) of which can change depending on the temperature

Note 1 to entry: The colour change can be reversible or irreversible.

3.122

tinting strength

colour strength

measure of the ability of a *colourant* (3.19) to colour other materials because of its absorptive power

3.123

titanium dioxide pigment

white, inorganic material in powder form having a high refractive index, that contains at least 80 % TiO_2

Note 1 to entry: This *pigment* (3.95) is available under the anatase (type A) and rutile (type R) mineral forms.

3.124**toner**

printing ink for electrostatic and digital printing processes

Note 1 to entry: In American English, the term toner is also used for organic pigments.

3.125**transparency**

characteristic of a pigmented or unpigmented system to scatter light as little as possible

Note 1 to entry: Accordingly, when a coating material is applied on a black substrate, the colour change of the black substrate shall be as little as possible. The higher the transparency of the pigmented or unpigmented system, the smaller the colour difference to the black substrate.

Note 2 to entry: The term “lasure” is used as a synonym for “transparency”.

3.126**tribopigment**

pigment (3.96) which, due to its pronounced tribo-electric properties, controls the polarity, height and constancy of the charge of *toners* (3.124) and tribo-electric powder coating materials

3.127**ultramarine pigment**

Note 1 to entry: inorganic coloured pigment

Note 2 to entry: Chemically, it is sodium aluminium silicate with included chalcogens, e.g. sulphur, as chromophore.

3.128**wettability**

property of *pigments* (3.96) and *extenders* (3.34) to form interfaces to liquid media

Note 1 to entry: In practice, the wettability is assessed by the speed with which the pigment powder (extender powder) is wetted by the liquid medium [see also *dispersing* (3.28)].

3.129**white lead**

white inorganic *reactive pigment* (3.102) consisting of basic lead carbonate of the theoretical composition $2\text{PbCO}_3 \cdot \text{Pb}(\text{OH})_2$

3.130**whiting**

natural calcium carbonate derived from chalk, a sedimentary rock of soft texture originating from the Cretaceous period

Note 1 to entry: It is characterized by microcrystalline calcitic crystals (up to 1 µm across). Chalk is mainly formed from shells and skeletons of small maritime organisms, e.g. foraminifera and coccoliths. Residual shell fragments are an essential characteristic of chalk. The term “whiting” shall not be used to describe forms of naturally occurring or precipitated calcium carbonate other than chalk.

3.131**zinc dust pigment**

pigment (3.96) produced by distillation and subsequent condensation of the vapour phase or by spraying of liquid zinc, and containing at least 94 % of metallic zinc

3.132**zinc oxide pigment****zinc white**

white inorganic *pigment* (3.96) that is produced by a pyrogenic procedure from metallic zinc or other zinc-containing raw materials

Note 1 to entry: Characteristically is the zinc oxide content of at least 98,5 %.

3.133

zinc phosphate pigment

active *corrosion-inhibiting pigment* (3.25) consisting either predominantly of zinc phosphate dihydrate $[\text{Zn}_3(\text{PO}_4)_2 \cdot 2\text{H}_2\text{O}]$ or of a mixture of zinc phosphate dihydrate and zinc phosphate tetrahydrate $[\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}]$ or predominantly of zinc phosphate tetrahydrate

3.134

zinc sulphide pigment

white pigment that is produced by wet-chemical methods

Note 1 to entry: Characteristically is a zinc sulphide content of at least 98 %.

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