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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

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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*

Pigments, dyestuffs and extenders — Terminology —

Part 1: General terms

1 Scope

This part of ISO 18451 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.

In addition to terms in English and French (two of the three official ISO languages), this part of ISO 18451 gives the equivalent terms in German; these are published under the responsibility of the member body for Germany (DIN). However, only the terms and definitions given in the official languages can be considered as ISO terms and definitions.

NOTE Those terms that are defined elsewhere in this part of ISO 18451 are shown in *italics*.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
abrasiveness
property of *pigments* (2.95) or *extenders* (2.34) and their preparations to cause wear at the used apparatus by mechanical action

2.2
aluminium pigment
pigment (2.95) consisting essentially of finely divided pure aluminium Al 99,5

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

2.3
apparent density after tamping
ratio of mass to volume of a powder after compressing (e.g. by tamping or vibration) under specified conditions

2.4
barite
naturally occurring barium sulfate, $BaSO_4$

2.5
binder demand
amount of a binder or binder solution that is required to obtain, under specified dispersion conditions, a mass of defined rheology

2.6
bismuth vanadate pigment
yellow inorganic *pigment* (2.95) consisting of bismuth vanadate with or without isomorphous inclusion of bismuth molybdate

2.7
blanc fixe
barium sulphate
synthetic barium sulphate, produced by a precipitation process

Note 1 to entry: Naturally occurring barium sulfate is called *barite* (2.4).

2.8
bleeding
migration (2.76) of a *colourant* (2.19) from a material into another material being in contact with it

2.9
blooming
migration (2.76) of a *colourant* (2.19) to the surface of the coloured material

2.10
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)

2.11
calcined clay
calcined aluminium silicate
aluminium silicate ($Al_2O_3 \cdot 2SiO_2$), lamellar, mainly amorphous in structure as determined by X-ray diffraction, produced from natural clay by thermal dehydration, consisting partly of cristalline mullite $3(Al_2O_3 \cdot 2SiO_2)$

2.12 Calcite

2.12.1
calcite
crystalline calcium carbonate
<mineralogy> calcium carbonate of trigonal crystal structure

2.12.2
calcite
crystalline calcium carbonate
<pigments> designation for *extenders* (2.34) produced from calcareous spar of marble or for precipitated calcitic calcium carbonates

2.13
carbon black
pigment (2.95) 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.

2.14
ceramic decoration colour
preparation consisting of coloured or colourless glass powder and inorganic *pigments* (2.95) for coating of ceramics or glass by melting at temperatures above 450 °C

2.15
chalking
appearance of a loosely adherent fine *powder* (2.97) on the surface of a film or pigmented plastic arising from the degradation of the binder

2.16
chroma
difference of a *colour* (2.20) from an achromatic colour of the same lightness

2.17
chromium oxide pigment
inorganic coloured pigment consisting essentially of chromium (III) oxide (Cr_2O_3) in the form of a dry powder

2.18
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.

2.19
colourant
generic term for all colouring substances

Note 1 to entry: Colourants comprise *pigments* (2.95) which are insoluble in the medium as well as *dyestuffs* (2.30) which are soluble in the medium.

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

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

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

2.20
colour
sensation resulting from the visual perception of electromagnetic radiation of a given spectral composition

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

Note 2 to entry: A colour is characterized by *hue* (2.49), *saturation* (2.105) or *chroma* (2.16), and *lightness* (2.65).

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

2.21
colour difference
differences in *lightness* (2.65), *chroma* (2.16) and *hue* (2.49)

Note 1 to entry: Colour differences, for example, occur between different specimens, between the same specimens but of different history and within a specimen inhomogeneous with regard to colour.

2.22
colour strength equivalent
reciprocal of the *relative tinting strength* (2.104) of a *pigment* (2.95)

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* (2.95) is greater than 100.

2.23 Compound

2.23.1
compound
<pigments> mixture of *pigments* (2.95) and/or *extenders* (2.34), ready for use

2.23.2
compound
<plastics> moulding material, ready for use, containing all the *colourants* (2.19), *extenders* (2.34) and additives

2.24
core pigment
pigment (2.95) 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

2.25
corrosion-inhibiting pigment
anticorrosive pigment
pigment (2.95) that inhibits or avoids, in priming coats on metals, the corrosion of the metal surface, normally by chemical or physicochemical action

2.26
depth of shade
measure for the intensity of a colour perception that increases with increasing *chroma* (2.16) and decreases with increasing *lightness* (2.65)

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* (2.121).

2.27
dispersibility
property of a *pigment* (2.95) or *extender* (2.34) 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* (2.93.3).

Note 2 to entry: As a measure of the dispersibility under specified dispersion conditions, e.g. the speed of the *tinting strength* (2.121) development and/or the decrease of the *fineness of grind* (2.37) can be taken.

2.28
dispersing
separation of the *agglomerates* (2.93.3) of the *pigment* (2.95) or *extender* (2.34) powder into smaller particles [*agglomerates* (2.93.3), *aggregates* (2.93.2) and *primary particles* (2.93.1)] and their wetting by the medium at the same time

Note 1 to entry: Occasionally, separation of *aggregates* (2.93.2) and breaking, for example, of needle-shaped *primary particles* (2.93.1) also takes place. Furthermore, a statistically uniform distribution of the *particles* (2.93) formed in this way to all volume elements of the medium is a part of the dispersing process.

2.29
dolomite
natural calcium magnesium carbonate containing between 1,18 and 1,23 parts by mass of $CaCO_3$ to 1 part by mass of $MgCO_3$

2.30
dyestuff
colourant (2.19), soluble in the application medium

Note 1 to entry: *Colourants* (2.19) 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”.

2.31
earth pigment
pigment (2.95) produced from earths, e.g. by classification, if necessary with additional thermal treatment

2.32
effect pigment
platelet-like *pigment* (2.95) that confers not only *colour* (2.20) 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* (2.72), *nacreous pigment* (2.78), *interference pigment* (2.51).

2.33
electro chromic pigment
pigment (2.95) which changes its *colour* (2.20) depending on the electric current or the voltage

2.34
extender
substance in granular or powder form, insoluble in the medium (e.g. coating material) 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* (2.95) or extender depends on its application.

2.35
fastness
stability of the *colour* (2.20)

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* (2.20) of the coating under the influence of acids.

2.36
final level of dispersion
level of dispersion (2.62) when it has become constant under the defined conditions

Note 1 to entry: The final level of dispersion of a *pigment* (2.95) depends on the binder system in which it is dispersed, on the dispersion process and on the composition of the milling base.

2.37
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.

2.38
floating
separation of one or more *pigments* (2.95) from a coloured coating material, casing streaks or areas on the surface of the coating material

2.39
flooding
separation of the *pigments* (2.95) in a liquid coating giving rise to a *colour* (2.20) which, although uniform over the whole surface, is markedly different from that of the freshly applied wet film before drying/hardening

Note 1 to entry: See *leafing* (2.61).

2.40
food dyestuff
substance that gives *colour* (2.20) to a foodstuff or restores the colour of a foodstuff

2.41
full shade
colour (2.20) of a *mass tone system* (2.70) in a non-hiding layer

2.42
functional extender
extender (2.34), 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.

2.43
functional pigment
pigment (2.95), 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, photocatalytical properties, function as barrier pigment, infrared absorption or infrared reflection.

2.44
goniochromatic pigment
effect pigment (2.32) showing an angle-depending colour change between different interference colours

2.45
heat stability
resistance to a heat treatment of the *colour* (2.20) of the test specimens under specified conditions of test

2.46
heavy-metal containing pigment
pigment (2.95) containing heavy metal(s) as constituent

Note 1 to entry: Heavy metals are all metals having a density greater than 4,5 g/cm³.

2.47
hiding power
ability of material, containing *colourants* (2.19), to obliterate the *colour* (2.20) or *colour differences* (2.21) of the *substrate* (2.114)

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

[SOURCE: ISO 4618:2014, 2.138, modified — Note 2 deleted]

2.48
hiding power value
numerical value of the *hiding power* (2.47), as determined using a defined method

2.49
hue
type of *chroma* (2.16) of a *colour* (2.20)

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

2.50
inclusion pigment
pigment (2.95), 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.

2.51
interference pigment
pearlescent pigment
effect pigment (2.32), 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.

2.52
intrinsic hardness
hardness of the primary particle of a *pigment* (2.95) or *extender* (2.34) 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.

2.53
iron blue pigment
pigment (2.95) formed by the reaction of iron salts with cyanoferrate(II) or cyanoferrate(III) ions and followed, if necessary, by treatment with oxidizing agents

2.54
iron oxide pigment
pigment (2.95) consisting of natural or synthetic iron oxides, if necessary with additions of extenders

2.55
kaolinite
main constituent of *natural clay* (2.88)

2.56
lake
pigment (2.95) produced by precipitation of a dissolved organic *dyestuff* (2.30) with a precipitating agent

Note 1 to entry: Lake is not “Lack” as commonly used in German language but a *colourant* (2.19). In Austrian and Swiss usage, the German expression “Farblack” is not usual.

2.57 Lake pigment

2.57.1
lake pigment
<type 1> *pigment* (2.95) 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.

2.57.2
lake pigment
<type 2> *pigment* (2.95) produced by precipitation of a basic *dyestuff* (2.30) with heteropoly acids

2.58
lead chromate pigment
yellow, orange or red *pigment* (2.95) 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.

2.59
lead chrome green pigment
inorganic *pigment* (2.95) produced from *lead chromate pigments* (2.58) and *iron blue pigments* (2.53) without additions of *extenders* (2.34) and other *colourants* (2.19)

2.60
lead chrome/phthalocyanine pigment
pigment (2.95) produced from *lead chromate pigments* (2.58) and phthalocyanine blue pigments without additions of other *colourants* (2.19)

2.61
leafing
flooding (2.39) of specially treated *effect pigments* (2.32) to the surface of a coating material shortly after application

2.62
level of dispersion
extent to which *pigment* (2.95) particles have been separated, distributed and stabilized by milling in a binder system under defined conditions

2.63
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).

2.64
lightening power
ability of a *pigment* (2.95) to increase the *lightness* (2.65) of a coloured, grey or black medium

2.65
lightness
intensity of a light perception as it is inseparable connected with each colour perception

Note 1 to entry: Definition aligned to CIELAB.

2.66
lithopone™
white pigment obtained by combined precipitation of zinc sulphide (ZnS) and barium sulphate ($BaSO_4$)

2.67
luminance factor
measure of the *lightness* (2.65) of *surface colours* (2.115)

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.

2.68
luminous pigment
pigment (2.95) 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).

2.69
mass tone
colour (2.20) of a *mass tone system* (2.70) in optically infinite (hiding) layer