



Designation: D4302 – 14

Standard Specification for Artists' Oil, Resin-Oil, and Alkyd Paints¹

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1. Scope

1.1 This specification establishes requirements for composition, physical properties, performance, and labeling of artists' oil, resin-oil, and alkyd paints.

1.2 This specification covers pigments, vehicles, and additives. Requirements are included for pigment identification, lightfastness, consistency, and drying time.

1.3 Table 1 lists some pigments meeting the lightfastness requirements in this specification. In order to identify other pigments that meet these requirements, instructions are given for test specimen preparation. Test methods for determining relative lightfastness are referenced.

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.5 This pertains only to the test method found in Section 8. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D79 Specification for Zinc Oxide Pigments
- D185 Test Methods for Coarse Particles in Pigments
- D387 Test Method for Color and Strength of Chromatic Pigments with a Mechanical Muller
- D476 Classification for Dry Pigmentary Titanium Dioxide Products
- D602 Specification for Barium Sulfate Pigments
- D1133 Test Method for Kauri-Butanol Value of Hydrocarbon Solvents

¹ This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.57 on Artist Paints and Related Materials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- D1210 Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage
- D1640 Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
- D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials
- D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
- D2245 Test Method for Identification of Oils and Oil Acids in Solvent-Reducible Paints
- D2369 Test Method for Volatile Content of Coatings
- D2689 Practices for Testing Alkyd Resins (Withdrawn 2008)³
- D4236 Practice for Labeling Art Materials for Chronic Health Hazards
- D4303 Test Methods for Lightfastness of Colorants Used in Artists' Materials
- D4838 Test Method for Determining the Relative Tinting Strength of Chromatic Paints
- D4941 Practice for Preparing Drawdowns of Artists' Paste Paints
- E284 Terminology of Appearance

3. Terminology

3.1 Definitions:

3.1.1 *Colour Index Name, n*—consists of the category (type of dye or pigment), general hue, and an assigned number given to a colorant in the Colour Index⁴ as an international identification system.

3.1.1.1 *Discussion*—For example, the Colour Index Name of one phthalocyanine blue pigment is Pigment Blue 15 (PB 15).

3.1.2 *Colour Index Number, n*—a five-digit number given in the Colour Index that describes the chemical constitution of a colorant.

3.1.2.1 *Discussion*—For example, the Colour Index Number of one phthalocyanine blue pigment is 74160.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ *Colour Index*, 3rd ed., 5 Vols and Revisions, The Society of Dyers and Colourists, London, 1971–75. Available from the American Association of Textile Chemists and Colorists, P. O. Box 12215, Research Triangle Park, NC 27709.

3.1.3 Refer to Terminology [E284](#) for appearance terms used in this specification.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *alkali refined oil*, *n*—triglyceride oil of vegetable origin that has been treated with alkali to reduce the free acidity by formation of water-soluble salts, subsequently removed by washing.

3.2.1.1 *Discussion*—An appreciable degree of free acidity may cause a greater development of yellowing in a dried film of oil. Most artists' oil paints are ground in alkali refined oil.

3.2.2 *alkyd paint*, *n*—paint containing a resin produced by combining a polybasic acid, a polyhydric alcohol, and the fatty acid of a drying vegetable oil. For this specification, the resin produced must be soluble in mineral spirits or turpentine.

3.2.3 *drier (siccative)*, *n*—a substance, usually an organo-metallic compound, that accelerates the rate of drying of an oil paint or oil medium.

3.2.4 *oil paint*, *n*—paint containing an alkali refined triglyceride drying oil of vegetable origin.

3.2.5 *resin-oil paint*, *n*—paint containing 90 weight % minimum of vehicle solids, vegetable drying oil, and 10 weight % maximum of vehicle solids replaced by gum or resin.

4. Significance and Use

4.1 This specification establishes quality requirements and provides a basis for common understanding among producers, distributors, and users.

4.2 It is not intended that all paints meeting the requirements be identical nor of uniform excellence in all respects. Variations in manufacture, not covered by this specification, may cause some artists to prefer one brand over another, either of which may be acceptable under this specification.

5. Labeling Requirements

5.1 Pigment(s) Identification:

5.1.1 Every label shall include for each pigment contained in the paint (1) the information underlined in [Table 1](#) (which includes the Common Name, Colour Index Name, and any additional terms necessary to identify the form of the pigment) and (2) the appropriate Lightfastness Category.

5.1.2 The complete pigment identification given in [Table 1](#), which also includes the Colour Index Number and a simple chemical description, shall be given by the producer in an appropriate electronic version or printed publication. Manufacturers are encouraged to put this complete identification on the container label when label size permits.

5.1.3 The Common Name shall be placed on the front of the label and shall be the name of the paint except as described in [5.1.5](#) and [5.1.6](#). Other identification may be placed elsewhere on the container.

5.1.4 The Colour Index name may be spelled out in full or abbreviated depending on the size of the label. Example: Pigment Blue 15, or Pig. Blue 15 or PB 15.

5.1.5 *Substituted Pigment*—In the case of substituted pigments, except for those pigments listed in [Table X3.1](#), the word “Hue” in equal size letters shall follow in the title, on the

front of the tube, immediately after the name of the pigment that has been simulated.

5.1.6 Proprietary names or optional names may be used provided the Common Name(s) given in [Table 1](#) is listed along with their Colour Index Names and the Lightfastness Category of the mixture somewhere on the label.

5.1.7 *Mixed Pigments*—Artists' paints containing more than one pigment comply with this specification if all colored pigments included in the mixture are on the suitable pigment list ([Table 1](#)) and provided the mixture itself has passed all other test requirements in this specification. The lightfastness category shall be that of the least lightfast pigment. This lightfastness category may be changed if the mixture is tested for lightfastness in accordance with Test Methods [D4303](#) and results indicating a different category are submitted to ASTM Subcommittee D01.57 for evaluation.

5.1.8 *Historical and Discontinued Pigments*—Pigments that are either (1) primarily of a historical nature, or (2) have not been commercially manufactured for a minimum of 10 years or more, may be submitted to ASTM Subcommittee D01.57 for inclusion in [Table X3.1](#).

5.1.8.1 The Common Name(s) of pigments in [Table X3.1](#) may be used by substituted pigments without the designation of “Hue” in the title.

5.1.8.2 Paints using pigments listed in [Table X3.1](#) may use the word “Genuine” in front of the title to differentiate them from substituted pigments.

5.2 Provide on the label:

5.2.1 *Artists' Oil Paints*—Vegetable origin of the oil and method of refinement.

NOTE 1—The type of oil can be identified in accordance with Test Method [D2245](#).

5.2.2 *Artists' Alkyd Paints*—Type of fatty acid used. If free vegetable oil is used in combination with an alkyd resin, declare this also on the label. State if compatible with artists' oil paints.

NOTE 2—The type of alkyd can be identified in accordance with Practices [D2689](#).

5.2.3 *Artists' Resin-Oil Paints*—Vegetable origin and method of refinement of the oil and type of resin or gum. If the colors in a resin-oil paint line contain more than one, or different, gums or resins, the identification on the individual labels may uniformly include all of the gums or resins used in the paint line. Example: “Damar or Mastic Gum.” State if compatible with artists' oil paints.

NOTE 3—The type of oil can be identified in accordance with Test Method [D2245](#).

5.3 *Lightfastness*—The label shall contain the word “Lightfastness” followed by the appropriate rating, I or II, as given for each pigment in [Table 1](#), or else one of these corresponding icons ([Fig. 1](#)):

5.3.1 Lightfastness I pigments, when made into paint specimens as described in Section [8](#) and exposed, tested, and rated in accordance with Test Methods [D4303](#), shall have a color difference (ΔE^*_{ab}) of 4 or less CIELAB units between the specimens measured before and after exposure.

TABLE 1 Suitable Pigments List

NOTE 1—Underlined information and the lightfastness rating in the table shall be included on every label.

NOTE 2—The chemical classes in **Table 1** have been revised to more closely conform to recommended terminology. When relabeling or publishing literature, the chemical classes given in **Table 1** should be used; however, product labels or literature using the chemical descriptions given in Table 1 of D4302–96a are still in conformance with this specification.

Key:

Lightfastness Category:

Lightfastness I Excellent Lightfastness

Lightfastness II Very Good Lightfastness

Abbreviations Used in Colour Index Names:

NR Natural Red
PB Pigment Blue
PBk Pigment Black
PBr Pigment Brown
PG Pigment Green
PO Pigment Orange
PR Pigment Red
PV Pigment Violet
PW Pigment White
PY Pigment Yellow

Pigment Notations:

(BS) Blue shade
(CC) Concentrated cadmium pigments may contain up to 15 % barium sulfate for color control. Cadmium-barium pigments contain a much higher amount of barium sulfate.
(DL) May darken in strong light
(LF) Lightfast type
(NA) Colour index name or number not assigned
... Not tested
(RS) Red shade
(SM) Sensitive to moisture in direct sunlight
(SS) Sensitive to hydrogen sulfide

| Colour Index Name | Lightfastness Category | | Common Name and Chemical Class | Colour Index Number |
|-------------------|------------------------|-------|--|---------------------|
| | Oil and Resin-Oil | Alkyd | | |
| YELLOWS | | | | |
| PY 3 | II | II | Arylide Yellow 10G, with option of adding the name Hansa Yellow Light, Organic: monoazo, acetoacetyl, 10G | 11710 |
| PY 35 | I | ... | Cadmium (hue designation), Inorganic: cadmium zinc sulfide (CC) (SM) | 77205 |
| PY 35:1 | I | ... | Cadmium-Barium (hue designation), Inorganic: cadmium zinc sulfide coprecipitated with barium sulfate (SM) | 77205:1 |
| PY 37 | I | I | Cadmium (hue designation), Inorganic: cadmium sulfide (CC) (SM) | 77199 |
| PY 37:1 | I | ... | Cadmium-Barium (hue designation), Inorganic: cadmium sulfide coprecipitated with barium sulfate (SM) | 77199:1 |
| PY 40 | II | ... | Aureolin, or Cobalt Yellow, Inorganic: potassium cobaltinitrite | 77357 |
| PY 41 | I | ... | Naples Yellow, Inorganic: lead antimoniate (SS) | 77589 |
| PY 42 | I | ... | Mars Yellow or Iron Oxide Yellow, Inorganic: synthetic hydrated iron oxide | 77492 |
| PY 42 | I | ... | Mars Orange or Iron Oxide Orange, Inorganic: synthetic hydrated iron oxide | 77492 |
| PY 43 | I | I | Yellow Ochre, Inorganic: natural hydrated iron oxide | 77492 |
| PY 53 | I | ... | Nickel Titanate Yellow, Inorganic: oxides of nickel, antimony and titanium | 77788 |
| PY 65 | I | ... | Arylide Yellow RN, with option of adding Hansa Yellow RN, Organic: monoazo, acetoacetyl RN | 11740 |
| PY 73 | I | ... | Arylide Yellow GX, with option of adding the name Hansa Yellow GX, Organic: monoazo, acetoacetyl, GX | 11738 |
| PY74(LF) | I | ... | Arylide Yellow 5GX, with option of adding Hansa Yellow 5GX, Organic: monoazo: acetoacetyl 5GX | 11741 |
| PY 83 HR 70 | I | ... | Diarylide Yellow HR70, Organic: disazo, HR 70 | 21108 |
| PY 97 | I | ... | Arylide Yellow FGL, Organic: monoazo, acetoacetyl FGL | 11767 |
| PY 98 | II | ... | Arylide Yellow 10GX, with the option of adding the name Hansa Yellow 10GX, Organic: monoazo, acetoacetyl, 10GX | 11727 |
| PY 108 | I | ... | Anthrapyrimidine Yellow, Organic: anthraquinone | 68420 |
| PY 109 | I | ... | Isoindolinone Yellow G, Organic: aminoketone, G tetrachloroisindolinone | 56284 |
| PY 110 | I | ... | Isoindolinone Yellow R, Organic: aminoketone, R tetrachloroisindolinone | 56280 |
| PY 112 | I | ... | Flavanthrone Yellow, Organic: anthraquinone | 70600 |
| PY 129 | I | ... | Azomethine Yellow 56, Organic: methine, 5G copper complex of azomethine | 48042 |
| PY 138 | I | ... | Quinophthalone Yellow, Organic: aminoketone, quinophthalone | 56300 |
| PY 139 | I | ... | Isoindoline Yellow, Organic: aminoketone, isoindoline | 56298 |
| PY 150 | I | ... | Nickel Azo Yellow, Organic: monoazo, heterocyclic hydroxy, nickel complex | 12764 |
| PY 151 | I | ... | Benzimidazolone (hue designation) H4G, Organic: monoazo, acetoacetyl, H4G | 13980 |
| PY 153 | I | ... | Nickel Dioxine Yellow, Organic: methine, dioximer, nickel complex | 48545 |
| PY 154 | I | ... | Benzimidazolone (hue designation) H3G, Organic: monoazo, acetoacetyl, H3G | 11781 |
| PY 175 | I | ... | Benzimidazolone (hue designation) H6G, Organic: monoazo, acetoacetyl, H6G | 11784 |
| ORANGES | | | | |
| PO 5 | II | ... | Dinitraniline Orange, Organic: monoazo, acetoacetyl (SM) | 12075 |
| PO 20 | I | I | Cadmium (hue designation), Inorganic: cadmium sulfo-selenide (CC) | 77202 |
| PO 20:1 | I | ... | Cadmium-Barium (hue designation), Inorganic: cadmium sulfoselenide coprecipitated with barium sulfate | 77202:1 |
| PO 23 | I | ... | Cadmium Vermilion Orange, Inorganic: cadmium mercury sulfide (CC) | 77201 |
| PO 23:1 | I | ... | Cadmium-Barium Vermilion Orange, Inorganic: cadmium mercury sulfide coprecipitated with barium sulfate | 77201:1 |
| PO 36 | I | ... | Benzimidazolone (hue designation) HL, Organic: monoazo, acetoacetyl, HL | 11780 |