IMPORTANT EARLY SYNTHETIC DYES

Chemistry, Constitution, Date, Properties

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Preface

This notebook presents information on a limited number of important early synthetic dyes as recommended by the extensive work of Dr. Helmut Schweppe in the field of dye analysis. A great deal of the data has been abstracted from the well-known encyclopedia on dye structure and properties, the Colour Index, published jointly by the American Association of textile Chemists and Colorists and the Society of Dyers and Colourists.

The purpose of this manual is as an aid to textile conservators in their laboratories. It is distributed by the Conservation Analytical Laboratory, Smithsonian Institution, with the kind permission of the American Association of Textile Chemists and Colorists. For a complete review of all known dye structures and chemical properties of dyes, the reader is referred to the master volumes of the Colour Index.

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(by Colour Index Number)
(in chronological order by color)

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(Arrange by Colour Index Number)

Commercial Name: Discoverer, year:	Colour Index Generic Name:	C.I.Number:
1) Picric Acid (Woulfe,1771)	Acid Dye	10305
2) Martius Yellow (Ganahl, 1856)	C.I.Acid Yellow 24	10315
3) Naphthol Yellow S (BASF) (H.Caro, 1879)	C.I.Acid Yellow 1	10316
4) Chrysoidine (H.Caro, 1875)	C.I.Basic Orange 2	11270
5) Metanil Yellow (C.Rumpff, 1879)	C.I.Acid Yellow 36	13065
6) Orange IV (O.N.Witt, 1876)	C.I.Acid Orange 5	13080
7) Azo Flavine 3R (E.Knecht, 1880)	C.I.Acid Orange 1	13090
8) Archil Red (Z.Roussin and A.F.Poirrier,1878)	C.I.Acid Red 74	13355
9) Alizarin Yellow GGN (R.Nietzki, 1887)	C.I.Mordant Yellow 1	14025
10) Chrysoin (P.Griess, 1875)	C.I.Acid Orange 6	14270
11) Orange I (P.Griess,1876)	C.I.Acid Orange 20	14600
12) Naphthylamin Brown F (H.Caro, 1878)	C.I.Acid Brown 6	14625
13) Orange II (Z.Roussin, 1876)	C.I.Acid Orange 7	15510

14)	Fast Red AV (BASF) (H.Caro and Z.Roussin,1877)	C.I.Acid Red 88	15620
15)	Scarlet N for Silk (Durand and Huguenin)	C.I.Acid Red 9	15635
16)	Croceine Orange G (P.Griess, 1878)	C.I.Acid Orange 12	15970
17)	Fast Red E (H.Caro, 1878)	C.I.Acid Red 13	16045
18)	Ponceau 3RO (C.Rumpff, 1882)	C.I.Acid Red 25	16050
19)	Ponceau G (H.Baum, 1878)	C.I.Acid Orange 14	16100
20)	Ponceau RR (H.Baum, 1878)	C.I.Acid Red 26	16150
21)	Fast Red B (H.Baum, 1878)	C.I.Acid Red 17	16180
22)	Amaranth (H.Baum, 1878)	C.I.Acid Red 27	16185
23)	Orange GG (H.Baum, 1878)	C.I.Acid Orange 10	16230
24)	Kristallponceau 6R (M.Hoffmann, 1883)	C.I.Acid Red 44	16250
25)	Cochineal Red A (H.Baum, 1878)	C.I.Acid Red 18	16255
26)	Ponceau 6R (L.Limpach, 1882)	C.I.Acid Red 41	16290
27)	Fast Acid Magenta B	C.I.Acid Red 33	17200
28)	Amido Naphthol Red G (M.L.B. 1902)	C.I.Acid Red 1	18050
29)	Azo Fuchsine 6 B (M.L.B. 1902)	C.I.Acid Violet 7	18055
30)	Flavazine L (C.Möllenhoff,1892)	C.I.Acid Yellow 11	18820

31) Tartrazine (H.Ziegler, 1884)	C.I.Acid Yellow 23	19140
32) Amido Black 10B (M.Hoffmann, 1891)	C.I.Acid Black 1	20470
33) Vesuvine BA (C.Martius, 1863)	C.I.Basic Brown 1	21000
34) Congo Red (P.Böttiger, 1884)	C.I.Direct Red 28	22120
35) Brilliant Yellow (F.Bender and G.Schultz,1886)	C.I.Direct Yellow 4	24890
36) Cloth Scarlet (R.Nietzki, 1878)	C.I.Acid Red 151	26900
37) Wool Red B (R.Krügener, 1879)	C.I.Acid Red 115	27200
38) Cotton Scarlet (L.Limpach, 1882)	C.I.Acid Red 73	27290
39) Auramine (Kern and Caro, 1883)	C.I.Basic Yellow 2	41000
40) Diamond Green B (O.Fischer, 1877)	C.I.Basis Green 4	42000
41) Diamond Green G (Bindschedler and Busch, 1879)	C.I.Basic Green 1	42040
42) Patent Blue V (Herrmann, 1888)	C.I.Acid Blue 3	42051
43) Light Green SF Bluish (Kühler, 1879)	C.I.Acid Green 6	42075
44) Magenta (Natanson, 1856)	C.I.Basic Violet 14	42510
45) Methyl Violet (Lauth, 1861)	C.I.Basic Violet 1	42535
46) Crystal Violet (Kern and Caro, 1883)	C.I.Basic Violet 3	42555
47) Water Blue IN New (A.W.Hofman, 1858)	C.I.Acid Blue 93	42780
48) Victoria Blue R (Nachtvogel and Reingruber, 1892)	C.I.Basic Blue 11	44040

49)	Victoria Blue B (Caro and Kern, 1883)	C.I.Basic Blue 26	44045
50)	Rhodamine 6G (Bernthsen, 1892)	C.I.Basic Red 1	45160
51)	Rhodamine B (Cérésole, 1887)	C.I.Basic Violet 10	45170
52)	Uranine A (Baeyer, 1871)	C.I.Acid Yellow 73	45350
53)	Eosine A (Caro 1871)	C.I.Acid Red 87	45380
54)	Erythrosine (Kussmaul, 1876)	C.I.Acid Red 51	45430
55)	Quinoline Yellow (Jacobsen, 1882)	C.I.Acid Yellow 3	47005
56)	Safranine T (Greville Williams, 1859)	C.I.Basic Red 2	50240
57)	Mauveine (W.H.Perkin, 1856)	Basic Dye	50245
58)	Nigrosine , watersoluble (Coupier, 1867)	C.I.Acid Black 2	50420
59)	Methylene Blue (Caro, 1876)	C.I.Basic Blue 9	52015
60)	Murexide (Scheele, 1776)	Mordant Dye	56085
61)	Alizarin (C.Graebe and C.Liebermann, 1871)	C.I.Mordant Red 11	58000
62)	Alizarin Red S (C.Graebe and C.Liebermann, 1871)	C.I.Mordant Red 3	58005
63)	Alizarin Red PS	Mordant Dye	58210
64)	Alizarin Red SS (M.L.B., 1886)	C.I.Mordant Red 2	58260
65)	Indigo Carmine (Barth, 1740)	C.I.Acid Blue 74	73015
66)	Prussian Blue (Diesbach, 1704)	C.I.Pigment Blue 27	77510

Glossary

AATCC: American Association of Textile Chemists and Colorists. Professional organization, located in Research Triangle Park, North Carolina. Designs and promulgates textile testing standards, published annually in AATCC Technical Manual. Numerical references compare to Grey Scales for chnages in color or Grey Scales for changes in staining: 5 (least) to 1 (most). Lightfastness of dye on fabric compare to standards 1 (lowest) to 8 (highest fastness).

Carbonising: Operation in wool processing. Designed to removed vegetable impurities (burrs, etc.); occurs before dyeing. With woolen piece goods, fabric is immersed in 5% (wt/vol) H_2SO_4, squeezed, dried at 60°-70^oC, then baked at 110^oC for 5 minutes. Fabrics will contain about 6% H_2SO_4. Decreases affinity of fabric for acid dyes.

Crabbing: Operation in wool processing. Cloth under tension passes through boiling water and is quenched. Purpose is to prevent/correct cockling and distoriton of weave structure or pattern, particularly to plain weaves.

Decatising: Steaming. Operation in wool processing.

Dischargeability: Characteristic of certain dyestuffs, to be reduced (destroyed) and not to interfere with the shade of subsequent dye on a printed cloth.

Dye Method: For wool fibers, yarns and fabrics. Refers to acidity required in dye bath condition for the successful application of the dye to the fiber:
(1) Nearly neutral (pH 7.0-7.5)
(2) Weakly acidic (pH 3.5-5.5)
(3) Sulfuric acid (pH<3.5).

Exhaustion: A postiive characteristic of a dye. refers to the transfer of the dye from the bath (dye liquor) into the fiber.

Illuminating color: Dye not affected by the reducing agent used for a discharged dye.

ISO: International Organization for Standardization. Professional organization , located in Geneva, Switzerland. Designs and promulgates (textile) testing methods. Test methods for the determination of fastness also use Grey Scales.

Levelness: A positive characteristic of a dye. Refers to the overall evenness of shade througout the piece of cloth or skein of yarn. Also used to indicate thoroughness of penetration into the material, i.e. in cross-section.

Milling: Synonym for fulling. Operation in woolen processing. Designed to felt the cloth, increasing fullness and density, creating a pile.

Potting: Operation in wool processing similar to crabbing. Fabric is wrapped around iron roller, submerged in a cold bath; bath is slowly raised to the boil. Used to obtain bright finish and soft handle found in billiard cloths.

SDC. Society of Dyers and Colourists. British professional organization. Devises and promulgates textile testing standards. First fastness data published in the Society's Journal in 1884.

Stoving: A bleaching operation during wool processing. Involves the use of sulfur or sulfur dioxide.

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Knecht, E., C. Rawson, and R. Loewenthal. Manual of Dyeing: For the Use of Practical Dyers, Manufacturers, Students, and All Interested in the Art of Dyeing, Vol. II, 2nd edition. London: Charles Griffin and Co., Ltd., 1910.

Rossol, M. and A. Netburn. Hazards of Dyes and Pigments for Museum Personnel. New York: Center for Occupational Hazards, 1986.

Textile Chemist and Colorists Buyer's Guide, Vol, 17, #7 (July, 1985). Research Triangle Park, North Carolina: American Association of Textile Chemists and Colorists.

Storey, J. Thames and Hudson Manual of Dyes and Fabrics. London: Thames and Hudson, Ltd., 1978.

TOXICITY INFORMATION

This section will outline the general health hazards, protection equipment, and safety procedures one should follow when dealing with certain synthetic dyes. It should be emphasized that the information is general in nature and the sources utilized for this report should not be considered comprehensive.

In light of the absence of data on a majority of the dyes, and that unknown impurities exist in materials as obtained from the manufacturer, a reminder of good laboratory practice is in order. When using these chemicals, gloves should be worn, the wearing of lab coats is strongly recommended, Chemicals should only be used in a well ventilated space, and smoking, eating,and drinking while handling these materials should be strictly prohibited. Wastes should be disposed of in an approved manner.

Always try to avoid unecessary skin contact and especially avoid contact with the eyes. Do not bring food or drink into the proximity of your work area. Always wash your hands before and after handling dyes, before handling food and at the start and finish of your work day. Always wear long pants, a long sleeved shirt, non-leather shoes, and socks. Be in the habit of laundering the clothes worn in the lab separately from general laundry, or wear disposable overalls. In the case of dyes proven to be carcinogenic, wear disposable overalls and dispose of after use.

GENERAL HEALTH HAZARD PROTECTIVE EQUIPMENT

EYE PROTECTION: Wear safety goggles.

PROTECTIVE GLOVES: Wear impermeable rubber gloves (check for leaks) or wear disposable gloves. When working below the waist gloves are left inside the sleeves. When working above the waist gloves are worn outside the sleeves. In this way any spilled material will run down the outside of your clothing. When removing protective gear take the gloves off last to prevent contaminating your hands.

APRONS: When handling concentrates a rubber or neoprene apron will help to protect your chest, waist and legs from splashes.

VENTILATION: Local exhaust is preferred.

RESPIRATORY PROTECTION: Use a NIOSH/MNHA* approved respirator to avoid breathing dust. Check the filter for cleanliness. Make sure that the respirator fits tightly enough to from a seal around your face (but not too tightly so as to cause headache.

OTHER PROTECTIVE MEASURES: Wear overalls, labcoats, and non-leather shoes to prevent skin contact.

SHOULD ACCIDENTAL CONTACT OCCUR THE FOLLOWING GENERAL PROCEDURES SHOULD BE OBSERVED

SKIN CONTACT:

Wash affected skin areas thoroughly with soap and water. Rinse well. If irritation develops, consult a physician.

EYE CONTACT:

Flush eyes with flowing water for at least 15 minutes. Seek medical attention.

INHALATION:

Avoid breathing dust. If inhaled move to fresh air. If difficulty in breathing, administer oxygen and seek immediate medical attention.

INGESTION:

If ingested, spit it out. Procedures vary depending on the dye. In general, seek immediate medical attention. Refer to individual dye listings as in many cases it may be necessary to induce vomiting. NOTE - never try to induce vomiting if the person affected is unconscious.

FIRE HAZARDS

Organic powders may form explosive dust clouds when mixed with air in critical proportions and in the presence of source of ignition. Therefor it is important to AVOID DUSTING.

In the case of fire be equipped with; self contained breathing apparatus to protect against potential toxic and irritating fumes, as well as protective clothing.

SPILL LEAK

Sprinkle spillage with an absorbant sweeping compound to minimize dusting when sweeping up and containing. Flush area with water, and COLLECT WATER FOR PROPER DISPOSAL.

TOXICITY BIBLIOGRAPHY

Toxicity information referenced to text by number.

1). Egan, H., (Ed.), Environmental Carcinogens Selected Methods of Analysis, "Some Aromatic Amino and Azo Dyes in the General and Industrial Environment," Vol. 4, International Agency on Cancer, Lyon, 1981.

2). Gardner, W., (Ed.), Handbook of Chemical Synonyms and Trade Names, 8th edition, CRC Press Lt, Boca Raton, Florida, 1978.

3). Hawley, G.G., (Ed.), The Condensed Chemical Dictionary, 10th edition, Van Nostrand Reinhold Company, New York, 1981.

4). Rossol, M., and A. Netburn, Hazards of Dyes and Pigments for Museum Personnel, Center for Occupational Hazards, New York, 1986.

5). Sax, N. I., et al, (Eds.), Dangerous Properties of Industrial Materials, 6th edition, Van Nostrand Reinhold Co., New York, 1984.

6). Shibko, S. I., Associate Director for Toxicology, Evaluaition Division of Toxicology, Center for Food Safety and Applied Nutrition. Private Correspondance with Mary Ballard 11/9/87. Four sources were searched to obtain toxicological information concerning dyes to be used in course-work sponsored by the Smithsonian Institution. The sources used were: 1) The Priority-Based Assessment of Food Additives (PAFA) database, 2) The National Institute for Occupational Safety and Health (NIOSH), "Registry of Toxic Effects of Chemical Substances" (RTECS), 3) A publicaiton from the Food and Agriculture Organization of the United Nations World Health World Health Organization (WHO), Toxicological Evaluation of Some Food Colours, Emulsifiers, Stabilizers, Anticaking Agents and Certain Other Substances, and 4) the worksheets that were the basis for this WHO publication.

7). Society of Dyers and Colourists, and the American Association of Textile Chemists and Colorists, Colour Index, 3rd edition, Vol. 4, The Society of Dyers and Colourists, Great Britian, Lund Humphries, Bradford, and London, 1971.

8). Windholz, M., (Ed.), The Merck Index, 10th edition, Rahway, N.J., Merck & Co., Inc., 1983.

TOXICITY MANUFACTURERS LISTING

Names and addresses including emergency telephone numbers of sources of material safety data sheets referenced to text by code letters. Should the need arise, when making use of these emergency telephone numbers be sure to refer to the dye name as given in the text under the toxicity information section included with each of the dyes.

(ATL) Atlantic Industries Inc.
10 Kingsland Road
Nutley, NJ 07110 Emergency phone: (201) 235-1800

(PDC) Berncolors-Poughkeepsie Inc.
75 N. Water Street
Poughkeepsie, NY 12601 Emergency phone: (914)454-6700

(CCC) Carolina Color and Chemical Company
3400 Silas Avenue
Charlotte, NC 28206 Emergency phone: (704) 333-5101

(DHHS) Dept. of Health and Human Services
Public Health Service
Food and Drug Administration
Washington, DC 20204

(IDC) Internationas Dyestuffs Corporation
50 Page Road
P.O. Box 2169
Clifton, NJ 07015 Emergency phone: (201) 778-0122

(ORC) Organic Dyestuffs Corporation
74-84 Valley Street
East Providence, RI 02914 Emergency phone: (401) 434-3300

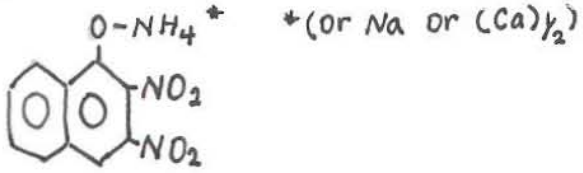
(PCC) Passaic Color and Chemical Company
28-36 Paterson Street
Paterson, NJ 07501 Emergency phone: (201)438-5200
(704)332-8691

(TCI) Tricon Colors Inc
16 Leliaris Lane
Elmwood Park, NJ 07407-3291 Emergency phone:
(201) 794-3800

Common Name: Martius Yellow
Color Index Name: Acid Yellow 24
C.I.: 10315

Chemical Class: Nitro

Structure:



Synthesis: Dinitrate 1-naphthol and convert to ammonium,* sodium or calcium salt.

Discoverer: Ganahl 1856, Martius 1864

Reactions to reagents:
Soluble in water; ammonium salt soluble in ethanol.
Sulphuric Acid conc.--yellow; on dilution--yellow ppt.

Dyeing: wool (rarely used)
Method: 2
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: --

Dyeing other fibers:
silk dyed from a weakly acid bath (rarely used).

Printing:

Hue: daylight: yellow
tungsten: --

Toxicity Information: Source: Reference (8), 1983.
Highly toxic material readily absorbed through the skin. Produces marked increase in metabolism and temperature, profuse sweating, collapse and death. May cause dermatitis, cataracts, weight loss, granulocytopenia, polyneuropathy.

Common Name: Maritus Yellow
Color Index Name: Acid Yellow 24
C.I. 10315

Fastness Properties: No listing for AATCC or ISO

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light:	1/3, 1/2 normal:		
	normal:		
	2X normal:		
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties:

Dischargeability:	
Effects of Metals:	Copper:
	Chromium:
	Iron:

Non-textile Usage:

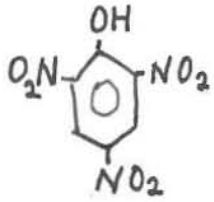
Notes:

This dye can be used for protein fibers (silk and wool) but as of the 3rd edition it is rarely used.

Common Name: Picric Acid
Color Index Name: Acid Yellow
C.I.: 10305

Chemical Class: Nitro

Structure:



Synthesis:

a). Trinitratephenol or phenol sulfonic acid or sulfanilic acid.

b). Nitrate benzene in presence of mercury.

Discoverer: Woulfe 1771

Reactions to reagents:

Sparingly soluble in water (yellow); readily soluble in ethanol.
Sulphuric Acid conc.--yellow; on dilution--unaltered.
Aqueous KCN boiling--brown solution.

Dyeing: wool

Method: --
Levelling: --
SDC migration Test Method/grade --
Staining (other fiber) acetate and cellulose: --

Dyeing other fibers:

Dyes wool, silk, and leather from an acid dye bath in greenish yellow shades of poor fastness to light and washing.

Printing:

Hue: daylight:
tungsten:

Toxicity Information: Source: Reference (5), 1984.

Can cause allergic irratation as well as dermatitis. Symptoms of systematic poisoning are nausea, vomiting, diarrhea, suppressed urine, yellow discoloration of skin and convulsions, as well as stupor, skin eruptions, anemia, abdominal pain and oligeria.

(Cont.)

Common Name: Picric Acid
Color Index Name: Acid Yellow
C.I. 10305

Toxicity Information: (Cont.)

EXPLOSION HAZARD: Dangerous when shocked or exposed to heat. Keep out of contact with metals. Forms unstable salts with concrete, ammonia and bases. Picric acid is a more powerful explosive than TNT.
DISASTER HAZARD: Highly dangerous, shock will explodes it on decomposion it emits highly toxic fumes and explodes. Can react vigorously with reducing materials.

Fastness Properties: No listing for AATCC or ISO

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light:	1/3, 1/2 normal:		
	normal:		
	2X normal:		
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties:
Dischargeability:
Effects of Metals: Copper:
Chromium:
Iron:

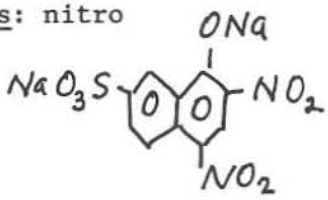
Non-textile Usage:

Notes:

Common Name: Naphthol Yellow S
Color Index Name: Acid Yellow 1
C.I. 10316

Chemical Class: nitro

Structure:



Synthesis: React 1-naphthol-2,4,7-trisulfonic acid, or 1-naphthol-4,7-disulfonic acid, or 1-naphthol-2,7,disulfonic acid, or more usually the nitrosocompound of the latter with nitric acid. Naphthol Yellow RS (Baeyer) was 2,4-dnitro-1-naphthol-8-sulfonic acid GP 40571 (Fr. 1,393)
Discoverer: Caro, 1879

Reactions to reagents: Soluble in cold and hot water (yellow) (8% at $0^{o}C$); slightly soluble in ethanol; H_2SO_4 conc.--greenish yellow; on dilution--weaker and brighter; aqueous sol. + KOH--yellow floccuent ppt.; aq. solution + $FeCl_3$-- yellow towards yellowish brown.

Dyeing: wool
Method: 3
Levelling: good, can be salted
SDC migration Test Method/grade: 1/4
Staining (other fiber) --

Dyeing other fibers: nylon , with formic acid (light dyeing only)

Printing: --

Hue: daylight: bright greenish yellow
tungsten: slightly redder, brighter

Toxicity Information: Source: (IDC), "Elcacide Naphthol Yellow S," 11/15/85
Chronic effects are unknown.
Combustion will produce oxides of carbon and nitrogen.

Common name: Naphthol Yellow S
Color Index Name: Acid Yellow 1
C.I. 10316

Fastness Properties:

Method:	AATCC	ISO
Alkali	4	4
Carbonizing	4-5	5
Chlorination: alteration:	4	5
staining:	4	5
Decatising:	4-5	5
Light: 1/3, 1/2 normal:	1	1
normal:	1	1
2X normal:	1	1
Milling: alkaline:		
Alteration:	1-2	1
Staining:	1-2	1
Milling: acid:		
Alteration:	-	4
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	5
Perspiration:	1	3
Potting:		
Alteration:	5	3-4
Staining:	5	1
Seawater:		
Alteration:	2	1
Staining:	2	1
Stoving:	4-5	4
Washing:		
Alteration:	2	1
Staining:	2	5

Other Properties:

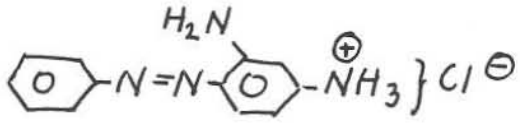
Dischargeability:	poor
Effect of Metals:	
Copper:	somewhat duller
Chromium:	--
Iron:	much duller

Non-textile Usage: paper: bright yellow in deep dyeing; pigment; heavy metal salts are used mainly for printing inks and ribbons;fur, soap, drugs and cosmetics, biological stain indicator.

Common Name: Chrysodine
Color Index Name: Basic Orange 2
C.I. 11270

Chemical Class: monoazo

Structure:



Synthesis: Aniline is diazotised and coupled to m-phenylenediamine

Discoverer: Caro (1875); Witt (1876)

Reactions to reagents: Soluble in water (yellowish orange), ethanol, and cellosolve; sl. soluble in acetone; insolube in benzene; H_2SO_4 conc.--yellow; on dilution, orange; HNO_3-- orange solution.

Dyeing: cotton (tannin mordant)
Method: --
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) --

Dyeing other fibers: --

Printing: --

Toxicity Information: Source: (PCC), "Chrysoidine Y Conc.," 9/25/85.
Combustion may produce nitrous oxides.
Ingestion: Induce vomiting.
Incompatability (materials to avoid): strong oxidizing agents.

Common name: Chrysodine
Color Index Name: Basic Orange 2
C.I. 11270

Hue: daylight: yellowish orange
tungsten: brighter

Fastness Properties:

Method:	cotton*	wool**
Light: 1/3, 1/2 normal:	1	1
normal:	1	1-2
2X normal:	2	2
Perspiration:	1	-
Washing:		
Alteration:	1	1-2
Staining:	-	-

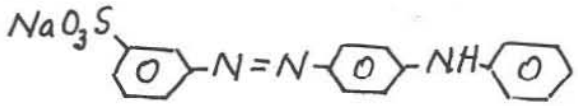
Non-textile Usage: bast fibers, silk, paper; biological stain; leather; wood stains; spirit inks; varnishes; see C.I. Solvent Orange 3.

*Note: cotton mordanted with tannin; tests based on daylight, using obsolete method. See Colour Index, Vol. IV, second edition, 1956.
**wool also tested with obsolete test method; lightfastness tests for wool here used different source for illuminant and cannot be directly compared to results found for tannin-mordanted cotton.

Common Name: Metanil Yellow
Color Index Name: Acid Yellow 36
C.I. 13065

Chemical Class: monoazo

Structure:



Synthesis: metanilic acid is diazotised and coupled with diphenylenediamine

Discoverer: C. Rumpff, 1879; Hepp 1882

Reactions to reagents: aqueous solution + HCL-- magenta red solution and ppt; aq. solution + NaOH--unaltered, yellow ppt with excess; Soluble in water and ethanol (orange yellow) moderately soluble in ether, benzene and cellusolve; sl. soluble in acetone; H_2SO_4 conc.--violet; on dilution, magenta red solution and ppt; HNO_3 conc.--blue solution, turning orange.

Dyeing: wool

Method: 3
Levelling: -
SDC migration Test Method/grade: 1/4
Staining (other fiber) cellulose and acetate, slight staining

Dyeing other fibers: silk; jute and the like

Printing: direct on wool and silk

Toxicity Information: Source: (CCC) "Caracid Metanil Yellow Y, Y Liq.," 4/28/86.
Acute oral toxicity as tested on rats. (LD 50 4,000-4,500 mg/kg)
Ingestion: Consult a physician.

Common name: Methanil Yellow
Color Index Name: Acid Yellow 36
C.I. 13065

Hue: daylight: reddish yellow to orange
tungsten: redder

Fastness Properties:

Method:		AATCC	ISO
Alkali		5	4
Carbonizing		4	3-4
Chlorination:	alteration:	-	3
	staining:	-	-
Decatising:		4	4
Light: 1/3, 1/2 normal:		2	2
normal:		3	3
2X normal:		4	4
Milling: alkaline:			
Alteration:		1	1-2
Staining:		-	-
Perspiration:		4	2-3
Seawater:			
Alteration:		5	-
Staining:		1	-
Stoving:		1	2
Washing:			
Alteration:		1	2
Staining:		-	-

Other Properties:

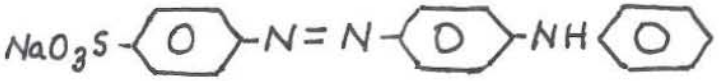
Dischargeability:	good
Effect of Metals:	
Copper:	greener and duller
Chromium:	little change
Iron:	much weaker

Non-textile Usage: paper: good colour value, but not fast to acid pigments; heavy metal salts, soap, wood stains, polishes, lacquers, biological stain indicator (pH 1-3) or in drugs and cosmetics.

Common Name: Orange IV
Color Index Name: Acid Orange 5
C.I.: 13080

Chemical Class: Monoazo

Structure:



Synthesis: Sulfanilic acid--->Diphenylamine

Discoverer: O.N. Witt 1876; Z. Roussin 1877

Reactions to reagents:
Soluble in water and ethanol (orange yellow). Slightly soluble in ether. Insoluble in benzene. Sulphuric acid conc.--violet; on dilution--violet ppt. Aqueous solution and hydrochloric acid--violet ppt. Aqueous solution and sodium hydroxide--yellow ppt.

Dyeing: wool
Method: 1,2,3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose:
Slightly stained.

Dyeing other fibers:
Silk: formic or sulphuric acid or broken degumming liquor.

Printing: --

Hue: daylight: yellowish orange
tungsten: little changed

Toxicity Information:

Hazard: SEVERE EXPLOSION risk when shocked or heated; especially reactive with metals or metallic salts. Toxic by skin absorption. Tolerance 0.1 mg per cu. meter of air.

Common Name: Orange IV
Color Index Name: Acid Orange 5
C.I. 13080

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			4
Carbonizing:			3-4
Chlorination:	alteration:		3
	staining:		-
Decatising:			4
Light: 1/3, 1/2 normal:			2
normal:			3
2X normal:			3-4
Milling (Alkaline):	alteration:		1-2
	staining:		-
Milling (Acid):	alteration:		1
	staining:		-
Peroxide Bleaching:	alteration:		1-2
	staining:		1
Perspiration:			2
Potting:	alteration:		1
	staining:		-
Seawater:	alteration:		1-2
	staining:		-
Stoving:			2
Washing:	alteration:		1-2
	staining:		-

Other Properties:

Dischargeability: moderate
Effects of Metals: Copper: duller
Chromium: --
Iron: much weaker

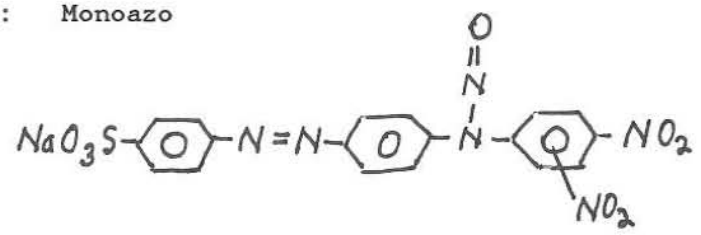
Non-textile Usage: Indicator, paper, soap, straw, and glue. See Leather Dyes section.

Notes: But as of the third edition it is rarely used.

Common Name: Azo Flavine 3 R
Color Index Name: Acid Orange 1
C.I.: 13090 or 13091

Chemical Class: Monoazo

Structure:



Synthesis:
Couple diazotized sulfanilic acid with diphenylamine and treat with aq. sodium nitrite to form the n-nitroso derivative; then nitrate so as to introduce one to two nitro groups.

Discoverer: E. Knecht, 1880; Charvolin, 1880; terMeer, 1881.

Reations to reagents:
Soluble in water and ethanol (yellowish brown); very soluble in toluene and acetone.
Sulphuric acid conc.--reddish violet; on dilution--brownish yellow to olive brown ppt.
Aqueous solution and sodium hydroxide--yellowish brown.
Aqueous solution and hydrochloric acid conc.--magenta red.

Dyeing: wool
Method: 2,3
Levelling: --
SDC migration Test Method/grade: 1/3 - 4
Staining (other fiber) acetate: stained
cellulose: slightly stained

Dyeing other fibers: Silk: acetic or sulphuric acid
Nylon: with ammonium sulfate.

Printing: --

Hue: daylight: yellowish orange (on wool)
tungsten: redder

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Azo Flavine 3 R
Color Index Name:	Acid Orange 1
C.I.	13090 or 13091

Fastness Properties:

Method:		AATCC	ISO
Alkali:		3	4
Carbonizing:		4-5	3-4
Chlorination:	alteration:	-	4-5
	staining:	-	4
Decatising:		5	4
Light: 1/3, 1/2 normal:		2	2
normal:		3	3
2X normal		4	4
Milling (Alkaline):	alteration:	3-4	1
	staining:	3-4	1
Milling (Acid):	alteration:	-	2
	staining:	-	1
Peroxide Bleaching:	alteration:	3	1
	staining:	3	2
Perspiration:		3-4	3
Potting:	alteration:	3	1
	staining:	3	1
Seawater:	alteration:	5	3
	staining:	5	2
Stoving:		5	3
Washing:	alteration:	3-4	1
	staining:	3-4	2

Other Properties:

Dischargeability: moderate

Effects of Metals: Copper: slightly duller
Chromium: unaffected
Iron: much duller

Non-textile Usage: Pigment as heavy metal salt, leather dye, soap.

Notes:

Common Name: Archil Red
Color Index Name: Acid Red 74
C.I. 13355

Fastness Properties:

Method:		AATCC	ISO
Alkali:			moderate
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light: 1/3, 1/2 normal:			moderate
normal:			
2X normal:			
Milling (Alkaline):	alteration:		poor
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties: No Listing
Dischargeability:
Effects of Metals: Copper:
Chromium:
Iron:

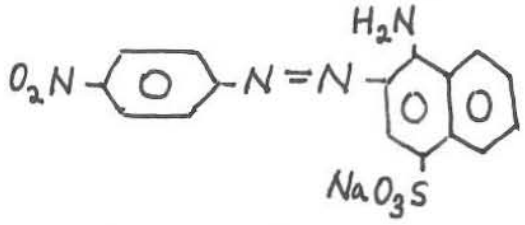
Non-textile Usage: No Listing

Notes:

Common Name: Archil Red
Color Index Name: Acid Red 74
C.I.: 13355

Chemical Class: Monoazo

Structure:



Synthesis: P-Nitroaniline--->Naphthionic Acid

Discoverer: Z. Roussin and A.F. Poirrier, 1878.

Reactions to reagents:
Soluable in water (reddish brown)
Sulphuric acid conc.--magenta red; on solution--brownish red ppt.
Aqueous solution and hydrocloric acid--brownish red ppt.
Aqueous solution and Sodium hydroxide--brownish red ppt.

Dyeing: wool
Method: acid bath
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: --

Dyeing other fibers: --

Printing: --

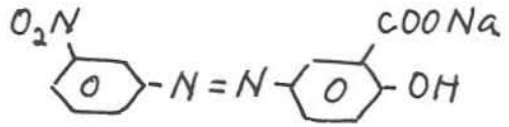
Hue: daylight: red
tungsten: --

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained.)

Common Name: Alizarin Yellow GGN
Color Index Name: Mordant Yellow 1
C.I. 14025

Chemical Class: monoazo

Structure:



Synthesis: m-nitroaniline diazotised and coupled with salicylic acid

Discoverer: R. Nietzki, 1887

Reactions to reagents: Soluble in water (yellow); slightly soluble in ethanol, acetone, and cellosolve; insoluble in other organic solvents; H_2SO_4 conc.--orange; on dilution, pale greenish yellow; HNO_3 conc.--reddish yellow solution; aqueous solution + HCl conc.--pale greenish yellow ppt; aq. solution + NaOH conc.--brownish orange

Dyeing: wool
Method: 1, 2, 3
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) in all three methods: cellulose and acetate unstained to heavy stainings; and silk, slight staining to heavy staining

Dyeing other fibers: nylon dyed with afterchrome; silk dyed with mordant

Printing: wool, silk, or cotton: dyed with chrome mordant; cotton print fastness ratings: chlorine 4-5; light 4,5,5; washing 4,4

Hue: daylight: dull yellow (Chromium mordant)
tungsten: brighter and redder

Toxicity Information: Source: (PDC), "Bernachrome Yellow 2 G," 11/22/85.
Combustion may produce carbon monoxide and irritating fumes.
Inhalation and ingestion: Seek medical attention.

Common name: Alizarin Yellow GGN
Color Index Name: Mordant Yellow 1
C.I. 14025

Fastness Properties:

Method:	AATCC wool(1)	ISO wool(1)*	ISO silk(3)
Alkali	3-4	3 4	-
Carbonizing	3-4	3-4	-
Chlorination: alteration:	-	3-4	-
staining:	-	-	-
Cross dyeing wool			
acetic acid	3	3-4	1-2
sulfuric acid	1	1-2	2-3
Decatising:	4	4	-
Light: 1/3, 1/2 normal:	4	4	4
normal:	5-6	4-5	4-5
2X normal:	6	5	5
Milling: alkaline:	-	4	4-5
Milling: acid:	4-5	2-3	-
Peroxide Bleaching:	2	2	1-2
Perspiration:	4-5	4	4-5
Potting:	2-3	2-3	-
Seawater:	4,4	4	-
Stoving:	2,3	3	2
Washing:	4	4	4-5

Other Properties:

Dischargeability: dischargeable to white

Effect of Metals:

Copper:	--
Chromium:	--
Iron:	--

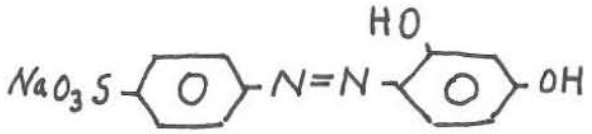
Non-textile Usage: anodized aluminum; biological stain; indicator, leather dyes

* Note: Wool dyed by methods (2) or (3) is smiliar but light fastness is slightly lower and that to stoving is slightly higher

Common Name: Chrysoin(e)
Color Index Name: Acid Orange 6
C.I.: 14270

Chemical Class: Monoazo

Structure:



Synthesis: sulfanilic acid--->Resorcinol

Discoverer: P. Griess 1875, O.N. Witt 1876

Reactions to reagents:
soluble in water (golden yellow), ethanol (lemon yellow), acetone and Cellosolve. Insoluble in other organic solvents.
Sulphuric acid conc.--yellow; on dilution--lemon yellow.
Nitric acid--yellow solution.
Aqueous solution and hydrochloric acid conc.--golden yellow.
Aqueous solution and sodium hydroxide conc.--brownish orange.

Dyeing: wool
Method: 3
Levelling: moderate to good
SDC migration Test Method/grade: --
Staining (other fibers) acetate and cellulose:
slightly stained

Dyeing other fibers:
Nylon: acetic acid or formic acid.
silk: broken degumming liquor or formic acid.

Printing: --

Hue: daylight: yellowish orange
tungsten: redder, brighter

Toxicity Information: Source: Reference (6), 11/9/87.
No tumors were found in short-term toxicity test of rats. In addition there was no sensitization activity in experiments with guinea pigs. In long-term tests, the color was found to have no carcinogenic action in a mouse study and no tumors were observed in studies of rats which were either fed or injected with the dye.

Common Name:	Chrysoin(e)
Color Index Name:	Acid Orange 6
C.I.	14270

Fastness Properties:

Method:		AATCC	ISO
Alkali:		4	3
Carbonizing:		3	3
Chlorination:	alteration:	-	3
	staining:	-	-
Decatising:		-	4
Light: 1/3, 1/2 normal:		3	4
normal:		3-4	4-5
2X normal:		4	5
Milling (Alkaline):	alteration:	1	1-2
	staining:	-	-
Milling (Acid):	alteration:	-	3
	staining:	-	-
Peroxide Bleaching:	alteration:	1	1-2
	staining:	-	-
Perspiration:		1	2
Potting:	alteration:	-	-
	staining:	-	-
Seawater:	alteration:	3	3
	staining:	-	-
Stoving:		2	3-4
Washing:	alteration:	4	3
	staining:	-	-

Other Properties:

Dischargeability:	good	
Effects of Metals:	Copper:	duller
	Chromium:	--
	Iron:	greener, duller

Non-textile Usage: Finish coloring, biological stain and indicator, pH range 12-14, food. See C.I. Food Yellow 8

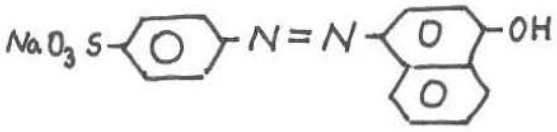
Notes:

See C.I. 11920

Common Name: Orange I
Color Index Name: Acid Orange 20
C.I.: 14600

Chemical Class: Monoazo

Structure:



Synthesis: sulfanilic acid--->1-naphthol

Discoverer: P. Griess 1876; Z. Roussin 1876

Reactions to reagents:
soluble in water (brownish orange). Slightly soluble in ethanol (yellowish brown) and acetone. Insoluble in most other organic solvents.
Sulphuric acid concentrate--violet; on solution-brownish orange (+reddish violet ppt).
Aqueous solution and hydrochloric acid concentrate--orange/brown.
Aqueous solution and sodium hydroxide conc.--red.

Dyeing: wool
Method: from acid dye bath
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: --

Dyeing other fibers: silk: acid

Printing: --

Hue: daylight: orange
tungsten: —

Toxicity Information: Source: Reference (6), 11/9/87.
This chemical was found to be equivoally tumorigenic when rats were given 9360 mg/kg bw subcutaneously. The agent had a cathartic effect in humans at 80 mg. Limited evidence for carcinogenicity in experimental animals.

Common Name: Orange I
Color Index Name: Acid Orange 20
C.I. 14600

Fastness Properties: No Listing Given

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light:	1/3, 1/2 normal:		
	normal:		
	2X normal:		
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties: No Listing Given

Dischargeability:	
Effects of Metals:	Copper:
	Chromium:
	Iron:

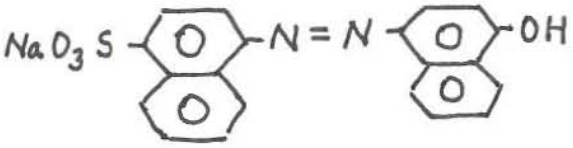
Non-textile Usage: indicator, leather

Notes:

Common Name: Naphthylamin Brown F
Color Index Name: Acid Brown 6
C.I.: 14625

Chemical Class: Monoazo

Structure:



Synthesis: Naphthionic acid--->1-naphthol

Discoverer: H. Caro 1878

Reactions to reagents:
Soluble in water (brown).
Sulphuric acid conc.--violet to blue; on dilution--dull reddish violet.
Aqueous solution and hydrochloric acid--magenta red and brown ppt.
Aqueous solution and sulphuric acid 10%--no change.
Aqueous solution and sodium hydroxide--violet brown.

Dyeing: wool
Method: 3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose:
Slightly stained

Dyeing other fibers: silk: broken degumming liquor

Printing: --

Hue: daylight: reddish brown
tungsten: little yellower

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Naphthylamin Brown F
Color Index Name:	Acid Brown 6
C.I.	14625

Fastness Properties: AATCC not listed

Method:		AATCC	ISO
Alkali:			1
Carbonizing:			3
Chlorination:	alteration:		-
	staining:		-
Decatising:			4
Light:	1/3, 1/2 normal:		2
	normal:		2
	2X normal:		3
Milling (Alkaline):	alteration:		1-2
	staining:		-
Milling (Acid):	alteration:		-
	staining:		-
Peroxide Bleaching:	alteration:		2
	staining:		-
Perspiration:			1
Potting:	alteration:		1
	staining:		-
Seawater:	alteration:		2
	staining:		-
Stoving:			1
Washing:	alteration:		2-3
	staining:		1-2

Other Properties:

Dischargeability:	moderate to good	
Effects of Metals:	Copper:	slightly duller
	Chromium:	--
	Iron:	duller

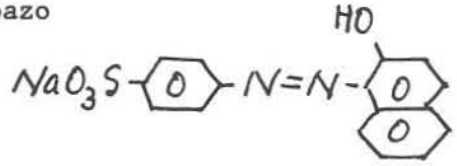
Non-textile Usage: biological stain
see Leather Dyes section

Notes:

Common Name: Orange II
Color Index Name: Acid Orange 7
C.I. 15510

Chemical Class: monoazo

Structure:



Synthesis: Sulfanilic acid diazotised and coupled with 2-naphthol

Discoverer: Z. Roussin, 1876

Reactions to reagents: Soluble in water (reddish yellow) and in ethanol (orange); H_2SO_4 conc.--magenta red; on dilution, brownish yellow ppt; aqueous solution + HCl -- brownish yellow ppt; aq. solution + NaOH -- dark brown

Dyeing: wool
Method: 2, 3
Levelling: --
SDC migration Test Method/grade: 1/5
Staining (other fiber) cellulose or acetate, slight staining

Dyeing other fibers: nylon (with formic acid); silk (with broken degumming liquor)

Printing: direct on wool, silk, or nylon

Hue: daylight: bright reddish orange
tungsten: little brighter

Toxicity Information: Source: (ATL), "Atlantic Acid Orange II," 3/14/86.
(PDC), "Bernacid Orange Y Conc.," 11/6/85.

Chronic effects include possible mutagneic based on positive AMES tests and other experiments. May cause testicular, liver and blood effects, if swallowed, based on tests with rats.
Avoid breathing dust. Workers must wash with soap and water after handling. Wear disposible and dispose after use.
Combustion will produce carbon dioxide, carbon monoxide. Oxides of nitrogen and sulfur may also be produced.
Incompatability (materials to avoid): oxidizing agents.
Ingestion and inhalation: Seek immediate medical attention.

Common name: Orange II
Color Index Name: Acid Orange 7
C.I. 15510

Fastness Properties:

Method:	AATCC	ISO
Alkali	3-4	4
Carbonizing	5	4
Chlorination: alteration:	-	2-3
staining:	-	4
Decatising:	5	4
Light: 1/3, 1/2 normal:	4	3
normal:	5	4
2X normal:	6	4
Milling: alkaline:		
Alteration:	1	1
Staining:	1	1
Milling: acid:		
Alteration:	-	2-3
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	2
Perspiration:	1	2-3
Potting:		
Alteration:	-	1
Staining:	-	1
Seawater:		
Alteration:	3	2
Staining:	3	1
Stoving:	2	1
Washing:		
Alteration:	1-2	1
Staining:	1-2	2

Other Properties:

Dischargeability: good

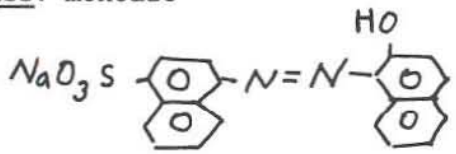
Effect of Metals:

Copper:	redder, duller
Chromium:	--
Iron:	weaker, duller

Non-textile Usage: biological stain or indocator; heavy metahl salts for paper coating, transparent pigments in printing and on moulding powders; leather dye

Common Name: Fast Red AV
Color Index Name: Acid Red 88
C.I. 15620

Chemical Class: monoazo

Structure: 

Synthesis: naphthionic acid diazotised and coupled with 2-naphthol

Discoverer: H. Caro and Z. Roussin, 1877

Reactions to reagents: soluble in water, ethanol, and cellosolve (red); slightly soluble in acetone; H_2SO_4 conc.--bluish violet; on dilution, yellowish brown ppt.; HNO_3 conc.-- slightly soluble (reddish yellow); NaOH dil. --reddish brown solution, dark ppt.

Dyeing: wool
Method: 2, 3
Levelling: --
SDC migration Test Method/grade: II/ 1-2
Staining (other fiber) acetate or cellulose--slight staining

Dyeing other fibers: nylon (with formic acid); silk (with acetic or formic acid);jute or other ligneous fibers

Printing: direct on silk or wool

Hue: daylight: red
tungsten: slightly yellower and brighter

Toxicity Information: Source: (PDC), "Bernacid Red A," 1/22/86.
Combustion will produce oxides of carbon and nitrogen.
Ingestion and inhalation: Seek medical attention.

Common name: Fast Red AV
Color Index Name: Acid Red 88
C.I. 15620

Fastness Properties:

Method:	AATCC	ISO
Alkali	3-4	4
Carbonizing	5	4
Chlorination: alteration:	-	1
staining:	-	4
Decatising:	4-5	4
Light: 1/3, 1/2 normal:	3	2
normal:	4	2-3
2X normal:	5	3
Milling: alkaline:		
Alteration:	1-2	1
Staining:	1 2	1
Milling: acid:		
Alteration:	-	3
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	1
Perspiration:	3	3
Potting:		
Alteration:	-	1
Staining:	-	1
Seawater:		
Alteration:	2	3
Staining:	2	1
Stoving:	1	1
Washing:		
Alteration:	1	1
Staining:	1	1

Other Properties:

Dischargeability: good

Effect of Metals:

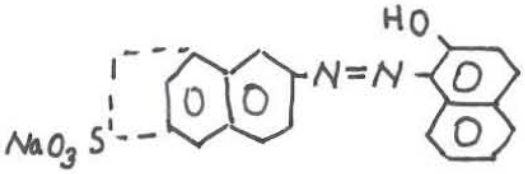
Copper: duller
Chromium: --
Iron: duller

Non-textile Usage: paper, soaps, hydrated creams, wood stains;cosmetic or drugs; leather dye

Common Name: Scarlet N for Silk
Color Index Name: Acid Red 9
C.I.: 15635

Chemical Class: Monoazo

Structure:



Synthesis:
6(+7)-amino-1-naphthalenesulfonic acids--->2-naphthol

Discoverer: Durand and Huguenin

Reactions to reagents:
Slightly soluble in cold water; soluble hot (yellowish red).
Sulphuric acid conc.--magenta red; on dilution--brown ppt.
Aqueous solution and hydrochloric acid--brown ppt.
Aqueous solution and sodium hydroxide--browner.

Dyeing: wool
Method: 2,3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: Stained

Dyeing other fibers: silk: degumming liquor, neutral or acid, with glaubers salt.

Printing: --

Hue: daylight: yellowish red
tungsten: slightly yellower

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Scarlet N for Silk
Color Index Name:	Acid Red 9
C.I.	15635

Fastness Properties: AATCC no listing

Method:		AATCC	ISO
Alkali:			3-4
Carbonizing:			4
Chlorination:	alteration:		4
	staining:		-
Decatising:			4
Light:	1/3, 1/2 normal:		1-2
	normal:		2
	2X normal:		2-3
Milling (Alkaline):	alteration:		2-3
	staining:		3-4
Milling (Acid):	alteration:		1-2
	staining:		-
Peroxide Bleaching:	alteration:		3
	staining:		-
Perspiration:			2-3
Potting:	alteration:		1-2
	staining:		-
Seawater:	alteration:		2
	staining:		-
Stoving:			2
Washing:	alteration:		3
	staining:		3

Other Properties:

Dischargeability:	good	
Effects of Metals:	Copper:	yellower
	Chromium:	--
	Iron:	duller

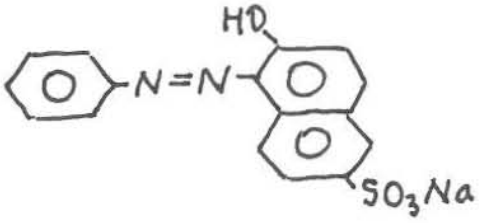
Non-textile Usage: paper (see Leather Dyes section)

Notes: Wet fastness properties are lower on silk than on wool, but may be improved by aftertreatment with tannin and tartar emetic.

Common Name: Croceine Orange G
Color Index Name: Acid Orange 12
C.I.: 15970

Chemical Class: Monoazo

Structure:



Synthesis: Aniline ---> Schaeffer's acid

Discoverer: P. Griess 1878

Reactions to reagents: Soluble in water (golden orange). Slightly soluble in ethanol (golden orange), acetone and Cellosolve. Insoluble in other organic solvents.
Sulphuric acid conc.--golden orange; on dilution--golden orange.
Nitric acid conc.--brown solution turning red.
Aqueous solution and hydrochloric acid conc.--golden orange.
Aqueous solution and sodium hydroxide conc.--brownish orange.
Aqueous solution and sodium carbonate 10%--no change.

Dyeing: wool
Method: 2,3
Levelling: --
SDC migration Test Method/grade: I/4-5
Staining (other fiber) acetate and cellulose: Slightly stained

Dyeing other fibers: Silk: acetic or formic acid or broken degumming liquor.
Jute: --

Printing: Direct on wool and silk.

Hue: daylight: Bright Orange
tungsten: Little change

Toxicity Information: Source: References, (5), 1984, (7), 1971, and (8), 1983.
(No information obtained.)

Common Name:	Croceine Orange G
Color Index Name:	Acid Orange 12
C.I.	15970

Fastness Properties:

Method:		AATCC	ISO
Alkali:		3-4	4
Carbonizing:		4-5	3
Chlorination:	alteration:	-	2-3
	staining:	-	3
Decatising:		4	4
Light: 1/3, 1/2 normal:		3	3
normal:		4	4
2X normal:		5	4-5
Milling (Alkaline):	alteration:	1	1
	staining:	1	1
Milling (Acid):	alteration:	-	2-3
	staining:	-	1
Peroxide Bleaching:	alteration:	-	1
	staining:	-	2
Perspiration:		2	2-3
Potting:	alteration:	2	1
	staining:	2	1
Seawater:	alteration:	4	2-3
	staining:	4	1
Stoving:		4	2
Washing:	alteration:	2-3	1
	staining:	2-3	2

Other Properties:

Dischargeability:	good	
Effects of Metals:	Copper:	slightly duller
	Chromium:	--
	Iron:	much duller

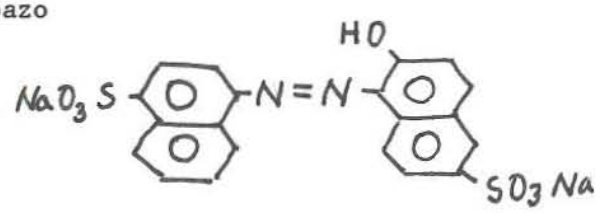
Non-textile Usage: paper, moulding powders, biological stain and indicator. See Leather Dyes section. See C. I. Food Orange 1: general purpose. See C. I. Pigment Orange 18.

Notes: C. I. 15970:1 is the calcium salt.

Common Name: Fast Red E
Color Index Name: Acid Red 13
C.I.: 16045

Chemical Class: Monoazo

Structure:



Synthesis: Naphtholionic acid--->Schaeffer's acid

Discoverer: H. Caro 1878

Reactions to reagents:
Soluble inwater (cherry red).
Slightly soluble in ethanol (weak reddish violet brown).
Very slightly soluble in acetone.
Sulphuric acid conc.--violet:on solution--cherry red(orange ppt.)
Nitric acid conc.--yellowish red.
Aqueous solution and hydrochloric acid conc.--reddish/orange/brown.
Aqueous solution and sodium hydroxide conc.--orange/brown.

Dyeing: wool
Method: 3
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose:
Slightly stained to unstained.

Dyeing other fibers: silk (unweighted): degumming liquore with acetic, formic, or sulphuric acid. Jute: acid.

Printing: --

Hue: daylight: red
tungsten: little change

Toxicity Information: Source: Reference (6), 11/9/87.
This agent was found to be tumorigenic in rats that received 524 gm/kg bw by oral route and was lisited as an animal carcinogen by one source. In another source, in long term studies, there was no carcinogenic action seen in mice and no tumors were observed in rats.

Common Name:	Fast Red E
Color Index Name:	Acid Red 13
C.I.	16045

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			3-4
Carbonizing:			4-5
Chlorination:	alteration:		-
	staining:		-
Decatising:			4-5
Light:	1/3, 1/2 normal:		2-3
	normal:		3
	2X normal:		3-4
Milling (Alkaline):	alteration:		2
	staining:		-
Milling (Acid):	alteration:		3
	staining:		-
Peroxide Bleaching:	alteration:		1-2
	staining:		-
Perspiration:			2
Potting:	alteration:		3
	staining:		-
Seawater:	alteration:		2-3
	staining:		-
Stoving:			3
Washing:	alteration:		2-3
	staining:		3

Other Properties:

Dischargeability:	good	
Effects of Metals:	Copper:	little change
	Chromium:	--
	Iron:	duller and weaker

Non-textile Usage:

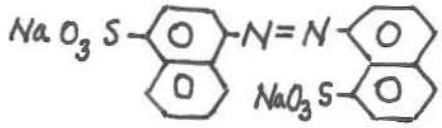
The aluminium salt is used for coloring pharmaceuticals.
Feathers, paper, soap, wood, cosmetics & drugs.
See C.I. Food Red 4. See leather Dyes section.

Notes: On silk fastness properties are generally as on wool, but fastness to washing and persperation is lower. Wet fastness properties are improved by aftertreatment with tannin and tartar emetic.

Common Name: Ponceau 3RO
Color Index Name: Acid Red 25
C.I.: 16050

Chemical Class: Monoazo

Structure:



Synthesis: Naphthionic Acid--->Crocein Acid

Discoverer: C. Rumpff 1882

Reactions to reagents:
Soluble in water (red)
Moderately soluble in ethanol
Sulphuric Acid conc.--reddish violet; on solution--red
Aqueous solution and Hydrochloric Acid--red
Aqueous solution and Sodium Hydroxide conc.--yellow brown.

Dyeing: Wool
Method: 3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose:
Slightly stained

Dyeing other fibers: Silk: degumming liquor and Sulphuric Acid.

Printing: --

Hue: daylight: red
tungsten: brighter

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Ponceau 3RO
Color Index Name:	Acid Red 25
C.I.	16050

Fastness Properties:

Method:		AATCC	ISO
Alkali:		5	3
Carbonizing:		3	4
Chlorination:	alteration:	-	-
	staining:	-	-
Decatising:		5	5
Light: 1/3, 1/2 normal:		2	2
normal:		3	3-4
2X normal:		4	4
Milling (Alkaline):	alteration:	1	-
	staining:	-	-
Milling (Acid):	alteration:	-	-
	staining:	-	-
Peroxide Bleaching:	alteration:	-	1
	staining:	-	-
Perspiration:		1	2
Potting:	alteration:	-	-
	staining:	-	-
Seawater:	alteration:	1	2
	staining:	-	-
Stoving:		1	-
Washing:	alteration:	1	-
	staining:	-	-

Other Properties:

Dischargeability: moderate to good

Effects of Metals:		
	Copper:	slightly duller
	Chromium:	--
	Iron:	duller

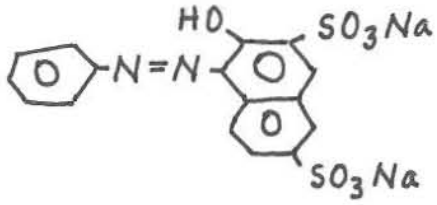
Non-textile Usage: pigments (as barium and aluminium salts).

Notes:

Common Name: Ponceau G
Color Index Name: Acid Orange 14
C.I.: 16100

Chemical Class: Monoazo

Structure:



Synthesis: Aniline---> R Acid

Discoverer: H. Baum 1878

Reactions to reagents:
Soluble in water (reddish orange). Slightly soluble in ethanol (orange).
Sulphuric Acid conc.--cherry red; on solution--orange.
Aqueous solution and Hydrochloric Acid--unaltered.
Aqueous solution and Sodium Hydroxide--yellower.

Dyeing: wool
Method: 2,3
Levelling: --
SDC migration Test Method/grade: I/3
Staining (other fiber) acetate and cellulose:
Slightly stained

Dyeing other fibers: silk: Acetic Acid

Printing: Direct on wool.

Hue: daylight: bright reddish orange
tungsten: unchanged

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Ponceau G
Color Index Name:	Acid Orange 14
C.I.	16100

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			3
Carbonizing:			4
Chlorination:	alteration:		4
	staining:		4
Decatising:			4-5
Light: 1/3, 1/2 normal:			3
normal:			4
2X normal:			4-5
Milling (Alkaline):	alteration:		1
	staining:		1
Milling (Acid):	alteration:		3
	staining:		1
Peroxide Bleaching:	alteration:		1
staining:			3
Perspiration:			3-4
Potting:	alteration:		2
	staining:		1
Seawater:	alteration:		3-4
	staining:		1
Stoving:			3
Washing:	alteration:		2
	staining:		5

Other Properties:

Dischargeability: moderate to good

Effects of Metals:	Copper:	redder
	Chromium:	--
	Iron:	slightly redder

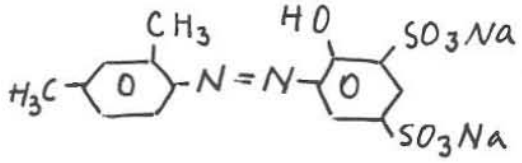
Non-textile Usage: Bright yellowish/red aluminium and barium salts for paper coating--paper and button dyeing.

Notes:

Common Name: Ponceau RR
Color Index Name: Acid Red 26
C.I. 16150

Chemical Class: monoazo

Structure:



Synthesis: 2,4-xylidine is diazotised and coupled R acid

Discoverer: H.Baum, 1878

Reactions to reagents: soluble in water (bright reddish orange to red); very slightly soluble in ethanol and acetone; insoluble in other organic solvents; H_2SO_4 conc. -- cherry red to magenta; on dilution, yellowish red; aqueous solution + HCL conc.-- red ppt; aq.solution + HNO_3 conc.--bright red becoming orange; aq. sol. + NaOH conc.-- orange brown; aq. sol. + 10% NaOH --brownish red

Dyeing: wool
Method: 3
Levelling: --
SDC migration Test Method/grade: 1
Staining (other fiber) acetate or cellulose --unstained

Dyeing other fibers: nylon (with formic acid); silk (with formic or sulfuric acid)

Printing: direct on silk or wool

Hue: daylight: bright yellowish red
tungsten: slightly yellower and brighter

Toxicity Information: Source: Reference (4), 1986.
Colorant has shown to cause cancer in laboratory animals.

Common name: Ponceau RR
Color Index Name: Acid Red 26
C.I. 16150

Fastness Properties:

Method:	AATCC	ISO
Alkali	3	4
Carbonizing	4	5
Chlorination: alteration:	5	3
staining:	5	4
Decatising:	4-5	3-4
Light: 1/3, 1/2 normal:	-	2
normal:	4	3
2X normal:	-	4
Milling: alkaline:		
Alteration:	1	1
Staining:	1	1
Milling: acid:		
Alteration:	-	3
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1-2	1
Staining:	1-2	4
Perspiration:	1-2	4
Potting:		
Alteration:	2	3
Staining:	2	1
Seawater:		
Alteration:	2-3	3
Staining:	2-3	2
Stoving:	1-2	2
Washing:		
Alteration:	2	3-4
Staining:	2	5

Other Properties:

Dischargeability: good

Effect of Metals:

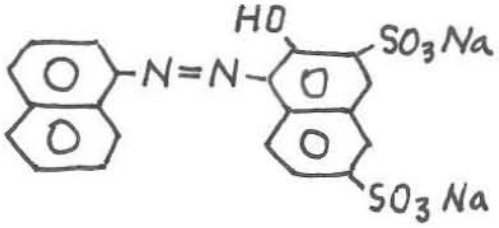
Copper: duller and bluer
Chromium: --
Iron: slightly weaker and duller

Non-textile Usage: inks, paper pigments (heavy metal salts), wood stains, drugs and cosmetics; food dye; leather dye

Common Name: Fast Red B
Color Index Name: Acid Red 17
C.I.: 16180

Chemical Class: Monoazo

Structure:



Synthesis: 1-Naphthylamine ---> R acid.

Discoverer: H. Baum 1878

Reactions to reagents: Soluble in water (magenta red). Slightly soluble in ethanol and Cellosolve. Insoluble in other organic solvents.
Sulphuric acid conc.--deep blue, on dilution--magenta red.
Nitric acid conc.--slightly soluble (bluish red becoming yellowish red).
Sodium hydroxide 10%--reddish brown solution.
Aqueous solution and hydrochloric acid conc.--wine red.
Aqueous solution and sodium hydroxide conc.--orange brown.

Dyeing: wool
Method: 3
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: Slightly stained

Dyeing other fibers: Silk: sulphuric acid or degumming liquor and sulphuric acid.

Printing: --

Hue: daylight: Bluish Red
tungsten: Yellower

Toxicity Information: Source: References, (5), 1984, (7), 1971, and (8), 1983.
(No information obtained.)

Common Name:	Fast Red B
Color Index Name:	Acid Red 17
C.I.	16180

Fastness Properties:

Method:		AATCC	ISO
Alkali:		2	3
Carbonizing:		4	3-4
Chlorination:	alteration:	-	3
	staining:	-	-
Decatising:		4	4
Light: 1/3, 1/2 normal:		-	2
normal:		4	3
2X normal:		-	3
Milling (Alkaline):	alteration:	1	1-2
	staining:	-	-
Milling (Acid):	alteration:	-	3
	staining:	-	-
Peroxide Bleaching:	alteration:	2	2
	staining:	-	-
Perspiration:		2	2
Potting:	alteration:	-	-
	staining:	-	-
Seawater:	alteration:	2	2-3
	staining:	-	-
Stoving:		1-2	3
Washing:	alteration:	2	3
	staining:	-	-

Other Properties:

Dischargeability: good

Effects of Metals:		
	Copper:	bluer and duller
	Chromium:	--
	Iron:	bluer and duller

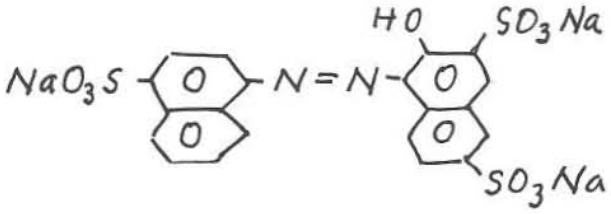
Non-textile Usage: paper, pigments (as barium salts), biological stain. See Leather Dyes section. Used as indicator.

Notes:

Common Name: Amaranth
Color Index Name: Acid Red 27
C.I. 16185

Chemical Class: monoazo

Structure:



Synthesis: naphthionic acid diazotised and coupled with R acid

Discoverer: H. Baum, 1878

Reactions to reagents: slightly soluble in water (magenta red); very slightly soluble in ethanol and cellosolve; conc. H_2SO_4--violet; on dilution, pink; conc. HNO_3--bright red solution; conc. HCl--brownish solution, black residue; aq. solution + HCl conc. --magenta red; aq. sol. + NaOH conc.--reddish brown

Dyeing: wool
Method: 2, 3
Levelling: --
SDC migration Test Method/grade: III/2
Staining (other fiber) acetate or cellulose unstained

Dyeing other fibers: silk with sulfuric or acetic acid

Printing: direct on silk and wool

Hue: daylight: bluish red
tungsten: yellower

Toxicity Information: Source: (ATL), "Atlantic Acid Amaranth," 4/24/86. Reference (4), 1986.

Hazardous component C.I. Acid Red 27 65%
Combustion will produce carbon dioxide, carbon monoxide. Oxides of nitrogen and sulfur may also be produced. May cause skin allergic reactions. The carcinogenic potential of this product has not been fully evaluated, however, reference 4 states: Colorant has been shown to cause cancer in laboratory animals. Also colorant has been shown to have reproductive effects in laboratory animals.
Ingestion: Seek immediate medical attention.

Common name: Amaranth
Color Index Name: Acid Red 27
C.I. 16185

Fastness Properties:

Method:	AATCC	ISO
Alkali	3	-
Carbonizing	4-5	3-4
Chlorination: alteration:	-	1
staining:	-	5
Decatising:	4	3-4
Light: 1/3, 1/2 normal:	-	3
normal:	5	3
2X normal:	-	4
Milling: alkaline:		
Alteration:	1	1
Staining:	1	4
Milling: acid:		
Alteration:	-	3
Staining:	-	1
Peroxide Bleaching:		
Alteration:	2	1
Staining:	2	4-5
Perspiration:	3-4	3-4
Potting:		
Alteration:	2	2-3
Staining:	2	2
Seawater:		
Alteration:	1	3
Staining:	1	2
Stoving:	1	1
Washing:		
Alteration:	3	3
Staining:	3	5

Other Properties:

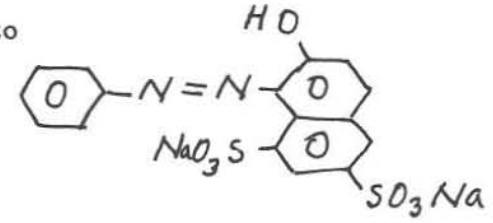
Dischargeability: good
Effect of Metals:
Copper: little change
Chromium: --
Iron: duller

Non-textile Usage: paper, phenol-formaldehyde resins; pigments (as a barium salt); wood, drugs, cosmetics and leather; see Food Red 9

Common Name: Orange GG
Color Index Name: Acid Orange 10
C.I. 16230

Chemical Class: monoazo

Structure:



Synthesis: Aniline diazotised and coupled with G acid

Discoverer: H. Baum, 1878

Reactions to reagents: conc. H_2SO_4--yellowish orange; on dilution, yellower; conc. HNO_3-- wine colored solution, turns orange; aqueous solution + HCl conc.-- yellow orange; aq. sol. + conc. HNO_3--wine red, becoming orange; aq. sol. + conc. NaOH--orange brown; soluble in water (orange); slightly soluble in ethanol (golden orange) and cellosolve ; insoluble in other organic solvents

Dyeing: wool
Method: 3
Levelling: can be salted at boil
SDC migration Test Method/grade: 1/4-5
Staining (other fiber) acetate and cellulose, unstained

Dyeing other fibers: silk, with formic or sulfuric acid

Printing: direct on wool and silk

Hue: daylight: bright orange
tungsten: redder, brighter

Toxicity Information: Source: (ORC), "Orcoacid Orange 2 G," 6/22/87.
Ingestion: Seek immediate medical attention.
Combustion will produce carbon monoxide and other organic oxides.
Incompatability (materials to avoid): oxidizing and reducing agents.

Common name: Orange GG
Color Index Name: Acid Orange 10
C.I. 16230

Fastness Properties:

Method:	AATCC	ISO
Alkali	3	4-5
Carbonizing	4	4
Chlorination: alteration:	-	3
staining:	-	4-5
Decatising:	4	4
Light: 1/3, 1/2 normal:	3	4
normal:	4	4-5
2X normal:	6	5
Milling: alkaline:		
Alteration:	1	1
Staining:	1	3
Milling: acid:		
Alteration:	-	3
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	5
Perspiration:	2	2
Potting:		
Alteration:	-	2
Staining:	-	1
Seawater:		
Alteration:	1	2
Staining:	1	1
Stoving:	3	2
Washing:		
Alteration:	1	1
Staining:	1	5

Other Properties:

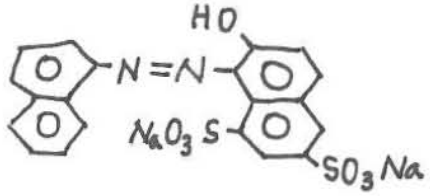
Dischargeability: good
Effect of Metals:
Copper: redder, duller
Chromium: -
Iron: almost destroyed

Non-textile Usage: biological stain; paper, wood stains; inks and copying pencils; Food Orange 4; leather dye

Common Name: Kristallponceau 6R
Color Index Name: Acid Red 44
C.I.: 16250

Chemical Class: Monoazo

Structure:



Synthesis: 1-naphthylamine---> G. Acid

Discoverer: M. Hoffmann 1883

Reactions to reagents:
Soluble in water (red) and ethanol (yellowish red).
Very slightly soluble in acetone.
Sulphuric Acid conc.--reddish/blue;on solution--scarlet red.
Aqueous solution and Hydrochloric Acid--darker, brown crystalline plates ppt.
Aqueous and Sodium Hydroxide conc.--yellowish brown.

Dyeing: wool
Method: 3
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose:
Slightly stained

Dyeing other fibers: Silk: Acetic or Sulphuric Acid.

Printing: Direct on silk and wool.

Hue: daylight: bright red
tungsten: little change

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Kristallponceau 6R
Color Index Name:	Acid Red 44
C.I.	16250

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			3*
Carbonizing:			4-5
Chlorination:	alteration:		3
	staining:		-
Decatising:			4-5
Light:	1/3, 1/2 normal:		2
	normal:		3
	2X normal:		4
Milling (Alkaline):	alteration:		2
	staining:		-
Milling (Acid):	alteration:		2-3
	staining:		-
Peroxide Bleaching:	alteration:		2
	staining:		-
Perspiration:			2
Potting:	alteration:		1-2
	staining:		-
Seawater:	alteration:		2-3
	staining:		-
Stoving:			3
Washing:	alteration:		2-3
	staining:		3

Other Properties:

Dischargeability: good

Effects of Metals:		
	Copper:	bluer
	Chromium:	--
	Iron:	bluer

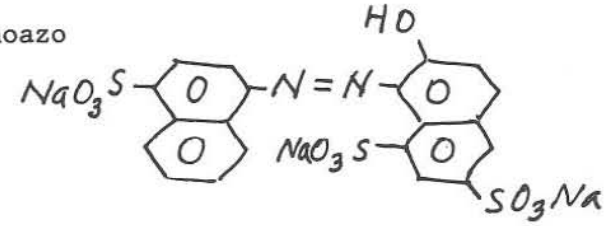
Non-textile Usage: See Leather Dyes section.

Notes: Fastness properties on silk (ISO): light-2, washing-1

Common Name: Cochineal red A
Color Index Name: Acid Red 18
C.I. 16255

Chemical Class: monoazo

Structure:



Synthesis: Naphthionic acid diazotised and coupled to G acid

Discoverer: H. Baum, 1878

Reactions to reagents: conc. H_2SO_4-- violet; on dilution, reddish orange; conc. HNO_3--yellow solution; aqueous solution + conc. HCl--red; aq. sol. + conc. NaOH --brown; soluble in water (red; slightly soluble in ethanol and cellosolve; insoluble in other organic solvents

Dyeing: wool
Method: 2,3
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate or cellulose--unstained

Dyeing other fibers: nylon (with acetic or formic acid); silk (with acetic or sulfuric acid)

Printing: direct on nylon, silk or wool

Hue: daylight: bright red
tungsten: yellower

Toxicity Information: Source: (ORC), "Orcoacid Brilliant Scarlet 3 R," 6/22/87.
Ingestion: Seek immediate medical help.
Combustion will produce carbon monoxide and other organic oxides.
Incompatability (materials to avoid): oxidizing and reducing agents.

Common name: Cochineal Red A
Color Index Name: Acid red 18
C.I. 16255

Fastness Properties:

Method:	AATCC	ISO
Alkali	4	4
Carbonizing	5	4-5
Chlorination: alteration:	-	4
staining:	-	-
Decatising:	4-5	4-5
Light: 1/3, 1/2 normal:	-	3
normal:	4	4
2X normal:	-	4-5
Milling: alkaline:		
Alteration:	2	2
Staining:	-	-
Milling: acid:		
Alteration:	-	2-3
Staining:	-	-
Peroxide Bleaching:		
Alteration:	1	1-2
Staining:	-	-
Perspiration:	1	2
Seawater:		
Alteration:	4	3
Staining:	-	-
Stoving:	1	2
Washing:		
Alteration:	2	2
Staining:	2	3-4

Other Properties:

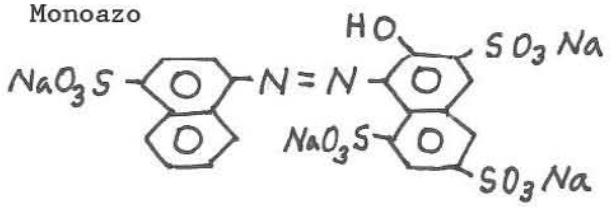
Dischargeability: good
Effect of Metals:
Copper: bluer and duller
Chromium: -
Iron: bluer and duller

Non-textile Usage: inks, paper, plastics, wood stains,drugs and cosmetics, Food Red 7; leather dye.

Common Name: Ponceau 6R
Color Index Name: Acid Red 41
C.I.: 16290

Chemical Class: Monoazo

Structure:



Synthesis: Naphthionic Acid--->2-Naphthol-3,6,8-trisulfonic acid.

Discoverer: L. Limpach 1882

Reactions to reagents:
Soluble in water (magenta red). Very slightly soluble in ethanol.
Sulphuric Acid conc.--violet; on solution--pink.
Aqueous solution and Hydrochloric Acid conc.--magenta red.
Aqueous solution and Sodium Hydroxide--reddish/brown.

Dyeing: wool
Method: 3
Levelling: moderate to good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: Unstained

Dyeing other fibers: silk: broken degumming liquor

Printing: --

Hue: daylight: bright bluish red
tungsten: little yellower

Toxicity Information: Source: Reference (6), 11/9/87.
No tumors were observed in rats and no sensitization in guines pigs was found in short-term studies. In long-tern studies, one carcinoma was found in rats fed this agent, one sarcoma, and one non-malignant adenoma were found in rats injected with this dye.

Common Name:	Ponceau 6R
Color Index Name:	Acid Red 41
C.I.	16290

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			3
Carbonizing:			4
Chlorination:	alteration:		-
	staining:		-
Decatising:			4-5
Light:	1/3, 1/2 normal:		3-4
	normal:		4-5
	2X normal:		5
Milling (Alkaline):	alteration:		2-3
	staining:		-
Milling (Acid):	alteration:		2-3
	staining:		-
Peroxide Bleaching:	alteration:		1
	staining:		-
Perspiration:			2
Potting:	alteration:		1
	staining:		-
Seawater:	alteration:		2-3
	staining:		-
Stoving:			2-3
Washing:	alteration:		2-3
	staining:		2-3

Other Properties:

Dischargeability: good

Effects of Metals:		
	Copper:	duller
	Chromium:	--
	Iron:	duller and weaker

Non-textile Usage:

Notes:

Casein plastics, cosmetics and drugs. See C.I. Food Red 8

Common name: Fast Acid Magenta B
Color Index Name: Acid red 33
C.I. 17200

Fastness Properties:

Method:	AATCC	ISO
Alkali	4	3-4
Carbonizing	5	4-5
Chlorination: alteration:	-	2-3
staining:	-	-
Decatising:	-	4
Light: 1/3, 1/2 normal:	-	-
normal:	2-3	2
2X normal:	-	-
Milling: alkaline:		
Alteration:	1	2
Staining:	-	-
Milling: acid:		
Alteration:	-	2
Staining:	-	-
Peroxide Bleaching:		
Alteration:	1	2
Staining:	-	-
Perspiration:	1	2
Potting:		
Alteration:	-	1-2
Staining:	-	-
Seawater:		
Alteration:	4	2-3
Staining:	-	-
Stoving:	5	3
Washing:		
Alteration:	2-3	2-3
Staining:	-	-

Other Properties:

Dischargeability: good

Effect of Metals:

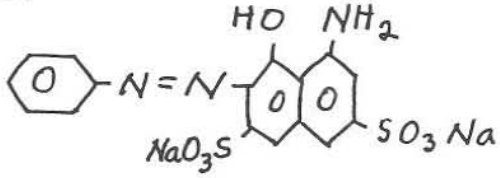
Copper: bluer and duller
Chromium: --
Iron: much bluer and duller

Non-textile Usage: wood stains, biological stain, cosmetics and drugs; Food Red 12; leather dye

Common Name: Fast Red Magenta B
Color Index Name: Acid Red 33
C.I. 17200

Chemical Class: monoazo

Structure:



Synthesis: Aniline diazotised and coupled with (alkaline) H acid

Discoverer: Bayer Co., BP 13443/90, FP 210033; GP 62368 (Fr. 3,606); Cassela Co., GP 70031 (Fr. 3,605)

Reactions to reagents: soluble in water; slightly soluble inethanol (magenta red); conc. H_2SO_4--magenta red; on diluition--orange red; conc. HNO_3--brownish maroon solution; aqueous soution + conc. HCl--red; aq. solution + conc. NaOH--reddish brown; aq. solution + dilute NaOH--brick red

Dyeing: wool
Method: 3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose unstained

Dyeing other fibers: nylon (with acetic or formic acid); silk (with acetic or sulfuric acid)

Printing: direct on wool

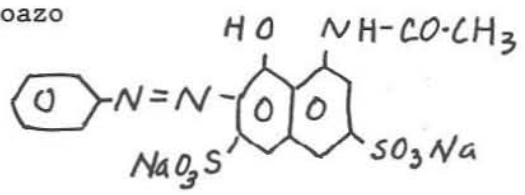
Hue: daylight: bright red
tungsten: yellower

Toxicity Information: Source: (TCI), "D & C Red 33," ("Acid Fuchsine B"), 1987.
Combustion may produce oxides of carbon, sulfur and nitrogen.
Ingestion: Induce vomiting (do not induce vomiting if the person is unconscious). Seek immediate medical attention.
Incompatability (materials to avoid): oxidizing and reducing agents may destroy color.

Common Name: Amido Naphthol Red G
Color Index Name: Acid Red 1
C.I. 18050

Chemical Class: monoazo

Structure:



Synthesis: Aniline diazotised and coupled with n-acetyl H acid

Discoverer: Meister, Lucius, and Bruning Farbwerke, 1902

Reactions to reagents: soluble in water (scarlet red); slightly soluble in ethanol and cellosolve; insoluble in orther organic solvents; conc. H_2SO_4--bluish red; on dilution--yellower red; conc. HNO_3--orange red solution, becoming orange

Dyeing: wool
Method: 3
Levelling: --
SDC migration Test Method/grade: 1/4
Staining (other fiber) acetate and cellulose unstained

Dyeing other fibers: nylon (with formic acid); silk with acetic or sulfuric acid)

Printing: direct on nylon, silk and wool

Hue: daylight: bright bluish red
tungsten: yellower and brighter

Toxicity Information: Source: (PDC), "Bernacid Red 2 G Conc.," 3/86.
Inhalation and ingestion: Seek immediate medical attention.

Common name: Amido Naphthol Red G
Color Index Name: Acid Red 1
C.I. 18050

Fastness Properties:

Method:	AATCC	ISO
Alkali	3-4*	4
Carbonizing	4	3
Chlorination: alteration:	1	2
staining:	-	3
Decatising:	4-5	4
Light: 1/3, 1/2 normal:	4	4-5
normal:	4	5
2X normal:	5	5-6
Milling: alkaline:		
Alteration:	1-2	1
Staining:	1-2	2
Milling: acid:		
Alteration:	--	2
Staining:	--	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	4
Perspiration:	2	4-5
Potting:		
Alteration:	-	2
Staining:	-	2
Seawater:		
Alteration:	2	2
Staining:	2	1
Stoving:	4	4
Washing:		
Alteration:	2	3
Staining:	2	5

Other Properties:

Dischargeability: moderate

Effect of Metals:

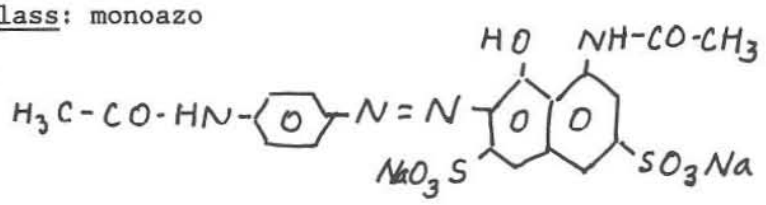
Copper: little bluer and duller
Chromium: --
Iron: bluer and much weaker

Non-textile Usage: cosmetics, drugs inks, paper, plastics, pigments (as barium salt), soap, wood stains, Food Red 10, leather dye

Common Name: Azo Fuchsine 6B
Color Index Name: Acid Violet 7
C.I. 18055

Chemical Class: monoazo

Structure:



Synthesis: p-aminoacetanilide is diazotised and coupled with n-acetyl H acid

Discoverer: Meister, Lucius, and Bruning Farbwerke, 1902

Reactions to reagents: soluble in water (bluish red to magenta); slightly soluble in ethanol, acetone and cellusolve; insoluble in other organic solvents; aqueous solution + conc. HCl --bluish red; on dilution, clear red; conc. HNO_3--crimson solution, turns orange

Dyeing: wool
Method: 3
Levelling: can be salted at the boil
SDC migration Test Method/grade: 1/4-5
Staining (other fiber) acetate and cellulose unstained

Dyeing other fibers: nylon (with formic acid); silk (with formic and sulfonic acid)

Printing: --

Hue: daylight: reddish violet
tungsten: slightly yellower

Toxicity Information: Source: (ORC), "Orcoacid Fuschine 6 B Ex. Conc.," 6/22/87.
Ingestion: Seek immediate medical help.
Combustion will produce carbon monoxide and other organic oxides.
Incompatability (materials to avoid): oxidizing and reducing agents.

Common name: Azo Fuchsine 6B
Color Index Name: Acid Violet 7
C.I. 18055

Fastness Properties:

Method:	AATCC	ISO
Alkali	3-4	3-4
Carbonizing	3	3
Chlorination: alteration:	-	2
staining:	-	4
Decatising:	4-5	4
Light: 1/3, 1/2 normal:	4	3
normal:	4	4
2X normal:	5	4-5
Milling: alkaline:		
Alteration:	2	1
Staining:	2	5
Milling: acid:		
Alteration:	-	1
Staining:	-	1
Peroxide Bleaching:		
Alteration:	1	1
Staining:	1	4
Perspiration:	1	2-3
Potting:		
Alteration:	-	2
Staining:	-	1
Seawater:		
Alteration:	2	2
Staining:	2	2
Stoving:	4	4
Washing:		
Alteration:	2	2
Staining:	2	4

Other Properties:

Dischargeability: moderate

Effect of Metals:

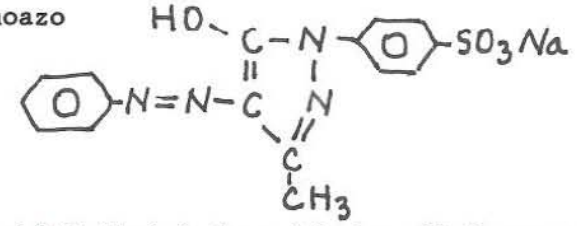
Copper: slightly bluer, duller
Chromium: little change
Iron: weaker

Non-textile Usage: leather dye, paper--surface coloring; soap and wood stains; biological stain; drugs and cosmetics; Food Red 11

Common Name: Flavazine L
Color Index Name: Acid Yellow 11
C.I.: 18820

Chemical Class: Monoazo

Structure:



Synthesis: Aniline--->3-Methyl-1-(p-sulfophenyl)-5-pyrazolone. Aniline is diazotised and coupled with 3-methyl-1-(psulfophenyl)-5-pyrazolone.

Discoverer: C. Möllenhoff 1892

Reactions to reagents:
Very slightly soluble in water, ethanol, and Cellosolve (yellow).
Soluble in acetone, slightly soluble in benzene. Insoluble in other organic solvents.
Sulphuric acid conc.--yellow; on dilution--yellow
Nitric acid conc.--yellow.
Aqueous solution and Sulphuric Acid 10%--no change.
Aqueous solution and sodium hydroxide conc.--no change.

Dyeing: wool
Method: 3
Levelling: good; can be salted at boil.
SDC migration Test Method/grade: --
Staining (other fiber):
Silk-heavily stained, acetate-slightly stained, nylon-dyed, cellulose-unstained.

Dyeing other fibers:
silk: sulphonic or acetic acid (levelling-good)
Nylon: Formic acid.

Printing: direct on silk and wool

Hue: daylight: bright yellow
tungsten: slightly redder

Toxicity Information: Source: (ORC), "Orcoacid fast Light Yellow 3," 6/22/87.
Ingestion: Seek immediate medical attention. Combustion will produce carbon monoxide and other organic oxides. Incompatability (materials to avoid): oxidizing and reducing agents.

Common Name:	Flavazine L
Color Index Name:	Acid Yellow 11
C.I.	18820

Fastness Properties:

Method:		AATCC	ISO
Alkali:		5	4
Carbonizing:		4-5	4-5
Chlorination:	alteration:	-	-
	staining:	-	-
Decatising:		5	4-5
Light: 1/3, 1/2 normal:		-	5
normal:		6-7	5-6
2X normal:		-	6
Milling (Alkaline):	alteration:	2	1-2
	staining:	-	-
Milling (Acid):	alteration:	-	2
	staining:	-	-
Peroxide Bleaching:	alteration:	1	2
	staining:	-	-
Perspiration:		1	2-3
Potting:	alteration:	-	2
	staining:	-	-
Seawater:	alteration:	3-4	2
	staining:	-	-
Stoving:		4-5	4
Washing:	alteration:	2	1-2
	staining:	2	2

Other Properties:

Dischargeability: good

Effects of Metals:		
	Copper:	redder
	Chromium:	--
	Iron:	duller

Non-textile Usage:

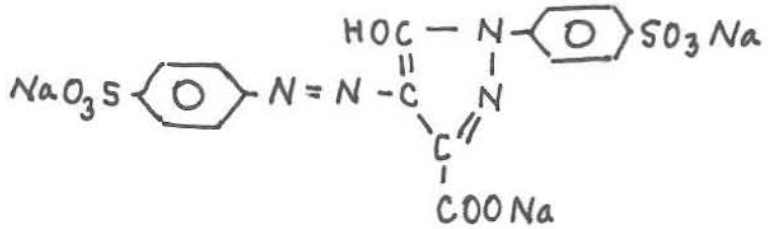
Leather (Solvent Yellow 15), paper: coating and surface coloring. Heavy metal salts struck on alumina are used in lacquers, paints and enamels, also for textile printing, resins, cellulose esters and spirt varnishes, drugs and cosmetics.

Notes:

Common Name: Tartrazine
Color Index Name: Acid Yellow 23
C.I.: 19140

Chemical Class: Monoazo

Structure:



Synthesis:

a). Sulfanilic acid--->3-carboxy-1-(P-sulfophenyl)-5-pyrasolone.
b). React p-hydrazino benezene sulfonic acid (2 mol.) with dioxosuccinic acid.

Discoverer: H. Ziegler 1884

Reactions to reagents:

Soluble in water (yellow). Slightly soluble in ethanol and Cellosolve.
Insoluble in other organic solvents.
Sulphuric Acid conc.--yellow; on dilution--yellow.
Nitric acid conc.--yellow solution.
Aqueous solution and Hydrochloric Acid--unaltered.
Aqueous solution and Sodium Hydroxide--redder yellow.

Dyeing: wool
Method: 3
Levelling: moderate to good
SDC migration Test Method/grade: I/3
Staining (other fiber) acetate and cellulose: unstained

Dyeing other fibers:

silk: Formic or sulphonic Acid (leveling: moderate to good).
nylon: Formic acid.

Printing: Direct on wool or silk.

Hue: daylight: yellow
tungsten: slightly redder

Toxicity Information: Source: Reference (6), 11/9/87.

Mutations were found in human lymphocytes treat in vitro with 100 mg/L. Effects on newborn were found of rats given 1280 mg/kg bw when pregnant. 14 ug/kg bw in humans given orally caused paresthesia. There was no evidence for carcinogenicity in experimental animals in either short or long-term studies.

Common Name: Tartrazine
Color Index Name: Acid Yellow 23
C.I. 19140

Fastness Properties:

Method:		AATCC	ISO
Alkali:		3	3-4
Carbonizing:		5	4-5
Chlorination:	alteration:	-	5
	staining:	-	5
Decatising:		4-5	4-5
Light: 1/3, 1/2 normal:		3	3
normal:		4	4
2X normal:		5	4-5
Milling (Alkaline):	alteration:	2	1
	staining:	2	4
Milling (Acid):	alteration:	-	3
	staining:	-	1
Peroxide Bleaching:	alteration:	1	1
	staining:	1	5
Perspiration:		3	4-5
Potting:	alteration:	5	3-4
	staining:	5	2
Seawater:	alteration:	3	2
	staining:	3	3
Stoving:		4	4-5
Washing:	alteration:	2	2
	staining:	2	5

Other Properties:

Dischargeability: to white
Effects of Metals: Copper: somewhat redder
Chromium: --
Iron: weaker and duller

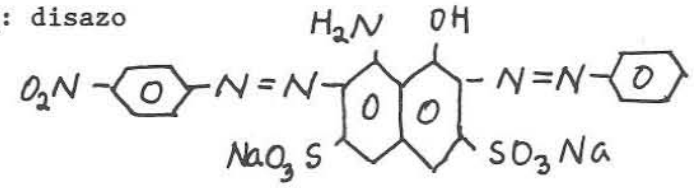
Non-textile Usage: paper: surface staining and coloring of creped tissues, barium salt is used for paper coating; a lake on alumina is used for transparent effects on tin printing, leather, soaps, casein plastics, anodised aluminium, writing inks, wood stains, food. C.I. Food Yellow 4. C.I. 19140:1 C.I. Pigment Yellow 100 is the aluminium salt.

Notes:

Common Name: Amido Black 10B
Color Index Name: Acid Black 1
C.I. 20470

Chemical Class: disazo

Structure:



Synthesis: p-nitroaniline is diazotised and coupled with H acid in acid medium, then diazotised aniline is coupled with that product in alkaline medium

Discoverer: M. Hoffmann, 1891

Reactions to reagents: soluble in water (blue black), ethanol (deep blue), and cellosolve; slightly soluble in acetone; insoluble in other organic solvents; conc. H_2SO_4--bluish green; on dilution, dull greenish blue ppt.; conc. HNO_3--dull green solution, becomes maroon; 10% NaOH --royal blue solution; aqueous solution + conc. HCl--greenish blue ppt.; aq. sol. + conc.NaOH--blue ppt.

Dyeing: wool
Method: 2,3
Levelling: moderate, good
SDC migration Test Method/grade: 1/3
Staining (other fiber) --

Dyeing other fibers: nylon (with formic acid); silk (with acetic or sulfuric acid or broken degumming liquor)

Printing: direct on wool, silk, or nylon

Hue: daylight: bluish black
tungsten: lighter, greener

Toxicity Information: Source: (PDC), "Bernacid Black B R," 11/22/85.
Combustion will produce carbon dioxide. As well carbon monoxide, oxides of nitrogen and sulphur may be produced.
Ingestion and inhalation: Seek immediate medical attention.
Incompatability (materials to avoid): oxidizing agents.

Common name: Amido Black 10B
Color Index Name: Acid Black 1
C.I. 20470

Fastness Properties:

Method:	AATCC	ISO
Alkali	4-5	4
Carbonizing	4	4-5
Chlorination: alteration:	-	4
staining:	-	3-4
Decatising:	5	4-5
Light: 1/3, 1/2 normal:	-	-
normal:	7	5
2X normal:	8	-
Milling: alkaline:		
Alteration:	2	2
Staining:	2	1
Milling: acid:		
Alteration:	-	4
Staining:	-	2

Notes: fastness to perspiration, stoving and washing is lower on silk than it is on wool.

Other Properties:

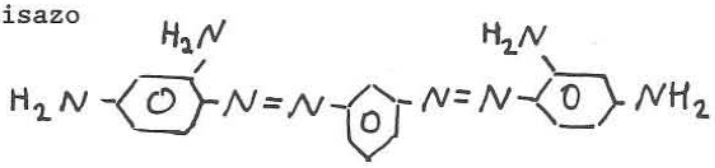
Dischargeability: moderate
Effect of Metals:
Copper: little change
Chromium: --
Iron: weaker and greener

Non-textile Usage: paper; anodized aluminum; casein buttons; soaps; wood stains; writing inks; urea-melamine moulding powders; biological stain; drugs and cosmetics; leather dyes

Common Name: Vesuvine BA
Color Index Name: Basic Brown 1
C.I. 21000

Chemical Class: disazo

Structure:



Synthesis: n-phenylenediamine hydrochloride (3 mole) is treated with nitrous acid (2 moles). The disazo dye is probably the major product of the reaction; commercial dye usually consists of the dihydrochlorides

Discoverer: C. Martius, 1863

Reactions to reagents: the base (C.I. 21000:1) is soluble in ethanol, acetone, and benzene; very soluble in water (yellowish brown); slightly soluble in ethanol; insoluble in acetone, benzene, carbon tetrachloride, and stoddard solvent; conc. H_2SO_4--brown; on dilution, reddish brown; conc. HNO_3--orange solution, turns yellow

Dyeing: cotton
Method: tannin mordant

Dyeing other fibers: direct dyeing on discharged tannin mordant

Printing: direct printing on discharged tannin mordant

Toxicity Information: Source: (PCC), "Bismark Brown Y C Ex. Conc.," 6/17/87.
Should be handled with care as no in-depth testing has been done.
Effects of overexposure unknown.
Ingestion: Induce vomiting.
Incompatability (materials to avoid): strong oxidizing agents.

Common name: Vesuvine BA
Color Index Name: Basic Brown 1
C.I. 21000

Hue: daylight: brown
tungsten: little redder

Fastness Properties:

Method:	cotton*	silk*	wool*
Light*: 1/3, 1/2 normal:	1	1	1
normal:	1-2	1-2	1-2
2X normal:	2	2	2
Perspiration:	4	-	-
Washing:			
Alteration:	1	1-2	-
Staining:	1	2	1-2

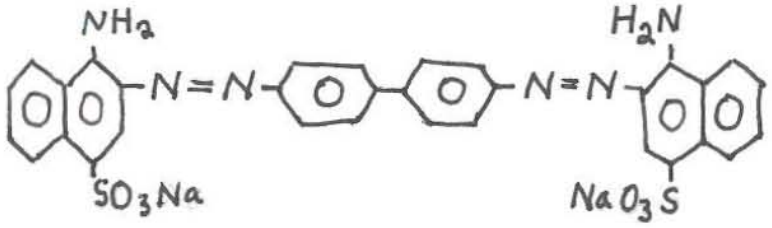
Non-textile Usage: Bast fibers, paper, pigments, distempers, leather, wood stain, biological stain, solvent dye;

*Note: tests based on daylight, using obsolete method. See Colour Index, Vol. IV, second edition, 1956.

Common Name: Congo Red
Color Index Name: Direct Red 28
C.I.: 22120

Chemical Class: Disazo

Structure:



Synthesis: Benzidine====>Naphthionic acid (2 mol.).

Discoverer: P. Böttiger 1884.

Reactions to reagents: Soluble in water (yellowish red) and ethanol (orange);
Very slightly soluble in acetone.
Sulphuric acid conc.--deep blue, on dilution--paler blue, blue ppt.
Aqueous solution and hydrochloric acid conc.--reddish blue ppt.
Aqueous solution and acetic acid--bluish violet, then reddish blue ppt.
Aqueous solution and sodium hydroxide conc.--yellower

Dyeing: cotton
Method: normal (alkaline)
Levelling: --
SDC Classification: C
Staining (other fiber) acetate: Stained
Nylon: Heavily Stained

Dyeing other fibers: Silk and wool: neutral bath.
Silk and wool dyes equal to cotton but yellower.

Printing: --

Hue: daylight: Yellowish Red
tungsten: --

Toxicity Information: Source: References, (8), 1983.
LD/50 i.v. in rats: 190 mg/kg, 1939.

Common Name: Congo Red
Color Index Name: Direct Red 28
C.I. 22120

Fastness Properties:

Method:			AATCC	ISO
Light:	1/3, 1/2 normal:		-	1
	normal:		2	1
	2X normal:		-	1
Alkaline:			3	3
Acid:			1	1
Hot Pressing:			3	3
Water:		alteration:	3	2
		staining:	-	-
Washing:		alteration:	(I) 1	2
		staining:	-	-

Other Fastness Properties: Sodium hydroxide 1%--good
Sulphuric acid 1%--poor
Light--fair
Water--good

Dischargeability: Neutral and Alkaline: good
Effects of Metals: Copper: little yellower, trace duller
Chromium: little yellower
Iron: somewhat sensitive to hard water

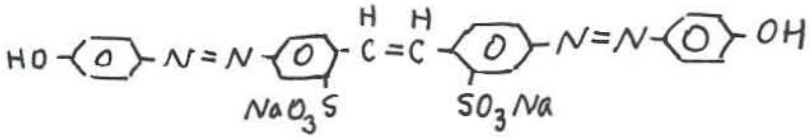
Non-textile Usage: Biological stain, indicator: red to deep blue from pH 3 to 5 (approx.). Paper: beater dyeing. Diagnostic aid.

Notes: The first synthetic organic dye to have direct affinity for cellulose.

Common Name: Brillant Yellow
Color Index Name: Direct Yellow 4
C.I. 24890

Chemical Class: disazo

Structure:



Synthesis: Tetrazotised 4,4'-diaminostilbene-2,2'-disulphonic acid is coupled with phenol (2 moles).

Discoverer: F. Bender and G. Schultz, 1886

Reactions to reagents: soluble in water (golden yellow); moderately soluble in ethanol (golden yellow); slightly soluble in acetone and cellosolve; conc. H_2SO_4--reddish violet; on dilution, violet (blackish violet ppt.); conc. HNO_3--dark brown solution (incomplete)

Dyeing: cellulose
Method: normal
Exhaustion: good
SDC classification: A
Staining (other fiber) see below

Dyeing other fibers: nylon (with acetic acid); silk, wool, and nylon dyed; acetate unstained

Printing: --

Toxicity Information: Source: Reference (3), 1981.
Toxic by ingestion.

Common name: Brillant Yellow
Color Index Name: Direct Yellow 4
C.I. 24890

Hue: daylight: bright yellow

Fastness Properties:

Method:	AATCC
Acid (organic)	3
Alkali	1
Light: 1/3, 1/2 normal:	-
normal:	5
2X normal:	-
Washing:	
Alteration:	1
Staining:	-

Other Properties:

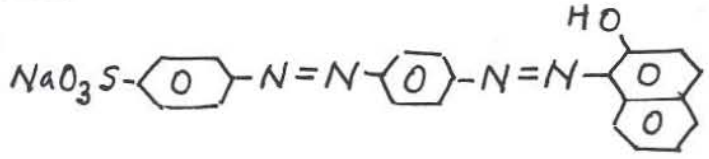
Dischargeability:	very good
Effect of Metals:	
Copper:	unaffected
Chromium:	--
Iron:	--

Non-textile Usage: Used as a pH range 6.4-9.4 (yellow to reddish orange); leather; beater dyeing and surface coloring in paper; biological stain; rarely used on textiles

Common Name: Cloth Scarlet
Color Index Name: Acid Red 151
C.I. 26900

Chemical Class: disazo

Structure:



Synthesis: p-(p-aminophenylazo)benzenesulfonic acid is diazotised and coupled to 2-naphthol

Discoverer: R. Nietzki, 1878; R. Krïgener, 1879; F. Köhter, 1880

Reactions to reagents: moderately soluble in water (cloudy, brownish orange); soluble in ethanol (orange red), and cellosolve; insoluble in other organic solvents; conc. H_2SO_4--bluish green; on dilution, weak brownish orange; aqueous solution + conc. HCl --orange brown; aq. + conc. NaOH --corinth, ppt.

Dyeing: wool
Method: 1,2
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose stained

Dyeing other fibers: nylon (with acetic acid or neutral); silk (with acetic acid or neutral); may be applied on cotton and jute with alum

Printing: direct on silk and wool

Hue: daylight: red
tungsten: little change

Toxicity Information: Source: (ORC), "Oro Nylosol Scarlet C L," 6/22/87.
Ingestion: Seek immediate medical help.
Combustion will produce carbon monoxide and other organic oxides.
Incompatability (materials to avoid): oxidizing and reducing agents.

Common name: Cloth Scarlet
Color Index Name: Acid Red 151
C.I. 26900

Fastness Properties:

Method:	AATCC	ISO
Alkali	3	3
Carbonizing	3	4
Chlorination: alteration:	-	4
staining:	-	4-5
Decatising:	3	3
Light: 1/3, 1/2 normal:	-	3-4
normal:	6	4
2X normal:	-	4-5
Milling: alkaline:		
Alteration:	2-3	-
Staining:	-	-
Milling: acid:		
Alteration:	-	3-4
Staining:	-	2-3
Peroxide Bleaching:		
Alteration:	-	4
Staining:	-	3-4
Perspiration:	2-3	4
Seawater:		
Alteration:	3	4
Staining:	3	3-4
Stoving:	4-5	4
Washing:		
Alteration:	3	4
Staining:	3	3-4

Other Properties:

Dischargeability: good

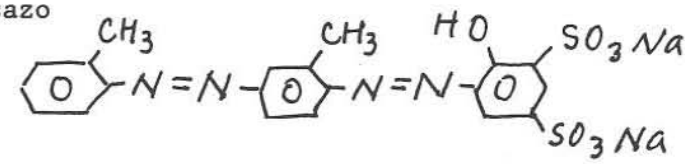
Effect of Metals:
Copper: slightly bluer
Chromium: little change
Iron: somewhat duller

Non-textile Usage: casein, plastic, paper, leather

Common Name: Wool Red B
Color Index Name: Acid Red 115
C.I. 27200 or 27201

Chemical Class: disazo

Structure:



Synthesis: 4-o-tolyazo-o-toluidine is diazotised and coupled with R acid. Dye is a mixture; see also C.I. 27190

Discoverer: R. Krïgener, 1879; C. Rumpff and F. Grässler, 1879

Reactions to reagents: soluble in water (magenta red); slightly soluble in ethanol; conc. H_2SO_4--deep blue; on dilution, pink ; aqueous solution + conc. HCl--dullish violet; aq. sol. + conc. NaOH--bordeaux

Dyeing: wool
Method: 2
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose are slightly stained

Dyeing other fibers: nylon (with formic acid); silk (with acetic, formic or sulfuric acid)

Printing: direct on silk and wool

Hue: daylight: bluish red
tungsten: yellower and brighter

Toxicity Information: Source: (ATL), "Atlantic Milling Red 2 B N," 2/13/86.
Combustion will produce carbon dioxide. As well, carbon monoxide, oxides of nitrogen, and sulfur may also be produced.
Ingestion: Seek immediate medical attention.

Common name: Wool Red B
Color Index Name: Acid Red 115
C.I. 27200 or 27201

Fastness Properties:

Method:	AATCC	ISO
Alkali	5	4
Carbonizing	5	3
Chlorination: alteration:	-	2
staining:	-	4-5
Decatising:	3-4	3-4
Light: 1/3, 1/2 normal:	-	4
normal:	3-4	4-5
2X normal:	-	4-5
Milling: alkaline:		
Alteration:	2	2
Staining:	2	3
Milling: acid4		
Alteration:	-	4
Staining:	-	3
Peroxide Bleaching:		
Alteration:	2	1
Staining:	2	2
Perspiration:	3	3
Potting:		
Alteration:	-	1
Staining:	-	1
Seawater:		
Alteration:	3	4
Staining:	3	4
Stoving:	3-4	1
Washing:		
Alteration:	2	3
Staining:	2	3

Other Properties:

Dischargeability: good

Effect of Metals:

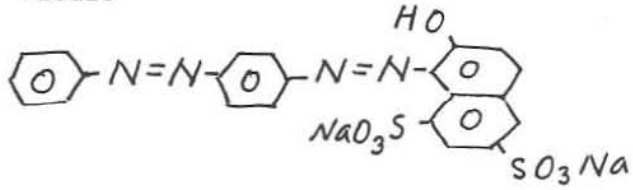
Copper: slightly bluer and duller
Chromium: --
Iron: bluer and duller

Non-textile Usage: pigments (heavy metal salts); leather dye

Common Name: Cotton Scarlet
Color Index Name: Acid Red 73
C.I. 27290

Chemical Class: disazo

Structure:



Synthesis: p-phenylazoaniline is diazotised and coupled with G acid

Discoverer: 1. Limpach, 1882; L. Gans and M. Hoffmann, 1883

Reactions to reagents: soluble in water (red, ethanol, and cellosolve; very slightly soluble in acetone; insoluble inother organic solvents; conc. H_2SO_4--reddish violet; on dilution--reddish brown ppt.; conc. HNO_3--blue, becoming olive brown, then orange; aqueous solution + conc. HCl--dark reddish brown, ppt.; aq. sol. + conc. NaOH--dark brown, ppt.

Dyeing: wool
Method: 2, 3
Levelling: --
SDC migration Test Method/grade: I/2
Staining (other fiber) slight staining of acetate and cellulose

Dyeing other fibers: nylon (with acetic and formic acid); silk (with acetic, formic, or sulphuric acid); jute or cotton with addition of alum

Printing: direct on nylon, silk, and wool

Hue: daylight: yellowish red
tungsten: slightly yellowish and brighter

Toxicity Information: Source: (PCC), "Croceine Scarlet Mod. Conc.," 6/17/87.
Incompatability(materials to avoid): strong acids will destroy usefullness of the dye.

Common name: Cotton Scarlett
Color Index Name: Acid Red 73
C.I. 27290

Fastness Properties:

Method:	AATCC	ISO	ISO (nylon)
Alkali	2	3	-
Carbonizing	5	3-4	-
Chlorination: alteration:	-	1	-
staining:	-	4	-
Decatising:	5	4-5	-
Light: 1/3, 1/2 normal:	3	5	4
normal:	5	6	4-5
2X normal:	6	6-7	5
Milling: alkaline:			
Alteration:	1	1	-
Staining:	1	4	-
Milling: acid:			
Alteration:	-	3	-
Staining:	-	2	-
Peroxide Bleaching:			
Alteration:	2	1	-
Staining:	2	4	-
Perspiration:	1	3	4-5*
Potting:			
Alteration:	-	2	-
Staining:	-	2	-
Seawater:			
Alteration:	2-3	3	-
Staining:	2-3	2	-
Stoving:	1	1	-
Washing:			
Alteration:	4	3	4-5*
Staining:	4	5	-

Other Properties:

Dischargeability: good
Effect of Metals:
Copper: much duller
Chromium: --
Iron: duller

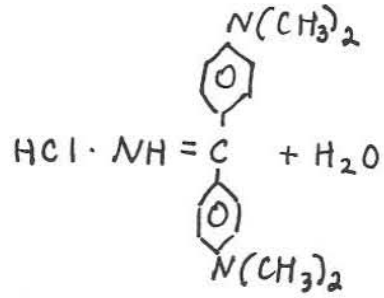
Non-textile Usage: anodized aluminum, inks, milled soaps; pigments (heavy metal salts), plastics, typewriter ribbons, wood stains, biological stains, cosmetics and drugs (see C.I. Solvent Red 30 (dicyclohexylamine salt); leather dye.

Notes: fastness on is generally similar to that on wool; * indicates nylon was aftertreated.

Common Name: Auramine
Color Index Name: Basic Yellow 2
C.I. 41000

Chemical Class: ketone imine

Structure:



Synthesis: a) Dissolve sulfur in p,p'-methylenebis[n,n-dimethylaniline]*, add ammonium and sodium chlorides, heat the misture at 175°C in a current of ammonia, extract the dye with hot water, and salt out (GP53614); b) Heat p,p'-bis(dimethylamino)benzophenone with ammonium and zinc chlorides at 150-160°C (GP29060). *Michler's base.
Note: The free base (C.I. 41000:1) is made from the above hypochloride by adding to its aquoues solutionabout the equimolar amount of NaOH, Na_2CO_3, or NH_3.

Discoverer: Kern and Caro, 1883

Reactions to reagents: soluble in cold and very soluble in hot water (bright yellow), readily decomposed on boiling; soluble in ethanol (yellow); conc. H_2SO_4--colorless; on dilution, pale yellow

Dyeing: tannin mordanted cotton

Dyeing other fibers: see non-textile usage

Printing: direct or discharge printing on cotton mordanted with tannin

Toxicity Information: Source: (IDC), "Elcozine Auramine," 9/18/86.
Hazardous ingredients - Basic Yellow 89 %, Michler's Ketone >0.1 %.*
May cause cancer, based on tests with lab animals. Combustion will produce oxides of carbon, nitrogen and/or hydrogenchloride.
Ingestion: Drink several glasses of milk or water, induce vomiting and get immediate medical attention.

Common name: Auramine
Color Index Name: Basic Yellow 2
C.I. 41000

Hue: daylight: bright yellow
tungsten: redder

Fastness Properties:

Method:	silk*	cotton**	wool***
Light: 1/3, 1/2 normal:	1	-	1
normal:	1	2-3	1-2
2X normal:	2	-	2
Perspiration (alkaline)			
Alteration:	2	1	-
Staining:	1	2	-
Washing:			
Alteration:	1	2	1-2
Staining:	3	4	2

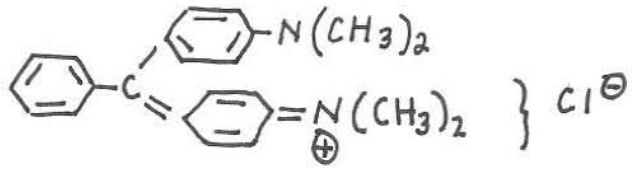
Non-textile Usage: bast fibers, paper, leather, spirit inks, etc. biological stain. See C.I. Solvent Yellow 34

*Note: tests based on daylight, using obsolete method. See Colour Index, Vol IV, second edition, 1956.**cotton is mordanted with tannin; test method used is same as with silk; results are directly comparable; ***wool tests based on obsolete method; results are not directly comparable to those on silk or cotton.

Common Name: Diamond Green B (Malachite Green)
Color Index Name: Basic Green 4
C.I.: 42000

Chemical Class: Triarylmethane

Structure:



Synthesis:

a). Condense bezaldehyde (1 mol.) with n,n-dimethylaniline (2 mol.) in presence of hydrochloric or sulfuric acid, and oxidize the product with lead peroxide and acid.

b). Heat n,n-dimethylaniline with a,a,a-trichlorotoluene.

Discoverer: O.Fischer, 1877

Reations to reagents:

Soluble in cold and hot water (blue green); very soluble in ethanol (blue green);
Sulphuric acid conc.--yellow; on dilution--dull orange.
Aqueous solution and sodium hydroxide--greenish white.

Dyeing:

Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers: For directly dyeing silk, wool, jute, leather. Dyeing cotton after mordanting.

Printing:

Hue: daylight: bright bluish green
tungsten: little yellower

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Diamond Green B
Color Index Name:	Basic Green 4
C.I.	42000

Fastness Properties:

Method:		Silk*	Wool*	Bast Fiber
Alkali:				
Carbonizing:				
Chlorination:	alteration:			
	staining:			
Decatising:				
Light: 1/3, 1/2 normal:		-	1	-
normal:		1-2	1	3-4**
2X normal		-	2	-
Milling (Alkaline):	alteration:			
	staining:			
Milling (Acid):	alteration:			
	staining:			
Peroxide Bleaching:	alteration:			
	staining:			
Perspiration:	alteration:			2-3
	staining:			4
Seawater:	alteration:			
	staining:			
Stoving:				
Washing:	alteration:	3	2	1
	staining:	-	5	5

Other Properties:

Dischargeability:	
Effects of Metals:	Copper:
	Chromium:
	Iron:

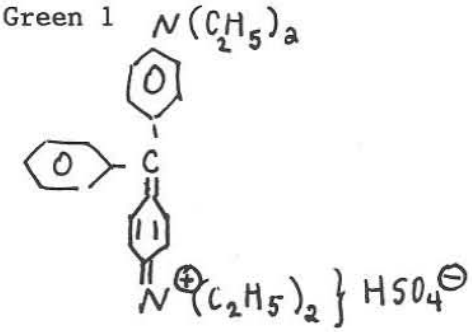
Non-textile Usage: leather, paper, cellulose nitrate lacquers, spirit inks, oils, waxes, solvent dye (see C.I. Solvent Green 1), pigments with MW acids, (see C.I. Pigment Green 4). Topical antiseptic and bacterial stain.

Notes: * Tests on silk and wool based on daylight, using obsolete method.
** Light test based on AATCC Carbon Arc lightfastness test method

Common Name: Diamond Green G
Color Index Name: Basic Green 1
C.I. 42040

Chemical Class: triarylmethane

Structure:



Synthesis: Condense benzaldehyde with n,n-diethylaniline in presence of hydrochloric or sulfuric acid, oxidize the product and convert to the sulfate. The resinous mixture first formed solidifies suddenly to a mass of well-defined crystals

Discoverer: Bindschedler and Busch, 1879

Reactions to reagents: soluble in cold and hot water (green); very soluble in ethanol (green); conc. H_2SO_4--yellow; on dilution, green; aqueous solution + NaOH--pale green ppt.

Dyeing: silk

Dyeing other fibers: cotton with tannin mordant; wool; acrylic

Printing: --

Toxicity Information: Source: (IDC), "Elcozine Brilliant Green Cryst.," 11/15/85.
Basic green 1 is mutagenic in microorganisms.
Combustion will produce oxides of carbon and nitrogen.
Ingestion: Drink several glasses of milk or water, induce vomiting and seek immediate medical attention.

Common name: Diamond Green G
Color Index Name: Basic Green 1
C.I. 42040

Hue: daylight: bright green
tungsten: little yellower

Fastness Properties:

Method:	ISO(silk)*	cotton**	wool***
Light: 1/3, 1/2 normal:	2	1	1
normal:	2	1	1
2X normal:	3	2	2
Perspiration: (alkaline):			
Alteration:	4-5	-	-
Staining:	1	-	-
Washing:			
Alteration:	2	4-5	2-3
Staining:	4	2	5

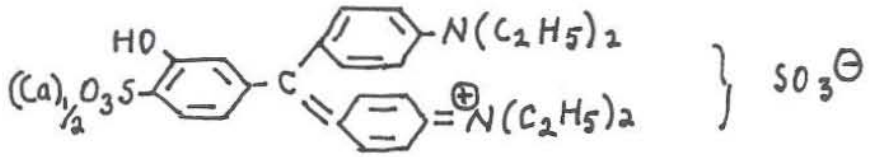
Non-textile Usage: PVC fibers, paper, pgiments (with high MW acids); C.I. Pigment Greens 1, 2, 3; leather dye; spirit inks; wood stains; indicator; biological stain; medicinal stain; solvent dye (base is used); oils, fats, waxes.

*Notes: ISO test method forlightfastness employed daylight; **cotton with tannin mordant was tested with obsolete method. See Color Index, vol IV, second edition, 1956. ***wool also tested with obsolete test method; only wash fastness of cotton and wool should be directly and categorically compared; lightfastness tests for wool here used different source for illuminant.

Common Name: Patent Blue V
Color Index Name: Acid Blue 3
C.I.: 42051

Chemical Class: Triphenylmethane (listing Triarylmethane)

Structure:



Synthesis:

a). Condense m-nitrobenzaldehyde with N,N-diethylaniline (2 mol.), reduce, diazotise the amine formed, convert to the hydroxy compound, disulfonate, isolate as the calcium salt and oxidise.

b). Condense m-hydroxybenzaldehyde with N,N-diethylaniline (2 mol.), disulfonate, convert to calcium salt and oxidise.

Discoverer: Hermann 1888

Reactions to reagents:

Very soluble in cold and hot water (blue). Soluble in ethanol (greenish blue).

Sulphuric Acid conc.--brown-olive yellow; on dilution--deep yellow.

Aqueous solution and Sodium Hydroxide--unaltered cold, deep violet hot.

Dyeing: wool

Method: 3

Levelling: good

SDC migration Test Method/grade: --

Staining (other fiber) acetate: Unstained

cellulose and nylon: Heavily stained

Dyeing other fibers: silk: Acetic acid, leveling good.

Also nylon, jute, feathers, and straw

Printing: Direct on wool and silk.

Hue: daylight: bright greenish blue

tungsten: --

Toxicity Information: Source: Reference (6), 11/9/87.

In short-term studies, only slight tissue reactions were found in rats injected with this agent. There were no untoward findings in long-term tests. The World Health Organization recommended that this dye be accepted for human comsumption pending further studies.

Common Name:	Patent Blue V
Color Index Name:	Acid Blue 3
C.I.	42051

Fastness Properties:

Method:		AATCC	ISO
Alkali:		2	3-4
Carbonizing:		3	4
Chlorination:	alteration:	-	4
	staining:	-	-
Decatising:		-	4-5
Light: 1/3, 1/2 normal:		-	1
normal:		1	1-2
2X normal:		-	2
Milling (Alkaline):	alteration:	2	2
	staining:	-	-
Milling (Acid):	alteration:	-	1
	staining:	-	-
Peroxide Bleaching:	alteration:	2	3
	staining:	-	-
Perspiration:		3	2-3
Potting:	alteration:	-	2
	staining:	-	-
Seawater:	alteration:	1	2
	staining:	-	-
Stoving:		4-5	4
Washing:	alteration:	2	2-3
	staining:	-	-

Other Properties:

Dischargeability:	moderate	
Effects of Metals:	Copper:	greener and duller
	Chromium:	--
	Iron:	greener and duller

Non-textile Usage:

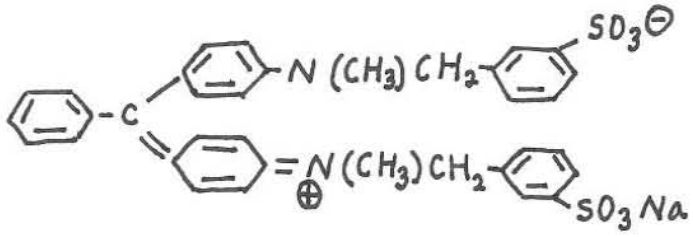
Heavy metal salts used as pigments. See Leather Dyes section. Paper in the beater, coating and surface coloring. Anodised aluminium--inks. Aluminium salts used as colorant in cosmetics.

Notes: very good solubility in water, suitable for covering "faded" wool.

Common Name: Light Green SF bluish (IG)
Color Index Name: Acid Green 6
C.I.: 42075

Chemical Class: Triphenylmethane (listing Triarylmethane)

Structure:



Synthesis:
Condense benzaldehyde with a-(n-methylanilino)-m-toluenesulfonic acid, sulfonate, oxidise the product, and convert to the sodium salt.

Discoverer: Köhler 1879

Reactions to reagents:
Very soluble in water (blue green). Almost soluble in ethanol (green).
Sulphuric Acid conc.--golden yellow; on dilution--green.
Aqueous solution and Sodium Hydroxide--colorless with dull violet ppt.

Dyeing: wool
Method: 3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: Unstained

Dyeing other fibers: silk: broken degumming liquor, formic or sulphuric acid.

Printing: Direct on wool and silk.

Hue: daylight: bright green
tungsten: little change

Toxicity Information: Source: Reference (6), 11/9/87.
Limited evidence for carcinogenicity in experimental animals.

Common Name:	Light Green SF bluish (IG)
Color Index Name:	Acid Green 6
C.I.	42075

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			1
Carbonizing:			4-5
Chlorination:	alteration:		4
	staining:		-
Decatising:			4-5
Light:	1/3, 1/2 normal:		2
	normal:		2
	2X normal:		3
Milling (Alkaline):	alteration:		2-3
	staining:		-
Milling (Acid):	alteration:		-
	staining:		-
Peroxide Bleaching:	alteration:		1
	staining:		-
Perspiration:			3
Potting:	alteration:		-
	staining:		-
Seawater:	alteration:		2-3
	staining:		-
Stoving:			2
Washing:	alteration:		1
	staining:		4

Other Properties:

Dischargeability: good

Effects of Metals:		
	Copper:	little change
	Chromium:	--
	Iron:	little change

Non-textile Usage:

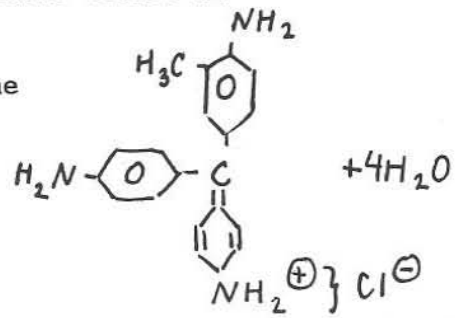
paper, plastics, pigments, wood stains

Notes:

Common Name: Magenta
Color Index Name: Basic Violet 14
C.I. 42510

Chemical Class: triarylmethane

Structure:



Synthesis: a) Nitrobenzene process: heat a mixture of aniline, o- and p-toluidine, and their hydrochlorides with nitrobenzene, or a mixture of nitrobenzene and o-nitrotoluene, in the presence of iron and zinc chloride; b) Arsenic acid process: heat a mixture of aniline and o- and p-toluidine with arsenic acid

Discoverer: Natason, 1856; A.W> Hoffman, 1858; Verguin, 1858; Gerber and Keller, 1859; Medlock, 1860; Nicholson, 1860; Girard and deLaire, 1860; Laurent and Cathelaz, 1861; Coupier, 1869.

Reactions to reagents: soluble in cold and hot water (red violet); very soluble in ethanol (red); conc. H_2SO_4--yellow brown; on dilution, almost colorless; aqueous solution + NaOH--almost colorless with red ppt.

Dyeing: silk

Dyeing other fibers: acrylic, cotton (with tannin mordant)

Printing: direct printing on cotton with discharged tannin mordant

Toxicity Information: Source: (ORC), "Orcozine Fuschine S B," 6/22/87.
Reference (5), 1984.

Combustion will produce toxic fumes of HCl and nitrous oxides.
Ingestion: Seek immediate medical attention.

Common name: Magenta
Color Index Name: Basic Violet 14
C.I. 42510

Hue: daylight: bright reddish violet
tungsten: yellower

Fastness Properties:

Method:	ISO(silk)*	cotton**	wool***
Light: 1/3, 1/2 normal:	1	1	1
normal:	1	1	1
2X normal:	2	1	2
Perspiration (alkaline):			
Alteration:	3-4	-	-
Staining:	2	-	-
Washing:			
Alteration:	2	2	2-4
Staining:	3-4	-	5

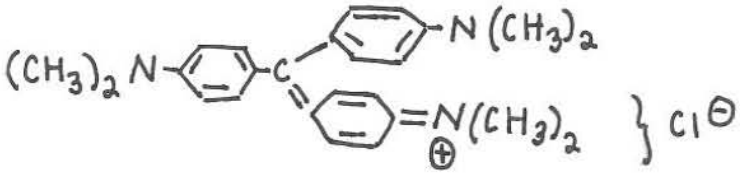
Non-textile Usage: bast fibers, paper; pigments (with high MW acids); distemper on china clay; leather; photography; spirit inks; C.I. Solvent Red 41 (as free base)

*Notes: Using daylight in lightfastness test method; ** ctoon mordanted with tannin and obsolete test method. See Colour Index, vol. IV, second edition, 1956; ***also using obsolete test method, but not comparable to that used on cotton.

Common Name: Methyl Violet
Color Index Name: Basic Violet
C.I.: 42535

Chemical Class: Triarylmethane

Structure:



Synthesis: A mixture of the hydrochlorides of the more highly methylated p-rosanilines, containing principally the n-tetrepenta, and hexa-methyl derivatives, obtained by oxidation of n,n-dimethylaniline with cupric chloride, or by the action of air on an intimate mixture of n,n-dimethylaniline, phenol, sodium chloride, and copper sulfate.

Discoverer: Lauth, 1861. Placed on the market by Poirrier and Chappat, 1866.

Reactions to reagents:
Soluable in cold and hot water (violet);very soluble in ethanol (violet).
Sulphuric acid conc.--orange; on dilution--green ppt.
Aqueous solution and hydrocloric acid--brown red ppt.

Dyeing: cotton with tannin mordant
Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers: wool and silk

Printing: printing on cotton , silk , and wool

Hue: daylight: blueish violet
tungsten: redder

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained.)

Common Name:	Methyl Violet
Color Index Name:	Basic Violet 1
C.I.	42535

Fastness Properties:

Method:		Cotton*	Wool**
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light: 1/3, 1/2 normal:		1	1
normal:		1	1
2X normal:		1	1
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:	alteration:	1-2/4-5***	-
	staining:	-	-
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:	1-2	4
	staining:	-	4

Other Properties: No Listing

Dischargeability:		
Effects of Metals:	Copper:	
	Chromium:	
	Iron:	

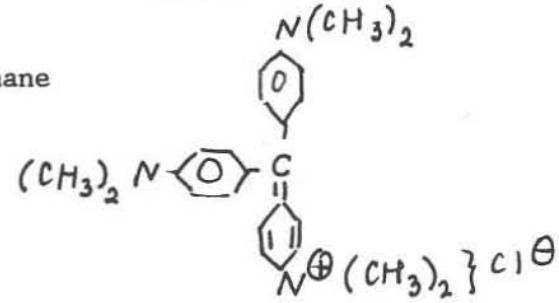
Non-textile Usage: Major use of dyestuff is non-textile: pigments with high MW acids (see C.I. Pigment Violet 3); paper, leather, distempers, plastics, biological stain indicator, photographic filters, spirit inks, lacquers, wood stains, solvent dye (see C.I. Solvent Violet 8).

Notes:
- * Cotton has been treated with tannin mordant, tests are based on daylight using obsolete method.
- ** Wool also tested with obsolete method but not directly comparable with those on cotton.
- *** Data from two different obsolete test methods produced different results.

Common Name: Crystal Violet
Color Index Name: Basic Violet 3
C.I. 42555

Chemical Class: triarylmethane

Structure:



Synthesis: a) Condense 4,4'-bis-(dimethylamino)benzophenone with n,n-dimethylaniline and phosphorus trichloride; b) react n,n-dimethylaniline with phosgenein the presence of zinc chloride; c) condense 4,4'-bis(dimethylamino) benzhydrol with n,n-dimethylaniline and oxidize the product

Discoverer:Kern and Caro, 1883

Reactions to reagents: soluble in cold and hot water (violet); very soluble in ethanol (violet); conc. H_2SO_4--red yellow; on dilution, dull greenish yellow changing to blue and violet; aqueous solution + NaOH--violet ppt.

Dyeing: tannin mordanted cotton

Dyeing other fibers: wool, silk

Printing: --

Toxicity Information: Source: Reference (4), 1986.
Colorant has tested positive for mutagenicity (Ames Test).

Common name: Crystal Violet
Color Index Name: Basic Violet 3
C.I. 42555

Hue: daylight: bright bluish violet
tungsten: redder

Fastness Properties:

Method:	cotton*	wool**	silk**
Light: 1/3, 1/2 normal:	1	1	1
normal:	1	1	2-3
2X normal:	1	2	2
Perspiration:			
Alteration:	1-2	-	-
Staining:	-	-	-
Washing:			
Alteration:	1-2	2-3	3
Staining:	-	1-2	-

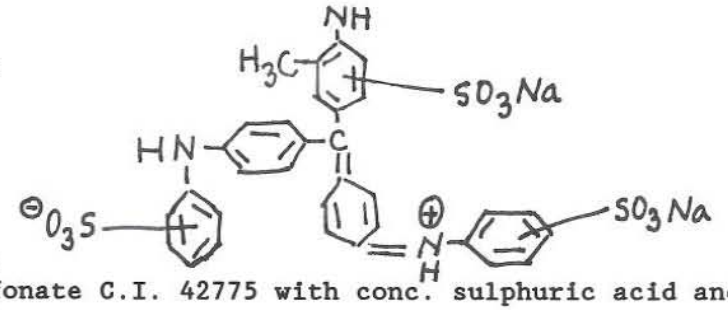
Non-textile Usage: widely used on paper, leather; biological stain; indicator; ball pen inks; carbon paper; spirit inks; lacquers; see C.I. Solvent Violet 9

*Notes: cotton mordanted with tannin; tests based on daylight using obsolete method. See Colour Index, vol IV, second edition, 1956.
**test methods used on wool and silk are directly comparable to each other, but not to those on cotton; again test methods used are obsolete.

Common Name: Alkali Blue
Color Index Name: Acid Blue 110
C.I.: 42750

Chemical Class: Triphenylmethane (listing Triarylmethane)

Structure:



Synthesis:
Sulfonate C.I. 42775 with conc. sulphuric acid and convert to the sodium salt.

Discoverer: Nicholson 1862, Gilbee 1862

Reactions to reagents:
Soluble in cold, slightly soluble in hot water (colorless).
slightly soluble in ethanol.
Sulphuric Acid conc.--brownish red; on dilution--blue ppt.

Dyeing: wool
Method: In a boiling alkaline (borax) bath; rinse and acidify to produce the final dyeing.
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber)
acetate, cellulose, & silk: Heavily stained

Dyeing other fibers: --

Printing: --

Hue: daylight: blue
tungsten: little change

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Alkali Blue
Color Index Name:	Acid Blue 110
C.I.	42750

Fastness Properties: No listing for AATCC

Method:		AATCC	ISO
Alkali:			2
Carbonizing:			4-5
Chlorination:	alteration:		-
	staining:		-
Decatising:			-
Light:	1/3, 1/2 normal:		1
	normal:		2
	2X normal:		2
Milling (Alkaline):	alteration:		2
	staining:		-
Milling (Acid):	alteration:		-
	staining:		-
Peroxide Bleaching:	alteration:		-
	staining:		-
Perspiration:			2
Potting:	alteration:		-
	staining:		-
Seawater:	alteration:		2
	staining:		-
Stoving:			4
Washing:	alteration:		2-3
	staining:		-

Other Properties:

Dischargeability:	
Effects of Metals:	Copper:
	Chromium:
	Iron:

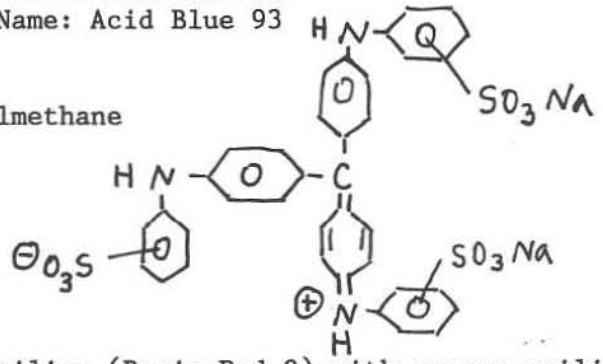
Non-textile Usage: paper, pigments

Notes:

Common Name: Water Blue IN New
Color Index Name: Acid Blue 93
C.I. 42780

Chemical Class: triarylmethane

Structure:



Synthesis: a)Heat rosaniline (Basic Red 9) with excess aniline in the presence of benzoic acid at about 180°C.;trisulfonate the product and convert to the sodium salt; b) condense formaldehyde with n-phenylsulfanilic acid or metanilic acid (2 mol) and oxidize the product formed in the presence of another mole of n-phenylsulfanilic acid; c)condense diphenylamine with carbon tetrachloride and sulfonate the product.

Discoverer: A.W. Hofmann, 1858; Nicholson, 1862; Girard and deLaire, 1866; K.Heumann, 1892; Sandmeyer, 1892; M.Weiler, 1906.

Reactions to reagents: very soluble in cold and hot water (blue); conc. H_2SO_4--reddish brown; on dilution, blue violet

Dyeing: wool
Method: 2
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) --

Dyeing other fibers: silk (acid or neutral); cotton on tannin mordant

Printing: --

Toxicity Information: Source: (CCC), "Caracid Soluble Blue OBB-ASS, OBB-SS," 1/86.
Ingestion: Drink several glasses of milk or water and induce vomiting. Seek immediate medical attention.

Common name: Water Blue IN New
Color Index Name: Acid Blue 93
C.I. 42780

Hue: daylight: bright blue
tungsten: slightly redder

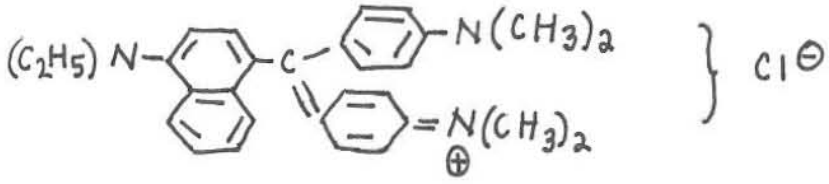
Fastness Properties: no data available

Non-textile Usage: heavy metal slats as pigments for printing inks; biological stain; indicator; see also leather dyes.

Common Name: Victoria Blue R
Color Index Name: Basic Blue 11
C.I.: 44040

Chemical Class: Triphenylmethane (listing Triarylmethane)

Structure:



Synthesis:

a). Condense 4,4'-bis(dimethylamino) benzhydrol with N-ethyl-1-naphthylamine, convert the product into the N-nitroso derivative, oxidize, and remove the nitroso group.

b). Condense p,p'-(dichloromethylene) bis [N,N-dimethylaniline] with N-ethyl-1-naphthylamine.

Discoverer: Nachtvogel and Reingruber 1892

Reactions to reagents:

Soluble in water (blue). Very soluble in ethanol (blue).
Sulphuric Acid conc.--brownish yellow; on dilution--lt. green to blue.
Aqueous solution and Sodium Hydroxide--brown flocculent ppt.

Dyeing: wool
Method: 3
Levelling: good
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: Unstained

Dyeing other fibers: Cotton: with tannin mordant.

Printing: Direct on wool and silk. Direct dyeing and printing cotton on discharged mordant.

Hue: daylight: bright reddish blue
tungsten: duller

Toxicity Information: Source: Reference (6), 11/9/87.
Limited evidence for carcinogenicity in experimental animals.

Common Name:	Victoria Blue
Color Index Name:	Basic Blue 11
C.I.	44040

Fastness Properties: No listing for ISO

Method:		AATCC	ISO
Alkali:		-	
Carbonizing:		-	
Chlorination:	alteration:	-	
	staining:	-	
Decatising:		1	
Light: 1/3, 1/2 normal:		1	
normal:		2	
2X normal:		-	
Milling (Alkaline):	alteration:	-	
staining:		-	
Milling (Acid):	alteration:	-	
	staining:	-	
Peroxide Bleaching:	alteration:	-	
	staining:	-	
Perspiration:		-	
Potting:	alteration:	-	
	staining:	-	
Seawater:	alteration:	-	
	staining:	-	
Stoving:		-	
Washing:	alteration:	1	
	staining:	2	

Other Properties:

Dischargeability:	
Effects of Metals:	Copper:
	Chromium:
	Iron:

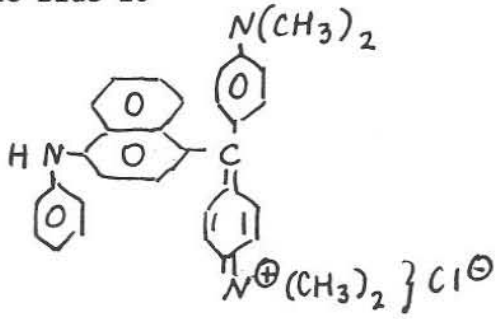
Non-textile Usage: paper, wood stains, leather, biological stain. see G.I. Solvent Blue 6.

Notes: Fastness properties on silk are similar to those on wool.

Common Name: Victoria Blue B
Color Index Name: Basic Blue 26
C.I. 44045

Chemical Class: triarylmethane

Structure:



Synthesis: a) Condense p,p'(dichloromethylene)bis [n,n-dimethylaniline] with n-phenyl-1-naphthylamine. b) Condense 4,4'-bis(dimethylaminobenzhydrol with n-phenyl-1-naphthylamine, convert the product to the n-nitroso derivative, oxidize, and remove the nitroso group.

Discoverer: Caro and Kern, 1883

Reactions to reagents: soluble in cold and hot water (blue); soluble in ethanol (blue); conc. H_2SO_4--reddish brown; on dilution, yellow to green and then to blue; aqueous solution + NaOH--dark reddish brown ppt.

Dyeing: cotton with tannin mordant

Dyeing other fibers: wool, silk

Printing: direct on tannin mordanted cotton

Toxicity Information: Source: (ATL), "Atlantic Victoria Blue B Conc." 2/26/86.
Combustion will produce carbon dioxide and carbon monoxide. As well oxides of nitrogen, acidic and oxidation products of halogens may be produced.
Ingestion: Seek immediate medical attention.

Common name: Victoria Blue B
Color Index Name: Basic Blue 26
C.I. 44045

Hue: daylight: bright blue
tungsten: greener, duller

Fastness Properties:

Method:	cotton*	wool*	silk*
Light: 1/3, 1/2 normal:	1	1	1
normal:	1	1-2	1-2
2X normal:	1	2	2
Washing:			
Alteration:	3	3	3
Staining:	-	-	-

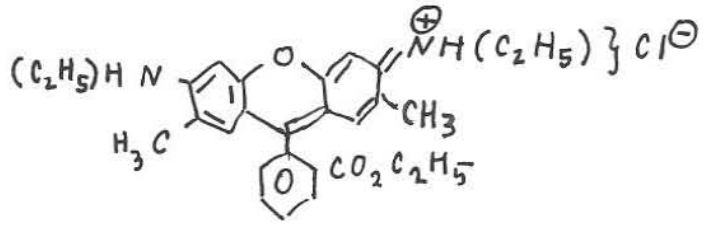
Non-textile Usage: widely used on paper; jute; pigments (see C.I. Pigment Blue 2); leather; biological stain; solvent dye, see C.I.Solvent Blue 2

*Note: tests based on daylight, using obsolete method; see Colour Index, vol. IV, second edition, 1956.

Common Name: Rhodamine 6G
Color Index Name: Basic Red 1
C.I. 45160

Chemical Class: xanthene

Structure:



Synthesis: Condense 3-ethylamino-p-cresol with phthalic anhydride and esterify the product with ethanol and a mineral acid

Discoverer: Bernthsen, 1892; Schmid and Rey, 1892

Reactions to reagents: Soluble in water (scarlet red with a greenish fluorescence); soluble in ethanol (red with a yellow fluorescence); conc. H_2So_4--yellow; on dilution, red; aqueous solution + NaOH--red ppt.

Dyeing: silk, cotton

Dyeing other fibers: wool

Printing: direct and direct on discharged tannin mordanted cotton

Toxicity Information: Source: Reference (4), 1986.
Colorant has been shown to cause cancer in lab animals.

Common name: Rhodamine 6G
Color Index Name: Basic Red 1
C.I. 45160

Hue: daylight: bluish pink (fluorescent)
tungsten: yellower

Fastness Properties:

Method:	ISOsilk*	cotton**	wool**
Light: 1/3, 1/2 normal:	2	1	1
normal:	2	1	1
2X normal:	2	2	2
Perspiration (alkaline):			
Alteration:	4-5	-	-
Staining:	1	-	-
Washing:			
Alteration:	3	2-3	
Staining:	3-4	5	

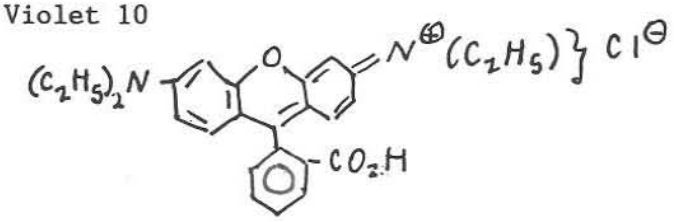
Non-textile Usage: Widely used on paper, bast fibers, leather (chrome and leather tannages); solvent dye (dissolved in stearic acid); pigments with high MW acids for printing inks, drawing inks, crayons, pastel, etc. Fastness generally poor except in C.I. Pigment Red 81.

*Notes: tests on lightfastness employed daylight; test methods used on cotton and wool are directly comparable, but use obsolete methods. See Colour Index, Vol. IV, second edition, 1956.

Common Name: Rhodamine B
Color Index Name: Basic Violet 10
C.I. 45170

Chemical Class: xanthene

Structure:



Synthesis: a) Condense m-diethylaminophenol with phthalic anhydride; b)React 3',6''-dichlorofluoran with diethylamine under pressure (BP 9600/88)

Discoverer: Cérésole, 1887; Homdka and Boedeker, 1888

Reactions to reagents: Soluble in water and ethanol (bluish red with strong fluorescence); slightly soluble in acetone; very soluble in cellosolve; conc. H_2SO_4--yellowish brown with strong green fluorescence; on dilution, scarlet then to bluish red and orange; aqueous solution + NaOH--rose red flocculent ppt. on heating

Dyeing: silk, cotton with tannin mordant

Dyeing other fibers: wool, acetate, nylon

Printing: direct and as illuminating color in discharges

Toxicity Information: Source: (CCC), "Rhodamine B 500% Liq.," 5/22/86. Considered potentially carcinogenic. Vitro tests on mammalin cell cultures indicate that the pure dye compound does cause alterations in chromosones and DNA fragmentation. Other adverse health effects seen in lab studies include hemolysis, inhibition of enzyme activity, suppression of the immune response, toxicity to the eye and cytotoxicity to skin cells.
Ingestion: Seek immediate medical attention.

Common name: Rhodamine B
Color Index Name: Basic Violet 10
C.I. 45170

Hue: daylight: reddish violet fluosecent (silk); bright reddish violet (cotton with tannin mordant)
tungsten: yellower (silk); redder (cotton with tannin mordant)

Fastness Properties:

Method:	ISO(silk)	cotton*	wool**
Light: 1/3, 1/2 normal:	2	1	2
normal:	2	1	3
2X normal:	2	2	3
Perspiration (alkaline):			
Alteration:	3-4	1	-
Staining:	1	-	-
Washing:			
Alteration:	3	1	3
Staining:	3-4	-	2-3

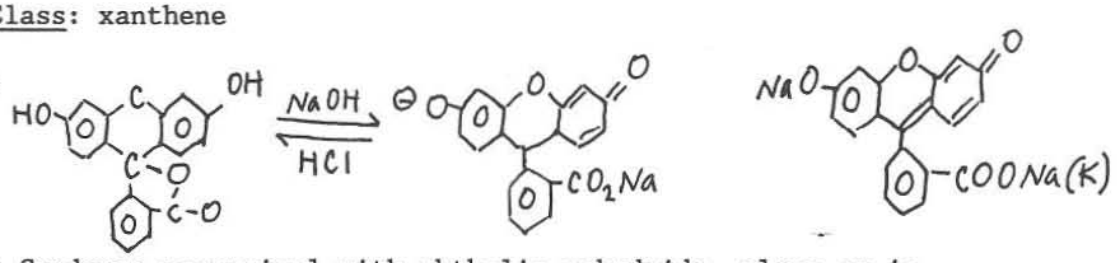
Non-textile Usage: widely used on paper,bast fibers, acetate, nylon (fluorescent effects); pigments with high MW acides give brillant red for printing inks, crayons, etc. Generally poor fastness except for C.I. Pigment Violet 1; distempers on china clay; leather; spirit inks and lacquers; soap; wool stains; feathers; see C.I. Solvent Red 49.

*Notes: cotton mordanted with tannin;tests based on daylight using obsolete method; see Colour Index, vol. IV, second edition, 1956; test methods used on cotton and wool not directly comparable; test methods used on wool are also obsolete.

Common Name: Uranine A (Fluoresceïn)
Color Index Name: Acid Yellow 73
C.I. 45350

Chemical Class: xanthene

Structure:



Synthesis: Condense resorcinol with phthalic anhydride, alone or in presence of zinc chloride or sulfuric acid, for Fluoresceïn, and convert to sodium or potassium salt for Uramine

Discoverer: Baeyer, 1871

Reactions to reagents: soluble in water and ethanol (yellow with intense green fluorescence); conc. H_2SO_4--yellow with faint fluorescence; on dilution, yellow with yellow ppt.; aqueous solution + NaOH --darker solution with a dark green fluorescence

Dyeing: wool

Dyeing other fibers: silk

Printing:

Toxicity Information: Source: (CCC), "Caracid Fluorescent LTS," 4/29/86.
Combustion will produce carbon dioxide and carbon monoxide, as well as toxic sodium fumes.
Ingestion and inhalation: Seek immediate medical attention.

Common name: Uranine A
Color Index Name: Acid Yellow 73
C.I. 45350

Hue: daylight: bright yellow
tungsten: no change

Fastness Properties: no data available; Uramine A does not possess enough tinctorial power to be used as a dyestuff

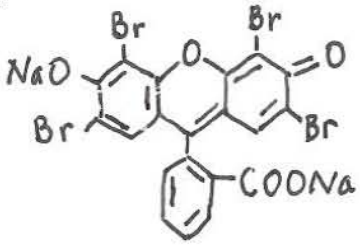
Other Properties: fluoresces strongly in aqueous solution, even at very dilute levels

Non-textile Usage: As a marker for life saving at sea and tracing the course of underground streams; medicinal, drugs, and cosmetics

Common Name: Eosine A
Color Index Name: Acid Red 87
C.I.: 45380

Chemical Class: Xanthene

Structure:



Synthesis: Brominate Fluorsceïn (C.I. 45350) in aqueous or ethanolic solution to the tetrabromo derivative, and convert to the sodium salt.

Discoverer: Caro, 1871

Reactions to reagents:
Soluable in water and ethanol (bluish red with a yellowish green fluorescence).
Sulphuric acid conc.--yellow; on dilution--yellowish red ppt.

Dyeing: wool
Method: 2
Levelling: moderate
SDC migration Test Method/grade: --
Staining (other fiber) acetate and cellulose: slightly stained

Dyeing other fibers: Nylon (with formic acid).
Silk (neutral or with acetic acid).

Printing: --

Hue: daylight: yellowish pink
tungsten: slightly brighter and yellower

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained.)

Common Name: Eosine A
Color Index Name: Acid Red 87
C.I. 45380

Fastness Properties:

Method:		AATCC	ISO
Alkali:		3	2
Carbonizing:		3	2
Chlorination:	alteration:	-	2
	staining:	1	4-5
Decatising:		3	3-4
Light: 1/3, 1/2 normal:		-	1
normal:		1	2
2X normal:		-	3
Milling (Alkaline):	alteration:	2	1
	staining:	2	1
Milling (Acid):	alteration:	-	2
	staining:	-	1
Peroxide Bleaching:	alteration:	1	1
	staining:	1	2
Perspiration:		3	2
Potting:	alteration:	-	1
	staining:	-	1
Seawater:	alteration:	3	2
	staining:	3	2
Stoving:		4-5	3
Washing:	alteration:	2	3
	staining:	2	3

Other Properties:

Dischargeability: poor
Effects of Metals: Copper: little bluer
Chromium: --
Iron: bluer and duller

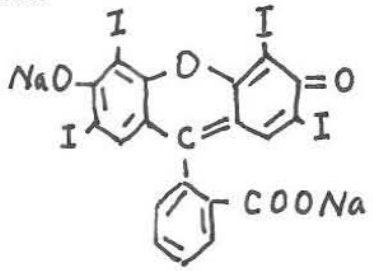
Non-textile Usage: Inks, psper, pencil leads, pigments (as lead and other salts), spirit stains, cosmetics and drugs; see C.I. Pigment Red 90; see Leather Dyes section.
Lipstick, and nail polish coloring. FDA approved for use in drugs and cosmetics except in eye area.

Notes:

Common Name: Erythrosine
Color Index Name: Acid Red 51
C.I.: 45430

Chemical Class: Xanthene

Structure:



Synthesis:
Tetraiodinate. Fluorescein (C.I. 45350) in aqueous or ethanolic solution and convert to the sodium salt.

Discoverer: Kussmaul 1876

Reactions to reagents:
Soluble in water (cherry red without fluorescence).
Sulphuric Acid conc.--brownish yellow; on solution--brownish yellow ppt.
Aqueous solution sodium hydroxide--soluble red ppt.

Dyeing: wool
Method: 2
Levelling: poor
SDC migration Test Method/grade: --
Staining (other fiber) acetate: Unstained
cellulose: Slightly stained

Dyeing other fibers: silk: neutral or acetic acid
nylon: acetic or sulphuric acid.

Printing: Direct on wool and silk. Illuminating discharge effects on silk.

Hue: daylight: bluish pink
tungsten: yellower

Toxicity Information: Source: References (6), 11/9/87, and (8), 1983.
Weight decrease and diarrhea were seen in rats fed 2000 mg/kg bw/day. Dogs had inflamed thyroids when fed 500 mg/kg bw/day. Many other reports noted. Hemoglobin reduced and cholesterol depressed in rats fed this agent. No estrogenic activity in rats. No sensitization activity in guinea pigs. The World Health Organization committee recommended that this chemical be accepted for human consumption pending further testing.

Common Name:	Erythrosine
Color Index Name:	Acid Red 51
C.I.	45430

Fastness Properties: No listing for ISO

Method:		AATCC	ISO
Alkali:		4	
Carbonizing:		2	
Chlorination:	alteration:	-	
	staining:	-	
Decatising:		4	
Light: 1/3, 1/2 normal:		1	
normal:		1	
2X normal:		1	
Milling (Alkaline):	alteration:	3	
	staining:	-	
Milling (Acid):	alteration:	-	
	staining:	-	
Peroxide Bleaching:	alteration:	1	
	staining:	-	
Perspiration:		4	
Potting:	alteration:	-	
	staining:	-	
Seawater:	alteration:	2-3	
	staining:	-	
Stoving:		4	
Washing:	alteration:	3	
	staining:	-	

Other Properties:

Dischargeability: poor

Effects of Metals:	Copper:	slightly bluer
	Chromium:	--
	Iron: --	

Non-textile Usage:

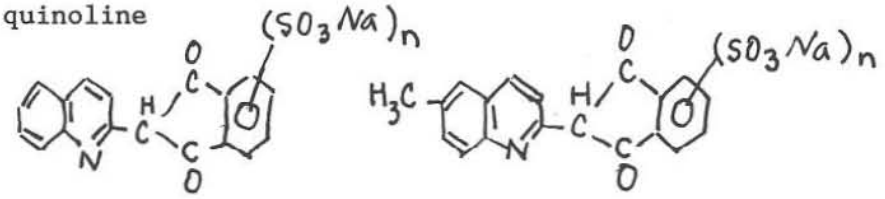
Inks, stamping inks, lacquers, paper, pigments (as aluminium and lead salts), biological stains, cosmetics and drugs.
See C.I. Food Red 14.

Notes:

Common Name: Quinoline Yellow
Color Index Name: Acid Yellow 3
C.I. 47005

Chemical Class: quinoline

Structure:



Synthesis: Quinaldine and 6-methyl quinaldine are condensed with phthalic anhydride. This product, also known as Quinoline Yellow Spirit Soluble (C.I. 47000), is sulfonated to create Quinoline Yellow Extra, a mixture of di- and trisulfonic acids derivatives. Quinoline Yellow S is a mixture of mono- and di-sulfonic derivatives.

Discoverer: Jacobsen, 1882

Reactions to reagents: soluble in water and ethanol (yellow); conc. H_2SO_4--orange; on dilution, yellow; aqueous solution + reducing agents--not decolorised (as distinct from Picric Acid, C.I. 10305, and Naphthol Yellow, C.I. 10316).

Dyeing: wool
Method: 3
Levelling: good, can be salted
SDC migration Test Method/grade: I/4
Staining (other fiber) acetate and cellulose, slightly stained

Dyeing other fibers: nylon (with formic acid); silk (with sulfuric acid, has good levelling)

Toxicity Information: Source: (TCC), "D & C Yellow 10 (Quinoline)," and "Quinoline Yellow Conc.," 1987.
Combustion may produce oxides of carbon, nitrogen and sulfur.
Ingestion: Induce vomiting and seek immediate medical attention.
Incompatability (materilas to avoid): oxidizing and reducing agents may destroy color.

Common name: Quinoline Yellow
Color Index Name: Acid Yellow 3
C.I. 47005

Hue: daylight: bright greenish yellow
tungsten: little change

Fastness Properties:

Method:		AATCC	ISO
Alkali		3	3-4
Carbonizing		5	5
Chlorination:	alteration:	1	4
	staining:	-	3
Decatising:		5	4-5
Light: 1/3, 1/2 normal:		2	1
normal:		3	2
2X normal:		4	3
Milling: alkaline:			
Alteration:		2	1
Staining:		2	2
Milling: acid:			
Alteration:		-	4
Staining:		-	1
Peroxide Bleaching:			
Alteration:		1	1
Staining:		1	5
Perspiration:		1	3-4
Potting:			
Alteration:		-	3
Staining:		-	1
Seawater:			
Alteration:		2	3
Staining:		2	1
Stoving:		4-5	5
Washing:			
Alteration:		2-3	1
Staining:		2-3	3

Other Properties:

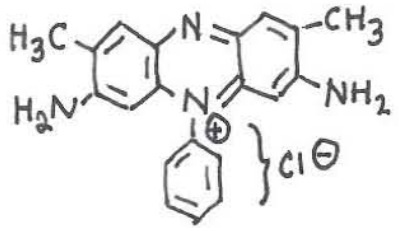
Dischargeability: not dischargeable
Effect of Metals:
Copper: duller
Chromium: --
Iron: redder and duller

Non-textile Usage: see Leather dyes seciton; paper dyeing in the beater; staining and coloring of crepe tissues; barium salt used as printing ink pigment;soaps and wax emulsions; biological stain; drugs and costumetics; see C.I. Food Yellow 13.

Common Name: Safranine T
Color Index Name: Basic Red 2
C.I.: 50240

Chemical Class: Azine

Structure:



Synthesis:
Oxidize equimolar proportions of toluene-2, 5-diamine and O-toluidine, condense the product with aniline and purify the dye by fractional precipitations; then convert to the chloride.

Discoverer: Greville Williams, 1859.

Reactions to reagents:
Soluble in water (red). Soluble in ethanol (red with red yellowish fluorescence).
Sulphuric Acid conc.--green; on dilution--blue then red.
Aqueous solution and sodium hydroxide--brownish red ppt.
Aqueous solution and hydrochloric acid--bluish violet.

Dyeing: Cotton with tannin mordant.
Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers: wool, silk

Printing: (not dischareable, but unsuitable for illuminated discharges.)

Hue: daylight:
tungsten:

Toxicity Information: Source: References (7), 1971, & (8), 1983.
(No information obtained).

Common Name: Safranine T
Color Index Name: Basic Red 2
C.I. 50240

Fastness Properties:

Method:		Cotton*	Silk**	Wool**
Alkali:				
Carbonizing:				
Chlorination:	alteration:			
	staining:			
Decatising:				
Light: 1/3, 1/2 normal:		1	1	1
normal:		1-2	1	1
2X normal:		2	1	1
Milling (Alkaline):	alteration:			
	staining:			
Milling (Acid):	alteration:			
	staining:			
Peroxide Bleaching:	alteration:			
	staining:			
Perspiration:		2	-	-
Potting:	alteration:			
	staining:			
Seawater:	alteration:			
	staining:			
Stoving:				
Washing:	alteration:	2-3	-	2-3
	staining:	5	-	4

Other Properties:

Dischargeability: Not dischargeable but unsuitable for illuminated discharges.

Effects of Metals: Copper:
Chromium:
Iron:

Non-textile Usage: leather, paper, biological stain, pigment, spirit inks, solvent dyes.

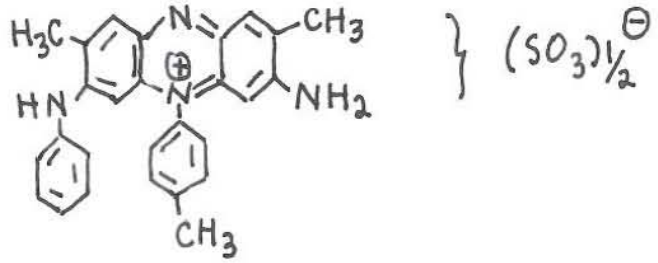
Notes: * Cotton is tannin mordanted. Tests based on daylight using obsolete method.

** Wool and silk tested using obsolete methods but the results for all fibers are directly comparable.

Common Name: Mauveine, Mauve
Color Index Name: Basic Dye
C.I.: 50245

Chemical Class: Azine

Structure:



Synthesis:
Oxidise aniline containing o-& p-toluidines with potassium dichromate in cold dilute sulfuric acid solution.

Discoverer: W.H. Perkin 1856

Reactions to reagents:
Insoluble in cold and slightly soluble in hot water (red violet. Soluble in ethanol (purple).
Sulphuric Acid conc.--olive green; on dilution--green to blue, and then reddish violet.
Aqueous solution and Sodium Hydroxide--bluish violet ppt.

Dyeing:
Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers:

Printing:

Hue: daylight:
tungsten:

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name: Mauveine, Mauve
Color Index Name: Basic Dye
C.I. 50245

Fastness Properties: No listing for AATCC or ISO

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light:	1/3, 1/2 normal:		
	normal:		
	2X normal:		
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties:

Dischargeability:
Effects of Metals: Copper:
Chromium:
Iron:

Non-textile Usage:

Notes: No longer produced, Mauveine is produced only with "impure" toluidines. Dyes silk reddish violet and cotton violet.

Common Name: Nigrosine Water Soluble
Color Index Name: Acid Black 2
C.I. 50420

Chemical Class: azine

Structure:

Synthesis: Heat nitro compounds like nitrobenzene and nitrophenol in with aniline and aniline hydrochloride in the presence of iron or copper to 180°-$200^{o}C$. Sulphonate the product and subsequently convert the derivatives to the sodium salt

Discoverer: Coupier, 1867

Reactions to reagents: soluble in water (bluish violet); soluble in ethanol (blue); conc. H_2SO_4--blue; on dilution, violet and ppt.; aqueous solution + NaOH--brownish violet ppt.

Dyeing: wool
Method: 3
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) --

Dyeing other fibers: silk (with broken degumming liquor)

Printing: --

Toxicity Information: Source: (CCC), Caracid Nigrosine B R Conc.," 5/15/86.
Hazardous decomposition products not available.
Ingestion: Induce vomiting and seek immediate medical attention.

Common name: Nigrosine Water Soluble
Color Index Name: Acid Black 2
C.I. 50420

Hue: daylight: black
tungsten: no change

Fastness Properties:

Method:	ISO(silk)
Light: 1/3, 1/2 normal:	-
normal:	5
2X normal:	-
Milling: alkaline:	
Alteration:	3
Staining:	-
Milling: acid:	
Alteration:	-
Staining:	-
Peroxide Bleaching:	
Alteration:	3
Staining:	-
Perspiration:	4
Potting:	
Alteration:	-
Staining:	-
Seawater:	
Alteration:	4
Staining:	-
Stoving:	3
Washing:	
Alteration:	4
Staining:	-

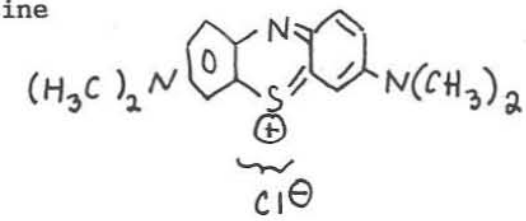
Other Properties:
Dischargeability: --
Effect of Metals:
Copper: --
Chromium: --
Iron: --

Non-textile Usage: paper, leather, anodized aluminum, inks, soap

Common Name: Methylene Blue
Color Index Name: Basic Blue 9
C.I. 52015

Chemical Class: thiazine

Structure:



Synthesis: Convert n,n-dimethyl-p-phenylenediamine by treatment with dichromate in the presence of sodium thiosulfate (preferably with addition of aluminum sulfate) to the thiosulfonic acid (2-amino-5-dimethyl-aminophenyl thiosulfate), then convert the product with dichromate and n,n-dimethylaniline to the indamine-thiosulfonic acid, cyclize and oxidize with dichromate and copper sulfate (or MnO_2), and isolate as zinc double chloride ($2C_{16}H_{18}N_3SCl$, $ZnCl_2$, H_2O)

Discoverer: Caro, 1876; Hepp, 1882; Ullrich, 1885; Bernthsen, 1887

Reactions to reagents: Soluble in water and less readily soluble in ethanol (blue); conc. H_2SO_4--yellowish green; on dilution, blue; aqueous solution + NaOH--violet and dull violet ppt.

Dyeing: silk or cotton with tannin mordant

Dyeing other fibers: bast fibers, viscose rayon, wool

Printing: direct on cotton and dyeing on discharged tannin mordant

Toxicity Information: Source: (ATL), "Atlantic Methylene Blue 2 B P dr., and 2 B N Liq.," 12/2/85. References (3), 1981, and (4), 1986. Potential mutagenic hazard especially if ingested based on positive Ames Test. May cause nausea. Acute oral toxicity in tests on rats. Combustion will produce carbon dioxide, carbon monoxide. As well oxides of nitrogen an sulfur and acidic and oxidation products of halogens may be produced.
Ingestion: Seek immediate medical attention.

Common name: Methylene Blue
Color Index Name: Basic Blue 9
C.I. 52015

Hue: daylight: greenish blue (silk); bright greenish blue (cotton with tannin mordant)
tungsten: greener and duller (silk); greener (cotton with tannin mordant)

Fastness Properties:

Method:	ISO(silk)	cotton*	wool**
Light: 1/3, 1/2 normal:	1	2	1
normal:	1	3	1
2X normal:	2	4	1-2
Perspiration (alkaline):			
Alteration:	2	1-2	-
Staining:	1	-	-
Washing:			
Alteration:	1	2-3	-
Staining:	2	4-5	-

Other Properties:
Dischargeability: withstands reduction discharge; suitable for illuminated discharges

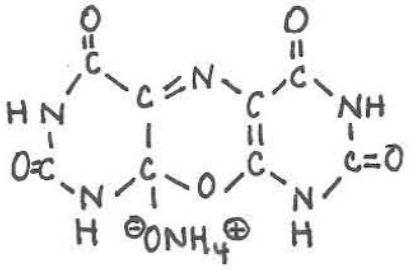
Non-textile Usage: paper, pigments with high MW acids; medicinal; bast fiber; viscose; leather; external drugs and cosmetics; biological stain; distemper; wood stain; solvent dye (see C.I. Solvent Blue 8)

*Notes: cotton tannin mordanted; test based on daylight, using obsolete method. See Colour Index, Vol. IV, second edition, 1956.
**wool also tested with obsolete method, using daylight; results are directly comparable between cotton and wool.

Common Name: Murexide, (Rouge de Naples, Purpuric Acid)
Color Index Name: Mordant Dye
C.I.: 56085

Chemical Class: Aminoketone/ Lactone

Structure:



Synthesis:

a). Heat alloxantin to 100° in an atmosphere of ammonia.
b). Evaporate uric acid with dilute Nitric acid and heat the residue with ammonia.
c). Boil uramil with water, mercuric oxide and ammonia.

Discoverer: Scheele 1776, Prout 1818

Reactions to reagents:

Slightly soluble in cold, very soluble in hot water (wine red).
Soluble in ethanol.
Sulphuric Acid conc.--yellow; on dilution--colorless.

Dyeing:

Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers:

Printing: Formerly used in calico printing.

Hue: daylight:
tungsten:

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name: Murexide
Color Index Name: Mordant Dye
C.I. 56085

Fastness Properties: No listing for AATCC or ISO

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light: 1/3, 1/2 normal:			
normal:			
2X normal:			
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties:

Dischargeability:
Effects of Metals: Copper:
Chromium:
Iron:

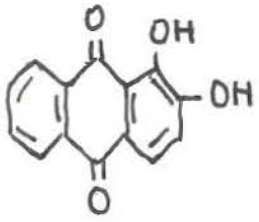
Non-textile Usage:

Notes: No longer produced, Murexide is a classic name.

Common Name: Alizarin
Color Index Name: Mordant Red 11
C.I.: 58000

Chemical Class: Anthraquinone

Structure:



Synthesis: Occurs in the root of the madder plant in combination with 2 mols glucose, called ruberythric acid. Synthesized from 2-anthraquinonesulfonic acid.
Please refer to Colour Index, Vols. 3 & 4, for further information.

Discoverer: Robiquet and Colen (from Madder) 1826.
C. Graebe and C. Lieberman, (Prep. a) 1868.
C. Graebe, C. Lieberman and H. Caro (Prep. b) 1869.
W.H. Perkin (Prep. b) 1869.

Reactions to reagents:

Dyeing: wool
Method: Aluminium or chromium mordant.
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) acetate and silk (Al mordant): Stained.

Dyeing other fibers:
Silk: Al, Cr, or Sn mordant. Cotton: Al, Cr, or Fe mordant.

Printing: Cotton: Al, Cr, Al-oil, or Fe mordant.

Hue: daylight: Dull Bluish Red (Cr mordant)
Red-Bluish Red (Al mordant)
tungsten: Yellower

Toxicity Information: Source: References, (5), 1984, (7), 1971, and (8), 1983.
(No information obtained.)

Common Name: Alizarin
Color Index Name: Mordant Red 11
C.I. 58000

Fastness Properties:

Method:	AATCC*	ISO*	ISO**
Alkali:	3	3	-
Cross Dyeing Wool Acetic/Sulphuric:	3/1	2/1	-/2
Carbonizing:	4	1	-
Chlorination:	-	1	-
Decatising:	5	3	-
Hot Pressing:	dry 2, wet 5	3-4	3
Light: 1/3, 1/2 normal:	6	6-7	6
normal:	7	7	6
2X normal:	7-8	7-8	6-7
Milling (Alkaline):	2-3	3-4	3
Milling (Acid):	-	1	-
Peroxide Bleaching:	4	3	4-5
Perspiration:	4	3	4
Potting:	4-5	2-3	5
Seawater:	4-5	4	-
Stoving:	2	2	-
Washing:	4	4	5
Water:	5	4	5

Other Properties:

Dischargeability: not dischargeable
Effects of Metals: Copper: Duller
Iron: Bluer and duller

Solubility: --

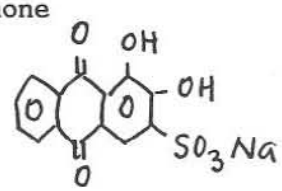
Non-textile Usage: Biological Stain, Indicator (in .05% alcoholic solution; pH yellow 5.5, red 6.8). See C.I. Pigment Red 83.

Notes: * Wool aluminium mordant.
** Silk aluminium mordant.
Fastness on cotton is very dependent on method of application.
Dye was known in ancient Egypt, Persia, and India.

Common Name: Alizarin Red S
Color Index Name: Mordant Red 3
C.I. 58005

Chemical Class: anthraquinone

Structure:



Synthesis: Sulfonate alizarin with fuming sulfuric acid and convert to the sodium salt

Discoverer: C. Graebe and C. Liebermann, 1871

Reactions to reagents: soluble in cellosolve; slightly soluble in acetone, alcohol; conc. H_2SO_4--orange; on dilution, pale yellow

Dyeing: wool
Method: 1,3. Al, Cr, or Sn mordant; with Al or Cr aftertreatment
Levelling: --
SDC migration Test Method/grade: --
Staining (other fiber) Al mordant: acetate and cellulolose unstained; silk, heavily stained; with afterchrome treatment: acetate, slightly stained; cellulose unstained or slightly stained

Dyeing other fibers: silk and nylon (afterchrome)

Printing: wool (with Al or Cr mordant); silk (with Cr mordant); vigoureux printing

Toxicity Information: Source: (CCC), "Carochrome Red S," (n.d.).
Acute oral toxicity (LD/50) 5,000 mg/kg tested in rats. Slight eye irritation when tested on rabbits.
Splashes in eye should be treated promptly by irrigation with clean water.

Common name: Alizarin Red S
Color Index Name: Mordant Red 3
C.I. 58005

Hue: daylight: bright yellow red (Al mordant); dull bluish red (Cr)
tungsten: no change

Fastness Properties:

Method:	AATCC(wool)	ISO(silk)
Alkali	3-4	-
Carbonizing	2-3	-
Decatising:	3	-
Light: 1/3, 1/2 normal:	5	4-5
normal:	6-7	5-6
2X normal:	7	6
Milling: alkaline:		
Alteration:	3	2-3
Staining:	-	-
Milling: acid:		
Alteration:	-	-
Staining:	-	-
Peroxide Bleaching:		
Alteration:	2	3-4
Staining:	-	-
Perspiration:	5	3
Potting:		
Alteration:	3	-
Staining:	-	-
Seawater:		
Alteration:	5	-
Staining:	-	-
Stoving:	4-5	3
Washing:		
Alteration:	4	3
Staining:	-	-

Other Properties:

Dischargeability: poor
Effect of Metals:
Copper: bluer
Chromium: --
Iron: duller

Non-textile Usage: drugs and cosmetics; indicator; lakes; microscopic stain

Common Name: Alizarin Red PS
Color Index Name: Mordant Dye (Pigment Red 84)
C.I.: 58210

Chemical Class: Anthraquinone (Aluminium Salt of Acid Dye)

Structure:

Synthesis:

A). Treat purpurin with sodium sulfite under pressure in presence of manganese dioxide.

B). Treat C.I. 58005 with nitric and sulfuric acid and convert to the sodium salt.

Discoverer: MBL 1886

Reactions to reagents:

Sulphuric acid conc. reddish orange; on dilution--unaltered.

Dyeing:

Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers:

Printing:

Hue: daylight: bright
tungsten: bluish red

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name: Alizarin Red PS
Color Index Name: Mordant Dye (Pigment Dye 84)
C.I. 58210

Fastness Properties:

Method:		AATCC	ISO
Alkali:			
Carbonizing:			
Chlorination:	alteration:		
	staining:		
Decatising:			
Light: 1/3, 1/2 normal:		(manufacturers fastness	
normal:		tests indicate, v. good)	
2X normal:			
Milling (Alkaline):	alteration:		
	staining:		
Milling (Acid):	alteration:		
	staining:		
Peroxide Bleaching:	alteration:		
	staining:		
Perspiration:			
Potting:	alteration:		
	staining:		
Seawater:	alteration:		
	staining:		
Stoving:			
Washing:	alteration:		
	staining:		

Other Properties:

Dischargeability:
Effects of Metals: Copper:
Chromium:
Iron:

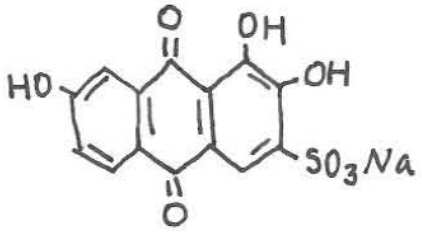
Non-textile Usage: Lacquers (but does not withstand high temperatures); also paints and printing inks (the Chromium Salt is bordeaux).

Notes:
-Insolvent to orgainic solvents such as: cellosolve, ethanol, NC Solvents, Xylene, water, linseed oil, and oleic acid.
-Poor solvency in 5% hydrochloric acid, and 5% sodium sulphite.
-Heat: Stable to 120° C.
-Slight soap gel bleeding.

Common Name: Alizarin Red SS
Color Index Name: Mordant Red 2
C.I.: 58260

Chemical Class: Anthraquinone

Structure:



Synthesis:
Sulfonate anthrapurpurin (C.I. 58255) and convert to the sodium salt.

Discoverer: MLB 1886

Reactions to reagents:
Slightly soluble in alcohol.
Sulphuric Acid conc.--yellowish red; on solution-light yellow.

Dyeing: wool
Method: 3
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate: Unstained
cellulose: Slightly stained
silk: Heavily stained

Dyeing other fibers: --

Printing: Cotton: Aluminium or chromium mordant.

Hue: daylight: dull red
tungsten: yellower

Toxicity Information: Source: Reference (6), 11/9/87.
(No information obtained).

Common Name:	Alizarin Red SS
Color Index Name:	Mordant Red 2
C.I.	58260

Fastness Properties: No listing for ISO

Method:		AATCC	ISO
Alkali:		3	
Carbonizing:		4	
Chlorination:	alteration:	-	
	staining:	-	
Decatising:		-	
Hot Pressing:	Dry:	2	
	Wet:	5	
Light: 1/3, 1/2 normal:		-	
normal:		7	
2X normal:		-	
Milling (Alkaline):		3	
Milling (Acid):		-	
Peroxide Bleaching:		3	
Perspiration:		4	
Potting:		4-5	
Seawater:		5	
Stoving:		2	
Washing:		4	
Water:		5	

Other Properties:

Dischargeability: --

Effects of Metals: Copper: --

Iron: --

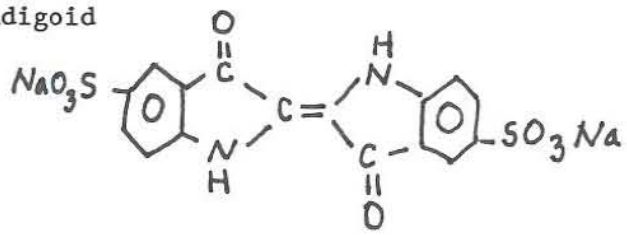
Non-textile Usage:

Notes: Cross dyeing wool acetic/sulphuric.

Common Name: Indigo Carmine
Color Index Name: Acid Blue 74
C.I.: 73015

Chemical Class: Indigoid

Structure:



Synthesis: Sulfonate indigo with concentrated or slightly fuming sulphuric acid.

Discoverer: Barth 1740

Reactions to reagents:
Soluble in water (blue). Slightly soluble in ethanol.
Sulphuric Acid conc.--deep bluish violet; on dilution--blue.
Aqueous solution and Sodium Hydroxide--green to yellowish green.

Dyeing: wool
Method: 3
Levelling: --
SDC migration Test Method/grade: I/4
Staining (other fiber)
acetate and cellulose: --Unstained to slightly stained
nylon-Heavily stained.

Dyeing other fibers: silk: formic or sulphuric acid

Printing: Direct on wool and nylon.

Hue: daylight: greenish blue
tungsten: somewhat greener

Toxicity Information: Source: Reference (6), 11/9/87.
This chemical reduced red blood cell count in pigs fed 1350 mg/kg bw/day. No estrogenic acitity in rats and no sensitization acitity in guines pigs in short-term studies. Limited evidence forcarcinogenicity in experimental animals. The World Health Organization recommended that this dye be accepted for human consumption pending further studies.

Common Name:	Indigo Carmine
Color Index Name:	Acid Blue 74
C.I.	73015

Fastness Properties:

Method:		AATCC	ISO
Alkali:		1	2-3
Carbonizing:		4	3-4
Chlorination:	alteration:	-	3
	staining:	-	5
Decatising:		3-4	4
Light: 1/3, 1/2 normal:		1	1
normal:		1	1-2
2X normal:		2	2-3
Milling (Alkaline):	alteration:	1	1
	staining:	1	1
Milling (Acid):	alteration:	-	1-2
	staining:	-	1-2
Peroxide Bleaching:	alteration:	1	1
	staining:	1	2
Perspiration:		1	2
Potting:	alteration:	-	1
	staining:	-	1
Seawater:	alteration:	2	2
	staining:	2	1
Stoving:		3	4
Washing:	alteration:	3	2
	staining:	5	4

Other Properties:

Dischargeability:	poor	
Effects of Metals:	Copper:	little greener & duller
	Chromium:	--
	Iron:	duller

Non-textile Usage:

Biological stain, cosmetics, indicator.
See C.I. Food Blue 1. See Leather Dyes section.

Notes: The C.I. Pigment Blue 63 is the aluminium salt.
The aluminium salt is used for coloring pharmaceuticals.

Common Name: Prussian Blue
Color Index Name: Pigment Blue 27
C.I.: 77510/77520

Chemical Class: Inorganic Pigment

Structure: Ferric Ferrocyanide.

$$Fe_4^{III}[Fe^{II}(CN)_6]_3 \cdot XH_2O$$

or

$$Fe^{III}[Fe^{II}Fe^{III}(CN)_6]_3 \cdot XH_2O$$

Synthesis:

1). Precipitate solution of ferrous salt with potassium ferrocyanide, wash the white precipitate of ferrous ferrocyanide and oxidize, e.g. with sulphuric and nitric acids or ferric sulfate. When fully oxidized, wash until neutral and dry at moderate temperature.

2). Run ferous sulfate solution into aqueous sodium or potassium ferrocyanide. Oxidize the pale blue precipitate to Prussian Blue with sulphuric acid and sodium chlorate, wash free of acid and dry. This method gives better control of the oxidation and of particle size which in turn determines the tone and bronziness of the product.

3). Precipitate a solution of potassium ferrocyanide with a ferrous salt.

Discoverer: The earliest of the modern synthetic pigments being first made by Diesbach in 1704.

Reactions to reagents:

Decomposed by alkalis to give brown ferric oxide. Unaltered by dilute mineral acid. Aqueous suspension turned green by chlorine but goes blue again on washing with water. Dissolves to blue solution in oxalic acid but reprecipitated suddenly on exposure to sunlight. Dissolves to colorless solution in alcoholic hydrochloric acid.Gives a white paste with sulphuric acid which turns blue on dilution. Insoluble in organic solvents and water. Unaltered by 5% hydrochloric acid. Insoluble in linseed oil and oleic acid. There is no soap gel bleeding (but becomes brown).

Dyeing:

Method:
Levelling:
SDC migration Test Method/grade:
Staining (other fiber) acetate and cellulose:

Dyeing other fibers:

Printing:

Hue: daylight:
tungsten:

Common Name:	Prussian Blue
Color Index Name:	Pigment Blue 27
C.I.	77510/77520

Toxicity information: Source: (ATL), "Atlantic Soluble Blue P," 3/10/86. Combustion will produce carbon dioxide, carbon monoxide. Oxides of nitrogen and ammonia gas may also be produced. Ingestion or inhalation: Seek immediate medical attention.

Fastness Properties:

Method:			AATCC	ISO
Alkali:				
Carbonizing:				
Chlorination:		alteration:		
		staining:		
Decatising:				
Light:	1/3, 1/2 normal:		Excellant fastness to light.	
	normal:			
	2X normal:			
Milling (Alkaline):		alteration:		
		staining:		
Milling (Acid):		alteration:		
		staining:		
Peroxide Bleaching:		alteration:		
		staining:		
Perspiration:				
Potting:		alteration:		
		staining:		
Seawater:		alteration:		
		staining:		
Stoving:				
Washing:		alteration:		
		staining:		

Non-textile Usage: Printing inks, paints, and alkyd resin enamels, paper coating and staining,linoleum, carbon papers, typewriter ribbons, and NC lacquers. Some use in rubber, plastics, and artists' colors.

Notes: In commercial products potassium or sodium is also present so that the blues are described commercially as potassium, sodium or ammonium blues. Milori Blue is lighter in hue and softer in texture. Gas Blues are made directly from gas liquors instead of crystallized ferrocyanide. Chinese Blue is considered the finest grade, and has a greenish undertone whereas ordinary Prussian Blue has a violet undertone. Bronze Blue shows a bronzy sheen when viewed from a certain angle (mostly used in printing inks). Steele Blue is a greenish variety. Antimony Blue is formed by adding dilute aqueous potassium ferrocyanide to a clear solution of antimony in aqua regia.