

U. S. DEPARTMENT OF COMMERCE

HENRY A. WALLACE, Secretary

NATIONAL BUREAU OF STANDARDS

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**COLOR MATERIALS FOR ART EDUCATION
IN SCHOOLS**

COMMERCIAL STANDARD CS130-46

Effective Date for New Production From January 1, 1946



**A RECORDED VOLUNTARY STANDARD
OF THE TRADE**

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PROMULGATION
of
COMMERCIAL STANDARD CS130-46
for
COLOR MATERIALS FOR ART EDUCATION
IN SCHOOLS

On June 3, 1943, at the instance of the Crayon, Water Color and Craft Institute, Inc., a proposed commercial standard for Color Materials for Art Education in Schools was circulated to leading user organizations, school systems, and to manufacturers for comment. Following adjustment in the light of comment, a recommended commercial standard was circulated on June 20, 1945, to the entire trade for written acceptance.

Those concerned have since accepted and approved the standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from January 1, 1946.

Promulgation recommended.

F. W. Reynolds,
Acting Chief, Division of Trade Standards.

Promulgated.

E. U. Condon,
Director, National Bureau of Standards.

Promulgation approved.

Henry A. Wallace,
Secretary of Commerce.

COLOR MATERIALS FOR ART EDUCATION IN SCHOOLS

COMMERCIAL STANDARD CS130-46

PURPOSE

1. The purposes of this Commercial Standard are to provide a guide to school authorities in the purchase of color materials for art education in schools, as to satisfactory color, working properties and durability; to eliminate confusion in nomenclature; to promote fair competition among manufacturers by providing criteria for differentiation among materials of known satisfactory composition and others considered unsuitable for art education in schools, and thus to provide a basis for certification of quality.

2. This Commercial Standard covers minimum requirements for color materials of satisfactory color and working properties for art education. It is not intended that all color materials for art education meeting the requirements shall be identical nor of uniform excellence in all respects. Variations in manufacture not controlled by the specification may cause some schools to prefer one brand over another, both of which are acceptable under this specification.

SCOPE

3. This Commercial Standard covers material and workmanship, working qualities, color, packing, and quality guarantees of the following color materials for art education in schools:

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DEFINITIONS

4. For the purpose of this standard the following definitions shall apply:

Hue.—The hue of a color determines whether it is red, yellow, green, blue, purple, or an intermediate. A color possessing hue is called a chromatic color, all others (white, black, silver, and gray) are called neutral colors. This standard does not place definite restrictions on variations in hue.

Value.—The value of a color is its lightness or darkness, expressed on a scale extending from black to white by perceptually uniform steps. This standard does not specify values.

Chroma.—The chroma of a color is the degree of its departure from the gray of the same value. If the color of the sample to be tested differs in hue and value from the standard to a degree which prevents judgment as to the relative chroma, the decision shall be based upon Munsell chroma. With respect to any one pigment used within the limitations customary for art materials, the chroma of a chromatic crayon or paint is a measure of the relative amount of pigment it contains. Excepting modeling clay and pastel crayons, this standard sets definite limitations below which the chromas of art materials conforming to this standard may not fall.

DETAIL REQUIREMENTS

WAX CRAYONS

5. **Size.**—Drawing crayons shall be $3\frac{5}{8}$ in. long and $\frac{5}{16}$ in. in diameter. Kindergarten crayons shall be $4\frac{1}{4}$ in. long and $\frac{7}{16}$ in. in diameter. The shape may be either round or hexagonal. The measurement of the diameter of the hexagonal crayons shall be the distance between parallel flat sides.

6. **Material and Workmanship.**—Wax crayons shall be made of quality pigments, high-quality waxes, and other essential materials, thoroughly and uniformly molded. They shall be free from grit and other substances that will impair their working properties. The color distribution shall be uniform. They shall not contain free dyestuff in excess of 0.5 percent.

7. **Waxes.**—The basic ingredients used in wax crayons shall be paraffin wax and stearic acid or equivalent. The paraffin content shall be not less than 40 percent; the stearic acid, or equivalent, content shall be not less than 40 percent. The average melting point of the colored crayons shall be not less than 120.0° F (see par. 108).

8. **Working qualities.**—Wax crayons shall have a marking texture that yields color freely without scratching, dragging, or smudging. Under normal working conditions there shall be a minimum of flaking or piling. Colors shall blend readily. The crayons shall withstand normal temperature changes without bending.

9. **Toxicity.**—Wax crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

10. **Packaging.**—Each wax crayon shall be wrapped with a printed or colored label indicating the color of the crayon and shall be plainly marked with brand and/or company name. The crayons shall be packed as specified in Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards.

11. *Chroma*.—The chroma of all chromatically colored wax crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107a.

12. *Color range (drawing crayons)*.—The color range of wax drawing crayons shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, carmine-red, dark blue (Prussian), dark green, dark red (Indian red), gray, green, lavender, light blue, light red (pink), light yellow, magenta, middle blue-green, olive-green, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre (gold-ochre), yellow-orange.

13. *Color range (kindergarten crayons)*.—The color range of wax kindergarten crayons shall be black, blue, blue-green, blue-violet, brown, burnt sienna, flesh, gray, green, magenta, orange, red, red-orange red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-orange.

PRESSED CRAYONS

14. *Size*.—Drawing crayons shall be $3\frac{1}{2}$ in. long by $\frac{5}{16}$ in. in diameter and 3 in. long by $\frac{1}{4}$ in. in diameter. Kindergarten crayons shall be 4 in. long by $\frac{7}{16}$ in. in diameter. Pressed drawing crayons shall be either round or hexagonal; pressed kindergarten or enlarged drawing crayons shall be either round, hexagonal, or round with one flat side—each to contain an equivalent amount of material by volume, using round dimension as basic, with a tolerance of ± 5 percent by volume.

15. *Materials and workmanship*.—Pressed crayons shall be made of quality pigments, together with waxes and other essential materials, thoroughly and uniformly pressed into a homogeneous crayon. They shall be free from grit and other substances that will impair their working properties. The color distribution shall be uniform throughout. They shall not contain free dyestuff in excess of 0.5 percent.

16. *Working qualities*.—Pressed crayons shall have a marking texture that yields color freely without scratching, dragging, or smudging. Under normal working conditions there shall be a minimum of flaking or piling. Colors shall blend readily. They shall withstand normal temperature changes without bending.

17. *Toxicity*.—Pressed crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

18. *Packaging*.—Each pressed crayon shall be wrapped with a printed or colored label indicating the color of the crayon, and shall be plainly marked with brand and/or company name. The crayons shall be packed in standard-type containers as set forth in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards.

19. *Chroma*.—The chroma of all chromatically colored pressed crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107a.

20. *Color range (pressed drawing crayons)*.—The color range of pressed drawing crayons shall be black, blue, blue-green, blue-violet, brown, gray, green, magenta, orange, red, red-orange,

red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

21. *Color range. (kindergarten crayons).*—The color range of pressed kindergarten crayons shall be black, blue, blue-green, blue-violet, brown, burnt sienna, flesh, gray, green, magenta, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-orange.

SEMIMOIST WATER COLORS

22. *Size.*—Semimoist water colors shall be put up in rectangular pans commonly known as half-pans, size (inside dimensions) $\frac{3}{4}$ in. long, $\frac{9}{16}$ in. wide and $\frac{1}{4}$ in. deep; three-quarter pans, size $1\frac{3}{16}$ in. long, $\frac{1}{2}$ in. wide and $\frac{1}{4}$ in. deep; and full pans, size $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. wide and $\frac{1}{4}$ in. deep; or in oval or round pans containing a volume of material equivalent to that held by the half pans.

23. *Material and workmanship.*—Semimoist water colors shall be manufactured from quality pigments and other essential materials. They shall be thoroughly ground and dispersed in a water-miscible vehicle. They shall be dried to a consistency such that, under normal climatic conditions, the material will not soften and run out of the pans. Semimoist water colors shall be free from air holes and grit. The pans shall be so filled, that when received, the outer rim of the concave surface of the color material shall extend to the brim of the pan.

24. *Working qualities.*—Semimoist water colors shall have a smooth, uniform spread and shall dry without gloss. They shall mix satisfactorily with each other to produce intermediate shades, and shall lift readily from the pans when a wet brush is applied.

25. *Toxicity.*—Semimoist water colors shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

26. *Packaging.*—Semimoist water colors shall be packed in a rolled-edge metal box of substantial construction, with a hinged cover containing mixing divisions. Each box shall be equipped with a suitable tray that will hold removable water color pans, and the box shall include a suitable No. 7 brush. All boxes shall have baked-enamel finish on the inside and either lacquer or enamel on the outside. Each box shall bear a brand and/or company name. Semimoist water color refills shall be packed in metal clips or boxes containing either 6 or 12 half-pans.

27. *Chroma.*—The chroma of all chromatically colored semimoist water colors shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107b.

28. *Color range (half-pans).*—The color range of semimoist water colors supplied in half-pans shall be alizarin crimson, black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, dark blue (Prussian), gamboge, green, gold, magenta, peacock blue, orange, red (carmin), red-orange, red-violet, silver, turquoise blue, vermilion, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

29. *Color range (three-quarter and full pans).*—The color range of semimoist water colors supplied in full pans and three-

quarter pans shall be black, blue, brown, green, magenta, orange, red, red-orange, turquoise blue, violet, white, yellow.

DRY CAKE WATER COLORS

30. *Size.*—Dry cakes shall be $1\frac{1}{8}$ in. long, $\frac{3}{16}$ in. wide and $\frac{1}{4}$ in. thick.

31. *Material and workmanship.*—Dry-cake water colors shall be manufactured from quality pigments, together with other essential materials. The cakes must withstand normal climatic conditions.

32. *Working qualities.*—Dry-cake water colors shall have a smooth, uniform spread when applied on water-color paper and shall dry without gloss. They shall mix satisfactorily with each other to give clear intermediate tones. The color shall lift readily from the cake when a wet brush is applied.

33. *Toxicity.*—Dry-cake water colors shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

34. *Packaging.*—Dry-cake water colors shall be packed in suitable cardboard containers. Each cake shall bear brand and/or company name.

35. *Chroma.*—The chroma of all chromatically colored dry-cake water colors shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107b.

36. *Color range.*—The color range of the dry-cake water colors shall be alizarin crimson, black, blue, brown, carmine-red, green, orange, turquoise blue, violet, white, yellow.

LIQUID TEMPERA

37. *Material and workmanship.*—Liquid tempera shall be made from quality pigments and other essential materials, ground and dispersed in a suitable water-miscible vehicle, which when thoroughly stirred, will be ready for immediate use.

38. *Working qualities.*—Liquid tempera colors shall have a smooth, uniform spread. They shall brush easily and adhere evenly on illustration board without flaking or chipping. They shall dry to a clean, velvety, matt finish. They shall intermix readily, giving clear intermediate tones without streaking. They shall not bleed, chip, or peel when one color is applied over a dried coat of another color.

39. *Preservatives.*—Liquid tempera colors shall contain the necessary preservatives so that they will keep for at least 1 year without decomposition.

40. *Toxicity.*—Liquid tempera colors shall not contain lead, arsenic, or other toxic metals in excess of 0.05 percent.

41. *Packaging.*—Liquid tempera colors shall be packed in glass jars. Each jar and container shall bear the name of color, brand, and/or company name.

42. *Chroma.*—The chroma of all chromatically colored liquid tempera shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107c.

43. *Color range.*—The color range of liquid tempera shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt

umber), burnt sienna, dark blue (Prussian), dark green, dark red, emerald green, gold, gray, green, magenta, lavender, medium yellow, orange, red, red-orange, red-violet, silver, turquoise blue, vermilion, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

POWDER TEMPERA

44. *Materials and workmanship.*—Powder tempera shall be made of quality pigments, sizing, preservatives, and other essential materials. They shall be intimately ground and mixed in such a manner as to insure a smooth uniform powder sufficiently fine, when wet, to pass through a No. 325 screen. The powder shall flow freely from the canister.

45. *Working qualities.*—Powder tempera shall be so compounded that, when mixed with water, it will produce liquid color readily. The colors shall have a smooth, uniform spread. They shall brush easily and adhere evenly on drawing paper without flaking or chipping. The colors shall not bleed, chip, or peel when one color is applied over a dried coat of another color.

46. *Preservatives.*—Powder tempera shall contain the necessary preservatives so that when mixed with water, it will remain undecomposed for 1 month.

47. *Toxicity.*—Powder tempera shall contain no lead, arsenic, or other toxic metals in excess of 0.05 percent.

48. *Packaging.*—Powder tempera shall be packed in cardboard canisters having an average minimum content of 16 oz. by weight and equipped with a sealed pouring opening. The canister shall bear a label containing printed instructions for use and shall be plainly marked with name of color, brand, and/or company name.

49. *Chroma.*—The chroma of all chromatically colored powder tempera shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107d.

50. *Color range.*—The color range of powder tempera shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, gold, gray, green, magenta, orange, red, red-violet, red-orange, silver, turquoise blue, violet, white, yellow, yellow-green, yellow-orange, extending white.

WHITE DUSTLESS BLACKBOARD CRAYONS

51. *Types.*—White dustless blackboard crayons are made in two types, differentiated according to the content of levigated whiting, as follows:

Type A, which shall contain not less than 90 percent of levigated whiting;

Type B, which shall contain not less than 45 percent of levigated whiting.

52. *Size.*—Crayons shall be $3\frac{1}{4}$ in. long and $\frac{3}{8}$ in. in diameter.

53. *Material and workmanship.*—White dustless blackboard crayons shall be made of high-quality levigated whiting and other essential materials. The crayons shall be free from grease, grit, and sandy abrasives. They shall register a highly visible and distinct mark that can be easily erased.

54. *Transverse strength.*—The strength of white dustless blackboard crayons shall be such that if a crayon is supported at points $2\frac{1}{2}$ in. apart and a weight applied midway between the supports, the average transverse breaking strength shall be not less than 4 pounds.

55. *Packaging.*—White dustless blackboard crayons shall be packed as specified in the Simplified Practice Recommendation R192-45 as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

SIGHT SAVING DUSTLESS BLACKBOARD CRAYONS

56. *Size.*—Crayons shall be $3\frac{1}{4}$ in. long and $\frac{3}{8}$ in. in diameter.

57. *Material and workmanship.*—Dustless sight-saving blackboard crayons shall be made of high-quality levigated whiting, organic coloring, and other essential materials. The whiting content shall be not less than 70 percent. The crayons shall be free from grease, grit, and sandy abrasives. They shall contain a very small amount of nontoxic, nonstaining, organic coloring material so as to render a light-yellow, distinct mark that can be easily erased, and which, under adequate illumination, may be read from all parts of the average classroom. They shall not contain free dyestuff in excess of 0.5 per cent.

58. *Transverse strength.*—The strength of sight-saving dustless blackboard crayons shall be such that if a crayon is supported at two points $2\frac{1}{2}$ in. apart and a weight applied midway between the supports, the average transverse breaking strength shall be not less than 4 pounds.

59. *Toxicity.*—Sight-saving dustless blackboard crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

60. *Packaging.*—Sight-saving dustless blackboard crayons shall be packed as specified in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

61. *Chroma.*—The chroma of sight-saving dustless blackboard crayons shall not exceed 6.5 when tested according to paragraphs 107 and 107e.

COLORED DUSTLESS CRAYONS

62. *Size.*—Colored dustless crayons shall be supplied in two sizes: (1) $3\frac{1}{4}$ in. long and $\frac{3}{8}$ in. in diameter, (2) $2\frac{3}{4}$ in. long and $\frac{7}{16}$ in. in diameter.

63. *Material and workmanship.*—Colored dustless crayons shall be made of quality pigments, high-quality levigated whiting, and other essential materials. The crayons shall be free from grit, hard spots, and sandy abrasives. They shall not contain free dyestuff in excess of 0.5 percent.

64. *Working qualities.*—Colored dustless crayons shall be soft, velvety, and pastel-like in texture. They shall have such firmness of stick as to be adaptable for various school uses without wasteful breakage or crumbling.

65. *Toxicity.*—Colored dustless crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

66. *Packaging.*—Colored dustless crayons shall be packed as specified in the Simplified Practice Recommendation R192-45 as issued by the National Bureau of Standards. Each package to be properly identified with brand and/or company name.

67. *Chroma.*—The chroma of all chromatically colored dustless crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107e.

68. *Color range.*—The color range of colored dustless crayons shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber) burnt sienna, dark blue (Prussian), dark green, dark red, flesh, gray, green, light red (pink), magenta, olive-green, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

MOLDED SIGHT SAVING BLACKBOARD CRAYONS

69. *Size.*—Crayons shall be $3\frac{3}{16}$ in. long and $\frac{7}{16}$ in. in diameter at one end, tapering to $\frac{3}{8}$ in. in diameter.

70. *Material and workmanship.*—Molded sight-saving blackboard crayons shall be made of not less than 90 percent of calcium sulfate, and other essential materials. The crayons shall be free from grit, hard spots, sandy abrasives, and air spaces. They shall contain a very small amount of nontoxic, nonstaining, organic coloring material so as to render a light-yellow, distinct mark that can be easily erased, and which, under adequate illumination, may be read from all parts of the average classroom.

71. *Packaging.*—Molded sight-saving blackboard crayons shall be packed as specified in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

72. *Chroma.*—The chroma of molded sight-saving blackboard crayons shall not exceed 6.5 when tested according to paragraphs 107 and 107e.

MOLDED WHITE CHALK CRAYONS

73. *Size.*—Crayons shall be $3\frac{3}{16}$ in. long and $\frac{7}{16}$ in. in diameter at one end, tapering to $\frac{3}{8}$ in. in diameter.

74. *Material and workmanship.*—Molded white chalk crayons shall be made of not less than 90 percent of calcium sulfate, and other essential materials. The crayons shall be free from grit, hard spots, sandy abrasives, and air spaces. They shall register a highly visible and distinct mark that can be easily erased, and shall have such firmness of stick as to be adaptable to ordinary classroom use without wasteful breaking.

75. *Enameled white chalk.*—Enameled white chalk shall have a satisfactory protective coating which shall not contain in excess of 0.05 percent of toxic material.

76. *Packaging.*—Molded white chalk crayons shall be packed as specified in Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

MOLDED COLORED CHALK CRAYONS

77. *Size.*—Crayons shall be $3\frac{3}{16}$ in. long and $\frac{7}{16}$ in. in diameter at one end, tapering to $\frac{3}{8}$ in. in diameter.

78. *Material and workmanship.*—Molded colored chalk crayons shall be made of quality pigments, calcium sulfate, and other essential materials. The crayons shall be free from grit, hard spots, and sandy abrasives.

79. *Working qualities.*—Molded colored chalk crayons shall be soft, velvety, and pastel-like in texture. The crayons shall have such firmness of stick as to be adaptable for various art uses without wasteful breakage or crumbling.

80. *Toxicity.*—Molded colored chalk crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

81. *Packaging.*—Molded colored chalk crayons shall be packed as specified in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

82. *Chroma.*—The chroma of all chromatically colored molded chalk crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107e.

83. *Color range.*—The color range of molded colored chalk crayons shall be black, blue (ultramarine), brown (burnt umber), burnt sienna, dark green, blue-green, blue-violet, dark blue (Prussian), dark red, flesh, gray, green, light red (pink), magenta, olive-green, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

LECTURERS' COLORED CHALK CRAYONS

84. *Size.*—Lecturers' colored chalk crayons shall be supplied in one size, 3 in. long, $\frac{1}{2}$ in. wide and $\frac{1}{2}$ in. thick.

85. *Materials and workmanship.*—Lecturers' colored chalk crayons shall be made of quality pigments, calcium sulfate, and other essential materials. The crayons shall be free from grit, hard spots, and sandy abrasives. They shall not contain in excess of 0.5 percent free dyestuff.

86. *Working qualities.*—Lecturers' colored chalk crayons shall be soft, velvety, and pastel-like in texture, and shall have such firmness of stick as to be adaptable for various classroom uses without wasteful breakage or crumbling.

87. *Toxicity.*—Lecturers' colored chalk crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

88. *Packaging.*—Lecturers' colored chalk crayons shall be packed as specified in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package shall be properly identified with brand and/or company name.

89. *Chroma.*—The chroma of all chromatically colored lecturers' chalk crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107e.

90. *Color range.*—The color range of lecturers' chalk crayons shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green,

dark red, flesh, gray, green, light red (pink), magenta, olive-green, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

LECTURERS' COLORED DUSTLESS CRAYONS

91. *Size*.—Lecturers' colored dustless crayons shall be supplied in one size, 3 in. long, $\frac{1}{2}$ in. wide and $\frac{1}{2}$ in. thick.

92. *Material and workmanship*.—Lecturers' colored dustless crayons shall be made of quality pigments, high-quality levigated whiting, and other essential materials. The crayons shall be free from grit, hard spots, and sandy abrasives. They shall not contain free dyestuff in excess of 0.5 percent.

93. *Working qualities*.—Lecturers' colored dustless crayons shall be soft, velvety, and pastel-like in texture. They shall have such firmness of stick as to be adaptable for various school uses without wasteful breakage or crumbling.

94. *Toxicity*.—Lecturers' colored dustless crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

95. *Packaging*.—Lecturers' colored dustless crayons shall be packed as specified in the Simplified Practice Recommendation R192-45, as issued by the National Bureau of Standards. Each package to be properly identified with brand and/or company name.

96. *Chroma*.—The chroma of all chromatically colored lecturers' dustless crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 107 and 107e.

97. *Color range*.—The color range of lecturers' dustless crayons shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, dark red, flesh, gray, green, light red (pink), magenta, olive-green, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-ochre, yellow-orange.

PASTEL CRAYONS

98. *Size*.—Pastel crayons shall be supplied in the following size: 3 in. long by $\frac{1}{4}$ in. in diameter.

99. *Material and workmanship*.—Pastel crayons shall be made of quality pigments, high-quality levigated whiting, and other essential materials. The crayons shall be free from grit, hard spots, and sandy abrasives. They shall not contain free dyestuff in excess of 0.5 percent.

100. *Working qualities*.—Pastel crayons shall have a soft, velvety texture. The colors shall be intense and cover perfectly; they shall blend readily when used on paper and shall erase easily from the blackboard.

101. *Toxicity*.—Pastel crayons shall not contain lead, arsenic, or other toxic materials in excess of 0.05 percent.

102. *Packaging*.—Pastel crayons shall be packed as specified in the Simplified Practice Recommendation R192-45 as issued by the National Bureau of Standards. Each package to be properly identified with brand and/or company name.

103. *Color range.*—The color range of pastel crayons shall be black, blue (ultramarine), blue-green, blue-violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, dark red, dark yellow, gray, green, light red (pink), magenta, orange, red, red-orange, red-violet, turquoise blue, violet, white, yellow, yellow-green, yellow-orange.

MODELING CLAY

104. *Material and workmanship.*—Modeling clay shall consist essentially of a plastic clay and a grease-type binder, ready to use and of such a putty-like consistency that it can be easily worked and kneaded with the hands of a small child, yet of sufficient body to retain its shape when molded into various finished objects.

105. *Working qualities.*—Modeling clay shall be sufficiently plastic so that a 1/2-in. cylinder can be either pulled apart without tearing or fashioned into small rings or spirals without cracking or breaking apart. It shall be harmless to use, nonstaining, and shall maintain its satisfactory working qualities over a period of 18 months. It shall be responsive to either fashioning with the fingers or with ordinary modeling tools.

106. *Packaging.*—Modeling clay shall be packed as specified in the Simplified Practice Recommendation R192-45 as issued by the National Bureau of Standards. Each package to be properly identified with brand and/or company name.

METHODS OF TEST

107. *Chroma.*—The chroma of color materials shall be found by applying a sample of the crayon or paint to a specified ground, and then determining the chroma by reference to the Munsell Book of Color, Library or Pocket Edition. Specified procedures for each material are described in paragraphs 107a to 107e, inclusive. Paints shall be allowed to dry to constant chroma before the determination is made.

107a. *Wax and pressed crayons.*—Make solid rub-out on white drawing paper.

107b. *Water colors (semimoist and dry cake).*—With a brush wet with water, paint out the color in the customary manner on white drawing paper. The amount of paint material taken up by the wet brush shall be adjusted, as near as is practical, to yield full chroma and uniform transparency in a single coat.

107c. *Liquid tempera.*—Stir liquid tempera thoroughly. Brush paint on white illustration board.

107d. *Powder tempera.*—Prepare the paint as follows:
20 parts of powder tempera (by weight).
12 parts of water (by weight).

Mix thoroughly and brush paint on white illustration board.

107e. *Dustless and molded chalk crayons.*—Make solid rub-out on drawing paper.

108. *Melting point of wax crayons.*—Melting point shall be determined according to ASTM Designation D87-42.

GUARANTEE

109. It is recommended that color materials for art education in schools shall be guaranteed by including the following statement on labels, invoices, contracts, etc.:

The manufacturer guarantees this material to conform with the requirements of Commercial Standard CS130-46, as issued by the National Bureau of Standards of the United States Department of Commerce.

110. On small labels, when space does not permit the use of the full statement, the commercial standard number "CS130-46" may be used for identification.

TABLE 1.—Munsell chroma

Color name	Wax crayons	Pressed crayons	Water colors	Tempera		Dustless crayon	Molded chalk
				Liquid	Powder		
Alizarin crimson.....			11.5				
Blue (ultramarine).....	15.0	13.0	14.9	16.7	15.0	14.0	14.5
Blue-green.....	8.0	3.5	7.6	7.5	7.0	8.5	7.5
Blue-violet.....	15.0	8.0	12.5	8.8	12.5	12.5	11.5
Brown (burnt umber).....	4.0	3.5	4.5	2.0	3.5	4.5	5.0
Burnt sienna.....	6.0	6.0	7.0	4.5	5.5	10.0	5.5
Carminc red.....	14.5		12.0				
Dark blue (Prussian).....	4.5		5.0	7.2	9.0	11.5	12.0
Dark green.....	5.5			5.0	4.0	6.0	9.0
Dark red (India).....	6.0			14.0		6.0	10.0
Emerald green.....				7.5			
Flesh.....	5.0	5.0				5.5	5.5
Gamboge.....			14.0				
Gold.....			4.5	5.5	4.5		
Green.....	10.0	8.0	9.5	8.0	9.5	4.5	5.0
Lavender.....	9.5			10.0			
Light blue.....	10.0						
Light red (pink).....	13.5					13.3	11.0
Light yellow.....	7.5						
Magenta.....	14.0	13.0	16.8	15.2	16.2	14.5	14.0
Medium yellow.....				11.5			
Middle blue-green.....	7.5						
Olive-green.....	6.0					3.5	3.5
Orange.....	14.5	13.5	15.5	16.0	15.0	14.0	10.0
Peacock blue.....			10.0				
Red.....	15.0	12.0		14.5	13.0	13.5	12.5
Red-orange.....	14.0	12.0	15.0	16.0	13.5	12.0	12.0
Red-violet.....	12.5	10.0	13.0	12.5	14.5	10.0	12.0
Turquoise blue.....	10.0	9.0	10.5	11.5	9.4	7.5	8.0
Vermilion.....			14.0	13.0			
Violet.....	11.5	7.5	11.0	12.0	6.0	8.0	10.0
Yellow.....	9.5	10.0	12.5	13.0	13.5	9.0	9.0
Yellow-green.....	9.5	9.0	9.0	13.5	10.0	6.5	9.5
Yellow-ochre.....	8.5	7.5	8.0	8.5		5.5	5.0
Yellow-orange.....	15.0	9.0	12.5	16.0	11.5	14.0	9.5

EFFECTIVE DATE

111. The standard is effective for new production from January 1, 1946.

STANDING COMMITTEE

112. The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Each organization nominated its own representatives. 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.

J. E. DEMEYER (chairman), The Crayon, Water Color & Craft Institute, Inc., 511 Fifth Avenue, New York, N. Y.

MACK LESTER, Art Crayon Co., 5610 First Avenue, Brooklyn 20, N. Y.

CYRUS KNOUFF, American Crayon Co., Sandusky, Ohio.

GEORGE LA BARRE, Binney & Smith Co., Easton, Pa.

H. SPILMAN BURNS (Representing the Association of School Business officials), 3 East Twenty-fifth Street, Baltimore 18, Md.

ALBERT T. REID (Representing the American Artists Professional League, Inc.), Room 1403, Hotel Carteret, 208 West Twenty-third Street, New York 11, N. Y.

Inter-Society Color Council (Invited to appoint a representative).

H. A. ALLAN (Representing the National Education Association), 1201 Sixteenth Street, N.W., Washington 6, D. C.

HISTORY OF PROJECT

113. On April 7, 1943, the Crayon, Water Color & Craft Institute, Incorporated, requested the cooperation of the National Bureau of Standards in the establishment of a commercial standard for color materials for art education in schools. Previously the Institute had appointed a committee of manufacturers which met with representatives of the National Bureau of Standards and developed a proposed commercial standard.

114. The Division of Trade Standards circulated copies of the proposal to manufacturers and leading user organizations for comment. Constructive comment was received from several sources but at the request of manufacturers further work was postponed because of restrictions on the supply of pigments under war conditions. On March 28, 1945, the Crayon, Water Color & Craft Institute requested that the work be resumed in order that a standard could be issued coincident with the availability of proper pigments. Accordingly, interested organizations were advised and further comment was invited.

115. The chairman of the Simplified Specifications Committee of the Association of School Business Officials met with representatives of the Crayon, Water Color & Craft Institute and the National Bureau of Standards on March 14, 1945, and the proposal was adjusted in line with the desires of the school business officials. The adjusted draft was then referred to leading producer and user organizations for comment leading to circulation of a recommended commercial standard for acceptance. Following subsequent minor adjustment indicated by the comment, a recommended commercial standard was circulated to the entire

trade for written acceptance on June 20, 1945. On November 23, 1945, the National Bureau of Standards announced that sufficient acceptances had been received, that no opposition to the establishment of the standard had been made, and that the standard, to be designated Color Materials for Art Education in Schools, Commercial Standard CS130-46, would be considered effective for new production from January 1, 1946.

APPENDIX

Colors of chroma standards.—In table 2 are given the color designations of the chroma standards, according to the ISCC-NBS¹ method². The purpose of table 2 is to furnish an approximate indication of the colors to be expected under the various color materials names, but the designations are not to be construed as requirements of the standard; it is intended that colors that are not close matches of the colors selected as chroma standards shall be obtainable under the standard. (See definitions of hue and value in paragraph 4.) It is to be noted, further, that the colors of several of the chroma standards lie at or near the boundary lines of the designations assigned, where a barely perceptible difference will place the colors in the adjacent areas, carrying different designations.

¹ Inter-Society Color Council—National Bureau of Standards.

² D. B. Judd and K. L. Kelly, Method of designating colors, J. Research NBS 23, 355 (1939) RP1239. Obtainable from the Superintendent of Documents, Washington 25, D. C., for 10 cents a copy.

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 measureable 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 four-fold: 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

116. The organizations listed below have individually accepted this standard for use as far as practicable in the production, distribution, testing, or purchase of color materials for art education in schools. In accepting the standard they reserved the right to depart therefrom as they individually deem advisable. It is expected that articles which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS

(GENERAL SUPPORT)

American Federation of Arts, The, Washington, D. C.
 Art Association of Indianapolis, Indianapolis, Ind.
 Association of Art Museum Directors, Toledo, Ohio.
 Association for Color Research, The, Chicago, Ill.
 Association of School Business Officials, Hartford, Conn.
 Kansas State Federation of Art, Manhattan, Kans.
 National School Service Institute, Chicago, Ill.
 Phoenix Fine Arts Association, Phoenix, Ariz.
 Portland Society of Art, School of Fine & Applied Art, Portland, Maine.
 Research Institute of America, Washington, D. C.
 Southern Printmakers Society, Mt. Airy, Ga.
 Tennessee Society of Artists, Memphis, Tenn.
 Winnipeg Art Gallery Association, Winnipeg, Manitoba, Canada.

FIRMS AND INDIVIDUALS

Adams State College, Alamosa, Colo.
 Alabama Polytechnic Institute, Department of Applied Art, Auburn, Ala.
 Alabama School Supply Co., Montgomery, Ala.
 Alabastine Paint Products, Grand Rapids, Mich.
 Allied Artists of Johnstown, Pa., Johnstown, Pa.
 Allied Chemical & Dye Corporation, National Aniline Division, New York, N. Y.
 American Artists' Supply Co., Baltimore, Md.
 American Crayon Co., The, Sandusky, Ohio.
 Ansbacher Siegle Corporation, Roebuck, S. I., N. Y.
 Appalachian Museum of Art, Mt. Airy, Ga.
 Arsenal Technical Schools, Indianapolis, Ind.
 Art Crayon Co., Inc., Brooklyn, N. Y.
 Art Instruction, Inc., Minneapolis, Minn.
 Artists' Colour Co., Ltd., Toronto, Canada.
 Ball State Teachers College, Muncie, Ind.
 Baltimore, City of, Department of Education, Baltimore, Md.
 Baltimore Museum of Art, Baltimore, Md.
 Bennett, Bertha Forbes, Ridgewood, N. J.
 Binney & Smith Co., New York, N. Y.
 Black Mountain College, Black Mountain, N. C.
 Blackwell Wielandy Co., St. Louis, Mo.
 Blake Studios, Berkshire, Mass.
 Blood Co., A. M., Rock Island, Ill.
 Boren-Malone Co., Wewoka, Okla.
 Brazer, Clarence W., New York, N. Y. (General support.)
 California Palace of the Legion of Honor Museum, San Francisco, Calif.
 Calvin College, Grand Rapids, Mich.
 Canton Art Institute, Canton, Ohio.
 Capital University, Columbus, Ohio.
 Caravel Color Co., Baltimore, Md.
 Central Falls Public Schools, Central Falls, R. I.
 Central School Supply Co., Louisville, Ky.
 Chicago Academy of Fine Arts, Chicago, Ill.
 Choate School, The, Wallingford, Conn.
 Cincinnati Art Club, The, Cincinnati, Ohio.
 Cincinnati, City of, Board of Education, Cincinnati, Ohio.
 Clearwater Museum School of Art, Clearwater, Fla.

Clemson A. & M. College, Department of Architecture, Clemson, S. C.
 Clifton, Mary Louise (William Rockhill Nelson Gallery of Art and Atkins Museum of Fine Arts), Kansas City, Mo.
 Colborn School Supply Co., Grand Forks, N. Dak.
 College of the Pacific, Stockton, Calif.
 Colorado, University of, Boulder, Colo.
 Colorado Woman's College, Denver, Colo.
 Connecticut Academy of Fine Arts, Hartford, Conn.
 Cook Paint & Varnish Co., Kansas City, Mo.
 Corning Glass Works, Corning, N. Y. (General support.)
 Craftint Manufacturing Co., The, Cleveland, Ohio.
 Culyer Military Academy, Culver, Ind.
 Daily, Inc., Bert L., Dayton, Ohio.
 Delta State College, Cleveland, Miss.
 Denver Art Museum, Denver, Colo.
 Des Moines Public Library, Des Moines, Iowa.
 Detroit Testing Laboratory, The, Detroit, Mich. (General support.)
 Downs-Randolph Co., Tulsa, Okla.
 Drexel Institute of Technology, Philadelphia, Pa.
 Drury, William H., (St. Georges School), Middletown, R. I.
 Dubuque, City of, Bureau of Education, Dubuque, Iowa.
 Eastern New Mexico College, Portales, N. Mex.
 Edmonton Museum of Art, Edmonton, Alberta, Canada.
 Edrudy Studios, Chicago, Ill.
 Educator Supply Co., Mitchell, S. Dak.
 Ekroth Laboratories, Inc., Brooklyn, N. Y.
 El Paso Testing Laboratories, El Paso, Tex.
 Electrical Testing Laboratories, New York, N. Y.
 Fairchild Corporation, E. E., Rochester, N. Y.
 Fessenden School, The, West Newton, Mass.
 Fogg Museum of Art, Harvard University, Cambridge, Mass.
 Fort Wayne Art School & Museum, Fort Wayne, Ind.
 Frances Shimer College, Mount Carroll, Ill.
 Fresno State College, Fresno, Calif.
 Geigy Co., Inc., New York, N. Y. (General support.)
 General Dyestuff Corporation, New York, N. Y.
 George Walter Vincent Smith Art Museum, The, Springfield, Mass.
 George Williams College, Chicago, Ill.
 Globe Crayon Co., Inc., New York, N. Y.
 Granville, Walter C. (Interchemical Corporation Research Laboratories), New York, N. Y.
 Grove City College, Grove City, Pa.
 Hallmark Laboratories, The, Jamestown, N. Y.
 Hamline University, School of Fine Arts, St. Paul, Minn.
 Hampton Institute, Hampton, Va.
 Harby, LeGrand H., (Knapp Memorial Laboratories Institute of Ophthalmology), New York, N. Y.
 Harris Laboratories, Lincoln, Nebr.
 Harvard University, Cambridge, Mass.
 Henschel & Co., Inc., John, New York, N. Y.
 High Museum School of Art, Atlanta, Ga.
 Hints, Inc., Wm. G., Reading, Pa. (General support.)
 Holland Color & Chemical Co., Holland, Mich.

- Hollins College, Hollins College, Va.
 Illinois State Museum, Springfield, Ill.
 Illinois State Normal University, Normal, Ill.
 (General support.)
 Illinois, University of, Urbana, Champaign, Ill.
 Imperial Crayon Co., Brooklyn, N. Y.
 Indiana State Teachers College, Art Department,
 Terre Haute, Ind.
 Indianapolis Public Schools, Indianapolis, Ind.
 Johnston Co., William G., Pittsburgh, Pa.
 Kandle, Matt (R. R. Donnelley & Sons Co.),
 Chicago, Ill.
 Kansas City Art Institute & School of Design, The,
 Kansas City, Mo.
 Kansas State College, Department of Architecture,
 Manhattan, Kans.
 Kansas, University of, School of Fine Arts,
 Lawrence, Kans. (General support.)
 Kentucky, University of, Lexington, Ky.
 Kimberly, Cara Draper, (Society of Washington
 Artists), Washington, D. C.
 Kohnstamm & Co., Inc., H., Brooklyn, N. Y.
 Lawrenceville School, Lawrenceville, N. J.
 Loomis Institute, The, Windsor, Conn.
 Louisiana State Museum, New Orleans, La.
 Louisville, University of, Louisville, Ky.
 Makepeace, Inc., B. L., Boston, Mass.
 Marietta-Harmon Chemicals, Inc., Paterson, N. J.
 Mariners Museum, The, Newport News, Va.
 Marston Supply Co., Phoenix, Ariz.
 Maryland State Teachers College, Towson, Md.
 Mayer, Ralph, (Art Classes, Columbia University),
 New York, N. Y.
 McDonogh School, McDonogh, Md.
 Michigan State Purchasing Division, Lansing,
 Mich.
 Michigan, University of, Ann Arbor, Mich.
 Mills College of Arts & Advertising, St. Paul, Minn.
 Milwaukee Public Schools, Milwaukee, Wis.
 Milwaukee State Teachers College, Milwaukee,
 Wis.
 Minnesota, University of, Department of Art
 Education, Minneapolis, Minn.
 Mississippi State Chemical Laboratory, State
 College, Miss.
 Munsell Color Co., Inc., Baltimore, Md.
 Muralo Co., Inc., The, Staten Island, N. Y.
 Museum School of Art, Houston, Tex.
 Nason, (Mrs.) Rosalind G. E., Bucksport, Maine.
 (General support.)
 New Mexico State Teachers College, Silver City,
 N. Mex.
 New York State Teachers College, Fredonia, N. Y.
 New York Testing Laboratories, Inc., New York,
 N. Y.
 Noberna Products Corporation, New York, N. Y.
 North Carolina, University of, Chapel Hill, N. C.
 North Dakota Agricultural College, Fargo, N. Dak.
 North Dakota State Teachers College, Mayville,
 N. Dak.
 North Texas Agricultural College, Art Department,
 Arlington, Tex.
 Northern Illinois State Teachers College, De Kalb,
 Ill.
 Northern School Supply Co., Great Falls, Mont.
 Northland College, Ashland, Wis.
 Norwich Art School, The, Norwich, Conn.
 Novic, Estel, Brooklyn, N. Y.
 Oberlin College, Art Museum, Oberlin, Ohio.
 Ohio State University, School of Fine & Applied
 Arts, Columbus, Ohio.
 Oklahoma Agricultural & Mechanical College,
 Stillwater, Okla.
 Oregon State College, Art Department, Corvallis,
 Oreg.
 Park College, Parkville, Mo.
 Partridge, Roi, (Mills College), Oakland, Calif.
 Patriz Testing Laboratories, Des Moines, Iowa.
 Pease Laboratories, Inc., New York, N. Y.
 Pennsylvania College for Women, Pittsburgh, Pa.
 (General support.)
 Pennsylvania State Teachers College, Indiana, Pa.
 Pennsylvania, University of, School of Fine Arts,
 Philadelphia, Pa.
 Permanent Pigments, Norwood, Ohio.
 Philbrook Art Center, Tulsa, Okla.
 Pioneer Museum & Haggin Art Galleries, Stockton,
 Calif.
 Pittsburgh, City of, Board of Public Education,
 Pittsburgh, Pa.
 Practical Drawing Co., Dallas, Tex.
 Prescott Paint Co., Inc., New York, N. Y.
 Progressive Teacher, The, Morristown, Tenn.
 Purdue University, Lafayette, Ind.
 Reardon Co., The, St. Louis, Mo.
 Reichhold Chemicals, Inc., Brooklyn, N. Y.
 Rice, (Dr.) Harold R., (University of Alabama,
 Dept. of Graphic & Plastic Arts), University,
 Ala.
 Riebe Co., Erwin M., New York, N. Y.
 Rockford College, Rockford, Ill.
 Russell Sage College, Troy, N. Y.
 San Diego Unified School District Purchasing
 Department, San Diego, Calif.
 Sanford Ink Co., Chicago, Ill.
 School of the Wichita Art Association, Wichita,
 Kans.
 Sears, Roebuck & Co., Chicago, Ill.
 Seton Hill College, Greensburg, Pa.
 Shreve, R. Norris, (Purdue University), Lafayette,
 Ind.
 Sinclair & Valentine Co., New York, N. Y.
 (General support.)
 Smith, George, Boston, Mass.
 Smith & Co., Inc., J. Lee, New York, N. Y.
 Smith-Ernery Co., Los Angeles, Calif., and San
 Francisco, Calif.
 Snell, Inc., Foster D., Brooklyn, N. Y.
 Southeastern State College, Durant, Okla.
 Southwestern Institute of Arts, Shreveport, La.
 Standard Crayon Manufacturing Corporation,
 Danvers, Mass.
 Stillman & Van Sicken, Inc., New York, N. Y.
 Stillwater Art Colony, Stillwater, Minn.
 Strasburger & Siegel, Baltimore, Md.
 Sweet Briar College, Art Department, Sweet Briar,
 Va.
 Talens School Products, Inc., New York, N. Y.
 Taylor, Frederick B., (Federation of Canadian
 Artists), Montreal, Que., Canada.
 Texas Tech. College, Department of Architecture &
 Allied Arts, Lubbock, Tex.
 Thurn School of Modern Art, Gloucester, Mass.
 Toch, (Dr.) Maxmilian (Toch Bros.), New York,
 N. Y.
 Tulsa, University of, Department of Art, Tulsa,
 Okla.
 Twining Laboratories, The, Fresno, Calif.
 Union Crayon Co., Lowell, Mass.
 United States Testing Co., Inc., Hoboken, N. J.
 (General support.)
 Virginia Museum of Fine Arts, Richmond, Va.
 Walker Art School, Minneapolis, Minn.
 Washington County Museum of Fine Arts, Hager-
 town, Md.
 Wayne University, College of Education, Detroit,
 Mich.
 Weber Co., F., St. Louis, Mo., and Philadelphia,
 Pa.
 Wesco Waterpaints, Inc., E. Boston, Mass.
 Wheaton College, Norton, Mass.
 Wisconsin, University of, Memorial Union Build-
 ing, Madison, Wis.
 Wyoming, University of, Laramie, Wyo.

U. S. GOVERNMENT

- Agriculture, U. S. Department of, Washington,
 D. C.
 Panama Canal, The, Division of Schools, Balboa
 Heights, C. Z.

COMMERCIAL STANDARDS

ITEM	CS No.
0-40. Commercial standards and their value to business (third edition).	50-34. Binders board for bookbinding and other purposes.
1-42. Clinical thermometers (third edition).	51-35. Marking articles made of silver in combination with gold.
2-30. Mopsticks.	52-35. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
3-40. Stoddard solvent (third edition).	53-35. Colors and finishes for cast stone.
4-29. Staple porcelain (all-clay) plumbing fixtures.	54-35. Mattresses for hospitals.
5-46. Pipe nipples; brass, copper, steel, and wrought iron (second edition).	55-35. Mattresses for institutions.
6-31. Wrought-iron pipe nipples (second edition.) Superseded by CS5-46.	56-41. Oak flooring (second edition).
7-29. Standard weight malleable iron or steel screwed unions.	57-40. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).
8-41. Gage blanks (third edition).	58-36. Woven elastic fabrics for use in overalls (overall elastic webbing).
9-33. Builders' template hardware (second edition).	59-44. Textiles—Testing and reporting (fourth edition).
10-29. Brass pipe nipples. Superseded by CS5-46.	60-36. Hardwood dimension lumber.
11-41. Moisture regain of cotton yarns (second edition).	61-37. Wood-slat venetian blinds.
12-40. Fuel oils (fifth edition).	62-38. Colors for kitchen accessories.
13-44. Dress patterns (fourth edition).	63-38. Colors for bathroom accessories.
14-43. Boys' button-on waists, shirts, junior and sport shirts (made from woven fabrics) (third edition).	64-37. Walnut veneers.
(E)15-43. Men's pajamas (made from woven fabrics) (second edition).	65-43. Methods of analysis and of reporting fiber composition of textile products (second edition).
16-20. Wall paper.	66-38. Marking articles made wholly or in part of platinum.
17-42. Diamond core drill fittings (third edition).	67-38. Marking articles made of karat gold.
18-29. Hickory golf shafts.	68-38. Liquid hypochlorite disinfectant, deodorant, and germicide.
19-32. Foundry patterns of wood (second edition).	69-38. Pine oil disinfectant.
20-42. Staple vitreous china plumbing fixtures (third edition).	70-41. Phenolic disinfectant (emulsifying type) (second edition) (published with CS71-41).
21-39. Interchangeable ground-glass joints, stop-cocks, and stoppers (fourth edition).	71-41. Phenolic disinfectant (soluble type) (second edition) (published with CS70-41).
22-40. Builders' hardware (nontemplate) (second edition).	72-38. Household insecticide (liquid spray type).
23-30. Feldspar.	73-45. Old growth Douglas fir standard stock doors (third edition).
24-43. Screw threads and tap-drill sizes.	74-39. Solid hardwood wall paneling.
25-30. Special screw threads. Superseded by CS24-43.	75-42. Automatic mechanical draft oil burners designed for domestic installations (second edition).
26-30. Aromatic red cedar closet lining.	76-39. Hardwood interior trim and molding.
27-36. Mirrors (second edition).	77-40. Sanitary cast-iron enameled ware.
28-32. Cotton fabric tents, tarpaulins, and covers.	78-40. Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).
29-31. Staple seats for water-closet bowls.	79-40. Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78-40).
30-31. Colors for sanitary ware.	80-41. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
31-38. Wood shingles (fourth edition).	81-41. Adverse-weather lamps for vehicles (after market).
32-31. Cotton cloth for rubber and pyroxylin coating.	82-41. Inner-controlled spotlamps for vehicles (after market).
33-43. Knit underwear (exclusive of rayon) (second edition).	83-41. Clearance, marker, and identification lamps for vehicles (after market).
34-31. Bag, case, and strap leather.	84-41. Electric tail lamps for vehicles (after market).
35-42. Plywood (hardwood and eastern red cedar) (second edition).	85-41. Electric license-plate lamps for vehicles (after market).
36-33. Fourdrinier wire cloth (second edition).	86-41. Electric stop lamps for vehicles (after market).
37-31. Steel bone plates and screws.	87-41. Red electric warning lanterns.
38-32. Hospital rubber sheeting.	88-41. Liquid-burning flares.
39-37. Wool and part-wool blankets (second edition) (withdrawn as commercial standard, July 14, 1941).	89-40. Hardwood stair treads and risers.
40-32. Surgeons' rubber gloves.	90- . (Reserved for power shovels and cranes)
41-32. Surgeons' latex gloves.	91-41. Factory-fitted Douglas fir entrance doors.
42-43. Structural fiber insulating board (third edition).	92-41. Cedar, cypress, and redwood tank stock lumber.
43-32. Grading of sulfonated oils.	
44-32. Apple wraps.	
45-45. Douglas fir plywood (sixth edition).	
46-40. Hosiery lengths and sizes (third edition).	
47-34. Marking of gold-filled and rolled-gold-plate articles other than watchcases.	
48-40. Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).	
49-34. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.	

CS No.

- 93-41. Portable electric drills (exclusive of high frequency).
 94-41. Calking lead.
 95-41. Lead pipe.
 96-41. Lead traps and bends.
 97-42. Electric supplementary driving and passing lamps for vehicles (after market).
 98-42. Artists' oil-paints.
 99-42. Gas floor furnaces—gravity circulating type.
 100-44. Porcelain-enameled steel utensils (second edition).
 101-43. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
 102- . (Reserved for Diesel and fuel-oil engines.)
 103-42. Cotton and rayon velour (jacquard and plain).
 (E)104-43.¹ Warm-air furnaces equipped with vaporizing pot-type oil burners.
 105-43. Mineral wool; loose, granulated, or felted form, in low-temperature installations.
 106-44. Boys' pajama sizes (woven fabrics) (second edition).
 107-45. Commercial electric-refrigeration condensing units (second edition).
 108-43. Treading automobile and truck tires.
 109-44. Solid-fuel-burning forced-air furnaces.
 110-43. Tire repairs—vulcanized (passenger, truck, and bus tires).

CS No.

- 111-43. Earthenware (vitreous-glazed) plumbing fixtures.
 112-43. Homogeneous fiber wallboard.
 113-44. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
 114-43. Hospital sheeting for mattress protection.
 115-44. Porcelain-enameled tanks for domestic use.
 116-44. Bitumized-fibre drain and sewer pipe.
 117-44. Mineral wool; blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment.
 118-44. Marking of jewelry and novelties of silver.
 (E)119-45. Dial indicators (for linear measurements).
 120-44. Standard stock ponderosa pine doors.
 121-45. Women's slip sizes (woven fabrics).
 122-45. Western hemlock plywood.
 123-45. Grading of diamond powder.
 (E)124-45. Master disks.
 125-45. Prefabricated homes.
 126-45. Tank-mounted air compressors.
 127-45. Self-contained mechanically refrigerated drinking water coolers.
 128-45. Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
 129- . (Reserved for standard in process.)
 130-46. Color materials for art education in schools.

NOTICE—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington 25, D. C.

¹ Where "(E)" precedes the CS number, it indicates an emergency commercial standard, drafted under war conditions with a view toward early revision.

Commercial Standard **CS130-60**

U.S. DEPARTMENT OF COMMERCE
Color Materials for
Art Education in Schools

A recorded
voluntary standard of the
trade published by
the U.S. Department
of Commerce



For sale by the Superintendent of Documents
U.S. Government Printing Office, Washington 25, D.C. Price 15 cents

U.S. DEPARTMENT OF COMMERCE

BUSINESS AND DEFENSE SERVICES ADMINISTRATION

OFFICE OF TECHNICAL SERVICES

Commodity Standards Division

With the cooperation of the
National Bureau of Standards

EFFECTIVE DATE

Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors herein-after listed, this Commercial Standard was issued by the U.S. Department of Commerce, effective December 30, 1960.

FREDERICK H. MUELLER, *Secretary*

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, Business and Defense Services Administration, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforceable through usual legal channels as a part of the sales contract.

Commercial Standards originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The division by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the division assures continuous servicing of each Commercial Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

Color Materials for Art Education in Schools

(Effective December 30, 1960)

1. PURPOSE

1.1 The purpose of this Commercial Standard is to provide a guide to school authorities in the purchase of color materials for art education in schools, as to satisfactory color, working properties and durability; to eliminate confusion in nomenclature; to promote fair competition among manufacturers by providing criteria for differentiation among materials of known satisfactory composition and other materials considered unsuitable for art education in schools and thus to provide a basis for certification of quality.

1.2 This Commercial Standard covers minimum requirements for color materials of satisfactory color and working properties for art education. It is not intended that all color materials for art education meeting the requirements shall be identical nor of uniform excellence in all respects. Variations in manufacture not controlled by the specification may cause some schools to prefer one brand over another, both of which are acceptable under this specification.

2. SCOPE

2.1 This Commercial Standard covers material and workmanship, working qualities, color packaging, quality standards, and standards of nontoxicity for the color materials shown in the following list:

Color Materials

- 4.1 Chalk, colored dustless chalkboard.
- 4.2 Chalk, colored dustless (pastel, regular, and lecturer).
- 4.3 Chalk, colored molded (poster, regular, and lecturer).
- 4.4 Chalk, sight-saving dustless.
- 4.5 Chalk, white, dustless.
- 4.6 Chalk, white, molded.
- 4.7 Crayons, pressed.
- 4.8 Crayons, wax.
- 4.9 Finger paint.
- 4.10 Modeling clay.
- 4.11 Tempera, liquid.
- 4.12 Tempera, powder.
- 4.13 Water colors, dry cake.
- 4.14 Water colors, semi-moist.

3. DEFINITIONS

3.1 For the purpose of this standard the following definitions shall apply:

3.1.1 **Hue.**—The hue of a color determines whether it is red, yellow, green, blue, purple, or an intermediate. A color possessing hue is called a chromatic color, all others (white, black, and gray) are called neutral or achromatic colors. This standard does not place definite restrictions on variations in hue.

3.1.2 **Value.**—The value of a color is its lightness or darkness, expressed on a scale extending from black to white by perceptually uniform steps. This standard does not specify value.

3.1.3 **Chroma.**—The chroma of a color is the degree of its departure from the gray of the same value. If the color of the sample to be tested differs in hue and value from the standard to a degree which prevents judgment as to the relative chroma, the decision shall be based upon Munsell chroma. With respect to any one pigment used within the limitations customary for art materials, the chroma of a chromatic crayon or paint is a measure of the relative amount of pigment it contains. Excepting modeling clay, this standard sets definite limitations below which the chroma of art materials conforming to this standard may not fall. (See table 1.)

4. DETAIL REQUIREMENTS

4.1 Requirements for Colored Dustless Chalkboard Chalk.

4.1.1 **Size.**—Supplied in a minimum size: $2\frac{3}{4}$ inches long and $\frac{7}{16}$ inch diameter.

4.1.2 **Material and workmanship.**—Colored dustless chalkboard chalk shall be made of high-quality whiting, pigments, and other essential materials. The chalk shall be free from grit and sandy abrasives. It shall contain a sufficient amount of nontoxic, nonstaining, pigment so as to render a light, but distinct, colored marking on the chalkboard which can be easily erased.

4.1.3 **Working qualities.**—Colored dustless chalkboard chalk shall be of a soft, velvety texture and pastel-like color. They shall be firm, strong sticks.

4.1.4 **Toxicity.**—Colored dustless chalkboard chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.1.5 **Packaging.**—Colored dustless chalkboard chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce.¹ Each package shall be properly identified with brand and/or company name.

4.1.6 **Color range.**—Black, blue, brown, green, magenta, orange, red, violet, white, yellow.

4.2 Requirements for Colored Dustless Chalk.

4.2.1 **Size.**—Shall be supplied in the following minimum sizes: 2 by $\frac{1}{4}$ by $\frac{1}{4}$ inches or equivalent in volume (pastel), $2\frac{3}{4}$ inches long and $\frac{7}{16}$ inch diameter, or equivalent in volume (regular); and 3 by $\frac{1}{2}$ by $\frac{1}{2}$ inches or equivalent in volume (lecturer).

4.2.2 **Material and workmanship.**—Colored dustless chalk shall be made of quality pigments, inert fillers, and other essential materials. The chalk shall be free from grit, hard spots, and sandy abrasives.

¹ For sale by Superintendent of Documents, Government Printing Office, Washington 25, D.C., at 10 cents a copy.

4.2.3 Working qualities.—Colored dustless chalk shall have a soft, velvety texture. The chalk shall have such firmness of stick as to be adaptable to various art uses.

4.2.4 Toxicity.—Colored dustless chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.2.5 Packaging.—Colored dustless chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.2.6 Chroma.—The chroma of all colored dustless chalk shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.1.

4.2.7 Color range.—Black, blue (ultramarine), blue green, blue violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, dark red, dark yellow, flesh, gray, green, light red (pink), magenta, ochre, olive green, orange, red, red orange, red violet, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.3 Requirements for Molded Colored Chalk.

4.3.1 Size.—Shall be as follows: $3\frac{1}{8}$ inches long and $\frac{7}{16}$ -inch in diameter at one end, tapering to $\frac{3}{8}$ inch (regular); 4 inches long by 1-inch diameter tapering to $\frac{7}{8}$ inch (poster); 3 by $\frac{1}{2}$ inches and 3 by 1 by 1 inches (lecturer).

4.3.2 Material and workmanship.—Molded colored chalk shall be made of quality pigments, calcium sulfate, and other essential materials. The chalk shall be free from grit, hard spots, and sandy abrasives.

4.3.3 Working qualities.—Molded colored chalk shall be soft, velvety, and pastel-like in texture. The chalk shall have such firmness of stick as to be adaptable to various art uses.

4.3.4 Toxicity.—Molded colored chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.3.5 Packaging.—Molded colored chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.3.6 Chroma.—The chroma of all colored molded-chalk crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.1.

4.3.7 Color range.—Black, blue (ultramarine), brown (burnt umber), burnt sienna, dark green, blue green, blue violet, dark blue (Prussian), dark red, flesh, gray, green, light red (pink), magenta, ochre, olive green, orange, red, red orange, red violet, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.4 Requirements for Sight-Saving Dustless Chalk (Yellow).

4.4.1 Size.—Shall be $3\frac{1}{4}$ inches long and $\frac{3}{8}$ -inch diameter.

4.4.2 Material and workmanship.—Dustless sight-saving chalk shall be made of high-quality calcium carbonate, yellow pigment, and other essential materials. The calcium carbonate content shall be not less than 70 percent. The crayons shall be free from grit and sandy abrasives.

4.4.3 Transverse strength.—The transverse breaking strength of sight-saving dustless chalk shall be not less than 4 pounds when tested as outlined in paragraph 5.2.

4.4.4 Toxicity.—Sight-saving dustless chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.4.5 Packaging.—Sight-saving dustless chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.4.6 Chroma.—The chroma of sight-saving dustless chalk shall not exceed 6.5 when tested according to paragraphs 5.1 and 5.1.1.

4.5 Requirements for White Dustless Chalk.

4.5.1 White dustless chalk is made as follows:

Type a. Shall contain not less than 75% calcium carbonate.

Type b. Shall contain not less than 45% calcium carbonate.

4.5.2 Size.—Shall be $3\frac{1}{4}$ inches long and $\frac{3}{8}$ -inch diameter.

4.5.3 Material, workmanship, and working qualities.—White dustless chalk shall be made of high-quality calcium carbonate and other essential materials. The chalk shall be free from grit and sandy abrasives. It shall produce a highly visible and distinct mark that can be easily erased.

4.5.4 Transverse strength.—The transverse breaking strength of white dustless chalk shall be not less than 4 pounds when tested as outlined in paragraph 5.2.

4.5.5 Toxicity.—White dustless chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.5.6 Packaging.—White dustless chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.6 Requirements for Molded White Chalk.

4.6.1 Size.—Shall be $3\frac{1}{8}$ inches long and $\frac{7}{16}$ -inch diameter at one end, tapering to $\frac{3}{8}$ inch.

4.6.2 Material, workmanship, and working qualities.—Molded white chalk shall contain not less than 90 percent of calcium sulphate and other essential materials. The chalk shall be free from grit, hard spots, and sandy abrasives. It shall register a distinct mark that can be easily erased.

4.6.3 Toxicity.—Molded white chalk is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.6.4 Packaging.—Molded white chalk shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.7 Requirements for Pressed Crayons.

4.7.1 Size.—Supplied in the following minimum sizes: $3\frac{1}{2}$ inches long and $\frac{5}{16}$ inch diameter, or equivalent in volume (regular); and

4 inches long and $\frac{7}{16}$ inch diameter, or equivalent in volume (large). The shape may be either round, round with one flat side, or hexagonal.

4.7.2 Material and workmanship.—Pressed crayons shall be composed of waxes, quality pigments and fillers, uniformly blended and extruded under pressure. They shall be free from grit or other foreign substances that would impair their working properties. The wax binder shall be composed of water-insoluble waxes. They shall be compounded in the best possible manner under uniform quality control standards.

4.7.3 Working qualities.—Pressed crayons shall have a marking texture that yields color evenly with moderate pressure without scratching. There shall be a minimum of flaking when rubbed on newsprint under normal working conditions. The color rubout shall be smooth and uniformly distributed with a minimum of color streaking. The regular size crayon shall have a minimum breaking strength, without label, of 4.0 pounds, when tested across a $2\frac{1}{2}$ -inch gap, at a temperature between 70° and 75° F. (See paragraph 5.2.)

4.7.4 Toxicity.—Pressed crayons are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.7.5 Packaging.—Each pressed crayon shall be wrapped with a printed or colored label indicating the color of the crayon and shall be plainly marked with color, brand and/or company name. The crayons shall be packed in standard type containers as set forth in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce.

4.7.6 Chroma.—The chroma of all colored pressed crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.2.

4.7.7 Color range (regular size pressed crayons).—Black, blue, blue green, blue violet, brown, flesh, gray, green, magenta, ochre, orange, red, red orange, red violet, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.7.8 Color range (large size pressed crayons).—Black, blue, brown, burnt sienna, flesh, green, magenta, orange, red, red orange, red violet, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.8 Requirements for Wax Crayons.

4.8.1 Size.—Supplied in the following minimum sizes: $3\frac{1}{2}$ inches long and $\frac{5}{16}$ inch diameter, or equivalent in volume (regular); and $4\frac{1}{4}$ inches long and $\frac{7}{16}$ inch diameter, or equivalent in volume (large). The shape may be either round, round with one flat side, or hexagonal.

4.8.2 Material and workmanship.—Wax crayons shall be a molded product consisting of a blend of water-insoluble waxes and quality pigments. The pigments shall be uniformly distributed throughout the crayon to give even color. They shall be free from grit that would impair their working properties.

4.8.3 Working qualities.—Wax crayons shall have a marking texture that yields color evenly with moderate pressure without scratching. There shall be a minimum of flaking when rubbed on newsprint under normal working conditions. The color rubout shall be smooth and uniformly distributed with a minimum of color streaking. The regular size crayon shall have a minimum breaking strength, with-

out label, of 2.0 pounds when tested across a 2½ inch gap at a temperature between 70° and 75° F. (See paragraph 5.2.) The crayon rubout shall be waterproof.

4.8.4 Toxicity.—Wax crayons are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.8.5 Packaging.—Each regular wax crayon shall be wrapped with a printed or colored label indicating the color of the crayon and shall be plainly marked with color, brand and/or company name. Large size crayons may be packaged, wrapped or unwrapped. The crayons shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce.

4.8.6 Chroma.—The chroma of all colored wax crayons shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.2.

4.8.7 Color range (for regular size crayons).—Black, blue (ultra-marine), blue green, blue violet, brown (burnt umber), burnt sienna, carmine red, dark blue (Prussian), dark green, dark red (Indian red), flesh, gold, gray, green, lavender, light blue, light red (pink), light yellow, magenta, middle blue green, ochre, olive green, orange, red, red orange, red violet, silver, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.8.8 Color range (for large size crayons).—Black, blue (ultra-marine), blue green, blue violet, brown, burnt sienna, dark green, flesh, gray, green, magenta, ochre, orange, dark blue (Prussian), red, red orange, red violet, rose pink, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.9 Requirements for Finger Paint.

4.9.1 Material and workmanship.—Finger paint shall be made from quality pigments and other essential materials uniformly ground in a suitable water-based, semiliquid vehicle, and shall be ready for immediate use.

4.9.2 Working qualities.—Finger paint shall have a smooth, creamy, consistency free from grit. When dry, they shall be clean, transparent colors, which shall not powder, crack or flake. Finger paints shall intermix readily to produce any desired color and shall be sanitary.

4.9.3 Preservatives.—Finger paint shall contain the necessary preservatives so that it shall keep at least one year without decomposition or mold formation.

4.9.4 Toxicity.—Finger paint is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchaser on request.

4.9.5 Packaging.—Finger paint shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.9.6 Chroma.—The chroma of all colored finger paint shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.3.

4.9.7 **Color range.**—Black, blue, brown, green, orange, red, violet, yellow.

4.10 Requirements for Modeling Clay.

4.10.1 **Material and workmanship.**—Modeling clay shall consist essentially of a clay powder, pigment, and a water-insoluble binder of such a puttylike consistency that it can be easily worked or kneaded by a small child, yet of sufficient body to retain its shape when molded into various finished objects.

4.10.2 **Working qualities.**—Modeling clay shall be capable of being fashioned into small rings or spirals without cracking or breaking apart. It shall be sanitary, and shall maintain its satisfactory working qualities over a period of at least 24 months, when stored under proper conditions. It shall be responsive to fashioning with the fingers and with modeling tools.

4.10.3 **Toxicity.**—Modeling clay is certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.10.4 **Packaging.**—Modeling clay shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce. Each package shall be properly identified with brand and/or company name.

4.10.5 **Color range.**—Blue, bronze green, brown, cream, dark brown, gray, gray green, green, red, terra cotta, yellow.

4.11 Requirements for Liquid Tempera.

4.11.1 **Material and workmanship.**—Liquid tempera shall be made from quality pigments and other essential materials, ground and dispersed in a suitable water soluble vehicle, which, when thoroughly stirred, should be ready for immediate use.

4.11.2 **Working qualities.**—Liquid tempera colors shall give a smooth uniform spread. They shall brush easily and adhere evenly on porous surfaces without flaking or chipping. They shall dry to a clean, opaque, mat finish. They shall not bleed, chip, or peel when one color is applied over a dried coat of another color.

4.11.3 **Preservatives.**—Liquid tempera colors, as manufactured, shall contain the necessary preservatives so that they will keep for at least one year without decomposition or mold formation.

4.11.4 **Toxicity.**—Liquid tempera colors are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.11.5 **Packaging.**—Liquid tempera colors shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce. Each jar and container shall bear the name of the color, brand, and/or company name.

4.11.6 **Chroma.**—The chroma of all colored liquid tempera shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.4.

4.11.7 **Color range.**—Black, blue (ultramarine), blue green, blue violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, dark red, emerald green, flesh, gold, gray, green, lavender, light brown, light red (pink), magenta, medium yellow, ochre, orange, red, red orange, red violet, silver, turquoise blue, vermilion, violet, white, yellow, yellow green, yellow orange.

4.12 Requirements for Powder Tempera.

4.12.1 **Material and workmanship.**—Powder tempera shall be made of quality pigments, sizing, preservatives, and other essential materials. They shall be intimately ground and mixed in such a manner as to insure a smooth, uniform powder sufficiently fine to pass 99½ percent through a U.S. No. 200 sieve (wet test). The powder shall flow freely from the container.

4.12.2 **Working qualities.**—Powder tempera shall be so compounded that, when mixed with water, it will produce liquid color readily. The colors shall give a smooth, uniform spread. They shall brush easily and adhere evenly on white drawing paper or on newsprint without flaking or chipping. They shall dry to a clean, opaque, mat finish. They shall not bleed, chip or peel when one color is applied over a dried coat of another color.

4.12.3 **Preservatives.**—Powder tempera shall contain the necessary preservatives so that, when mixed with water according to the manufacturer's directions, it will not decompose for a period of one month.

4.12.4 **Toxicity.**—Powder tempera colors are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.12.5 **Packaging.**—Powder tempera shall be packed as specified in the latest edition of Simplified Practice Recommendation R192 as issued by the U.S. Department of Commerce. The container shall bear a label plainly marked with the name of the color, brand and/or company name.

4.12.6 **Chroma.**—The chroma of all colored powder tempera shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.5.

4.12.7 **Color range.**—Black, blue (ultramarine), blue green, blue violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, extending white, flesh, gold, gray, green, magenta, ochre, orange, red, red orange, red violet, silver, turquoise blue, violet, white, yellow, yellow green, yellow orange.

4.13 Requirements for Dry Cake Water Colors.

4.13.1 **Size.**—Supplied in cakes 1½ inches long, ⅜ inch wide and ¼ inch thick.

4.13.2 **Material and workmanship.**—Dry cake watercolors shall be manufactured from quality pigments, together with other essential materials. The cakes shall withstand expected climatic conditions.

4.13.3 **Working qualities.**—Dry cake watercolors shall lift readily from the cake with a wet brush and shall give a transparent spread when applied on watercolor paper. They shall mix satisfactorily with each other to give clean, intermediate colors.

4.13.4 **Toxicity.**—Dry cake watercolors are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.13.5 **Packaging.**—Dry cake watercolors shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce. Each cake shall bear the brand and/or company name.

4.13.6 **Chroma.**—The chroma of all colored dry cake watercolors

shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.6.

4.13.7 **Color range.**—Alizarin crimson, black, blue, brown, green, orange, red (carmine), violet, white, yellow.

4.14 **Requirements for Semimoist Watercolors.**

4.14.1 **Size.**—Supplied in rectangular pans commonly known as half-pans, size (inside dimensions) $\frac{3}{4}$ inch long, $\frac{9}{16}$ inch wide and $\frac{1}{4}$ inch deep; three-quarter pans, size $1\frac{3}{16}$ inches long, $\frac{1}{2}$ inch wide and $\frac{1}{4}$ inch deep; and full pans, size $1\frac{1}{4}$ inches long, $\frac{3}{4}$ inch wide and $\frac{1}{4}$ inch deep; or in oval- or round-pans containing a volume of material equivalent to that held by the half pans.

4.14.2 **Material and workmanship.**—Semimoist watercolors shall be manufactured from quality pigments and other essential materials. They shall be thoroughly ground, free from grit, and dispersed in a water-soluble vehicle. They shall be dried so that, under expected climatic conditions, the material will not soften and run out of the pans.

4.14.3 **Working qualities.**—Semimoist watercolors should lift readily. The paintout shall be transparent and without gloss, with proper application, from deepest clean color through dilution with water to the palest color. They shall intermix readily to produce clean, transparent intermediate colors.

4.14.4 **Toxicity.**—Semimoist watercolors are certified to contain no known toxic materials in sufficient quantities to be injurious to the human body. Compliance shall be indicated on the package or furnished to purchasers on request.

4.14.5 **Packaging.**—Semimoist watercolor refills shall be packed as specified in the latest edition of Simplified Practice Recommendation R192, as issued by the U.S. Department of Commerce.

4.14.6 **Chroma.**—The chroma of all colored semimoist watercolors shall equal or exceed the Munsell chroma specified in table 1 when tested according to paragraphs 5.1 and 5.1.6.

4.14.7 **Color range (half pans).**—Alizarin crimson, black, blue (ultramarine), blue green, blue violet, brown (burnt umber), burnt sienna, dark blue (Prussian), dark green, gamboge, gold, green, magenta, ochre, orange, peacock blue, red (carmine), red orange, red violet, silver, turquoise blue, vermilion, violet, white, yellow, yellow green, yellow orange.

4.14.8 **Color range (three-quarter and full pans).**—Black, blue, blue violet, brown, green, magenta, orange, red, red orange, turquoise blue, violet, white, yellow.

5. METHODS OF TEST

5.1 **Chroma.**—The chroma of color materials shall be found by applying a sample of the chalk, crayon, or paint to the specified material and then determining the chroma by reference to the Munsell Book of Color, library or pocket edition. Specified procedures for each material are described in paragraphs 5.1.1 to 5.1.6 inclusive. Paintouts should completely dry before the determination is made.

5.1.1 **Chalks (colored, dustless and molded, sight-saving, lecturers, pastels and poster).**—Make solid rubout on drawing paper.

5.1.2 **Crayons (wax, pressed).**—Make solid rubout on newsprint.

5.1.3 **Finger Paint.**—Spread finger paint on wet finger-paint pa-

per. The strength of the paint mixture on the paper shall be adjusted, as nearly as is practical, to yield full chroma and uniform transparency.

5.1.4 **Liquid tempera.**—Stir liquid tempera thoroughly to insure uniformity. Paint out on white drawing paper.

5.1.5 **Powder tempera.**—Prepare the paint as follows:

3 parts of powder tempera (by volume).

2 parts of water (by volume).

5.1.6 **Water colors (semimoist and dry cakes).**—Paint out the color in the customary manner on white drawing paper. The amount of paint material taken up by the wet brush shall be adjusted, as nearly as is practical, to yield full chroma and uniform transparency in a single coat.

5.2 **Transverse breaking strength.**—At 70° F. six crayons or chalks of each size and color shall be tested for breaking strength. Paper wrappers shall be removed. The breaking strength shall be determined by gradually applying force to the crayon or chalk axis and midway between the ends. The crayons or chalk shall be supported equally at each end. The two supports shall be 2½ inches apart. Of the six crayons or chalks tested, four shall meet the minimum requirement for breaking strength.

6. LABELING

6.1 In order that purchasers may be assured of obtaining color materials for art education in schools conforming to the requirements of this standard, it is recommended that products complying herewith bear a certificate, label, or imprint such as the Certified Products seal of The Crayon, Water Color & Craft Institute, Inc., containing the following wording:

These color materials for art education in schools comply with all the requirements of Commercial Standard CS130-60, as developed by the trade under the procedure of the Commodity Standards Division and issued by the U.S. Department of Commerce.

6.2 On small labels, when space does not permit the full statement, the Commercial Standard number "CS130-60" may be used for identification.

APPENDIX

Colors of chroma standards.—In table 2 are given the color designation of the chroma standards, according to the ISCC-NBS² method.³ The purpose of table 2 is to furnish an approximate indication of the colors to be expected under the various color materials names, but the designations are not to be construed as requirements of the standard. It is intended that colors that are not close matches of the colors selected as chroma standards shall be permissible under the standard. (See definitions of hue and value in par. 3.1.) It is to be noted further that the colors of several of the chroma standards lie at or near the boundary lines of the designations assigned, where a barely perceptible difference will place the colors in the adjacent areas carrying different designations.

² Inter-Society Color Council—National Bureau of Standards.

³ K. L. Kelly and D. B. Judd, *The ISCC-NBS Method of Designating Color and a Dictionary of Color Names*, NBS Circular 553. For sale by the Superintendent of Documents, Washington 25, D.C., for \$2 a copy.

HISTORY OF PROJECT

First edition.—On April 7, 1943, the Crayon, Water Color & Craft Institute, Inc., requested the cooperation of the National Bureau of Standards in the establishment of a commercial standard for color materials for art education in schools. Previously, the institute had appointed a committee of manufacturers which met with representatives of the National Bureau of Standards and developed a proposed commercial standard.

The Division of Trade Standards circulated copies of the proposal to manufacturers and leading user organizations for comment. Constructive comment was received from several sources but at the request of manufacturers further work was postponed because of restrictions under war conditions on the supply of pigments. On March 28, 1945, the Crayon, Water Color & Craft Institute, Inc., requested that the work be resumed in order that a standard could be issued coincident with the availability of proper pigments. Accordingly, interested organizations were advised and further comment was invited.

The chairman of the Simplified Specifications Committee of the Association of School Business Officials met with representatives of the Crayon, Water Color & Craft Institute and the National Bureau of Standards on March 14, 1945, and the proposal was adjusted in line with the desires of the school business officials. The adjusted draft was then referred to leading producer and user organizations for comment leading to circulation of a recommended commercial standard for acceptance. Following subsequent minor adjustment indicated by the comment, a recommended commercial standard was circulated to the entire trade for written acceptance on June 20, 1945. On November 23, 1945, the National Bureau of Standards announced that sufficient acceptances had been received, that no opposition to the establishment of the standard had been made, and that the standard, to be designated Color Materials for Art Education in Schools, Commercial Standard CS130-46, would be considered effective for new production from January 1, 1946.

Second edition.—Under date of October 4, 1957, The Crayon, Water Color & Craft Institute submitted a draft of a proposed revision of CS130-46 with a request that the Commodity Standards Division assist in the establishment of a revised commercial standard. The proposal reflected developments within the industry since the original standard was established and included requirements for additional color materials.

Following determination of the chroma of sample rubouts by the National Bureau of Standards, the proposed revision was circulated to the standing committee for consideration on October 20, 1958. The proposal was adjusted, wherever practicable, in accordance with the comments received. Further adjustments were made in the proposal in order to reflect the views of the National Bureau of Standards. On September 9, 1960, the recommended revision was distributed to all known manufacturers and to other interested organizations for written acceptance.

Upon receipt of acceptances considered to be sufficiently representative of the industry to insure the successful application of the revision the Commodity Standards Division issued an announcement on

December 1, 1960, that the revised standard would be designated CS130-60 and would become effective December 30, 1960.

Project Manager: H. A. Bonnet, Commodity Standards Division, Office of Technical Services.

Technical Adviser: Kenneth L. Kelly, Photometry and Colorimetry Section, National Bureau of Standards.

STANDING COMMITTEE

The function of the standing committee is to review, prior to circulation for acceptance, changes proposed to keep the standard abreast of progress. Comments concerning the standard and suggestions for revision may be addressed to the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, which acts as secretary for the committee, or to any of its members listed below:

James J. Shea, Milton Bradley Co., Springfield, Mass. (Chairman).

H. Spilman Burns, Supervisor, Educational Supplies and Equipment, Department of Education, Business Division, Supply Dept., 3 East 25th Street, Baltimore 18, Md. (Representing the Association of School Business Officials.)

Miss Elizabeth Clarkson, The Crayon, Water Color and Craft Institute, Inc., 420 Lexington Avenue, New York 17, N.Y.

D. McCurrach, Executive Manager, National School Supply and Equipment Association, 27 East Monroe Street, Chicago 3, Ill.

Albert T. Reid, American Artists Professional League, Inc., 15 Gramercy Park, New York 3, N.Y.

Leland P. Spore, The American Crayon Company, 2002 Hayes Avenue, Sandusky, Ohio.

V. R. Watson, Binney and Smith Inc., 380 Madison Avenue, New York 17, N.Y.

ACCEPTORS

The manufacturers, distributors, users, and others listed have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the standard as far as practicable but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the standard, and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the standard may be identified as such by a certificate, grade mark, or label. Purchasers are encouraged to require such specific evidence of compliance, which may be given by the manufacturer whether or not he is an acceptor.

ASSOCIATIONS

(General Support)

Association School Business Officials of the United States and Canada, Evanston, Ill.
Crayon, Water Color & Craft Institute, Inc., The, New York, N.Y.
National School Supply & Equipment Association, Chicago, Ill.
National Society for the Prevention of Blindness, Inc., New York, N.Y.

FIRMS AND OTHER INTERESTS

Alabastine Paint Products, Division of Chicago Bronze & Color Works, Chicago, Ill.
American Art Clay Co., Indianapolis, Ind.
American Crayon Co., The, Sandusky, Ohio
Ansbacher-Siegle Corp., New York, N.Y.
Arsenal Technical High School, Art Department, Indianapolis, Ind.
Art Crayon Co., Inc., New York, N.Y.
Auburn University, Auburn, Ala.

Baltimore Public Schools, Department of Education, Baltimore, Md.
Binney & Smith, Inc., New York, N.Y.
Blackwell Wielandy Co., Saint Louis, Mo.

Calvin College, Grand Rapids, Mich.
Carter's Ink Co., The, Cambridge, Mass.
Cincinnati Art Club, The, Cincinnati, Ohio
Cincinnati Board of Education, Cincinnati, Ohio

Colborn School Supply Co., Grand Forks, N.D.
Colorado, University of, Fine Arts, Boulder, Colo.

Colorado Woman's College, Denver, Colo.
Craffint Manufacturing Co., Cleveland, Ohio

Dade County Board of Public Instruction, Materials Testing Division, Miami, Fla.
Dally, Bert L., Inc., Dayton, Ohio.
Durit Products, New York, N.Y.

Educator Supply Co., Mitchell, S.D.
Electrical Testing Laboratories, Inc., New York, N.Y.
El Paso Testing Laboratory, Ltd., El Paso, Tex.

Indiana State College, Art Department, Indiana, Pa.
Indianapolis Public Schools, Indianapolis, Ind.

Kohnstamm, H., & Co., Inc., New York, N.Y.

Macy, R. H., & Co., Inc., New York, N.Y.
Makepeace, B. L., Inc., Boston, Mass.
McDonogh School, McDonogh, Md.
Milton Bradley Co., Springfield, Mass.
Milwaukee Public Schools, Board of Education, Milwaukee, Wis.

Nelson, W. R., Gallery & Atkins Museum of Fine Arts, Kansas City, Mo.
Nobema Products Corp., New York, N.Y.
North Carolina, University of, Chapel Hill, N.C.
Northland College, Arts and Crafts, Ashland, Wis. (General support.)

Patzig Testing Laboratories, Des Moines, Iowa.
Permanent Pigments Inc., Norwood, Ohio.
Practical Drawing Co., Dallas, Tex.
Purdue University, Art and Design, Lafayette, Ind. (General support.)

Rockford College, Art Department, Rockford, Ill.

Sanford Ink Co., Bellwood, Ill.
Sears, Roebuck & Co., Chicago, Ill.
Shimer College, Art Department, Mt. Carroll, Ill.
Stafford, S. S., Inc., New York, N.Y.
Standard Ultramarine & Color Co., Huntington, W. Va.

Toledo Museum of Art, Toledo, Ohio.

United States Rubber Co., Stoughton, Wis.
United States Testing Co., Inc., Hoboken, N.J.

Weber, F., Co., Philadelphia, Pa.
Wisconsin, University of, Department of Art and Art Education, Milwaukee, Wisc.

U.S. GOVERNMENT

Atomic Energy Commission, Property & Supply Management Branch, Washington, D.C.
Bureau of Indian Affairs, Department of the Interior, Washington, D.C.
Treasury, Department of, Office of Administrative Services, Washington, D.C.
Veterans Administration, Washington, D.C.

TABLE 1.—

Color name	Wax crayons	Pressed crayons	Pastel crayons
Alizarin crimson.....			
Blue (ultramarine).....	15.0	13.0	16.0
Blue green.....	8.0	3.5	8.0
Blue violet.....	15.0	8.0	12.0
Brown (burnt umber).....	4.0	3.5	3.8
Burnt sienna.....	6.0	6.0	7.0
Carmine.....	14.5		
Dark blue (Prussian).....	4.5		8.5
Dark green.....	5.5		4.0
Dark red (Indian).....	6.0		4.2
Dark yellow.....			6.6
Emerald green.....			
Flesh.....	5.0	5.0	
Gamboge.....			
Gold.....			
Green.....	10.0	8.0	5.4
Lavender.....	9.5		
Light blue.....	10.0		
Light red (pink).....	13.5		11.0
Light yellow.....	7.5		
Magenta.....	14.0	13.0	14.5
Medium yellow.....			
Middle Blue green.....	7.5		
Ochre.....			
Olive green.....	6.0		
Orange.....	14.5	13.5	13.7
Peacock blue.....			
Red.....	15.0	12.0	12.7
Red orange.....	14.0	12.0	12.7
Red violet.....	12.5	10.0	13.5
Turquoise blue.....	10.0	9.0	7.5
Vermillion.....			
Violet.....	11.6	7.5	9.8
Yellow.....	9.5	10.0	9.5
Yellow green.....	9.5	9.0	9.5
Yellow orange.....	15.0	9.0	13.0

Munsell chroma

Water colors	Tempera		Dustless chalk	Molded chalk	Finger paint
	Liquid	Powder			
11.5					
14.9	16.7	15.0	14.0	14.5	
7.6	7.5	7.0	8.5	7.5	
12.5	8.8	12.5	12.5	11.5	
4.5	2.0	3.5	4.5	5.0	3.5
7.0	4.5	5.5	10.0	5.5	
12.0					
5.0	7.2	9.0	11.5	12.0	8.0
	5.0	4.0	6.0	9.0	
	14.0		6.0	10.0	
	7.5				
			5.5	5.5	
14.0					
4.5	5.5	4.5			
9.5	8.0	9.5	4.5	5.0	7.2
	10.0				
			13.3	11.0	
16.8	15.2	16.2	14.5	14.0	
	11.5				
			14.0	10.0	14.0
15.5	16.0	15.0			
10.0					
	14.5	13.0	13.5	12.5	15.0
15.0	16.0	13.5	12.0	12.0	
13.0	12.5	14.5	10.0		
			7.5	8.0	
10.5	11.5	9.4			
14.0	13.0			10.0	7.6
11.0	12.0	6.0	8.0		
			9.0	9.0	13.5
12.5	13.0	13.5	6.5	9.5	
9.0	13.5	10.0	14.0	9.5	
12.5	16.0	11.5			

TABLE 2.—Color designations of chroma standards (Inter-Society Color

Color material name	Wax crayons	Pressed crayons	Pastel crayons	Watercolors
Alizarin Crimson.....				Strong red.....
Blue (ultramarine).....	Vivid purplish blue.	Vivid purplish blue.	Vivid blue.....	Vivid blue.....
Blue-green.....	Strong bluish green.	Moderate bluish green.	Strong bluish green.	Strong bluish green.
Blue violet.....	Vivid purplish blue.	Moderate purplish blue.	Strong purplish blue.	Vivid purplish blue.
Brown (burnt umber).....	Moderate reddish brown.	Moderate reddish brown.	Moderate brown.....	Light brown.....
Burnt sienna.....	Strong brown.....	Strong brown.....	Strong brown.....	Moderate reddish orange.
Carmine.....	Vivid red.....			Strong red.....
Dark blue (Prussian).....	Dark blue.....		Moderate blue.....	Moderate purplish blue.
Dark green.....	Moderate green.....		Dark yellowish green.	
Dark red (Indian).....	Grayish red.....	Grayish red.....	Grayish red.....	
Dark yellow.....			Light yellow.....	
Emerald green.....				
Flesh.....	Moderate orange pink.	Moderate orange pink.		
Gamboge.....				Vivid yellow.....
Green.....	Strong yellowish green.	Strong green.....	Moderate green.....	Strong yellowish green.
Lavender.....	Strong violet.....			
Light blue.....	Brilliant blue.....			
Light red (pink).....	Deep purplish pink.		Strong purplish pink.	
Light yellow.....	Light greenish yellow.			
Magenta.....	Vivid reddish purple.	Vivid purplish red.	Deep purplish pink.	Vivid purplish red.
Medium yellow.....				
Middle blue green.....	Strong bluish green.			
Ochre.....	Moderate orange yellow.	Dark orange yellow.		Moderate orange yellow.
Olive green.....	Dark greenish yellow.			
Orange.....	Vivid yellowish pink.	Vivid reddish orange.	Strong orange.....	Vivid reddish orange.
Peacock blue.....				Strong greenish blue.
Red.....	Vivid red.....	Strong red.....	Strong red.....	
Red orange.....	Vivid reddish orange.	Strong reddish orange.	Strong reddish orange.	Vivid reddish orange.
Red violet.....	Strong reddish purple.	Strong reddish purple.	Vivid reddish purple.	Vivid reddish purple.
Turquoise blue.....	Brilliant greenish blue.	Brilliant greenish blue.	Brilliant greenish blue.	Brilliant greenish blue.
Vermilion.....				Vivid reddish orange.
Violet.....	Strong violet.....	Moderate violet.....	Strong violet.....	Strong violet.....
Yellow.....	Brilliant yellow.....	Brilliant yellow	Brilliant greenish yellow.	Vivid yellow.....
Yellow green.....	Brilliant yellow green.	Brilliant yellowish green.	Strong yellow green.	Brilliant yellow green.
Yellow orange.....	Vivid orange.....	Moderate orange.....	Strong orange yellow.	Strong orange.....

Council—National Bureau of Standards) designation by ISCC method

Tempera		Dustless crayons	Molded crayons	Finger paints
Liquid	Powder			
Vivid purplish blue...	Vivid purplish blue.	Vivid blue.....	Vivid purplish blue.	
Strong greenish blue...	Strong greenish blue.	Strong greenish blue.	Strong bluish green.	
Deep violet.....	Strong violet.....	Strong violet.....	Strong violet.....	
Grayish brown.....	Moderate reddish brown.	Moderate brown.....	Moderate brown.....	Moderate brown.
Moderate reddish brown.	Strong brown.....	Dark reddish orange.	Moderate reddish brown.	
Deep purplish blue.....	Strong purplish blue.	Strong blue.....	Strong blue.....	Deep purplish blue.
Dark green.....	Dark green.....	Moderate green.....	Strong green.....	
Vivid red.....		Moderate reddish brown.	Dark reddish orange.	
Strong yellowish green.				
		Moderate pink.....	Moderate yellowish pink.	
Strong green.....	Strong green.....	Moderate yellowish green.	Light green.....	Strong green.
Strong violet.....				
		Deep purplish pink.	Brilliant red purple.	
Vivid purplish red.....	Vivid purplish red.	Vivid reddish purple.	Vivid purplish red.	
Vivid yellow.....				
Dark orange yellow.....		Pale orange yellow. Light olive.....	Pale orange yellow. Weak yellowish green.	
Vivid orange.....	Vivid reddish orange.	Vivid reddish orange.	Vivid orange.....	Vivid reddish orange.
Vivid red.....	Vivid red.	Strong red.....	Strong red.....	Vivid red.
Vivid red.....	Vivid reddish orange.	Strong red.....	Strong red.....	
Deep reddish purple.....	Vivid reddish purple.	Strong reddish purple.	Strong reddish purple.	
Vivid greenish blue.....	Strong greenish blue.	Brilliant greenish blue.	Brilliant greenish blue.	
Deep reddish orange.....				
Strong violet.....	Dark violet.....	Moderate violet.....	Strong violet.....	Deep violet.
Vivid yellow.....	Vivid yellow.....	Brilliant greenish yellow.	Brilliant yellow.....	Vivid yellow.
Vivid yellowish green.	Strong yellow green.	Light yellow green.	Strong yellow green.	
Vivid orange.....	Strong orange.....	Vivid yellow.....	Moderate orange yellow.	

ACCEPTANCE OF COMMERCIAL STANDARD

Color Materials for Art Education in Schools

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 _____

Commodity Standards Division
Office of Technical Services
Business and Defense Services Administration
U. S. Department of Commerce
Washington 25, D. C.

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹

of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer _____

(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____

(Fill in exactly as it should be listed)

Street address _____

City, zone, and State _____

¹ Underscore the applicable words. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interest, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

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 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 nationwide 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 of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.