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Standard Specification for Artists' Acrylic Dispersion Paints¹

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1. Scope

1.1 This specification establishes requirements for composition, physical properties, performance, and labeling of artists' acrylic emulsion paints.

1.2 This specification covers pigments, vehicles, and additives. Requirements are included for pigment identification, lightfastness, bleeding, 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 section found in Sections 6 and 7, and Appendix X2. 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

- D185 Test Methods for Coarse Particles in Pigments
- D279 Test Methods for Bleeding of 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

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
- D3168 Practice for Qualitative Identification of Polymers in Emulsion Paints
- 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 Index³ 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.

3.1.3 Appearance terms used in this specification are defined in Terminology E284.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *acrylic emulsion paint, n*—paint containing a stable aqueous dispersion of polymers or copolymers of acrylic acid, methacrylic acid, esters of these acids, or acrylonitrile; sometimes termed latex, acrylic latex, or polymer emulsion paint.

3.2.2 *glycols, n*—general term for dihydric alcohols used to provide freeze-thaw stability in acrylic and other water-based vehicle systems.

³ *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.

TABLE 1 Suitable Pigment List

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

Key:
Lightfastness Category:

- Lightfastness I Excellent Lightfastness
 Lightfastness II Very Good Lightfastness

Abbreviations used in Colour Index Names:

- 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:

- (AR) Alkali Resistant
 (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
 (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
YELLOWS			
<u>PY 3</u>	II	<u>Arylide Yellow 10G</u> , with option of adding the name Hansa Yellow Light, arylide yellow	11710
<u>PY 35</u>	I	<u>Cadmium (hue designation)</u> , concentrated cadmium zinc sulfide (CC) (SM)	77205
<u>PY 35:1</u>	I	<u>Cadmium (hue designation)</u> , cadmium zinc sulfide coprecipitated with barium sulfate (SM)	77205:1
<u>PY 37</u>	I	<u>Cadmium (hue designation)</u> , concentrated cadmium sulfate (CC) (SM)	77199
<u>PY 37:1</u>	I	<u>Cadmium-Barium (hue designation)</u> , cadmium sulfide coprecipitated with barium sulfate (SM)	77199:1
<u>PY 42</u>	I	<u>Mars Yellow</u> or <u>Iron Oxide Yellow</u> , with option of adding the name Yellow Iron Oxide, synthetic hydrated iron oxide	77492
<u>PY 42</u>	I	<u>Mars Orange</u> or <u>Iron Oxide Orange</u> , synthetic hydrated iron oxide	77492
<u>PY 43</u>	I	<u>Yellow Ochre</u> , natural hydrated iron oxide	77492
<u>PY 53</u>	I	<u>Nickel Titanate Yellow</u> , oxides of nickel, antimony and titanium	77788
<u>PY 65</u>	I	<u>Arylide Yellow RN</u> , with option of adding Hansa Yellow RN, arylide yellow	11740
<u>PY 73</u>	I	<u>Arylide Yellow GX</u> , with option of adding the name Hansa Yellow GX, arylide yellow	11738
<u>PY 74 (LF)</u>	I	<u>Arylide Yellow 5Gx</u> , with option of adding Hansa Yellow 5GX, arylide yellow	11741
<u>PY 83 (HR70)</u>	I	<u>Diarylide Yellow HR70</u> , diarylide yellow	21108
<u>PY 97</u>	I	<u>Arylide Yellow FGL</u> , arylide yellow	11767
<u>PY 98</u>	I	<u>Arylide Yellow 10GX</u> , with option of adding the name Hansa Yellow 10GX, arylide yellow	11727
<u>PY 108</u>	I	<u>Anthrapyrimidine Yellow</u> , anthrapyrimidine	68420
<u>PY 109</u>	I	<u>Isoindolinone Yellow G</u> , tetrachloroisoindolinone	NA
<u>PY 110</u>	I	<u>Isoindolinone Yellow R</u> , tetrachloroisoindolinone	56280
<u>PY 112</u>	I	<u>Flavanthrone Yellow</u> , flavanthrone	70600
<u>PY 138</u>	I	<u>Quinophthalone Yellow</u> , quinophthalone	56300
<u>PY 139</u>	I	<u>Isoindoline Yellow</u> , isoindoline	NA
<u>PY 150</u>	I	<u>Nickel Azo Yellow</u> , nickel complex azo	NA
<u>PY 151</u>	I	<u>Benzimidazolone (hue designation) H4G</u> , benzimidazolone	13980
<u>PY 153</u>	I	<u>Nickel Dioxine Yellow</u> , dioxine yellow nickel complex	NA
<u>PY 154</u>	I	<u>Benzimidazolone (hue designation) H3G</u> , benzimidazolone	11781
<u>PY 175</u>	I	<u>Benzimidazolone (hue designation) H6G</u> , benzimidazolone	11784
<u>PY 184</u>	I	<u>Bismuth Vanadate Yellow</u> , bismuth vanadate	NA
ORANGES			
<u>PO 5</u>	II	<u>Dinitraniline Orange</u> , dinitraniline (SM)	12075
<u>PO 20</u>	I	<u>Cadmium (hue designation)</u> , concentrated cadmium sulfo-selenide (CC)	77202
<u>PO 20:1</u>	I	<u>Cadmium-Barium (hue designation)</u> , cadmium sulfoselenide coprecipitated with barium sulfate	77202:1
<u>PO 23</u>	I	<u>Cadmium Vermilion Orange</u> , concentrated cadmium mercury sulfide (CC)	77201
<u>PO 23:1</u>	I	<u>Cadmium-Barium Vermilion Orange</u> , cadmium mercury sulfide coprecipitated with barium sulfate	77201:1
<u>PO 36</u>	I	<u>Benzimidazolone (hue designation) HL</u> , benzimidazolone	11780
<u>PO 43(DL)</u>	I	<u>Perinone Orange</u> , perinone	71105
<u>PO 48</u>	I	<u>Quinacridone (hue designation)</u> , quinacridone	NA
<u>PO 49</u>	I	<u>Quinacridone (hue designation)</u> , quinacridone	NA
<u>PO 60</u>	I	<u>Benzimidazolone (hue designation) HGL</u> , benzimidazolone	11782
<u>PO 62</u>	I	<u>Benzimidazolone (hue designation) H5G</u> , monoacetolone	11775
REDS			
<u>PR 5</u>	II	<u>Naphthol ITR</u> , naphthol ITR	12490
<u>PR 7</u>	I	<u>Naphthol AS-TR</u> , naphthol AS-TR	12420
<u>PR 9</u>	I	<u>Naphthol AS-OL</u> , naphthol AS-OL	12460
REDS (cont'd)			
<u>PR 14</u>	II	<u>Naphthol AS-D</u> , naphthol AS-D	12380

TABLE 1 Continued

Colour Index Name	Lightfastness Category		Common Name and Chemical Class	Colour Index Number
		Acrylic		
PR 101	I		Indian Red, synthetic red iron oxide (bluish hue) 77491	
PR 101	I		Light or English Red Oxide, synthetic red iron oxide (yellowish hue)	77491
PR 101	I		Mars Red or Mars Orange or Iron Oxide Red or Iron Oxide Orange, with option of adding the name Red Iron Oxide, synthetic red iron oxide	77491
PR 101	I		Mars Violet or Iron Oxide Violet, with option of adding the name Violet Iron Oxide, synthetic iron oxide (violet hue)	77015
PR 101	I		Venetian Red, synthetic iron oxide (yellowish hue)	77491
PR 102	I		Light Red, calcined yellow ochre	77492
PR 106	I		Vermilion, mercuric sulfide (DL)	77766
PR 108	I		Cadmium (hue designation), concentrated cadmium-seleno sulfide (CC)	77202.1
PR 108:1	I		Cadmium-Barium (hue designation), cadmium seleno-sulfide coprecipitated with barium sulfate	77202:1
PR 112	II		Naphthol AS-D, naphthol AS-D	12370
PR 113	I		Cadmium Vermilion Red Light, Medium or Deep, concentrated cadmium mercury sulfide (CC)	77201
PR 113:1	I		Cadmium-Barium Vermilion Red Light, Medium or Deep, cadmium mercury sulfide coprecipitated with barium sulfate	77201:1
PR 119	I		Naphthol Red, naphthol	NA
PR 122	I		Quinacridone (hue designation), γ quinacridone	73915
PR 123	II		Perylene (hue designation), perylene	71145
PR 149	I		Perylene (hue designation), perylene	77137
PR 168	I		Brominated Anthanthrone, brominated anthanthrone	59300
PR 170 F3RK-70	I		Naphthol Red, naphthol carbamide	12475
PR 170 F5RK	II		Naphthol Crimson, naphthol carbamide	12475
PR 171	I		Benzimidazolone (hue designation), monoazo benzimidazolone	12512
PR 175	I		Benzimidazolone (hue designation), benzimidazolone	71513
PR 179	I		Perylene (hue designation), perylene	71130
PR 181	I		Thioindigoid Magenta, thioindigoid	73360
PR 188	I		Naphthol AS, naphthol AS	12467
PR 190	I		Perylene (hue designation), perylene	71140
PR 192	I		Quinacridone (hue designation), γ quinacridone red	NA
PR 194	I		Perinone Red Deep, perinone	71100
PR 202	I		Quinacridone (hue designation), quinacridone	73907
PR 206	I		Quinacridone Burnt Orange, quinacridone	NA
PR 207	I		Quinacridone (hue designation), quinacridone red	73900
PR 209	I		Quinacridone Yellow Red, quinacridone red γ	73905
PR 242	I		Disazo condensation	20067
PR 254	I		Pyrrole Red, pyrrolopyrrol	73902
PR 255	I		Pyrrole Scarlet, pyrrolopyrrol	NA
PV 19	I		Quinacridone (hue designation), γ quinacridone red	73900
PURPLES				
PV 15	I		Ultramarine Red, complex silicate of sodium and aluminum with sulfur, or sodium aluminosulphosilicate	77007
PV 15	I		Ultramarine Violet, complex silicate of sodium and aluminum with sulfur, or sodium aluminosulphosilicate	77007
PV 19 (DL)	I		Quinacridone (hue designation), quinacridone violet b	73900
PV 23 (RS)	II		Dioxazine Purple, carbazole dioxazine	51319
PV 31	I		Isoviolanthrone Violet, isoviolanthrone	60010
BLUES				
PB 15	I		Phthalocyanine Blue or Phthalo Blue, copper phthalocyanine	74160
PB 16	I		Phthalocyanine Blue, metal free phthalocyanine	74100
PB 22	I		Indanthrone Blue, indanthrone	69810
PB 27	II		Prussian Blue with option of adding the name Milori Blue, ferri-ammonium ferrocyanide	77510
PB 28	I		Cobalt Blue, oxides of cobalt and aluminum or cobalt aluminate	77346
PB 29	I		Ultramarine Blue, complex silicate of sodium and aluminum with sulfur, or sodium aluminosulphosilicate	77007
PB 33	I		Manganese Blue, barium manganate with barium sulfate	77112
PB 35	I		Cerulean Blue, oxides of cobalt and tin or cobalt stannate	77368
PB 36	I		Cerulean Blue, Chromium or Cobalt Chromite Blue, oxides of cobalt and aluminum, or cobalt chromite	77343
PB 60	I		Indanthrone Blue, indanthrone	69800
GREENS				
PG 7	I		Phthalocyanine Green or Phthalo Green, chlorinated copper phthalocyanine	74260
PG 10	I		Green Gold with option of adding the name Nickel Azo Yellow, nickel chelated azo	12775
PG 17	I		Chromium Oxide Green, anhydrous chromium sesquioxide	77288
PG 19	I		Cobalt Green, oxides of cobalt and zinc, or cobalt zincate	77335
PG 23	I		Green Earth or Terra Verte, natural ferrous silicate containing magnesium and aluminum potassium silicates	77009
PG 26	I		Cobalt Green, cobalt chromite	77344
PB 36	I		Cobalt Chromite Green or Cobalt Turquoise, oxides of cobalt and chromium, or cobalt chromite	77343
PG 36	I		Phthalocyanine Green, chlorinated and brominated phthalocyanine	74265
PG 50	I		Light Green Oxide, oxides of nickel, cobalt, and titanium	77377
BROWNS				
PBr 6	I		Mars Brown or Iron Oxide Brown with option of adding the name Brown Iron Oxide, synthetic brown iron oxide or mixture of synthetic iron oxides	77499

TABLE 1 *Continued*

Colour Index Name	Lightfastness Category		Common Name and Chemical Class	Colour Index Number
		Acrylic		
<u>PBr 7</u>	I		<u>Burnt Sienna</u> , calcined natural iron oxide	77491 or 77492
<u>PBr 7</u>	I		<u>Burnt Umber</u> , calcined natural iron oxide containing manganese	77491 or 77492
<u>PBr 7</u>	I		<u>Raw Sienna</u> , natural iron oxide	77491 or 77492
<u>PBr 7</u>	I		<u>Raw Umber</u> , natural iron oxide containing manganese	77491 or 77492
BLACKS				
<u>PBk 6</u>	I		<u>Lamp Black</u> , nearly pure amorphous carbon	77266
<u>PBk 7</u>	I		<u>Carbon Black</u> , nearly pure amorphous carbon	77266
<u>PBk 9</u>	I		<u>Ivory Black</u> or <u>Bone Black</u> , amorphous carbon produced by charring animal bones	77267
<u>PBk 10</u>	I		<u>Graphite Gray</u> , crystallized carbon	77265
<u>PBk 11</u>	I		<u>Mars Black</u> or <u>Iron Oxide Black</u> , with option of adding the name Black Iron Oxide, synthetic black iron oxide	77499
WHITES				
<u>PW 4</u>	I		<u>Zinc White</u> , zinc oxide	77947
<u>PW 6</u>	I		<u>Titanium White</u> , titanium dioxide (rutile or anatase)	77891

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 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.

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 in an appropriate producer 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 Pigments*—In the case of substituted pigments, 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. Directly below the title, the Common Name from **Table 1** of the pigment(s) used shall be given in letters no less than the next type size smaller than the title; or if more than one pigment is used, then **5.1.7** covering mixed pigments, can be followed. For example:

CADMIUM RED MEDIUM HUE
(Naphthol Red AS-OL)

COBALT BLUE HUE
(mixture)

5.1.6 Proprietary names or optional names may be used provided the Common Name(s) given in **Table 1** appears on the front of the label directly under the proprietary or optional name in letters no less than the next type size smaller than the

proprietary or optional name; or if more than one pigment is used, then **5.1.7** covering mixed pigments, can be followed.

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 Common Names for the pigments in the mixture, or the word “Mixture,” must appear under the title in letters no less than the next type size smaller than the title. For example:

PERMANENT GREEN LIGHT
(Cadmium Yellow Light,
Phthalocyanine Blue)

PERMANENT GREEN LIGHT
(Mixture)

If the word “Mixture” is used under the title, the Common Names of the pigments in the mixture, as given in **Table 1**, must be listed along with their Colour Index Names and the Lightfastness Category of the mixture somewhere on the label. 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.

5.2 Provide on the label identification of polymer used in the paint.

NOTE 1—The type of polymer can be identified by using Practice **D3168**.

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**.

5.3.1 Lightfastness I pigments, when made into paint specimens as described in Section 7 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.

5.3.2 Lightfastness II pigments, when made into paint specimens as described in Section 7 and exposed, tested, and rated in accordance with Test Methods **D4303**, shall have a color difference (ΔE^*_{ab}) of more than 4.0 but not more than 8.0 CIELAB units between the specimens measured before and after exposure.

5.3.3 Pigments were placed in a lightfastness category on the basis of either known historical performance in art works or