

U. S. DEPARTMENT OF COMMERCE

JESSE H. JONES, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

National Bureau of Standards
APR 14 1942

ARTISTS' OIL PAINTS

COMMERCIAL STANDARD CS98-42

Effective Date for New Production from May 10, 1942



A RECORDED VOLUNTARY STANDARD
OF THE TRADE

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1942

PROMULGATION
of
COMMERCIAL STANDARD CS98-42
for
ARTISTS' OIL PAINTS

On February 9, 1940, at the instance of the Massachusetts Art Project, WPA, a general conference of representative manufacturers, distributors, and users of artists' oil paints adopted a recommended commercial standard for this commodity. Those concerned have since accepted and approved for promulgation by the United States Department of Commerce, through the National Bureau of Standards, the standard as shown herein.

The standard is effective for new production from May 10, 1942.

Promulgation recommended.

I. J. Fairchild,
Chief, Division of Trade Standards,

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Jesse H. Jones,
Secretary of Commerce.

ARTISTS' OIL PAINTS

COMMERCIAL STANDARD CS98-42

PURPOSE

1. The purposes of the commercial standard are to serve as a guide to artists in the purchase of paints of satisfactory color, working quality, and durability; to eliminate confusion in nomenclature; to promote fair competition among manufacturers by providing criteria for differentiation among paints of known satisfactory composition and others of unknown or inferior quality, and thus to provide a basis for certification of quality.

This commercial standard covers minimum requirements for artists' oil paints of satisfactory color and durability. It is not intended that all paints meeting the requirements shall be identical nor of uniform excellence in all respects. Variations in manufacture and grinding not controlled by the specification may cause some artists to prefer one brand over another, both of which are acceptable under this specification.

SCOPE

2. This commercial standard covers one grade of artists' oil paints and includes criteria of color, nomenclature, chemical composition, working qualities, light fastness, and performance. It also covers methods of testing to demonstrate conformance with the standard, packaging, and guarantee of quality.

NOMENCLATURE

3. The paint names given in tables 1 and 2 indicate the chemical nature of the pigment or are those which, through usage, have become associated with that pigment. The use of these names for similarly colored pigments is not permitted by this standard.

GENERAL REQUIREMENTS

4. *Pigments* shall be of good grade. Composition and identity shall conform to tables 1 and 2. Organic lakes or toners shall not be used to fortify or sophisticate inorganic pigments. Substitution of similarly colored pigments is not permitted.

5. *Vehicles* shall consist of pure drying oils; linseed and/or poppy oil only.

6. *Driers* may be used in minimum amounts in paints that contain pigments which have a retarding effect on the drying of oils, to allow them to conform to drying-rate requirements (par. 7). The maximum amount of drier, however, shall not exceed 0.1 percent of cobalt or 0.2 percent of manganese, calculated as metal, on the weight of oil.

7. *Drying rate* shall be determined by the sand- and pressure-testing devices. Paints shall dry to both tests within 21 days and not under 3 days at 76° F. and 55-percent relative humidity. See paragraph 18.

8. *Consistency* of artists' oil paints shall be determined by use of a standard 2-kg Paste Paint Consistometer. Readings between 2 and 5 will be acceptable under this standard. See paragraph 20.

9. *Brushing* quality of artists' oil paints shall be determined by observing the handling quality of the paint when manipulated with a brush. All artists' oil paints shall brush out smoothly, evenly and easily, leaving a normal brush mark. They shall not be sticky, thick or rubbery, nor too fluid. There shall be no free or excess oil. They shall not contain skin and shall be uniformly ground. They shall retain their form and shall not level out when applied with a palette knife. See paragraph 21.

10. *Tinting strength* of artists' oil paint shall not be less than that of the standard adopted for each pigment. See paragraph 22.

11. *Composition* of the paint, governed by the relative amounts of vehicle, pigment, and inert used, shall produce a paint of satisfactory working qualities, conforming to all requirements of this commercial standard.

12. *Inerts and fillers* shall not be used in amounts that will impair the tinting strength, the drying time, or the working qualities of the paint.

13. *Bodifying agents*, such as metallic soaps and/or refined beeswax, may be used only in minimum amounts to produce desirable working qualities, consistency, and to prevent settling of pigment.

DETAIL REQUIREMENTS

14. *Light fastness*.—All pigments included in tables 1 and 2 have been shown to resist fading satisfactorily when used in oil painting and under normal conditions of exposure. No accelerated method of testing for light fastness has been found to be directly comparable with normal use conditions, but for purposes of test, exposure to sunlight under specified conditions has been found to be of some value as a means of grouping paints on the basis of fastness under test conditions. The grouping of pigments covered by this commercial standard, when painted in oil on nonabsorbent supports and unmixed with other pigments, is shown in tables 1 and 2.

14a. Group I paints shall resist fading to direct sunlight at southern exposure under glass at 45° angle for 2 months. This shall include at least 600 hours of sunlight, as shown by weather reports from the nearest United States Weather Bureau station.

14b. Group II paints shall resist fading to direct sunlight under the above conditions for 1 month. This shall include at least 300 hours of sunlight.

14c. The above tests shall be made in the period from April 1 to October 1 of any given year. If this method is impractical, or in case of dispute, the paints shall be tested under conditions agreed upon by all parties concerned.

15. *Names* under which artists' oil paints conforming to this commercial standard are sold, the pigments used in their composition, and the light-fastness group of each, shall conform to tables 1 and 2, glossary of terms. Only paints whose labels and contents conform to

the nomenclature and composition as indicated in the glossary of terms are acceptable. To assist in transition from past nomenclature to the standard nomenclature as employed in the glossary of terms (tables 1 and 2), manufacturers shall be permitted for a period of 2 years after acceptance of this standard to carry on the label as a subtitle, in smaller type and in parentheses, their customary designations for pigment identity or color description with which their clientele have become accustomed, but the use of such subtitles shall be discontinued at the termination of the 2-year period.

TABLE 1.—Standard paints—glossary of terms

Paint name	Pigment 1	Test group (see par. 14)
Alizarin crimson.....	The synthetic red organic dyestuff 1, 2-dihydroxy-anthraquinone precipitated on a base of aluminum hydrate.	I
Burnt sienna.....	Iron oxide prepared by calcining the natural earth, raw sienna.	I
Burnt umber.....	Iron oxide and manganese dioxide pigment prepared by calcining raw umber.	I
Cadmium orange.....	Cp cadmium sulfide, CdS, or cadmium sulfoselenide, CdS+CdSe.	I
Cadmium-barium orange.....	Cadmium sulfide, CdS, or cadmium sulfoselenide, CdS+CdSe, coprecipitated with barium sulfate.	I
Cadmium red, deep.....	Cp cadmium sulfoselenide, CdS+CdSe.....	I
Cadmium red, medium.....		
Cadmium red, light.....		
Cadmium-barium red, deep.....	Cadmium sulfoselenide coprecipitated with barium sulfate, CdS+CdSe+BaSO ₄ .	I
Cadmium-barium red, medium.....		
Cadmium-barium red, light.....		
Cadmium yellow, deep.....	Cp cadmium sulfide, CdS.....	I
Cadmium yellow, medium.....		
Cadmium yellow, light.....		
Cadmium-barium yellow, deep.....	Cadmium sulfide coprecipitated with barium sulfate, CdS+BaSO ₄ .	I
Cadmium-barium yellow, medium.....		
Cadmium-barium yellow, light.....		
Cerulean blue.....	Combined oxides of cobalt and tin, CoO.nSnO ₂ ..	I
Chromium oxide green.....	Anhydrous chromic oxide, Cr ₂ O ₃	I
Cobalt blue.....	Combined oxides of cobalt and aluminum, CoO.Al ₂ O ₃ .	I
Cremlitz white.....	Basic lead carbonate, 2PbCO ₃ .Pb(OH) ₂ . Made by Cremlitz process.	I
Flake white.....	Basic lead carbonate, 2PbCO ₃ .Pb(OH) ₂	I
Green earth.....	Natural earth consisting chiefly of the hydrous silicates of iron, aluminum, magnesium, and potassium.	I
Indian red.....	Nearly pure iron oxide Fe ₂ O ₃ . It may be either natural or artificial in origin.	I
Ivory black.....	Amorphous carbon produced by charring animal bones.	I
Lamp black.....	A nearly pure amorphous form of carbon made from the condensed smoke of a luminous flame.	I
Light red.....	Natural iron oxide, Fe ₂ O ₃ , with varying proportions of inert.	I
Mars orange.....	Artificial ochre, consisting chiefly of iron and aluminum oxides, Fe ₂ O ₃ +Al ₂ O ₃ .	I
Mars red.....	Artificial ochre consisting chiefly of iron and aluminum oxides, Fe ₂ O ₃ +Al ₂ O ₃ .	I
Mars violet.....	Artificial iron oxide, Fe ₂ O ₃	I
Mars yellow.....	Artificial ochre consisting chiefly of hydrous oxide of iron and aluminum, Fe ₂ O ₃ .nH ₂ O+Al ₂ O ₃ .nH ₂ O.	I
Mixed white.....	Mixture of zinc white, ZnO, and white lead, 2PbCO ₃ .Pb(OH) ₂ , percentages to be declared on label.	I
Phthalocyanine blue.....	A synthetic organic dyestuff, which is copper phthalocyanine.	I
Phthalocyanine green.....	Synthetic organic dyestuff, which is chlorinated copper phthalocyanine.	I
Raw sienna.....	Natural earth that consists chiefly of the hydrous silicates and oxides of iron and aluminum.	I
Raw umber.....	Natural earth that consists chiefly of the hydrous oxides and silicates of iron and manganese.	I
Rose madder.....	The synthetic red organic dyestuff 1, 2-dihydroxy-anthraquinone precipitated on a base of aluminum hydrate.	I

See footnote at end of table.

TABLE 1.—Standard paints—glossary of terms—Continued

Paint name	Pigment ¹	Test group (see par. 14)
Titanium white.....	A white containing at least 30 percent of titanium dioxide, TiO ₂ , and free from lead, balance either BaSO ₄ and/or ZnO.	I
Ultramarine blue.....	Complex silicate of sodium and aluminum with sulfur.	I
Ultramarine red.....	Complex silicate of sodium and aluminum with sulfur.	I
Venetian red.....	Artificial or natural iron oxide with varying proportions of inert.	I
Viridian.....	Hydrous chromic oxide, Cr ₂ O ₃ .2H ₂ O.....	I
Yellow ochre.....	Artificial or natural mixture of hydrous iron oxide with alumina and silica.	I
Zinc white.....	Zinc oxide, ZnO.....	I

¹ There is no claim that all the pigments listed in table 1 are stable and desirable under all conditions. The list at present includes only the better known and more stable pigments. It is to be understood that the chemical formulas used in the tables are not intended to indicate the exact chemical composition of the pigments but rather their approximate or substantial composition. It is recognized that in the preparation of certain pigments it is often necessary to incorporate modifying materials which are not to be regarded as fillers, extenders, or adulterants.

15a. *Supplementary paints* listed under table 2 include those which may not be regularly supplied by some manufacturers because of little demand, but they are listed in this standard for those who wish to purchase them.

TABLE 2.—Supplementary paints—glossary of terms

Paint name	Pigment	Test group (See par. 14)
Cobalt green.....	Combined oxides of zinc and cobalt, CoO. nZnO.....	I
Cobalt violet.....	Anhydrous cobalt phosphate, Co ₃ (PO ₄) ₂ , or arsenate, Co ₃ (AsO ₄) ₂ .	I
Cobalt yellow.....	Potassium cobalt nitrite, CoK ₃ (NO ₂) ₆ .H ₂ O.....	II
Manganese blue.....	Barium manganate with barium sulfate, BaMnO ₄ +BaSO ₄ .	I
Manganese violet.....	Manganese ammonium phosphate, MnNH ₄ PO ₄	I
Prussian blue.....	Ferri ferrocyanide, Fe ₄ (Fe(CN) ₆) ₃	I
Strontium yellow (lemon yellow).....	Strontium chromate, SrCrO ₄	II
Ultramarine green.....	Complex silicate of sodium and aluminum with sulfur.	II
Van Dyke brown.....	Bituminous earth or lignite with small amounts of iron, alumina, and silica.	II
Vermilion.....	Mercuric sulfide, HgS. Can be designated as English, French, or Chinese.	II

16. *Containers*.—Artists' oil paints shall be packed in tubes made of a suitable metal.

16a. Standard size tubes shall be approximately 1 by 4 inches over-all and shall contain not less than 37 ml of paint.

16b. When smaller size tubes are required, they shall be approximately ½ by 4 inches over-all, containing not less than 10 ml, or approximately ½ by 2 inches over-all, containing not less than 5 ml.

16c. White paint may be packed in tubes approximately 1½ by 6 inches over-all, containing not less than 150 ml and in tubes approximately 1 by 6 inches over-all, containing not less than 62 ml.

METHODS OF TEST

17. *Pigments* generally may be identified by the usual methods of analysis and identification of inorganic and organic compounds. In cases of doubt, the methods approved by the chairman of the standing committee and acceptable to both parties of the controversy may be used.

18. *Drying rate.*—Apparatus, preparation of samples, schedule, procedure, and interpretation are given below.

18a. *Apparatus.*—

- (1) Humidity- and temperature-controlled test room, maintaining approximately 76° F temperature and 55-percent relative humidity.
- (2) Sand testing apparatus. (See fig. 1.)
- (3) Pressure testing apparatus. (See fig. 2.)
- (4) Bronze template 0.010 inch in thickness, for use on 3- by 5-inch test panels. (See below.)
- (5) 3-by 5-inch glass panels (window glass thickness).
- (6) 2-ml measuring ring.
- (7) Doctor blade.
- (8) 50-ml Burette.
- (9) Palette knife.
- (10) Glass or marble mixing slab.

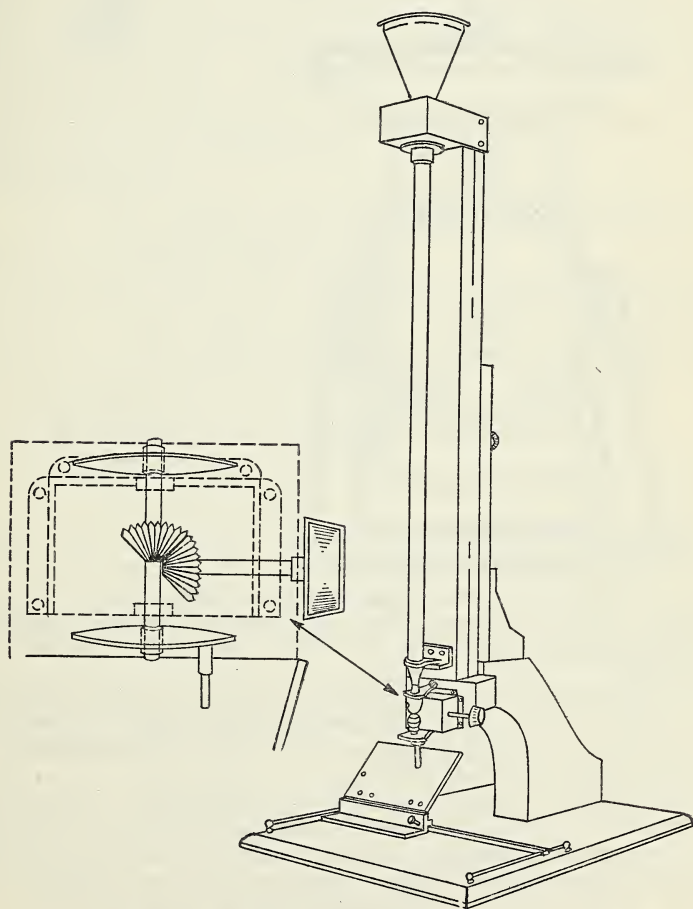


FIGURE 1.—Sand-type machine for drying-rate test.

For description and close-up photograph, see H. A. Gardner: *Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors*, ninth edition, pages 110-111. Institute of Paint and Varnish Research, Washington, D. C. (1939).

18b. *Preparation of test panels.*—Two ml of the paste paint are measured out in the ring and placed on the test plate; $\frac{1}{2}$ ml of turpentine is added and thoroughly mixed with the paste with a palette knife. The thinned paint is spread out on the glass panel to 0.010 inch in thickness with the aid of the template and a doctor blade.

18c. *Schedule.*—All tests are to be conducted in the controlled test room, and the specimens are to remain there until the tests are com-

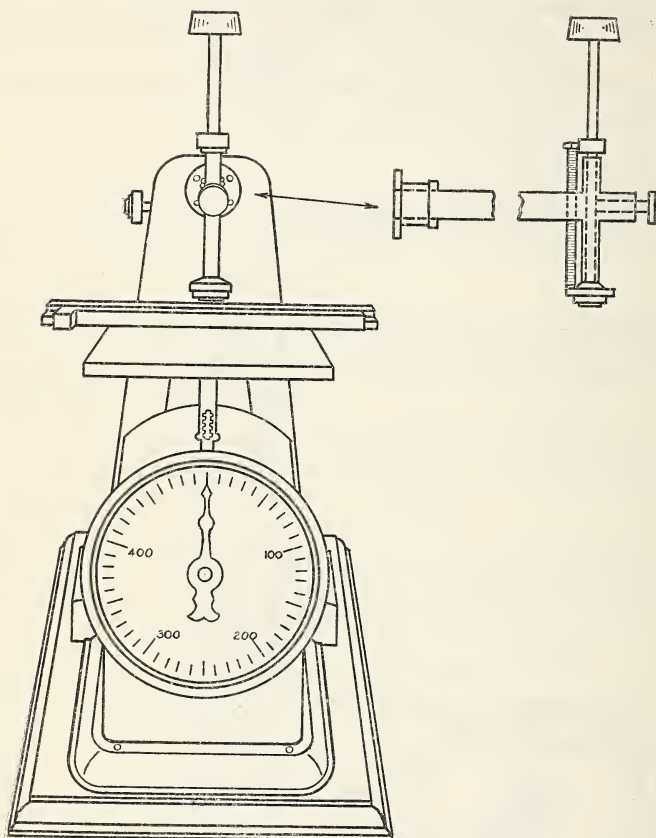


FIGURE 2.—Pressure-type machine for drying-rate test.

For description and close-up photograph, see H. A. Gardner: *Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors*, ninth edition, pages 118-119. Institute of Paint and Varnish Research, Washington, D. C. (1939).

pleted. The first test is to be made at the end of 3 days (72 hours) and the second at the end of 21 days (504 hours) after the paint has been applied and the sample has been deposited in the test room.

18d. *Procedure and interpretation.*—

18d(1). Surface drying rates shall be tested with the sand-type instrument (fig. 1), which permits 1 g of sand to flow over the painted surface held at an angle 45° with the vertical. For incidental tests, if this instrument is not available, sand may be poured by hand from a teaspoon. Sand shall not stick to the film nor leave a visible mark.

18d(2). Film-drying rate shall be tested with the pressure-type instrument (fig. 2), by which a 200-g weight is applied. For incidental tests, an ordinary metal ring with a sharp edge (like a wedding ring)

pressed on the paint film by a 200-g weight may be used. The ring shall leave no visible mark on the film.

19. *Light fastness* shall be determined in an out-of-door (roof) exposure rack.

19a. The exposure rack shall be constructed to hold panels at a 45° angle to southern exposure. The specimen shall be protected from rain and dirt by glass windows placed not less than 2 inches from the surface of the specimen. The windows shall be kept clean throughout the test. No obstruction shall interfere with exposure to full sunlight at all times of the day.

19b. Support for exposure tests shall be smooth opaque white, or opal, glass. Two specimen panels at least 3 by 5 inches in size shall be prepared by brushing out the paint as it comes from the tube without addition of thinner. In referee tests, a Bird applicator giving a film thickness of 0.003 inch shall be used. When dry, but not before 1 week, one specimen is placed in the exposure rack and left for a period conforming to its light-fastness group (see par. 14). The control panel shall be kept in diffused light during the period. The extent of fading shall be judged by comparison of the exposed panel with the control panel. A suitable varnish may be applied to differentiate between fading and chalking.

20. Consistency is measured with an instrument by which the paste paint is deformed under pressure.

20a. *Equipment.*—

- (1) Brass template approximately 4 inches square and 0.250 inch thick with centered hole (diameter 0.79 inch) to contain 2.0 ml of paint.
- (2) Glass plate with six concentric circles, numbered from 1 to 7, and spaced 1, 2, 3, 4, 5, 6, and 7 cm from the inner circle, whose diameter corresponds to the centered hole in the brass template. The chart is drawn on paper and glued to the back of the glass.
- (3) Wooden frame for housing template and glass.
- (4) Palette knife for applying paint to template.
- (5) Two-kg weight.
- (6) Glass plate for placing on top of paint after template has been removed.

20b. *Procedure.*—Place the glass plate with concentric rings face up in the bottom of the wooden frame. Place brass template over glass plate; if no frame or housing is used be sure the template is centered. Fill hole of template with paint to be tested and level off. Lift template from plate, take the plain glass plate and lay on the paint and apply evenly the 2-kg weight, allowing it to stand until the paint has ceased to spread. Paint of proper consistency shall spread over the No. 2 ring and not over the No. 5 ring.

21. *Brushing quality.*—This test shall be performed by a technician skilled in the use of artists' oil paints. Settlement of any dispute shall be made by a committee of three technicians satisfactory to both parties. Technicians should observe how the paint brushes out and handles and they shall describe these qualities in the following terms.

Smooth, describes a paint which spreads evenly and easily, leaving a normal brush mark.

Sticky or tacky, describes a paint which is thick, viscous, or rubbery, and difficult to apply.

Fluid. describes a paint which flows too rapidly for correct handling. Paints very fluid in character leave few or no brush marks, and when applied in impasto lose form and "level out." Any change in the leveling of paint over a period of 24 hours should be observed.

22. *Tinting strength.*

22a. *Equipment.*—

- (1) Template, measuring ring, or other suitable device for volumetric reduction of paste paints, 20:1 and 10:1.
- (2) Pieces of flat glass for use in mixing the paste.
- (3) Flexible spatula having a 3-inch blade for mixing.
- (4) Scraper or flexible doctor blade for smoothing down the paste color for comparative purposes.
- (5) Standard tint for the paint to be tested.¹

22b. *Materials.*—Zinc oxide standard reduction paste made from the following formulas as outlined by the Federation of Paint and Varnish Production Clubs, Official Digest, No. 120, p. 1029 (November 1932) and published in H. A. Gardner's Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors, 9th edition, page 33 (1939).

300 parts by weight Green Seal zinc oxide.
64 parts by weight poppy seed oil.
2 parts by weight calcium stearate.
1 part by weight turpentine.

22b (1). If, for certain uses, it is found that the above reduction paste dries too slowly, it is permissible to add 0.213 part by weight of 6-percent cobalt naphthenate drier to give 0.02 percent of metallic cobalt based on the weight of the oil.

22c. *Procedure.*—Reduce 1 volume of the paint to be tested with 20 volumes of the standard reduction paste. Mix thoroughly with a spatula on glass plate. Paint out the reduced paint on a suitable support and, after drying it, compare the color strength with the tinting-strength standard for the pigment being tested. Regard strength (value) only; differences in color caused by naturally occurring differences in pigments shall be disregarded. The color-tinting strength shall equal or exceed the standard. (The tinting-strength tests for Green Earth and Ultramarine Red, (table 1) and Cobalt Violet, (table 2) are made by reduction with standard reduction paste 10:1. The tinting-strength standards of paints made with these pigments have been made by 10:1 reduction (instead of 20:1) because they have inherently low tinting strength.)

LABELING

23. *Labeling* of artists' oil paints shall indicate the following:

- (a) The complete paint name, indicating pigment composition in conformance with the standard nomenclature in the glossary of terms, tables 1 and 2, paragraphs 15 and 15a, shall be clearly printed on one side of the tube in letters of equal size and importance. Subtitles, which

¹ A limited number of sets of standard tints of all paints listed in tables 1 and 2 are available, under appropriate conditions, to those who are required to compare manufactured paints with the standards, by applying to the chairman of the standing committee, R. J. Gettens, Fogg Museum of Art, Harvard University, Cambridge, Mass. These standards are made in volumetric ratios of 20:1 or 10:1 with the zinc oxide standard reduction paste described in section 22b.

are permitted for 2 years, (see par. 15) shall appear in smaller type and in parentheses directly under the paint name.

(b) Contents expressed in milliliters.

(c) The guarantee of conformance to the commercial standard.

GUARANTEE

24. It is recommended that artists' oil paints conforming to this commercial standard shall be guaranteed by the manufacturer through the use of the following statement appearing on labels or invoices:

The ----- Company guarantees this artists' oil paint to conform to all requirements of Commercial Standard CS98-42, issued by the National Bureau of Standards.

When space limitation on the label requires an abbreviated statement, the following will be acceptable in lieu of the complete statement:

Conforms to CS98-42.

EFFECTIVE DATE

The standard is effective for new production from May 10, 1942.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, appointed by the general conference to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

Chairman:

R. J. GETTENS, Fogg Art Museum, Harvard University, Cambridge, Mass.

Users:

F. W. STERNER, Paint Testing and Research Laboratory, Massachusetts WPA, 130 Lincoln St., Brighton, Mass.

STUART DAVIS, 43 Seventh Ave., New York, N. Y.

HAROLD PARKS, 17 Collinwood Road, Maplewood, N. J. (Representing American Artists Professional League).

WILFORD S. CONROW, 154 West 57th St., New York, N. Y. (Representing American Artists Professional League).

GEOFFREY NORMAN, 514 10th St., NW., Washington, D. C. (Representing National Society of Mural Painters).

JOHN SCOTT WILLIAMS, 8 West 13th St., New York, N. Y. (Representing Architectural League of New York).

JULIO DE DIEGO, 508 Grant Place, Chicago, Ill. (Representing Chicago Society of Artists).

JOSEPH SOLMON, 111 E. 28th St., New York, N. Y. (Representing United American Artists).

RALPH MAYER, 240 E. 20th St., New York, N. Y. (Representing American Artists' Congress, Inc.).

ROBERT F. LOGAN, Connecticut College, New London, Conn.

Manufacturers:

- J. H. LOVETT, Devoe & Reynolds Co., Inc., 44th St. & First Ave., New York, N. Y.
 W. J. GRUMBACHER, M. Grumbacher, 460 W. 34th St., New York, N. Y.
 H. W. LEVISON, Permanent Pigments, 2700 Highland Ave., Norwood Station, Cincinnati, Ohio.
 F. W. WEBER, F. Weber Co., 1220 Buttonwood St., Philadelphia, Pa.
 H. E. MARTINI, Martini Artists Color Laboratories, 10-15 43d Ave., Long Island City, N. Y.
 DANA JOHNSON, American Artists' Color Works, Inc., 5601 First Ave., Brooklyn, N. Y.
 J. S. DYSON, Winsor & Newton, Inc., 31 Union Square West, New York, N. Y.
 WM. M. BOSMAN, Talens & Son, Inc., 127 Sussex Ave., Newark, N. J.
 GERTRUDE M. TONSBURG, Hatfield's Color Shop, 112 St. James Ave., Boston, Mass. (Representing J. H. Hatfield).
 DAVID GANSLER, Permia Colors, 1915 Davidson Ave., New York, N. Y.

Secretary:

- F. W. REYNOLDS, Division of Trade Standards, National Bureau of Standards, Washington, D. C.

HISTORY OF PROJECT

On October 20, 1938, the Massachusetts Art Project, WPA, reported to the National Bureau of Standards that conditions surrounding the purchase of artists' oil paints of good quality were unsatisfactory and that paints purchased were often misnamed and did not contain the pigment the name indicated. The letter requested the establishment of a commercial standard along the lines of other commercial standards established by the National Bureau of Standards.

A tentative draft of a proposed commercial standard was prepared by F. W. Sterner, technical director, and R. J. Gettens, consultant, of the Paint Testing & Research Laboratory, whereupon the National Bureau of Standards conducted a preliminary conference of manufacturers with representatives of the Paint Testing & Research Laboratory in Boston on April 14, 1939. After adjustment of the tentative draft by the preliminary conference, and through subsequent correspondence, a general conference was called and held at the Museum of Modern Art in New York City on February 9, 1940.

The general conference, attended by 85 representatives of art organizations and paint firms, remained in session all day and well into the early part of the evening, and made a number of modifications in the requirements of the proposed standard. Some questions remained unsettled and were referred to a special committee composed of three artist representatives and three manufacturers.

The special committee met in New York City on April 30, 1940, and completed the tasks assigned to it by the general conference. The recommended commercial standard as adjusted was circulated to the entire industry for acceptance on August 16, 1940.

A large number of acceptances from both users and producers was received, but some comment led the special committee to believe some further adjustment of the specification was desirable. Accordingly, a second meeting of the committee was held in New York City on May 16, 1941. The second edition of the recommended commercial standard as finally adjusted was circulated for acceptance on August 15, 1941, and on February 10, 1942, the National Bureau of Standards announced that acceptances representing a sufficient volume of business had been received and that the standard would be effective for new production from May 10, 1942.

APPENDIX

SPONSORS' NOTES ON THE COMMERCIAL STANDARD FOR ARTISTS' OIL PAINTS

By R. J. GETTENS AND F. W. STERNER

Serious painters have long been concerned with the permanence of colors, and they have realized that no matter how true and deep their inspiration and how perfect their technical skill, the real value of their work is inextricably bound to the chemical and physical stability of the materials they use. For years, scattered individuals and groups have been especially interested in the technical problems of the artist, and they have contributed much to our knowledge of the permanence of painting materials. In years past, the books of A. H. Church, A. Eibner, A. P. Laurie, F. W. Weber, and Maximilian Toch have influenced a considerable number of painters; more recently, the writings of Max Doerner, and Ralph Mayer's recently published *Artists' Handbook of Materials and Techniques*, have brought the artist up-to-date information. In Germany some decades ago, a few artists' societies, particularly the German Society for the Promotion of Rational Methods in Painting, in Munich, sought to establish a limited and permanent palette, and at various congresses and sittings of commissions held in Germany over a period of many years, resolutions were passed covering the nomenclature, labeling, and quality of artists' oil paints. The Royal Academy of Arts and other societies in England have been active along similar lines. Here in America, Edward W. Forbes, of Harvard University, and others have stimulated interest in techniques and in permanent painting materials. Some years ago Martin Fischer, of Cincinnati, published a book, *The Permanent Palette*, in which he listed a restricted number of pigments that he believed to be permanent. The American Artists' Professional League realized the value of such information and gave its support to the views of Dr. Fischer. Wilford S. Conrow, national secretary of the League, pointed out at the general conference that, through the distribution of pamphlets, the inducement of some manufacturers to declare the chemical composition of paints on tube labels, and the sponsorship of chemically sound painting techniques, the League has promoted the use of pigments recommended as permanent. All these efforts, individual and collective, have been important steps in furthering the cause of permanent painting and have been of great value in laying the groundwork for the commercial standard.

This commercial standard seeks not only to arouse interest in materials for permanent painting but also to enable the artist to procure those materials. It sets up specifications for paints which are intended to assure the artist who buys them that he is getting a definite product which can be expected to have reasonable, if not excellent, permanence, provided it is used correctly. It is felt that the standard will eliminate the outright poor material that so often masquerades as high-quality paint.

The standard does not attempt to define or to guarantee the production of perfect paints because such paints have never existed and no one could recognize them if they had. There is general agreement, based on experience gained from centuries of use, that certain ingredients used in paints are good and permanent that some are acceptable within limitations, and that others are bad. There is much disagreement, however, among authorities about a great many paint materials because their application has not been sufficiently studied; for these, judgment will have to be reserved until reliable data are produced. One great difficulty is that final evaluation of the lasting qualities of artists' paints often cannot be made until many years after they are applied.

It is not intended that paint produced under the standard by different manufacturers shall be exactly the same in composition and in working qualities. The manufacture of paints is a complicated process, and is perhaps, even today, more of an art than a science. Methods of manufacture must necessarily vary among different firms. The product must satisfy those who are employing a wide variety of techniques. Artists may prefer one brand to another because of slight differences in working quality, consistency, color, and composition allowed under the terms of the standard.

When this standard was first proposed, it covered two grades of paint: an artists' grade, and a students' grade, based on differences in tinting strength; but, after much consideration, it was decided that the standard should cover only a single grade of high standard or "artists' grade" paint. Establishment of two grades would have led to much unnecessary confusion, not only for the manufacturer, but for the artist. It was felt that this standard was primarily for the benefit of the professional painter who was desirous of producing permanent works of art, and, furthermore, that it would be difficult to make any practical distinction between the two grades on the basis of tinting strength alone. It might have been possible with paints which contain expensive pigments but not with those which contain iron oxide or the earth colors.

The section on vehicles may call for some explanation. In the standard, the vehicles are limited to linseed oil or poppy-seed oil because these seem to have, to a greater extent than other drying oils, the desirable properties required in an artists' oil medium. No other oils have become well enough established for artists' purposes to be included, but when it can be demonstrated that there are other drying oils which are equal or superior, their inclusion in the standard may be considered by the standing committee. It has been suggested that the kind of vehicle used in artists' paints be printed on the label, but, since the vehicle in paints covered by the standard is definitely limited to these two oils, that does not seem necessary. If manufacturers wish, however, to designate on the label the kind of drying oil used, whether linseed or poppy-seed, the information would be much welcomed by artists.

There is also the difficult question concerning the direct incorporation of driers in prepared pigment pastes. Some artists are strongly against it. It is argued, however, with considerable justification, that the manufacturer can incorporate a drier more scientifically than can the artist. It is much better for the manufacturer to adjust the drying qualities of paints with minimum amounts of metallic driers than it is for the artist to do it by rule-of-thumb addition of siccativ or varnish. It is felt that the limited amounts of driers permissible under the standard can cause no harm.

Inerts, fillers, and bodying agents, including metallic soaps and waxes, are allowed in minimum amounts in paints covered by the standard (see sections 12 and 13). This is done because it is often necessary to incorporate limited amounts of such materials in order to insure proper keeping qualities and satisfactory working characteristics. From laboratory observations there appears to be no sharp border line between legitimate additions of inerts, fillers, and bodying agents to attain certain desirable qualities on the one hand and adulteration on the other. Although amounts of these materials allowable are not directly specified, indiscriminate use of them is limited by the high standards for tinting strength.

The standard does not attempt to set up a limited palette nor does it prescribe pigments that are to be used. The pigments listed under the glossary of terms include a fairly wide range in respect to color and composition, and they have been selected on the basis both of permanency and of usage. These pigments have been divided into two light-fastness test groups, I and II. Group I includes pigments which will not fade or change color when exposed to 600 hours of direct summer sunlight. If a pigment can withstand even this minimum exposure without change, it is felt that it will give altogether satisfactory performance in paint films intended for indoor exposure. The smaller group, II, covers a few pigments which do not have high permanency to long exposure in direct sunlight yet which, in diffuse light, are comparable in permanency to the pigments listed in group I. They include pigments like strontium yellow and vermilion, which are commonly used by artists because of their desirable color qualities. Pigments included in group II must be permanent enough, however, to resist fading or color change after exposure to 300 hours of direct summer sunlight.

Special mention should be made about the nomenclature used in the glossary of terms for cadmium yellow and red pigments (page 3 of the standard). Distinction is made between chemically pure (cp) cadmium sulfide and cadmium sulfoselenide (cadmium yellow and cadmium red) and these same materials coprecipitated with barium sulfate (called cadmium-barium yellow and red). This distinction is not made because there are great differences in color, purity, and permanency between the two classes of cadmium pigments but primarily because of the differences in tinting strength and the very considerable differences in cost. The cadmium barium pigments are much less expensive to make than the cp cadmiums. "Chemically pure" is used here in its technical sense. When applied to a pigment, the term means that it contains no intentionally admixed inert and is not fortified with a dyestuff, but it does not mean that it is 100 percent

pure. Some commercial cadmium yellows and reds, however, are better than 99.5 percent pure cadmium compounds, but cp cadmium yellow, light often contains a certain percentage of zinc sulfide to bring the cadmium yellow to proper value.

Ultimately, it would be desirable to have the quality of all pigments listed in the glossary of terms specified on a percentage basis of actual color ingredient. Harmful or undesirable impurities, like free sulfur or soluble sulfides in sulfide pigments, should be ruled out. Tolerance of noncoloring materials and inerts could be stated. This designation of the purity of pigments is a matter that might well come up for future consideration by the standing committee for the standard.

There has been some demand that more detailed information about paint composition be required on the label of the paint tube. It has been suggested that this include:

- (a) Chemical composition of the pigment.
- (b) Identity of all vehicular components.
- (c) Indication of the presence and amount of driers, inerts, and bodying agents.
- (d) Percentage composition of all components.
- (e) Volumetric contents of the package (tube).

If the manufacturer wants to supply all this information directly on the tube label, it would be welcome and nothing in the standard is intended to prevent him from doing so. The amount of information, however, that can be printed on the label of a studio-size tube is limited, and the printing of so many details would add to selling costs and would impose inflexibility in formulation. It is felt that a simple statement on the tube that the product conforms to all specifications in the standard is sufficient to indicate the quality and the contents.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date_____

Division of Trade Standards,
National Bureau of Standards,
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS98-42 as our standard of practice in the

Production ¹ Distribution ¹ Testing ¹ Use ¹

of artists' oil paints.

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature _____

Type or print } _____
name and address } _____
—Title, if any— } _____

If acceptance officially represents a firm or organization, kindly type or print that information below.

Organization _____
(Fill in exactly as it should be listed)

Address _____

¹ Please designate which group you represent by drawing lines through the other three. Please file separate acceptances for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade papers, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

Cut on this line

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations and individuals listed below have accepted this specification as their standard of practice in the production, distribution, and use of artists' oil paints. Such endorsement does not signify that they may not find it necessary to deviate from the standard, nor that producers so listed guarantee all of their products in this field to conform with the requirements of this standard. Therefore, specific evidence of quality certification should be obtained where required.

FIRMS, ORGANIZATIONS, AND INDIVIDUALS

- Academy of Allied Arts (Leo Nadon), New York, N. Y.
- Ackerman, Merle Beattie (Western College), Oxford, Ohio.
- Alabama Polytechnic Institute, Department of Applied Art (Frank W. Applebee), Auburn, Ala.
- Alabama, University of, Department of Art (Charles Le Clair), University, Ala.
- Albany Institute of History and Art (J. D. Hatch, Jr.), Albany, N. Y.
- Alexandria Art League (Stuart R. Purser), Alexandria, La.
- Allied Artists of Johnstown (Margie Coleman Harris), Johnstown, Pa.
- Allied Artists of West Virginia (Joseph Hugo), Charleston, W. Va.
- Allied Arts Studios (C. Genevieve Lawler), Swannanoa, N. C. (Formerly Workbench, Webster Groves, Mo.)
- American Artists' Color Works, Inc., Brooklyn, N. Y.
- American Artists' Congress, New York, N. Y.
- American Artists' Supply Co., Baltimore, Md.
- American Ceramic Society, Columbus, Ohio.
- American Crayon Co., The, Sandusky, Ohio. (In principle.)
- American Federation of Arts, Washington, D. C. (In principle.)
- American Institute of Architects, Colorado Chapter, Denver, Colo.
- American Photographic Publishing Co., Boston, Mass. (In principle.)
- An American Group, Inc. (Jack Markow), New York, N. Y.
- Anson K. Cross Art School, Inc. (Anson K. Cross), Boothbay Harbor, Maine, and St. Petersburg, Fla.
- Appalachian Museum of Art (Frank Hartley Anderson), Mount Airy, Ga.
- Architects League of Northern New Jersey, Cliffside Park, N. J., and Ridgewood, N. J.
- Arlt, William H. (Woodstock School of Design), Woodstock, N. Y.
- Art Students League of New York (Charles Trumbo Henry), New York, N. Y.
- Artists Union of Massachusetts (Lawrence Kupferman), Boston, Mass.
- Associated Artists of Pittsburgh (Earl Crawford), Pittsburgh, Pa.
- Associated Artists of Syracuse, The (Wilfred J. Addison), Syracuse, N. Y.
- Association of Oklahoma Artists (Iva B. Kelley), Oklahoma City, Okla.
- Baldinger, Wallace S. (Lawrence College), Appleton, Wis.
- Bath, Wm. K., South Windham, Conn.
- Bay State Artists' Guild (Alfred L. F. Denghausen), Brookline, Mass.
- Bennett, Bertha Forbes, Ridgewood, N. J.
- Berkshire Museum (Stuart C. Henry), Pittsfield, Mass. (In principle.)
- Binghamton Society of Fine Arts (Catherine R. Bartoo), Binghamton, N. Y.
- Blake Studios Summer School of Painting (Leo B. Blake), Berkshire, Mass.
- Bloch, Albert (University of Kansas), Lawrence, Kans.
- Bocour Hand Ground Artists Colors, New York, N. Y.
- Bradbury, C. E. (University of Illinois), Champaign, Ill.
- Braden Sutphin Ink Co., The, Cleveland, Ohio.
- Brazer, Clarence W., New York, N. Y.
- Brennan, Gertrudis A. (Brooklyn College), Brooklyn, N. Y.
- Brockton Public Library (William T. O'Rourke), Brockton, Mass.
- Browne, Margaret Fitzhugh, Boston, Mass.
- Bruce Museum, The (Paul Griswold Howes), Greenwich, Conn.
- Brushes, The, Art Department, Texas Christian University (Samuel P. Ziegler), Fort Worth, Tex.
- Bryn Mawr College Art Club (Helen Eichelberger), Bryn Mawr, Pa.

- Burris-Mayer, Elizabeth S. (Tobe-Coburn School for Fashion Careers), New York, N. Y.
- Bush, Lucile E. (Skidmore College), Saratoga Springs, N. Y.
- Business Men's Art Club (M. M. Kandle), Chicago, Ill.
- California Palace of the Legion of Honor (Henry Rusk), San Francisco, Calif.
- California School of Fine Arts (Hazel Percy), San Francisco, Calif.
- Callahan, H. D. (United States Quarry Tile Co.), East Sparta, Ohio.
- Calleott, Frank (Columbia University), New York, N. Y.
- Canadian Art Laboratory (H. J. Carter), Toronto, Ont., Canada.
- Catholic Schools of Archdiocese of Dubuque (Rt. Rev. Msgr. J. M. Wolfe, Dubuque, Iowa).
- Central Falls Public Schools (Edward L. Condon), Central Falls, R. I.
- Chase, Joseph Cummings (Hunter College), New York, N. Y.
- Chicago Academy of Fine Arts, The (Ruth Van Sickle Ford), Chicago, Ill.
- Chicago, University of (Edmund Giesbert), Chicago, Ill.
- Chinese Artists' Association (Charles Choy), Honolulu, Hawaii.
- Choinska, (Mrs.), Marion, Madison, Wis.
- Cincinnati Art Club (Charles Schlapp), Cincinnati, Ohio.
- Clearwater Museum School of Art (Henry White Taylor), Clearwater, Fla.
- Cogswell, Dorothy M. (Mount Holyoke College), South Hadley, Mass.
- Cohen, Edwin, Brooklyn, N. Y. (In principle.)
- Color Science Institute (Marie Sweet Carrington), New York, N. Y.
- Connecticut Academy of Fine Arts (Carl Ringius), Hartford, Conn.
- Consumers Testing Laboratories, Philadelphia, Pa. (In principle.)
- Cook, August (Converse College), Spartanburg, S. C.
- Cope, Thomas Pym, Philadelphia, Pa.
- Crossman, Catherine (State Teachers College), Winona, Minn.
- Curran, Chas. C., New York, N. Y.
- Davis, James E., (Princeton University), Princeton, N. J.
- Dallas Museum of Fine Arts (Richard Foster Howard), Dallas, Tex.
- Dayton Art Institute (Siegfried R. Weng), Dayton, Ohio.
- Dealer Service, Inc., Cleveland, Ohio.
- Delta Art Center (Leon Koury), Greenville, Miss.
- DeLuce, Olive S. (Northwest Missouri State Teachers College), Maryville, Mo.
- Denver Art College (E. L. Syman), Denver, Colo.
- DePauw University, Art Department (A. Reid Winsey), Greencastle, Ind.
- Diddel, Norma L., (Peru State Teachers College), Peru, Nebr. (In principle.)
- Dutch, C. I. (Evansville College), Evansville, Ind.
- East Texas State Teachers College (Ione Franklin), Commerce, Tex.
- Eastwood, Raymond J. (University of Kansas), Lawrence, Kans.
- Edmondson (Mrs.), Elisabeth, Medford, Oreg.
- Engel, Harry (Indiana University), Bloomington, Ind.
- Enoch Pratt Free Library (Gretta Smith), Baltimore, Md.
- Ericson, Sylvia (Hamline University), St. Paul, Minn.
- Farmer, Edward M. (Stanford University), Stanford University, Calif.
- Fashion Art Design School, Inc. (Louis A. Eisele), New York, N. Y.
- Ferdinand Perret Research Library of the Arts & Affiliated Sciences (Ferdinand Perret), Los Angeles, Calif.
- Ferguson, Eleanor A. (James Prendergast Free Library), Jamestown, N. Y.
- Ferguson, T. Reed, Jr., Kirkwood, Lancaster County, Pa.
- Fezandie & Sperrle, Inc., New York, N. Y.
- Field, Allan J., Cliffside, N. J.
- Fogg Museum of Art, Department of Conservation (George L. Stout), Cambridge, Mass.
- Fort Wayne Art School (Walter H. McBride), Fort Wayne, Ind.
- Foundation of Western Art (E. C. Maxwell), Los Angeles, Calif.
- Friends School (Mrs. Susan C. Ingersoll), Wilmington, Del.
- Gardner, Paul (Nelson-Atkins Gallery of Art), Kansas City, Mo. (In principle.)
- Gardner Museum (Isabella Stewart Gardner Museum) (Richard D. Buck), Boston, Mass.
- Garnsey, Julian E., New York, N. Y.
- General Electric Co., Schenectady, N. Y.
- Gilberg (Mrs.), R. G., Oakland, Calif.
- Givler, William H. (Museum Art School), Portland, Oreg.
- Glidden Co., The, Cleveland, Ohio.
- Grand Rapids Art Gallery School (Otto K. Bach), Grand Rapids, Mich.
- Grant, Gordon, New York, N. Y.
- Greason, Donald C., Rockport, Mass.
- Greene, Fred Stewart, Belleview, Fla.
- Gregg, Lairita Worden, Hartford, Conn.
- Grimes, James W. (Ohio State University), Columbus, Ohio.
- Gruenwald, Joan, Riverdale, N. Y.
- Haasis, Ferdinand, W. Salinas, Calif.
- Hackley Art Gallery (Harold Babcock), Muskegon, Mich.
- Hall, Weeks, New Iberia, La.

- Harder, Chas. M. (New York State College of Ceramics), Alfred, N. Y.
- Harshaw Chemical Co., The, Cleveland, Ohio.
- Hartford Salmagundians (Carl Ringius) Hartford, Conn.
- Harvard University (W. G. Morse), Cambridge, Mass.
- Harvard University, Semitic Museum, (Robert H. Pfeiffer), Cambridge, Mass.
- Hastings College (Helen Tilden), Hastings, Nebr.
- Hatch, John Davis, Jr. (Albany Institute of History & Art), Albany, N. Y.
- Hatfield, J. H., Canton, Mass.
- Hatfield's Color Shop, Inc., Boston, Mass.
- Heeb, Will H., Buffalo, N. Y.
- Helson, Harry (Bryn Mawr College), Bryn Mawr, Pa.
- Hiner, L. David (Ohio State University), Columbus, Ohio.
- Hoaglund, John Victor, Waltham, Mass.
- Hogue, Alexandre, Dallas, Tex.
- Holophane Co., Inc., New York, N. Y.
- Holt, George A., Belmont, Mass.
- Hotz, Henry, Jr. (Pennsylvania Academy of Fine Arts), Philadelphia, Pa. (In principle.)
- Howard University, The Friends of Art (James V. Herring), Washington, D. C.
- Howe, Robert Munson (State teachers college), Springfield, Mo.
- Illinois State Museum (Thorne Deuel), Springfield, Ill.
- Indiana State Library (Christopher B. Coleman), Indianapolis, Ind.
- Indiana State Teachers College (June Reynerson), Terre Haute, Ind.
- Institute of Modern Art, The (James S. Plaut), Boston, Mass.
- Inter-American Bureau of Information (Alvaro A. Araujo), Montevideo, Uruguay, South America.
- Inter-Society Color Council (Deane B. Judd), Washington, D. C. (In principle.)
- Irwin, Howard Lee (National Society of Mural Painters), New York, N. Y.
- Jewell, Kester (The Fitchburg Art Center), Fitchburg, Mass.
- Johns Hopkins Museum (David M. Robinson), Baltimore, Md.
- Johnson, Ellen (Oberlin College), Oberlin, Ohio.
- Jonas, Schubert E., Ann Arbor, Mich.
- Jones, Burton J. (New York University), New York, N. Y.
- Joyner, Howard W. (North Texas Agricultural College), Arlington, Tex.
- Kansas Federation of Art (Charles L. Marshall), Manhattan, Kans.
- Kansas, University of, School of Fine Arts (Raymond J. Eastwood), Lawrence, Kans.
- Kansas, University of (Marjorie Whitney), Lawrence, Kans.
- Kappa Pi National Art Fraternity (Iva Beatrice Kelley), Oklahoma City, Okla.
- Karwoski, Theodore (Dartmouth College), Hanover, N. H.
- Keck, Sheldon (Brooklyn Museum), Brooklyn, N. Y.
- Kentucky, University of, Department of Art (Edward W. Rannels), Lexington, Ky.
- Kerns, Maude Irvine (University of Oregon), Eugene, Oreg.
- Kingman, Eugene (Philbrook Art Center), Tulsa, Okla.
- Kissack, Robert A. (New York University), New York, N. Y.
- Klauzer, The Office of Charles Z., Philadelphia, Pa.
- Kleinert, Edward V. (Edrudy Studios), Chicago, Ill.
- Koch (Dr.), Berthe C. (University of Omaha), Omaha, Nebr.
- KoKoon Arts Club (Howard S. Roof), Cleveland, Ohio.
- Kromhout, H. M. A., Belmont, Mass.
- La Mond, Stella L. (Southern Methodist University), Dallas, Tex.
- Lafayette Art Association, The (Caroline B. Morrison), Lafayette, Ind.
- Lallier, Victor, Dallas, Tex.
- Laufman, Sidney, New York, N. Y.
- Lenser, Michael, Newark, N. J.
- Lewis, Harry, New York, N. Y.
- Logan, Robert Fulton (Connecticut College), New London, Conn.
- Los Angeles Art Association (Helen Wurdemann), Los Angeles, Calif.
- Los Angeles Public Library (Gladys Caldwell), Los Angeles, Calif. (In principle.)
- Louisiana State Exhibit Building (E. J. Whetzle), Shreveport, La.
- Louisville Art Association (Mrs. Castner Browder, Jr.), Louisville, Ky.
- Lowry, E. E. (State Normal School), Cortland, N. Y.
- Oberlin College, Department of Fine Arts (Clarence Ward), Oberlin, Ohio.
- Lucht, Harry, Cliffside Park, N. J.
- Lyman Allyn Museum (Winslow Ames), New London, Conn. (In principle.)
- M. H. de Young Memorial Museum (Henry Rusk), San Francisco, Calif.
- Macbeth Daylighting Corporation, New York, N. Y.
- Martini Artists Color Laboratories, The, Long Island City, N. Y.
- Mason Box Co., The, Attleboro Falls, Mass.
- Mattern, Karl (University of Kansas), Lawrence, Kans.
- Mayer, Ralph, New York, N. Y.
- McIntosh, P. R., (Bradley Institute), Peoria, Ill.

- Memphis Art Association (Florence McIntyre), Memphis, Tenn.
- Mendelowitz, Daniel M. (Stanford University), Stanford University, Calif.
- Men's Sketch Club (P. S. Day), Milwaukee, Wis.
- Meyer, William G., Milwaukee, Wis.
- Miller Studio, Frank L., Memphis, Tenn.
- Mills College, Department of Art (Roi Partridge), Oakland, Calif.
- Milwaukee, Art Students League of (Howard Thomas), Milwaukee, Wis. (In principle.)
- Mississippi Art Association (Karl Wolfe), Jackson, Miss.
- Monmouth College, Department of Art (Thomas Hoffman Hamilton), Monmouth, Ill.
- Montana Federation of Women's Clubs (Vesta O. Robbins), Bozeman, Mont.
- Montgomery, Lorin A. D., Philadelphia, Pa.
- Moore, Bethuel Clark, Charlottesville, Va.
- Moore, Isobel, Durham, N. C.
- Morris, Dudley H., Jr., Princeton, N. J.
- Moser, John Henri, Logan, Utah.
- Munro, Thomas (Western Reserve University), Cleveland, Ohio.
- Museum School of Art (James Chillman, Jr.), Houston, Tex.
- Musgrove, Alex J. (The Winnipeg Art Gallery), Winnipeg, Canada.
- National Academy of Design (Charles C. Curran), New York, N. Y.
- National Art School (Joseph G. Cowell), Washington, D. C.
- National Formulary Committee for Chemical Color Names (Emerson C. Beeler), Washington, D. C. (In principle.)
- National Society of Mural Painters, The (Howard Lee Irwin), New York, N. Y.
- Nealind Colors, Chester Springs, Pa.
- Nebraska State Teachers College (Jessie Stephen), Wayne, Nebr.
- New Hampshire, University of (George R. Thomas), Durham, N. H. (In principle.)
- New Jersey College for Women, Rutgers University (H. R. Kniffin), New Brunswick, N. J.
- New Orleans, Arts & Crafts Club of (Paul Ninas), New Orleans, La.
- New York School of Interior Decoration, The (Sherrill Whiton), New York, N. Y.
- New York Water-Color Club (Harry De Maine), New York, N. Y.
- North Carolina, University of, Department of Art, Woman's College (Gregory D. Ivy), Greensboro, N. C.
- Northern Arizona, Museum of (Mary-Russell F. Colton), Flagstaff, Ariz.
- Norwich Art School, The (Charlotte Fuller Eastman), Norwich, Conn.
- Novick, Estel, Brooklyn, N. Y.
- Nutt, Charles S., Lowell, Mass.
- Ohio Mechanics Institute, Cincinnati, Ohio.
- Ohio State University, Department of Fine Arts (James R. Hopkins), Columbus, Ohio.
- Oklahoma City University, School of Art (Dorothea Stevenson), Oklahoma City, Okla.
- Oregon State College, Art Department (J. Leo Fairbanks), Corvallis, Oreg.
- Painters' Workshop, The (Frank W. Sterner), Boston, Mass.
- Park, Edwin Avery (Bennington College), Bennington, Vt.
- Parker, Virginia (Knoxville High School), Knoxville, Tenn.
- Parks, Robert O. (Purdue University), W. Lafayette, Ind.
- Partridge, Charlotte R. (Layton School of Art), Milwaukee, Wis.
- Patrick County Public Library (Louise Clark), Stuart, Va. (In principle.)
- Pelikan, A. G. (Milwaukee Art Institute), Milwaukee, Wis.
- Permanent Pigments, Cincinnati, Ohio.
- Permia Colors, New York, N. Y.
- Peters, Bernard E., St. Louis, Mo.
- Phillips Gallery Art School (C. Law Watkins), Washington, D. C.
- Pokomy, Frank J. (Columbia University), New York, N. Y. (In principle.)
- Pollock, Harold C. (School of Practical Art), Boston, Mass.
- Pomona College (Thomas M. Beggs), Claremont, Calif.
- Porter County Art Association (N. S. Amstutz), Valparaiso, Ind.
- Portland Art Museum & Museum Art School (Robert Tyler Davis), Portland, Oreg.
- Pritikin, Samuel, Van Nuys, Calif.
- Providence Art Club (William B. Farnsworth), Providence, R. I.
- Queensboro Society of Arts & Crafts, Inc. (Robert F. Williams), New York, N. Y.
- Radford, E. K. (Municipal Art Commission), Kansas City, Mo.
- Raseman, Richard C. (Cranbrook Academy of Art), Bloomfield Hills, Mich.
- Reese, Hedley H. (Morgantown Art Center), Morgantown, W. Va.
- Rensselaer Polytechnic Institute, Department of Architecture (Ralph E. Winslow), Troy, N. Y.
- Rhode Island School of Design (Royal B. Farnum), Providence, R. I.
- Ridgely (Mrs.), J. A. (Illinois State Museum), Springfield, Ill.
- Ringling School of Art (Vernan Kimbrough), Sarasota, Fla.

- Rio Grande Painters (E. Boyd), Santa Fe, N. Mex.
- Robert Hull Fleming Museum (H. F. Perkins), Burlington, Vt.
- Rodman Memorial Gallery (Rodman Schraff), Fitzwilliam, N. H.
- Rogers, Millard B., Chicago, Ill.
- Ross Co., M. M., Boston, Mass.
- Ryland, Robert K., Brooklyn, N. Y.
- Sacker School of Design (Amy M. Sacker), Boston, Mass.
- Saint Andrew's School (Cortlanot Schoonover), Middletown, Del.
- Saint Louis, City Art Museum of, Saint Louis, Mo. (In principle.)
- Saint Paul School of Art (Cameron Booth), Saint Paul, Minn.
- Sallada Fabrics (Velmont Sallada), Annandale, N. J.
- San Francisco Museum of Art, The (Thomas Hughes), San Francisco, Calif.
- San Francisco Museum of Art, Civic Center—War Memorial, (G. McCann Morley), San Francisco, Calif.
- Sarah Lawrence College, Art Department (Kurt Roesch), Bronxville, N. Y.
- Sarasota Art Association (Truman Fassett), Sarasota, Fla.
- Sarff, Walter, Woodstock, N. Y.
- Saranac Lake Study & Craft Guild (E. M. Parrish), Saranac Lake, N. Y.
- Scheid, Harry H., New York, N. Y.
- Schmalz, Arthur E. (St. Paul's School), Concord, N. H.
- School of the Art Institute of Chicago, The (Norman Rice), Chicago, Ill. (In principle.)
- School of Painting & Allied Arts, Ohio University (L. C. Mitchell), Athens, Ohio.
- Schow, May (Teachers College), Huntsville, Tex.
- Scott, Henry E., Jr. (Amherst College), Amherst, Mass.
- Scott, Walter M. (Southern Regional Research Laboratory), New Orleans, La.
- Seattle Art Museum (Kenneth Callahan), Seattle, Wash.
- Shopen, Kenneth (Art Institute of Chicago), Chicago, Ill.
- Shreve, R. Norris (Purdue University), Lafayette, Ind. (In principle)
- Singer, Clyde (Butler Art Institute), Youngstown, Ohio.
- Smith, F. Sterling, Reynoldsburg, Ohio
- Smith, George E., Boston, Mass.
- Smith, J. B. (University of Wyoming), Laramie, Wyo.
- Snell, Conrad E., Atlanta, Ga.
- Soria, Martin S. (Fogg Art Museum), Cambridge, Mass. (In principle.)
- Southeast Missouri State Teachers College (Mary Howard Hix), Cape Girardeau, Mo.
- Southern California, University of (Dan Lutz), Los Angeles, Calif. (In principle.)
- Southern Printmakers Society (Frank Hartley Anderson), Mountain Hall, Mt. Airy, Ga.
- Southern School of Art (Ernest Henderson), Birmingham, Ala.
- Southern States Art League (Ethel Hutson), New Orleans, La.
- Southwestern Institute of Arts (Arthur C. Morgan), Shreveport, La.
- Spaulding Moses Co., Boston, Mass.
- Spectrum Club (E. H. Lore), Long Beach, Calif.
- Sprague, C. Hayes (New York University), New York, N. Y.
- Springfield Art Museum (Deborah D. Weisel), Springfield, Mo.
- Springfield, City Library Association of (Efalene H. King), Springfield, Mass.
- Springfield Museum of Fine Arts, The, (Alice K. Bausman), Springfield, Mass.
- Standard Ultramarine Co., Huntington, W. Va.
- Staten Island Institute of Arts & Sciences (Agnes C. Nash), Saint George, Staten Island, N. Y.
- Steuben Art Club (A. G. Bossard), Corning, N. Y.
- Stevenson, Robert L., (Plymouth Teachers College), Plymouth, N. H.
- Stillwater Art Colony (Richard E. Rollins), Stillwater, Minn.
- Stuart School (Robert Cullam Scott), Boston, Mass.
- Studio Angelico (Sister Helene), Adrian, Mich.
- Sweet, M. B., Chicago, Ill. (In principle.)
- Sweet Briar College, Art Department, (Edward M. Linforth), Sweet Briar, Va.
- Syracuse Museum of Fine Arts (R. Guy Cowan), Syracuse, N. Y.
- Talbot, Jarold D., (Ottumwa Art Center), Ottumwa, Iowa.
- Taubes, Frederic, New York, N. Y.
- Taylor, Frederick B., Montreal, Quebec, Canada.
- Texas Technological College, Department of Architecture & Allied Arts, (F. A. Kleinschmidt), Lubbock, Tex.
- Texas, University of, Department of Art (Ward Lockwood), Austin, Tex.
- Textile Color Card Association of the United States, Inc., The, New York, N. Y. (In principle.)
- Thomas, George R. (University of New Hampshire), Durham, N. H.
- Tiffany Foundation (Hobart Nichols), Oyster Bay, L. I., N. Y.
- Toch Bros., New York, N. Y.
- Toledo Museum of Art School of Design, The (J. Arthur MacLean), Toledo, Ohio.

- Tompsett, Ruth R. (North High Art Department), Omaha, Nebr.
- Union Workshop (Mrs. Elizabeth Antonius), Madison, Wis.
- United American Artists (Katherine von Minckwitz), New York, N. Y. (In principle.)
- University of the South (Louise S. McDonald), Sewanee, Tenn.
- Uptown Galleries, Inc. (Iva B. Kelley), Oklahoma City, Okla.
- Utah State Institute of Fine Arts (Donald B. Goodall), Salt Lake City, Utah.
- Van Raalte, David (Federal Art Project), Bronx, N. Y.
- Vesper George School of Art (Harold F. Lindergreer), Boston, Mass.
- Walker Art Center (D. S. Defenbacher), Minneapolis, Minn.
- Walther, Elsbeth C. (Otterbein College), Westerville, Ohio.
- Washington University, Saint Louis School of Fine Arts (Kenneth E. Hudson), Saint Louis, Mo.
- Washington, University of, School of Art (Walter F. Isaacs), Seattle, Wash.
- Watrous, James S. (University of Wisconsin), Madison, Wis.
- Weber Co., F., Philadelphia, Pa.
- Weigel, Paul (Kansas State College), Manhattan, Kans.
- Westchester Arts & Crafts Guild (Salvatore L. Aucello), White Plains, N. Y.
- Westfield Art Association (Mrs. Arnold Keskulla), Westfield, N. J.
- Wheaton College, Department of Art (Esther I. Seaver), Norton, Mass.
- Whitney, Irma (Boston Sunday Herald), Boston, Mass. (In principle.)
- Wichita, University of, Art Department (Clayton Henri Staples), Wichita, Kans.
- Wilkinson, Joseph, Jr., Fairhaven, Mass.
- Williams, Esther, New York, N. Y.
- Williams, Margaret (Grove City College), Grove City, Pa.
- Williams, Warner (Culver Military Academy), Culver, Ind.
- Williams & Co., C. K., Easton, Pa.
- Wisconsin Designer Craftsman (Harold A. Milbrath), Milwaukee, Wis.
- Witte Memorial Museum, San Antonio Art League (Eleanor Onderdonk), San Antonio, Tex.
- Woodhull, J. Clifford, Summit, N. J.
- Wyoming Artists' Association, University of Wyoming (Wilbur R. Brown), Laramie, Wyo.
- Zenk, Josef, Utica, N. Y.
- Zerbe, Karl (School of the Museum of Fine Arts), Medford, Mass.
- Zwermann, Carl H. (University of Washington), Seattle, Wash.

U. S. GOVERNMENT

- Agriculture, Department of, Forest Service, Madison, Wis. (In principle.)
- Federal Works Agency, Public Buildings Administration, Washington, D. C.
- Federal Works Agency, Colorado Art Project, Denver, Colo.
- Federal Works Agency, Work Projects Administration, New Haven, Conn.
- Federal Works Agency, Work Projects Administration, Art Unit, Washington, D. C.
- Federal Works Agency, Work Projects Administration, Florida Art Project, Jacksonville, Fla.
- Federal Works Agency, Work Projects Administration, Illinois Art Project, Chicago, Ill.
- Federal Works Agency, Work Projects Administration, Art Project of Louisiana, New Orleans, La.
- Federal Works Agency, Work Projects Administration, Maine Art Project, Portland, Maine.
- Federal Works Agency, Work Projects Administration, Massachusetts Art Project, Cambridge, Mass., and Boston, Mass.
- Federal Works Agency, Work Projects Administration, Paint Testing & Research Laboratory, Boston, Mass.
- Federal Works Agency, Work Projects Administration, New Hampshire Art Project, Manchester, N. H.
- Federal Works Agency, Work Projects Administration, New Jersey Arts & Crafts Project, Newark, N. J.
- Federal Works Agency, Work Projects Administration, Oregon Art Project, Portland, Oreg.
- Federal Works Agency, Work Projects Administration, Pennsylvania Art Project, Philadelphia, Pa.
- Federal Works Agency, Work Projects Administration, Rhode Island Art Project, Providence, R. I.
- Federal Works Agency, Work Projects Administration, Washington Art Project, Seattle, Wash.
- Library of Congress, Division of Fine Arts, Washington, D. C. (In principle.)
- Smithsonian Institution, U. S. National Museum, Washington, D. C.
- Veterans' Administration, Washington, D. C.

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25-30.	Special screw threads.	78-40.	Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).
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