TRIARYLMETHANE COLOURING MATTERS

The chromophore of this class is the quinonoid grouping, which may appear as $\overset{\diagdown}{\underset{\diagup}{C}}$=Ar=NH (as in Baeyer's fuchsonimine) or $\overset{\diagdown}{\underset{\diagup}{C}}$=Ar=O (as in Baeyer's fuchsone) (Ar=aromatic nucleus). Two aryl groups attached to the methane C-atom complete the chromogen, the dyes being formed by the introduction of two or three auxochromes, usually in *para*-position to the methane C-atom.

The introduction of a carboxyl group in *ortho*-position to a hydroxyl group confers mordant dyeing properties, while the introduction of sulfonic acid groups converts the basic dyes into acid dyes. When a sulfonic acid group is in *ortho*-position to the methane C-atom, the dye possesses enhanced fastness to alkali.

This class is one of the largest groups of synthetic dyes. It has been arranged according to constitution into six sub-groups, viz.

(*a*) Diamino derivatives of Triphenylmethane (C.I.42000–42175)
(*b*) Triamino derivatives of Triphenylmethane (C.I.42500–42800)
(*c*) Aminohydroxy derivatives of Triphenylmethane (C.I.43500–43570)
(*d*) Hydroxy derivatives of Triphenylmethane (C.I.43800–43875)
(*e*) Derivatives of Diphenylnaphthylmethane (C.I.44000–44100)
(*f*) Miscellaneous Triarylmethane derivatives (C.I.44500–44535)

Typical preparative methods are — (1) the condensation of benzaldehyde (or a substituted benzaldehyde) with arylamines or phenolic compounds, (2) the condensation of Michler's hydrol, or an analogue, with an arylamine or phenol (or naphthol) and (3) the condensation of Michler's ketone, or an analogue, with an amine in the presence of phosphorus oxychloride or thionyl chloride. The mechanism of formation of leuco-triarylmethane dyes by preparation (1) above is a two-step process, viz. (i) an aldol condensation between an aryl aldehyde and 1 mol. of an arylamine, and (ii) elimination of water between the aldol and a second mol. of an amine. The resulting leuco-compound is then oxidised to the dye which is isolated as a salt. In both preparations the amines used may be alike or different; the resulting combinations are very numerous.

Dyes of the triarylmethane class, usually reds, violets, blues or greens, are characterised by high tinctorial power and brilliant hue but generally possess only moderate fastness to light. The class includes basic, acid, direct, mordant, cosmetic and solvent dyes together with pigments of phosphomolybdotungstic acid lake type.

References

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Schwarzenbach, *Helv. Chim. Acta*, **20** (1937), 490
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Davies and Hodgson, *JSDC*, **59** (1943), 196
Venkataraman, *The Chemistry of Synthetic Dyes*, Academic Press, New York, 1952
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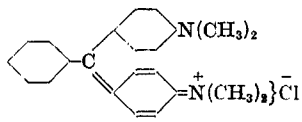
TRIPHENYLMETHANE, DIPHENYLNAPHTHYLMETHANE, AND MISCELLANEOUS TRISUBSTITUTED METHANE COLOURING MATTERS

(*a*) Diamino derivatives of Triphenylmethane

42000 **C.I. Basic Green 4** (*Bright bluish green*)
42000:1 (**C.I. Solvent Green 1**) is the free base
42000:2 (**C.I. Pigment Green 4**) is the phosphotungstomolybdic acid salt

Classical name **Malachite Green**



Oxalate — $2C_{23}H_{25}N_2 + 3C_2H_2O_4$
Zinc Double Chloride — $3C_{23}H_{25}N_2Cl.2ZnCl_2.2H_2O$

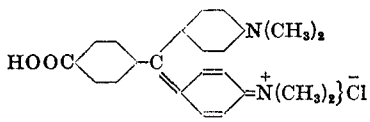
(*a*) Condense benzaldehyde (1 mol.) with *N*,*N*-dimethylaniline (2 mol.) in presence of hydrochloric or sulfuric acid, and oxidise the product with lead peroxide and acid

(*b*) Heat *N*,*N*-dimethylaniline with α,α,α-trichlorotoluene

Soluble in cold and hot water (blue green); very soluble in ethanol (blue green)
H_2SO_4 conc. — yellow; on dilution — dull orange
Aqueous solution + NaOH — greenish white ppt.

Discoverer — O. Fischer 1877
Agfa, *BP* 828/78; *USP* 222257; *FP* 123187, 144169; *GP* 4322, 18959, 23775, (*Fr.* **1**, 40, 41, 43)
Bayer Co., *BP* 1976/78
M.L.B., *BP* 4762/79; *FP* 133704; *GP* 11412 (*Fr.* **1**, 64)
Espenscheid, *GP* 14621 (*Fr.* **1**, 68)
Badische Co., *BP* 4850/84, 5038/84; *FP* 160090; *GP* 27789 (*Fr.* **1**, 80)
Wieland, *GP* 308298 (*Fr.* **13**, 340)
Dicks, David, & Heller Co., *USP* 1483233
FIAT 1313, **2**, 329
FIAT 764 — Malachitgruen BXN
O. Fischer, *Ber.* **10** (1877), 1625; **11** (1878), 950; **14** (1881), 2520; *Ann.* **206** (1881), 129
E. and O. Fischer, *Ber.* **11** (1878), 1081; **12** (1879), 791, 796, 2348
Doebner, *Ber.* **11** (1878), 1236, 2274; **12** (1879), 1010; **13** (1880), 2222; *Ann.* **217** (1883), 250
Lambrecht & Weil, *Ber.* **37** (1904), 3058; **38** (1905), 270
Schmidlin, *Compt. rend.* **139** (1904), 676
Nölting & Philipp, *Ber.* **42** (1908), 3910
Sidgwick & Moore, *JCS*, **95** (1909), 889
Wieland, *Ber.* **52** (1919), 880
Lowy & Haux, *Am. Electrochem. Soc.* 1921, 991
Kober, *Ind. Eng. Chem.* **15** (1923), 837
Chamberlain & Dull, *JACS*, **50** (1928), 3088
Tomioka, *JSCI, Japan*, **34** (1931), 176B
Dilthey, Brandt, Braun, & Schommer, *J. prakt. Chem.* **134** (1932), 188
Michaelis & Granick, *JACS*, **67** (1945), 1212

42005 **C.I. Mordant Green 13**

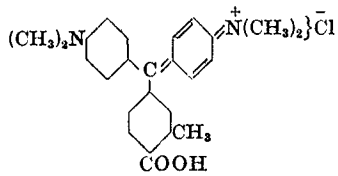


Condense 4,4′-bis(dimethylamino)benzhydrol with benzoic acid and oxidise the product with lead peroxide and acid

Discoverer — F. Runkel 1890
Bayer Co., *BP* 14621/90; *USP* 501104; *FP* 208330; *GP* 60606 (*Fr.* **3**, 125)
FDX 885 — Chromgruen BD

Soluble in water (greenish blue)
Soluble in ethanol (bluish green)
H_2SO_4 conc. — yellowish orange; on dilution — unaltered
Aqueous solution + NaOH — decolorised to faint blue

42010 **C.I. Mordant Green 23** (*Bright green*)

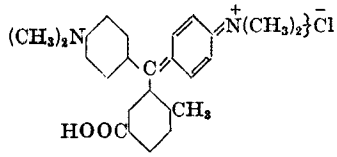


Condense 4,4′-bis(dimethylamino)benzhydrol (1 mol.) with *o*-toluic acid (1 mol.) and oxidise the product with lead peroxide in acetic-hydrochloric acid

Discoverer — F. Runkel 1890
Bayer Co., *BP* 14621/90; *USP* 501104; *FP* 208330; *GP* 60606 (*Fr.* **3**, 125)
FIAT 764 — Chromgruen GD ex.

Soluble in water (turquoise blue)
Soluble in ethanol (green)
H_2SO_4 conc. — yellow to golden yellow; on dilution — golden yellow
Aqueous solution + NaOH — decolorised to light green

42015 **C.I. Mordant Blue 52** (*Greenish blue*)

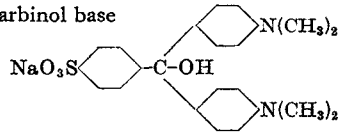


Condense 4,4′-bis(dimethylamino)benzhydrol with *p*-toluic acid, and oxidise the product with lead peroxide–hydrochloric acid

Discoverer — F. Runkel 1896
Bayer Co., *BP* 14621/90; *USP* 501104; *FP* 208330; *GP* 60606 (*Fr.* **3**, 125), 90881 (*Fr.* **4**, 211)
BIOS 1433, 131. *FIAT* 1313, **2**, 366
FIAT 764 — Chromtuerkisblau B

Soluble in water (pure blue to turquoise blue)
Soluble in ethanol (turquoise blue)
H_2SO_4 conc. — yellow to citron yellow; on dilution — moderate green
Aqueous solution + NaOH — decolorised to pale yellow brown

42020 Acid Dye



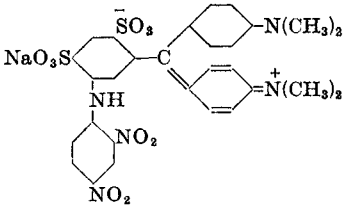
(*a*) Sulfonate **Malachite Green (C.I.42000)**

(*b*) Sulfonate leuco **Malachite Green**, oxidise the sulfonic acid formed, and convert into the sodium salt

Discoverers — Agfa 1878; Bindschedler and Busch 1879
Agfa, *BP* 4406/78; *FP* 127298; *GP* 6714 (*Fr.* **1**, 117)
Bindschedler & Busch, *BP* 2509/79; *FP* 131325; *GP* 10410, 14944, (*Fr.* **1**, 118, 118)
Chem. Ind. **3** (1880), 256

Soluble in water (blue green)
Slightly soluble in ethanol
H_2SO_4 conc. — yellow; on dilution — green
Aqueous solution + NaOH — colourless

42021 Acid Dye (*Bluish green*)

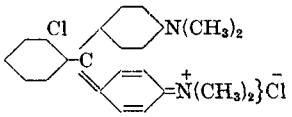


Preparation as for **C.I.42050** but with *N,N*-dimethyl- instead of *N,N*-diethylaniline

Discoverer — A. Hausdörfer 1905
Alkali Fast Green 3B (By)
Dyes wool and silk in presence of sulfuric acid in bluish green shades
Fastness Properties (C): Light 3, Alkaline Milling 2–3, Perspiration 2–3, Washing 3
Patents as for **C.I.42050**

42025 C.I. Basic Blue 1 (*Bright bluish green → Bright greenish blue*)

42025:1 (**C.I. Pigment Blue 9**) is the phosphotungstomolybdic acid salt



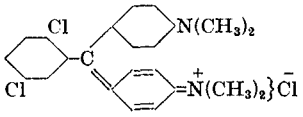
Condense *o*-chlorobenzaldehyde with *N,N*-dimethylaniline and oxidise the product with lead peroxide and acid

[*Note* — *m*- and *p*-chlorobenzaldehydes give dyes of no value]

Discoverers — Sandmeyer and Schmid 1896
Geigy, *GP* 94126 (*Fr.* **4**, 189)
BIOS 1088, 122; *BIOS* 1157, 53; *BIOS-MISC.* 20, Appendix 37; *FIAT* 1313, **2**, 333
FDX 885
FIAT 764 — Astrazonblau G, Rhodulinblau 6G
Nölting & Philipp, *Ber.* **41** (1908), 3911
Briggs, *JSDC*, **37** (1921), 291

Soluble in cold and hot water (green blue)
Soluble in ethanol (green blue)
H_2SO_4 conc. — red yellow; on dilution — yellow to green with yellow green ppt.
Aqueous solution + NaOH — blue black ppt. changing to red brown

42030 Basic Dye



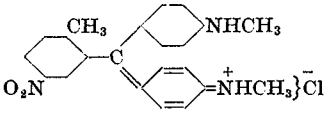
Condense 2,5-dichlorobenzaldehyde with *N,N*-dimethylaniline and oxidise the product

Discoverers — Bindschedler and Busch 1883
Victoria Green 3B (B)
Bindschedler & Busch, *BP* 251511; *USP* 1588052; *FP* 603650; *Sw.P* 116995, addn. 118627/629; *GP* 25827 (*Fr.* **1**, 42), 432427 (*Fr.* **15**, 442)
FIAT 764 — Viktoriagruenbase

Slightly soluble in cold, readily soluble in hot water (green blue)
H_2SO_4 conc. — yellow; on dilution — yellow green
Aqueous solution + NaOH — reddish yellow solution with ppt.

42035 Basic Dye

Zinc double chloride of

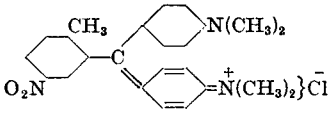


Oxidise **C.I.42036** with lead peroxide in acetic acid, whereby one or two methyl groups are removed, and isolate the dye as the zinc double chloride

Discoverers — F. Runkel and F. Reingruber 1891
Turquoise Blue BB (By)
Bayer Co., *USP* 541572; *GP* 63743 (*Fr.* **3**, 128)

42036 Basic Dye

Zinc double chloride of



Condense 4,4′-bis(dimethylamino)benzhydrol with *p*-nitrotoluene and oxidise the product

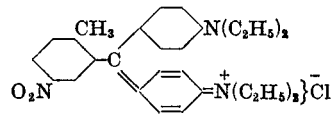
Discoverer — F. Runkel 1891
Turquoise Blue G (By)
Bayer Co., *USP* 541572; *GP* 63743 (*Fr.* **3**, 128)
FIAT 764 — Tuerkisblau G

Soluble in water (blue)
Soluble in ethanol (greenish blue)
H_2SO_4 conc. — golden yellow; on dilution — greenish yellow
Aqueous solution + NaOH — brown to violet brown ppt.

42037 Basic Dye

Turquoise Blue B (By)

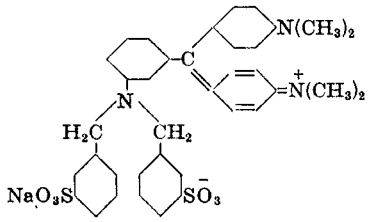
Zinc double chloride of



Condense 4,4′-bis(diethylamino)benzhydrol with *p*-nitrotoluene and oxidise the product

Soluble in water (blue)

42038 C.I. Acid Green 11 (*Bright bluish green*)



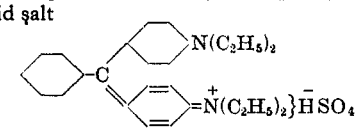
Condense *m*-nitrobenzaldehyde with *N,N*-dimethylaniline, reduce the nitro group and dibenzylate, then disulfonate, oxidise, and convert the product to the sodium salt

Discoverer — H. Hassenkamp 1885
Bayer Co., *BP* 15337/85; *FP* 176847; *GP* 37067 (*Fr.* **1**, 120)
FIAT 764 — Echtgruen blaeulich
JSDC, **6** (1890), 32; **9** (1893), 127
von Perger, *Mitt. Gew. Mus.* (1891), 202; cf. *JSCI*, **11** (1892), 30
Blangey, Fierz-David & Stamm, *Helv. Chim. Acta*, **25** (1942), 1162

Slightly soluble in cold, very soluble in hot water (bluish green)
Soluble in ethanol
H_2SO_4 conc. — yellowish red; on dilution — colourless to greenish blue
Aqueous solution + NaOH — colourless on heating

42040 C.I. Basic Green 1 (*Bright green*)

42040:1 (C.I. Pigment Green 1) is the phosphotungstomolybdic acid salt



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

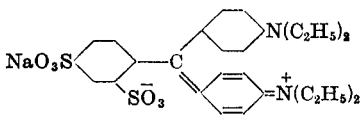
Discoverers — Bindschedler and Busch 1879
FIAT 1313, **2**, 328
Doebner, *Ber.* **13** (1880), 2229
O. Fischer, *Ber.* **14** (1881), 2521
Mühlhäuser, *Dingl.* **263** (1887), 260
Hannay, *JSDC*, **31** (1915), 248, 451
Fierz-David, *Künstliche Organische Farbstoffe* (1926), 229

Soluble in cold and hot water (green)
Very soluble in ethanol (green)
H_2SO_4 conc. — yellow; on dilution — green
Aqueous solution + NaOH — pale green ppt.

42045 C.I. Acid Blue 1 (*Bright greenish blue*)

C.I. Food Blue 3 (*Bright blue*)

42045:1 is the aluminium salt, used in pharmaceuticals

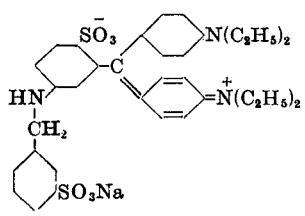


Condense 4-formyl-*m*-benzenedisulfonic acid with *N,N*-diethylaniline, oxidise and convert the product into the sodium salt. **Patent Blue VF Special** is the free acid

Discoverer — Steiner 1902
Sandoz, *BP* 18255/02; *USP* 731139; *FP* 320621 and addns.; *GP* 154528 (*Fr.* **7**, 108)
BIOS 1433, 25, 28
FIAT 1313, **2**, 352
FIAT 764 — Patentblau VF and neu
Holmes, *Ind. Eng. Chem.* **15** (1923), 833; cf. *JSDC*, **39** (1923), 354

Very soluble in cold and hot water (blue)
Soluble in ethanol (blue)
H_2SO_4 conc. — mustard yellow; on dilution — golden yellow
Aqueous solution + NaOH — blue; violet on boiling

42046 C.I. Acid Green 13 (*Bluish green*)

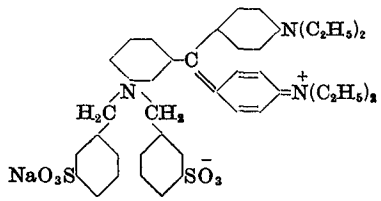


Condense *m*-nitrobenzaldehyde (1 mol.) with *N,N*-diethylaniline (2 mol.) in sulfuric acid, reduce, monobenzylate the amine formed, disulfonate with oleum, and oxidise with lead peroxide

Discoverer — H. Hassenkamp 1885
Fast Light Green (By)
Bayer Co., *BP* 15337/85; *FP* 176847; *GP* 37067 (*Fr.* **1**, 120)
Blangey, Fierz-David & Stamm, *Helv. Chim. Acta*, **25** (1942), 1162
FIAT 764 — Echtlichtgruen

Very soluble in water (turquoise blue)
Soluble in ethanol (turquoise blue)
H_2SO_4 conc. — olive yellow; on dilution — medium green
Aqueous solution + NaOH — unchanged

42047 C.I. Acid Green 14 (*Green*)

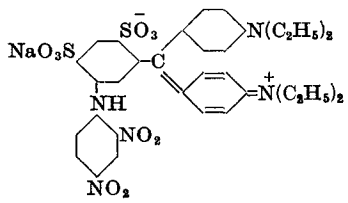


Condense *m*-nitrobenzaldehyde (1 mol.) with *N,N*-diethylaniline (2 mol.), reduce, dibenzylate the amine formed, disulfonate, and oxidise the product with lead peroxide

Discoverer — H. Hassenkamp 1885
Fast Green CR (By)
Bayer Co., *BP* 15337/85; *FP* 176847; *GP* 37067 (*Fr.* **1**, 120)
FIAT 764 — Echtgruen CR

Very soluble in water (bluish green)
Soluble in ethanol (blue green to turquoise blue)
H_2SO_4 conc. — yellow to citron yellow; on dilution — pale citron yellow
Aqueous solution + NaOH — pale blue green and ppt.

42050 C.I. Acid Green 8 (*Bright green*)



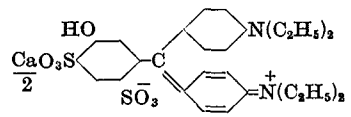
Condense *m*-nitrobenzaldehyde (1 mol.) with *N,N*-diethylaniline (2 mol.), reduce, condense the product with 1-chloro-2,4-dinitrobenzene, disulfonate with oleum, and oxidise with dichromate-oxalic acid

[3BX brand is a by-product and probably mainly a trisulfonic acid]

Discoverer — A. Hausdörfer 1905
Bayer Co., *FP* 193554; *GP* 63026, 66791, (*Fr.* **3**, 154, 155)
FIAT 764 — Alkaliechtgruen 3BX, Alkaliechtgruen BBF

Very soluble in water (bluish green)
Very soluble in ethanol (bluish green)
H_2SO_4 conc. — pale citron yellow; on dilution — deeper citron yellow
Aqueous solution + NaOH — dirty blue green with ppt.

42051 C.I. Acid Blue 3 (*Bright greenish blue*) C.I. Food Blue 5 (*Bright blue*)



(*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

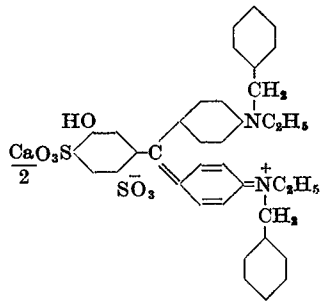
(*b*) Condense *m*-hydroxybenzaldehyde with *N,N*-diethylaniline (2 mol.), disulfonate, convert to calcium salt and oxidise

Discoverer — Hermann 1888
M.L.B., *BP* 12796/88, 14822/88; *USP* 412613, 412614, 412615; *FP* 192743, 192807, 193554; *GP* 46384, 48523, 50286, 50293, 50440, 55621, (*Fr.* **2**, 31, 39, 37, 41, 43, 44), 63026, 66791, 71156, 74014, (*Fr.* **3**, 154, 155, 159, 160)
National Aniline, *USP* 1478015, 1509413
BIOS 1433, 25
FIAT 764 — Patentblau V
Knecht, *JSDC*, **5** (1889), 106
Lehne, *Farben-Z.* **1** (1890), 10
Sandmeyer, *JSDC*, **12** (1896), 154
E. and H. Erdmann, *Ann.* **294** (1897), 376
Sisley, *Rev. gén. Mat. col.* **6** (1902), 57
Holmes, *Ind. Eng. Chem.* **15** (1923), 354

H_2SO_4 conc. — brown-olive yellow; on dilution — deep yellow then green
Aqueous solution + NaOH — unaltered cold, deep violet hot

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

42052 C.I. Acid Blue 5 (*Bright greenish blue*)

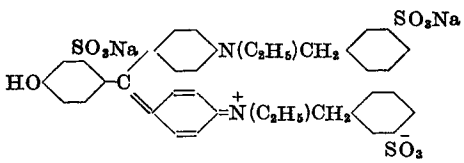


Condense *m*-hydroxybenzaldehyde with *N*-ethyl-*N*-phenylbenzylamine (2 mol.), disulfonate the product, oxidise, and isolate as the calcium salt

Discoverer — Hermann 1888
M.L.B., *BP* 12796/88, 14822/88; *USP* 422018; *FP* 192743; *GP* 46384 (*Fr.* **2**, 31)
See also patents under **C.I.42051**
Holmes, *Ind. Eng. Chem.* **15** (1923), 833

Soluble in water (greenish blue)
Soluble in ethanol (bright green)
H_2SO_4 conc. — pale dull yellow; on dilution — blue green with ppt.
Aqueous solution + NaOH — unaltered cold, violet and ppt. hot

42053 C.I. Food Green 3 (*Bluish green*)



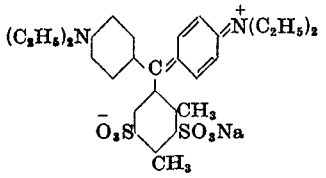
Condense *p*-hydroxybenzaldehyde with *N*-ethyl-*N*-phenylbenzylamine (2 mol.), trisulfonate the product, oxidise, and isolate as sodium salt

Discoverer — Warner–Jenkinson Manufacturing Co.
Ind. and Eng. Chem. **19** (1927), 497
Am. J. Pharm. Sept. 1942, p. 338
(See also *Coal-tar Color Regulations*, U.S. Food and Drug Administration, Sept. 1940, p. 5)

Very soluble in water (bluish green)
Soluble in ethanol (bluish green)
H_2SO_4 conc. — dull orange; on dilution — dull green
HCl conc. — orange
HNO_3 conc. — orange
10% aqueous NaOH — bright blue

42055 C.I. Acid Green 7 (*Bright bluish green*) C.I. Solvent Green 15 (*Bright green*)

FIAT 764 — Guineaechtgruen B (50)

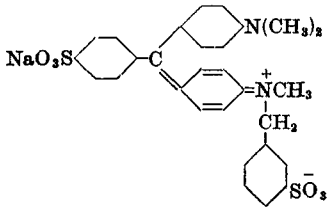


Condense 4,4′-bis(diethylamino)benzhydrol with 2,4-xylenesulfonic acid, sulfonate, and oxidise with dichromate

Very soluble in water
Soluble in ethanol

42060 Acid Dye

Discoverer — Bayer Co.
Acid Green BB extra (By)
Dyes wool in presence of sulfuric acid

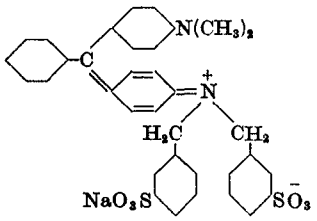


Condense benzaldehyde with *N*,*N*-dimethylaniline (1 mol.) and *N*-methyl-*N*-phenylbenzylamine (1 mol.), sulfonate the product with oleum to the disulfonic acid, and oxidise with lead peroxide

Very soluble in water (turquoise blue)
Slightly soluble in ethanol (blue green)
H_2SO_4 conc. — golden yellow; on dilution — pale yellow green
Aqueous solution + NaOH — decolorised

42065 Acid Dye

Discoverer — Bayer Co. 1883
Acid Green 6B (By)
Dyes wool in presence of sulfuric acid

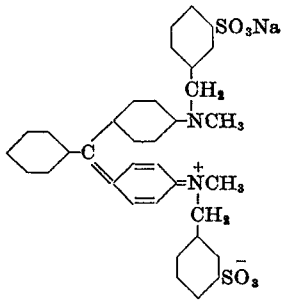


Condense benzaldehyde (1 mol.) with *N*,*N*-dimethylaniline (1 mol.) and *N*-phenyldibenzylamine (1 mol.), disulfonate the product with oleum, and oxidise with dichromate–oxalic acid

Very soluble in water (greenish blue)
Slightly soluble in ethanol (pale blue green)
H_2SO_4 conc. — yellow brown; on dilution — pale green
Aqueous solution + NaOH — decolorised to pale brown

42070 Acid Dye

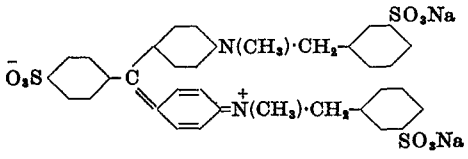
Discoverer — Bayer Co.
Acid Green 3B (By)
Dyes wool in presence of sulfuric acid



Condense benzaldehyde (1 mol.) with α-(*N*-methylanilino)-*m*-toluenesulfonic acid (2 mol.), and oxidise the product with dichromate–oxalic acid

42075 C.I. Acid Green 6 (*Bright green*)

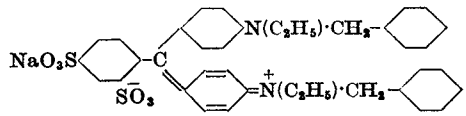
Discoverer — Köhler 1879
Light Green SF (Bluish) (IG)
FDX 885 — Lichtgruen SF bläul.
For an analogous preparation see:
FIAT 764 — Lichtgruen SF gelbl.
P. Mayer, *Zeit. Mikrosh.* **34** (1918), 317



Condense benzaldehyde with α-(*N*-methylanilino)-*m*-toluenesulfonic acid, sulfonate, oxidise the product, and convert to the sodium salt

Very soluble in water (blue green)
Almost insoluble in ethanol (green)
H_2SO_4 conc. — golden yellow; on dilution — green
Aqueous solution + NaOH — colourless with dull violet ppt.

42080 C.I. Acid Blue 7 (*Bright greenish blue*)

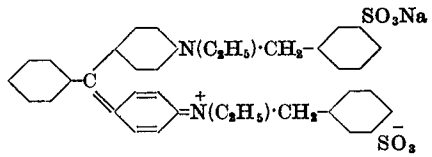


Condense 4-formyl-*m*-benzenedisulfonic acid with *N*-ethyl-*N*-phenylbenzylamine

Discoverer — Steiner 1902
Sandoz, *BP* 18255/02; *USP* 731139; *FP* 320621 and addns.; *GP* 154528 (*Fr.* **7**, 108)
BIOS 1433, 22
Holmes, *Ind. Eng. Chem.* **15** (1923), 833

Very soluble in cold and hot water (blue)
Soluble in ethanol (blue)
H_2SO_4 conc. — olive; on dilution — yellow
Aqueous solution + NaOH — blue turning to violet on boiling

42085 C.I. Acid Green 3 (*Bright green*) C.I. Food Green 1 (*Bright bluish green*)



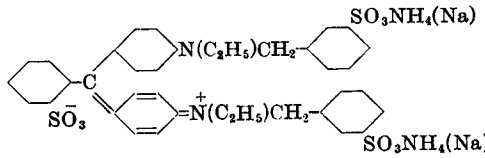
Condense benzaldehyde with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid, oxidise the product, and convert to the sodium salt

Discoverers — Schultz and Streng 1883
Agfa, *BP* 7550/89; *FP* 198415; *GP* 50782 (*Fr.* **2**, 47)
BIOS 1433, 136
FIAT 764 — Guineagruen B
Wales, *JACS*, **46** (1924), 2124

Soluble in water (green)
Soluble in ethanol (bluish green)
H_2SO_4 conc. — citron yellow; on dilution — green
Aqueous solution + NaOH — discolored (weakly brownish)

42090 C.I. Acid Blue 9 (*Bright greenish blue*) C.I. Food Blue 2 (*Bright greenish blue*)

42090:1 (**C.I. Pigment Blue 24**) is the barium salt
42090:2 is the aluminium salt used in pharmaceuticals



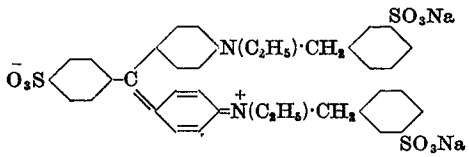
Condense *o*-formylbenzenesulfonic acid with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid, oxidise and convert the product formed into the ammonium or sodium salt

The **sodium** brands are obsolete

Discoverer — Sandmeyer 1896
Geigy, *BP* 5068/96; *USP* 564801; *FP* 254742; *GP* 89397 (*Fr.* **4**, 184)
BIOS 1433, 20
FIAT 764 — Patentblau AE
Sandmeyer, *JSDC*, **12** (1896), 154; *Chem. Zeitsch.* **21** (1897), 535
Holmes, *Ind. Eng. Chem.* **15** (1923), 833; cf. *JSDC*, **39** (1923), 354
Knop, *Z. anal. Chem.* **77** (1929), 111; *Z. angew. Chem.* (1929), 894

Very soluble in water (greenish blue)
Soluble in ethanol
H_2SO_4 conc. — pale amber; on dilution — yellow changing to green and greenish blue
Aqueous solution + NaOH — violet on boiling

42095 C.I. Acid Green 5 (*Green*) C.I. Food Green 2 (*Bright green*)

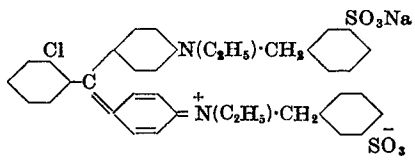


Condense benzaldehyde with *N*-ethyl-*N*-phenylbenzylamine, trisulfonate, oxidise the product and convert to the sodium salt

Discoverer — Köhler 1879
FIAT 764 — Saeuregruen kz. F extra stark (see *PB* 74025, fr. 1780–1 and *PB* 74711, fr. 8814)
Mühlhäuser, *Dingl.* **263** (1887), 250, 295
Friedländer, *Ber.* **22** (1889), 588

Very soluble in water (bluish green)
Almost insoluble in ethanol (green)
H_2SO_4 conc. — orange; on dilution — weak yellow
Aqueous solution + NaOH — almost colourless with dull violet ppt.

42100 C.I. Acid Green 9 (*Bright bluish green*)

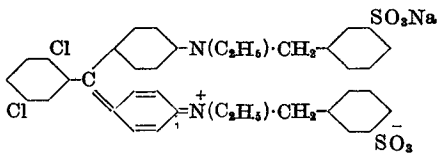


Prepare as for **C.I.42085** but with *o*-chlorobenzaldehyde as the aldehyde

Discoverer — Weiler-ter-Meer 1899
FIAT 764 — Neptungruen SGX

Very soluble in cold and hot water (green)
Soluble in ethanol (turquoise blue)
H_2SO_4 conc. — orange; on dilution — yellow
Aqueous solution + NaOH — olive green ppt. changing to dirty brown

42105 C.I. Acid Green 15 (*Bright green*)

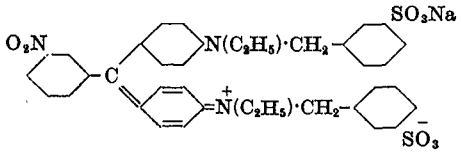


Condense 2,5-dichlorobenzaldehyde (1 mol.) with *N*-ethyl-*N*-phenylbenzylamine (2 mol.), disulfonate and oxidise

Discoverer — American Aniline Products Inc.

Very soluble in cold, very soluble in hot water (green)
H_2SO_4 conc. — orange brown; on dilution — yellow with yellow green ppt.
Aqueous solution + NaOH — yellower

42110 Acid Dye



Condense *m*-nitrobenzaldehyde with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid, oxidise the product and convert to the sodium salt

Discoverer — Agfa 1889

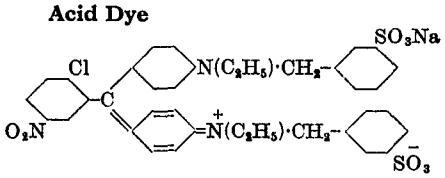
Guinea Green BV (A)

Dyes wool and silk in presence of acids

Agfa, *BP* 7550/89; *FP* 198415; *GP* 50782 (*Fr.* **2**, 47)

Soluble in water (yellow green)
Soluble in ethanol (green)
H_2SO_4 conc. — yellow; on dilution — yellow green

42115 Acid Dye



Prepare as for previous dye but with 2-chloro-5-nitrobenzaldehyde as the aldehyde

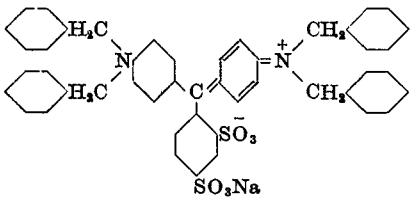
Discoverer — Weiler-ter-Meer 1899

Night Green B (tM)

Dyes wool and silk bluish green in presence of acid

Soluble in water (bluish green)
Readily soluble in ethanol
H_2SO_4 conc. — yellow; on dilution — yellow with green ppt. turning to bluish green
Aqueous solution + NaOH — dull green ppt.

42120 C.I. Acid Blue 103 (*Greenish blue*)

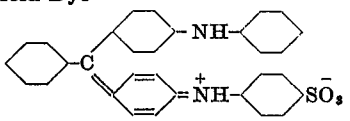


Condense 4-formyl-*m*-benzenedisulfonic acid (1 mol.) with *N*-phenyldibenzylamine (2 mol.), and oxidise the product with dichromate–oxalic acid

Discoverer — I.G.

BIOS 1433, 41
FIAT 764 — Brillantindoblau 5G

42125 Acid Dye



React benzotrichloride with diphenylamine, and then sulfonate the product

Discoverer — Meldola 1877

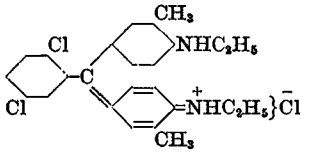
Viridine (BSS), Alkali Green

Dyes wool green in presence of acid

Ferrania, *BP* 961465
Meldola, *Ber.* **14** (1881), 1385; *JCS*, **41** (1882), 187
Doebner, *Ber.* **15** (1882), 237

The pure dye is insoluble in water but dyes wool green from aqueous alkaline solution. The disulfonate is water soluble and dyes silk green. The commercial product probably contained the disulfonate.

42130 C.I. Pigment Blue 12 (*Bright blue*)*



Condense 2,5-dichlorobenzaldehyde with *N*-ethyl-*o*-toluidine and oxidise the product

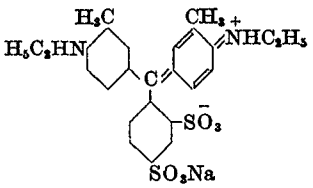
* Phosphotungstic acid salt

Discoverers — Schmid and Bachelut 1892

Ciba, *BP* 22741/93; *USP* 525627; *FP* 234576; *GP* 71370 (*Fr.* **3**, 106), 77135 (*Fr.* **4**, 190)

Soluble in hot water (greenish blue)
Soluble in ethanol (blue)
H_2SO_4 conc. — yellow; on dilution — green ppt.
Aqueous solution + NaOH — yellowish orange ppt.

42135 C.I. Acid Blue 147 (*Bright blue*)



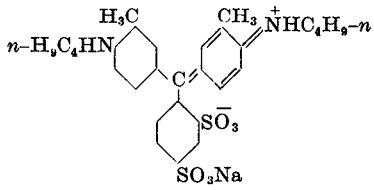
Prepare as for **C.I. 42120** but with *N*-ethyl-*o*-toluidine instead of *N*-phenyldibenzylamine

Discoverer — I.G.

BIOS 1433, 42
FIAT 764 — Cyanol ex.

Soluble in water (blue)

42136 Acid Dye



Prepare as for **C.I.42120** with *N*-butyl-*o*-toluidine instead of *N*-phenyldibenzylamine

Discoverer — I.G.

Cyanol FFG (IG)

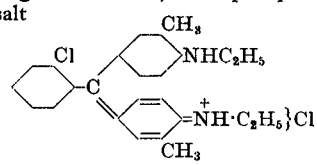
Dyes wool and silk from a sulfuric acid bath in bright bluish shades of poor to moderate fastness to light and washing

BIOS 1433, 42
FIAT 764 — Cyanol FFG

Soluble in water (blue)

42140 C.I. Basic Blue 5 (*Bright blue*)

42140:1 (**C.I. Pigment Blue 3**) is the phosphotungstomolybdic acid salt

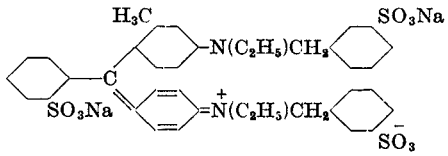


Condense *o*-chlorobenzaldehyde with *N*-ethyl-*o*-toluidine and oxidise the product

Discoverers — Sandmeyer and Schmid 1896
Geigy, *GP* 94126 (*Fr.* **4**, 189)
BIOS-MISC. 20, Appendix 37, p. 7, 13; *FDX* 885; *FIAT* 1313, **2**, 333
FIAT 764 — Astrazonblau B, Rhodulinblau 5B
Briggs, *JSDC*, **37** (1921), 291

Very soluble in hot water (green blue)
Very soluble in ethanol
H_2SO_4 conc. — reddish yellow; on dilution — yellowish green
Aqueous solution + NaOH — brownish yellow ppt.

42145 Acid Dye



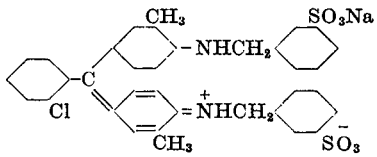
Condense *o*-formylbenzenesulfonic acid (1 mol.) with *α*-(*N*-ethylanilino)-*m*-toluenesulfonic acid (1 mol.) and *α*-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (1 mol.), and oxidise the product with lead peroxide in hydrochloric–acetic acid solution

Discoverer — Bayer Co.

Carbinol Fast Green 8B (By)

Dyes wool in presence of sulfuric acid

42150 C.I. Acid Blue 38 (*Bright greenish blue*)

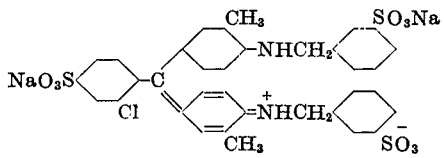


Condense *o*-chlorobenzaldehyde (1 mol.) with *N*-benzyl-*o*-toluidine (2 mol.) in sulfuric acid, sulfonate the product with oleum to the disulfonic acid, and oxidise with dichromate–oxalic acid

Discoverer — A. Hausdörfer 1910
BIOS 1433, 117
FIAT 764 — Brillantsaeureblau B

Slightly soluble in water (chrome green)
Slightly soluble in ethanol (blue green)
H_2SO_4 conc. — olive yellow; on dilution — pale yellow green
Aqueous solution + NaOH — brown yellow

42155 C.I. Acid Blue 11 (*Greenish blue*)



Condense *o*-chlorobenzaldehyde (1 mol.) with *N*-benzyl-*o*-toluidine (2 mol.), sulfonate the product with oleum to the trisulfonic acid, and oxidise with dichromate–oxalic acid

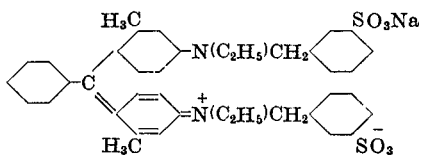
Discoverer — Bayer Co.

Neptune Green SBX (By)

FIAT 764 — Neptungruen SBX

Very soluble in water (pure blue)
Slightly soluble in ethanol (blue green)
H_2SO_4 conc. — yellow to citron yellow; on dilution — green
Aqueous solution + NaOH — yellow brown with ppt.

42160 Acid Dye



Condense benzaldehyde (1 mol.) with *α*-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (2 mol.) in sulfuric acid, and oxidise the product with lead peroxide in sulfuric–acetic acid solution

Discoverer — M Weiler 1912

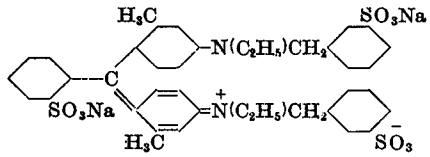
Acid Green 6G extra (By)

Dyes wool in presence of sulfuric acid

Bayer Co., *BP* 19488/13; *USP* 1101770; *FP* 461810; *GP* 269214 (*Fr.* **11**, 231)

Very soluble in water (green)
Very soluble in ethanol (yellow green)
H_2SO_4 conc. — citron yellow; on dilution — golden yellow to golden orange
Aqueous solution + NaOH — decolorised to pale grey green

42165 Acid Dye



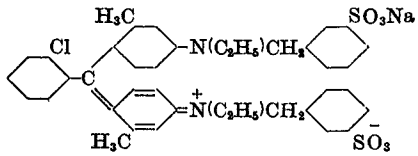
Condense *o*-formylbenzenesulfonic acid (1 mol.) with α-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (2 mol.), and oxidise the product with lead peroxide in hydrochloric–acetic acid solution

Discoverer — Bayer Co.

Carbinol Fast Green G, GO (By)

Dyes wool in presence of sulfuric acid

42170 C.I. Acid Green 22 (*Green*)



Condense *o*-chlorobenzaldehyde (1 mol.) with α-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (2 mol.), and oxidise the product with lead peroxide in sulfuric–acetic acid solution

Discoverer — M. Weiler 1912

Bayer Co., *BP* 19488/13; *USP* 1101770; *FP* 461810; *GP* 269214 (*Fr.* **11**, 231)

FIAT 1313, **2**, 351

FIAT 764 — Alkaliechtgruen 10G

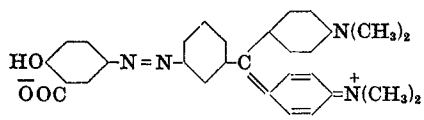
Very soluble in water (leaf green)

Very soluble in ethanol (leaf green)

H_2SO_4 conc. — brownish yellow; on dilution — golden yellow

Aqueous solution + NaOH — green ppt.

42175 Mordant Dye



Diazotise *N'*,*N'*,*N''*,*N''*-tetramethyl-*m*,*p'*,*p''*-methylidynetrianiline, couple with salicylic acid and oxidise the product in hydrochloric acid solution with lead peroxide

Discoverers — Sohst and Runkel 1888

Azo Green (By)

Dyes chromed wool yellowish green of good fastness to milling, but poor fastness to light. The chromium lake was used in wallpaper printing

Bayer Co., *BP* 3398/90; *FP* 204064; *GP* 57452 (*Fr.* **2**, 51)

Slightly soluble in hot water (green)

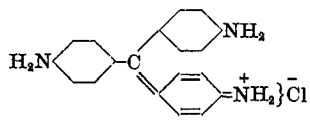
Slightly soluble in ethanol (green)

H_2SO_4 conc. — reddish brown; on dilution — reddish flocculent ppt.

(*b*) Triamino derivatives of Triphenylmethane

42500 C.I. Basic Red 9 (*Bright bluish red*)

Classical names **Para Magenta, Para Rosaniline**



(*a*) Heat *p*,*p'*-methylenedianiline with aniline, aniline hydrochloride, nitrobenzene, and ferric chloride at 170°C for several hours

(*b*) Heat aniline, *p*-toluidine, and their hydrochlorides with iron or ferrous chloride and nitrobenzene

(*c*) Oxidise a mixture of aniline and *p*-toluidine with arsenic acid

(*d*) Heat aniline with carbon tetrachloride

Slightly soluble in cold, more readily in hot water (red)

Readily soluble in ethanol (crimson)

H_2SO_4 conc. — yellow brown; on dilution — violet red

Discoverers — Coupier 1869; Rosenstiehl 1869; O. Fischer 1880; Greiff and Baum; Walter 1887; Homolka 1889; Monnet and Dury

M.L.B., *BP* 1212/81, 20678/89; *USP* 248154, 252202; *FP* 141077; *GP* 15120, 16750, 16766, 19304, 41929, (*Fr.* **1**, 49, 57, 54, 49, 50), 105862 (*Fr.* **5**, 192), 397823 (*Fr.* **14**, 720)

Greiff, *GP* 15120, 19304, (*Fr.* **1**, 49, 49)

Baum, *BP* 6000/86; *GP* 41929 (*Fr.* **1**, 50)

FIAT 1313, **2**, 330

Rosenstiehl, *Bull. Soc. ind. Mulhouse*, **36** (1866), 264; *Dingl.* **181** (1867), 389

Caro & Graebe, *Ber.* **11** (1878), 1117

E. and O. Fischer, *Ann.* **194** (1878), 242; *Ber.* **11** (1878), 1079; **13** (1880), 2204

Baeyer & Villiger, *Ber.* **37** (1904), 2857

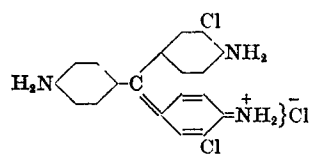
Hantzsch, *Ber.* **38** (1905), 2148

Lifschitz, *Ber.* **52** (1919), 1919

Wieland & Schening, *Ber.* **54** (1921), 2527

Holmes, *Ind. Eng. Chem.* **17** (1925), 59

42505 Basic Dye



Condense *p*-aminobenzaldehyde with *o*-chloroaniline and oxidise the product

Discoverer — Cassella Co. 1912

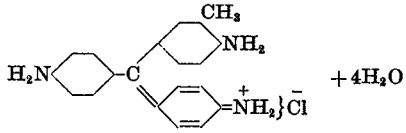
Tryparosan

Cassella Co., *BP* 14742/12; *FP* 456498; *GP* 264942 (*Fr.* **11**, 229)

Soluble in water (bluish red)

Soluble in ethanol (crimson)

42510 **C.I. Basic Violet 14** (*Reddish violet*)
42510:1 **(C.I. Solvent Red 41)** is the free base
42510:2 **(C.I. Pigment Violet 4)** is the phosphotungstomolybdic acid salt
Classical names **Magenta, Fuchsine**



(*a*) Heat a mixture of aniline, *o*(and *p*)-toluidine, and their hydrochlorides with nitrobenzene, or a mixture of nitrobenzene and *o*-nitrotoluene, in presence of iron and zinc chloride (nitrobenzene process)

(*b*) Heat a mixture of aniline and *o*(and *p*)-toluidine with arsenic acid (arsenic acid process)

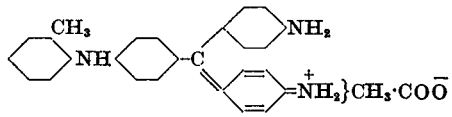
Discoverers — Natanson 1856; A. W. Hofmann 1858; Verguin 1858; Gerber and Keller 1859; Medlock 1860; Nicholson 1860; Girard and de Laire 1860; Laurent and Casthelaz 1861; Coupier 1869
Renard Frères & Franc, *FP* 46035 and 5 additions
Gerber & Keller, *FP* 42621
Medlock, *BP* 126/60; Nicholson, *BP* 184/60; Girard & de Laire, *BP* 1300/60; *FP* 44958
Laurent & Casthelaz, *FP* 52223
FIAT 1313, **2**, 330
Natanson, *Ann.* **98** (1856), 297
A. W. Hofmann, *Jahresber.* **4** (1858), 353; *J. prakt. Chem.* **77** (1859), 190; **87** (1862), 226
Coupier, *Jahresber.* **15** (1869), 568; *Ber.* **6** (1873), 25, 423, 1072
Schmidlin, *Compt. rend.* **139** (1904), 676
Lambrecht, *Ber.* **40** (1907), 247
Wales & Nelson, *JACS*, **45** (1923), 1662
Holmes, *Ind. Eng. Chem.* **17** (1925), 59
Michaelis & Granick, *JACS*, **67** (1943), 1212

H_2SO_4 conc. — yellow brown; on dilution — almost colourless
Aqueous solution + NaOH — almost colourless with red ppt.

Soluble in cold and hot water (red violet)
Very soluble in ethanol (red)

42515 **Basic Dye**

A mixture of the acetate of *N*-phenyl- or *N*-*o*-tolylrosaniline with the corresponding derivatives of pararosaniline, obtained by heating the unchanged reactants from the magenta melt (arsenic acid process, **C.I.42510**) with acetic acid at about 120°C, e.g. acetate of *N*-*o*-tolylpararosaniline

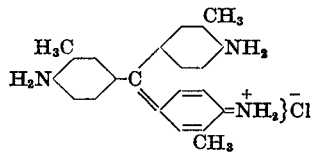


Discoverers — Girard and de Laire 1860
Regina Purple (BSS) (WSS)
Girard & de Laire, *BP* 97/61; *FP* 45826

Soluble in water (red violet)
H_2SO_4 conc. — brown; on dilution — blue
Aqueous solution + NaOH — brown ppt.

42520 **C.I. Basic Violet 2** (*Dull reddish violet*)

Classical name **New Magenta**

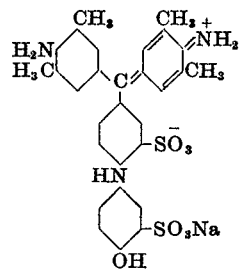


Heat 4,4′-methylenedi-*o*-toluidine with *o*-toluidine and its hydrochloride in the presence of an oxidising agent

Discoverer — Homolka 1889
M.L.B., *BP* 20678/89; *USP* 471638; *FP* 202769 and addn.; *GP* 59775 (*Fr.* **3**, 113), 87615 (*Fr.* **4**, 65), 397823 (*Fr.* **14**, 720)
FIAT 764 — Neufuchsin 90 Plv.
Lambrecht, *Ber.* **40** (1907), 247
Holmes, *Ind. Eng. Chem.* **17** (1929), 59

Very soluble in water (red)
Very soluble in ethanol (red)
H_2SO_4 conc. — yellow to golden yellow; on dilution — pale citron yellow
Aqueous solution + NaOH — orange brown ppt.

42525 **Acid Dye**



Condense *p*-chlorobenzaldehyde (1 mol.) with 2,6-xylidine (2 mol.), sulfonate the product with oleum to the monosulfonic acid, air oxidise in pyridine solution in presence of copper salts, and condense with 4-amino-1-phenol-2-sulfonic acid

Discoverer — K. Schmidt 1929
Acid Violet RRL (By)
Dyes wool in presence of sulfuric acid in level violet shades
Fastness Properties (C): Light 2, Milling 2, Perspiration 3, Sea water 3, Washing 2–3, 3, 3–4
Bayer Co., *BP* 299473; *USP* 1805925; 2199577; *FP* 662594, 845672; *GP* 492448 (*Fr.* **16**, 830), 699784 (*Fr.-Bayer*, **I–2**, 1101)
FIAT 764 — Saeureviolett RRL

Soluble in water (red violet)
Soluble in ethanol (red violet)
H_2SO_4 conc. — wine red; on dilution — violet
Aqueous solution + NaOH — decolorised to pale red violet grey

42530 **Basic Dye**

A mixture of methylated or ethylated rosaniline (**C.I.42510**) and pararosaniline (**C.I.42500**) of varying composition, obtained originally by heating the above dyes with methyl or ethyl iodide in methyl alcohol

Discoverers — A. W. Hofmann and Geyger 1863
Hofmann's Violet (BSS)
A. W. Hofmann & Geyger, *BP* 1291/63; *FP* 59309
A. W. Hofmann, *Compt. rend.* **54** (1862), 428; **56** (1863), 945; **57** (1863), 30; *Jahresber.* (1862), 347; *Dingl.* **172** (1864), 306
Related to *FDX* 885 — Rotviolett 5R ex. and Rotviolett 5RB

H_2SO_4 conc. — brownish yellow; on dilution — blue
Aqueous solution + NaOH — brownish red ppt.

Soluble in water (bluish violet)
Insoluble in ethanol

42535 C.I. Basic Violet 1 (*Bluish violet*)

42535:1 (**C.I. Solvent Violet 8**) is the free base

42535:2 (**C.I. Pigment Violet 3**) is the phosphotungstomolybdic acid salt

42535:3 (**C.I. Pigment Violet 27**) is the copper ferrocyanide complex

Classical name **Methyl Violet**

A mixture of the hydrochlorides of the more highly methylated pararosanilines, containing principally the *N*-tetra-, penta-, and hexamethyl 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

Soluble in cold and hot water (violet)
Very soluble in ethanol (violet)
H_2SO_4 conc. — orange; on dilution — green ppt.
Aqueous solution + NaOH — brown red and ppt.

Discoverer — Lauth 1861. Placed on the market by Poirrier and Chappat 1866
Lauth, *BP* 3195/66; *FP* 71970
FIAT 1313, **2**, 314
FIAT 764 — Methylviolettbase
Lauth, *Mon. sci.* (1861), 336; (1866), 1033
A. W. Hofmann, *Ber.* **6** (1873), 352
E. and O. Fischer, *Ber.* **11** (1878), 2098; **12** (1879), 2350; *Ann.* **194** (1878), 295
Crossley, *JACS*, **41** (1919), 2084
Briggs, *JSDC*, **37** (1921), 291
Kober, *Ind. Eng. Chem.* **15** (1923), 837
Holmes, *Ind. Eng. Chem.* **17** (1925), 918

Fanal Violet RM (IG)

Pigment for printing inks, consisting of the copper ferrocyanide lake of C.I.42535

M. Michels, *BP* 407856; *GP* 657740 (*Fr.* **24**, 607)
BIOS 961, 29. *BIOS* 1661, 19
FIAT 764 — Fanalviolett RM Plv.

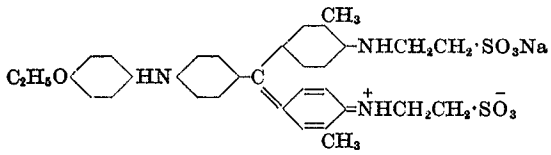
42536 C.I. Basic Violet 13 (*Bluish violet*)

A mixture of the hydrochlorides of benzylated tetra- and pentamethylpararosaniline with the hydrochloride of hexamethylpararosaniline obtained by reacting benzyl chloride with an alkaline ethanolic solution of Methyl Violet (**C.I.42535**)

Discoverer — Lauth 1866
Lauth & Grimaux, *Bull. Soc. chim.* **7** (1867), 105
O. Fischer & Körner, *Ber.* **16** (1883), 2910
Mühlhäuser, *Dingl.* **270** (1888), 179

Soluble in water (blue violet)
Soluble in ethanol (blue violet)
H_2SO_4 conc. — yellow; on dilution — violet
Aqueous solution + NaOH — brown red ppt.

42540 Acid Dye (*Bluish violet*)



Condense *N*-*o*-tolyltaurine (2 mol.) with *p*-chlorobenzaldehyde (1 mol.), oxidise the product with dichromate–oxalic acid, and fuse with *p*-phenetidine

Discoverer — I.G. 1931

Acid Violet 5BL (IG)

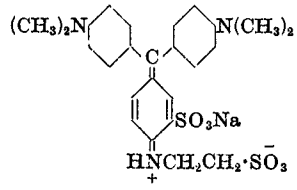
Dyes wool in presence of sulfuric acid

Fastness Properties (C): Light 3, Alkaline Milling 3, Perspiration 3, Washing 3–4

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756, 44375/742756; *GP* 574021 (*Fr.* **19**, 1574), 590748 (*Fr.* **20**, 1040), 597078, 606248, (*Fr.* **21**, 794, 792)
FIAT 764 — Saeureviolett 5BL

Slightly soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — orange brown; on dilution — violet

42545 Acid Dye (*Bright violet*)



Condense 4,4′-bis(dimethylamino)benzhydrol with *o*-(2-sulfoethylamino)benzenesulfonic acid, and oxidise the product with chloranil or manganese dioxide in acetic acid

Discoverer — I.G. 1931

Acid Violet BWN (IG)

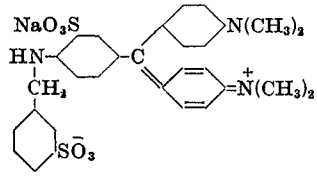
Dyes wool in presence of sulfuric acid in bright violet shades

Fastness Properties (C): Light 2, Alkaline Milling 3, Perspiration 2–3, Washing 3

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756, 44375/742746; *GP* 574021 (*Fr.* **19**, 1574), 590748 (*Fr.* **20**, 1040), 597078, 606248, (*Fr.* **21**, 794, 792)
FIAT 764 — Saeureviolett BWN

Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden orange; on dilution — violet
Aqueous solution + NaOH — almost decolorised to red orange

42550 Acid Dye



Sulfonate *o*-benzylaminobenzenesulfonic acid with oleum, condense the product with 4,4′-bis(dimethylamino)benzhydrol, and oxidise with lead peroxide in acetic acid

Discoverer — A. Hausdörfer 1902

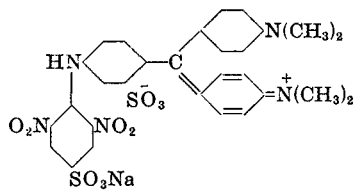
Acid Violet BW (By)

Dyes wool in presence of sulfuric acid in violet shades of poor light fastness

BIOS 1433, 119
FIAT 764 — Saeureviolett BW

Soluble in water (violet)
Slightly soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow to brown orange; on dilution — pale violet
Aqueous solution + NaOH — decolorised

42551 Acid Dye



Condense 4,4′-bis(dimethylamino)benzhydrol with the condensation product of 4-chloro-3,5-dinitrobenzenesulfonic acid and metanilic acid, oxidise, and convert to the sodium salt

Discoverer — Julius 1906

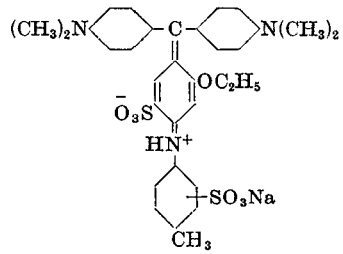
Agalma Green B (B)

Dyes wool and silk in presence of acid in level greenish shades of good fastness to alkali, milling and washing, rendered faster by afterchroming

Badische Co., *BP* 25977/06, 5640/07; *USP* 886815; *FP* 371742; *GP* 186989 (*Fr.* **9**, 196)

Soluble in water (green)
Soluble in hot ethanol (green)
H_2SO_4 conc. — dull yellow; on dilution — yellowish brown
Aqueous solution + NaOH — blue

42552 Acid Dye



Condense 4,4′-bis(dimethylamino)benzophenone with *N*-*p*-tolyl-*m*-phenetidine in toluene solution with phosphorus oxychloride, and sulfonate with 65% oleum

Discoverer — I.G.

Acid Violet 2B (IG), Acid Violet 6BNOO (IG)

Dyes wool and silk in presence of acid violet blue of moderate fastness to light and washing

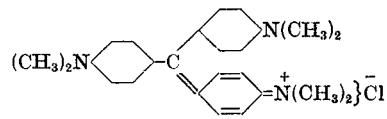
BIOS 959, 13; 1433, 53
FIAT 764 — Saeureviolett 6BN00

42555 C.I. Basic Violet 3 (*Bright bluish violet*)

42555:1 (**C.I. Solvent Violet 9**) is the free base

42555:2 (**C.I. Pigment Violet 39**) is the PMA salt

Classical name **Crystal Violet**



(*a*) Condense 4,4′-bis(dimethylamino)benzophenone with *N*,*N*-dimethylaniline and phosphorus trichloride

(*b*) React *N*,*N*-dimethylaniline with phosgene in the presence of zinc chloride

(*c*) Condense 4,4′-bis(dimethylamino)benzhydrol with *N*,*N*-dimethylaniline and oxidise the product

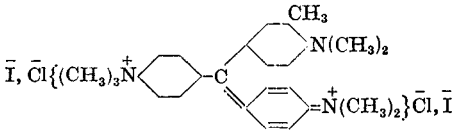
Discoverers — Kern and Caro 1883

Badische Co., *BP* 4428/83, 5450/83, 4850/84, 11030/84, 12022/86; *USP* 290856, 290891, 290892; *FP* 157430, 158438, 160090, 213928; *GP* 26016, 27032, 27789, 29943, 29962, (*Fr.* **1**, 78, 75, 80, 70, 86)
M.L.B., *BP* 4961/84; *GP* 34463 (*Fr.* **1**, 88)
S. A. St. Denis, *GP* 61815 (*Fr.* **3**, 101)
Kern & Sandoz, *GP* 64270 (*Fr.* **3**, 140)
Heumann, *BP* 8634/92; *GP* 66511 (*Fr.* **3**, 102)
Wieland, *GP* 308298 (*Fr.* **13**, 340)
BIOS 959, 9. *FIAT* 1313, **2**, 317–320
FIAT 764 — Kristallviolett Plv., and 10B
O. Fischer & German, *Ber.* **16** (1883), 706
O. Fischer & Körner, *Ber.* **16** (1883), 1904; **17** (1884), 98
A. W. Hofmann, *Ber.* **18** (1885), 767
Schmidlin, *Compt. rend.* **139** (1904), 676
Lambrecht & Weil, *Ber.* **37** (1904), 3058
Nölting & Philipp, *Ber.* **41** (1908), 3909
Karrer, *Ber.* **50** (1917), 1497
Wieland, *Ber.* **52** (1919), 880
Lifschitz, *Ber.* **52** (1919), 1919
Wales & Nelson, *JACS*, **45** (1923), 1661

Soluble in cold and hot water (violet)
Very soluble in ethanol (violet)
H_2SO_4 conc. — red yellow; on dilution — dull greenish yellow changing to blue and violet
Aqueous solution + NaOH — violet ppt.

42556 Basic Dye

Zinc double chloride of



React methyl iodide or chloride with Rosaniline (**C.I.42510**) or with Hofmann's Violet (**C.I.42530**)

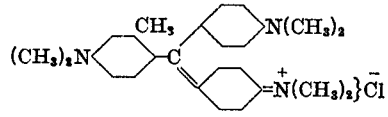
Discoverer — Keisser 1866

Iodine Green

Keisser, *FP* 71625
A. W. Hofmann & Girard, *Ber.* **2** (1869), 442
Appenzeller, *Ber.* **6** (1873), 965

Soluble in water (bluish green)
H_2SO_4 conc. — reddish yellow; on dilution — pale yellowish-green
Aqueous solution + NaOH — colourless

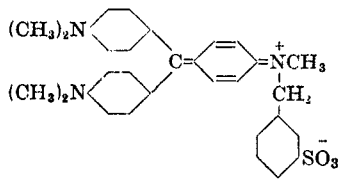
42557 C.I. Basic Violet 23



(*a*) Condense 4,4′-bis(dimethylamino)benzophenone with *N*,*N*-dimethyl-*m*-toluidine and phosphorus trichloride

(*b*) Condense 4,4′-bis(dimethylamino)benzhydrol with *N*,*N*-dimethyl-*m*-toluidine and oxidise the product

42560 C.I. Acid Violet 16 (*Bluish violet*)



Condense 4,4′-bis(dimethylamino)benzhydrol with α-(*N*-methylanilino)-*m*-toluenesulfonic acid, and oxidise the product with lead peroxide–hydrochloric acid

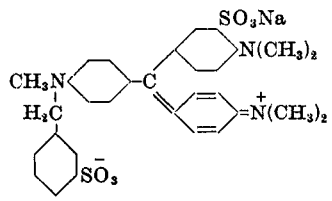
Discoverer — H. Hassenkamp 1891

Alkali Violet R (By)

Bayer Co., *BP* 19062/91; *USP* 498471; *FP* 217020; *GP* 69654 (*Fr.* 3, 133)

FIAT 764 — Alkaliviolett R

42561 C.I. Acid Blue 34 (*Bright blue*)



Condense 4,4′-bis(dimethylamino)benzophenone with *N*-methyl-*N*-phenylbenzylamine and phosphorus oxychloride, then disulfonate, and convert to sodium salt

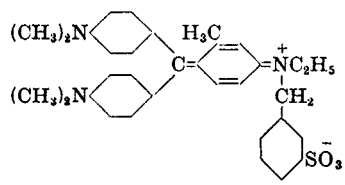
Discoverers — Schmalzigang 1883; Hassenkamp 1883

Badische Co., *BP* 4850/84, 5038/84; *FP* 160090; *GP* 27789 (*Fr.* 1, 80)

Bayer Co., *BP* 7645/84; *USP* 331964, 331965; *FP* 161967; *GP* 31509 (*Fr.* 1, 113)

Very soluble in cold and hot water (blue violet)
Slightly soluble in ethanol
H_2SO_4 conc. — yellow; on dilution — olive to green
Aqueous solution + NaOH — blue flocculent ppt.

42562 Acid Dye



Condense 4,4′-bis(dimethylamino)benzhydrol with α-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid, and oxidise the product with lead peroxide–hydrochloric acid

Discoverer — A. Hausdörfer 1911

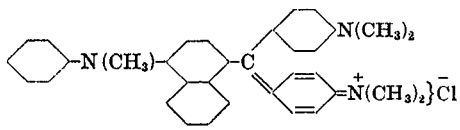
Alkali Violet 10B (By)

Dyes wool and silk from an acid or neutral bath violet shades

Fastness Properties (C): Alkali 4, Light 1, Milling 3, Perspiration 3, Sea water 2, Washing 3

42563 C.I. Basic Blue 8 (*Reddish blue*)

42563:1 (C.I. Solvent Blue 2) is the free base



The constitution for this dye given in *BIOS* 1433, 72 is incorrect; this error led to the inclusion of this Diphenylnaphthylmethane dye with the Triphenylmethanes

React *N*-methyl-*N*-phenyl-1-naphthylamine with *p*,*p*′-(dichloromethylene)bis[*N*,*N*-dimethylaniline]

Discoverers — Caro and Kern 1883

Badische Co., *BP* 5038/84, 11159/84, 12022/86; *USP* 308748; *FP* 160090; *GP* 27032, 27789, 29962, (*Fr.* 1, 75, 80, 86)

BIOS 959, 16

FIAT 764 — Viktoriablau 4R

Nathansohn & Müller, *Ber.* 22 (1889), 1891

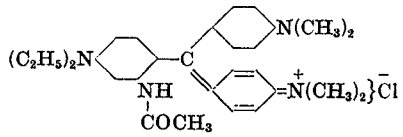
Venkataraman (1952), 721

Lubs (1955), 286

Soluble in cold, very soluble in hot water (blue)
Very soluble in ethanol (blue)
H_2SO_4 conc. — yellowish brown; on dilution — green and then yellowish brown
Aqueous solution + NaOH — violet brown ppt.

42565 Basic Dye

Zinc double chloride of



Condense 4,4′-bis(dimethylamino)benzhydrol with *m*-diethylaminoacetanilide in acetic–sulfuric acid, oxidise with lead peroxide in acetic–hydrochloric acid, and isolate as the zinc double chloride

Discoverers — O. Nastvogel and R. Kothe

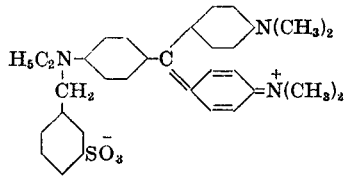
Brilliant Rhoduline Blue R (By)

Bayer Co., *BP* 5056/94, 5711/94; *FP* 239031; *GP* 81374, 82268, (*Fr.* **4**, 204, 205)

BIOS 1433, 127

FIAT 764 — Brillantrhodulinblau R

42570 Acid Dye



Condense 4,4′-bis(dimethylamino)benzhydrol with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid, and oxidise the product with lead peroxide in hydrochloric–acetic acid

Discoverer — F. Reingruber 1896

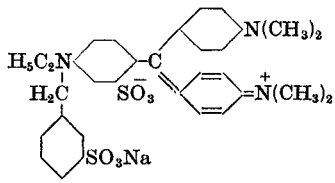
Acid Violet 8B extra (By)

Dyes wool in presence of sulfuric acid

Bayer Co., *BP* 14728/92; *USP* 501069; *FP* 217020; *GP* 68865 (*Fr.* **3**, 132)

Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — yellow green
Aqueous solution + NaOH — pale violet

42571 C.I. Acid Blue 13 (*Reddish blue*)



React 4,4′-bis(dimethylamino)benzhydrol with *N*-ethyl-*N*-(*m*-sulfobenzyl)metanilic acid, oxidise, and convert to the sodium salt

Note — **Echtsaeureviolett 10B** is a mixture of the disulfonated dye and a small amount of **C.I.42570**

Discoverer — H. Hassenkamp 1891

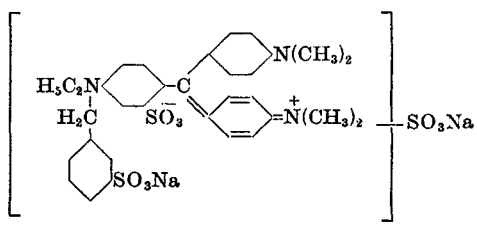
Bayer Co., *BP* 19062/92; *USP* 501069, 611628; *FP* 217020; *GP* 68291, 69777, (*Fr.* **3**, 130, 39)

FIAT 1313, **2**, 348

FIAT 764 — Echtsaeureviolett 10B

Very soluble in cold and hot water (violet)
Slightly soluble in ethanol (violet)
H_2SO_4 conc. — reddish yellow; on dilution — greenish yellow
Aqueous solution + NaOH — pink on heating

42572 Acid Dye



Sulfonate **C.I.42571** and convert to the sodium salt

Discoverer — Geigy

Alpine Blue (Gy)

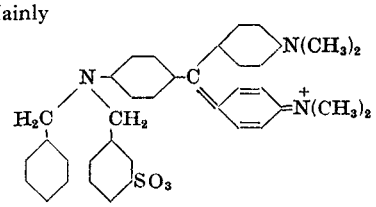
Dyes wool in presence of acids in level violet blue shades of poor fastness to light and good fastness to alkali

Geigy, *FP* 211913; *GP* 65017 (*Fr.* **3**, 116)

Soluble in water (blue)
Soluble in ethanol (blue)
H_2SO_4 conc. — brown yellow; on dilution — green

42575 Acid Dye

Mainly



(Contains some disulfonic acid)

Condense 4,4′-bis(dimethylamino)benzhydrol with α-(*N*-benzylanilino)-*m*-toluenesulfonic acid, and oxidise the product with manganese dioxide or lead peroxide in acetic acid

Discoverer — H. Hassenkamp 1891

Acid Violet 4BL (By)

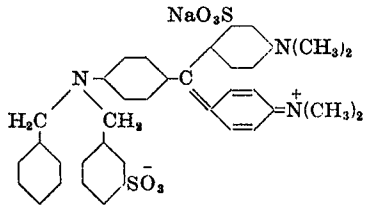
Dyes wool from a sulfuric acid and silk from an acetic acid or neutral dyebath in violet shades, levelling moderate

Fastness Properties (C): Alkali 4–5, Light 1, Milling 2–3, Perspiration 3–4, Sea water 3, Washing 3

Bayer Co., *BP* 19062/91; *USP* 498471; *FP* 217020; *GP* 69654 (*Fr.* **3**, 133)

Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow to golden orange; on dilution — pale turquoise blue
Aqueous solution + NaOH — pale cornflower blue

42576 C.I. Acid Blue 75 (*Violet blue*)

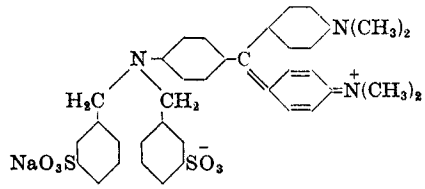


Condense 5-dimethylamino-α-(*p*-dimethylaminophenyl)-α-hydroxy-*o*-toluenesulfonic acid (2-sulfo-Michler's hydrol) with α-(*N*-benzylanilino)-*m*-toluenesulfonic acid, oxidise the product and convert to the sodium salt

Discoverer — Geigy 1895
Geigy, *GP* 88085 (*Fr.* **4**, 219)
Blangey, Fierz-David & Stamm, *Helv. Chim. Acta*, **25** (1942), 1162

Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — light brown; on dilution — pale green to blue

42580 C.I. Acid Violet 21 (*Bright reddish violet*)

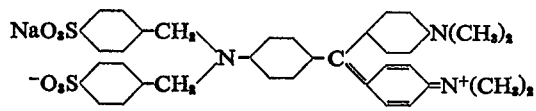


Condense 4,4′-bis(dimethylamino)benzhydrol with α,α′-(phenylimino)di-*m*-toluenesulfonic acid, and oxidise the product with manganese dioxide or lead peroxide in acetic acid

Discoverer — H. Hassenkamp 1891
Bayer Co., *BP* 19062/91; *USP* 498471; *FP* 217020; *GP* 69654 (*Fr.* **3**, 133)
FIAT 1313, **2**, 346
FIAT 764 — Saeureviolett 4BL

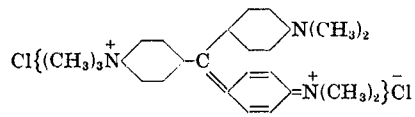
Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — pale blue green
Aqueous solution + NaOH — pale blue

42581 C.I. Food Violet 3



42585 C.I. Basic Blue 20 (*Greenish blue*)

Zinc double chloride of



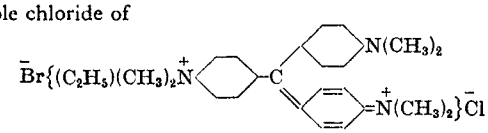
React methyl chloride with **Methyl Violet (C.I.42535)**

Discoverers — Lauth and Baubigny 1871; Wischin, 1873; Monnet and Reverdin 1874
BIOS 959, 9
Lauth & Baubigny, *Ber.* **6** (1873), 825
Monnet & Reverdin, *Mon. sci.* (1878), 124
A. W. Hofmann, *Ber.* **6** (1873), 363
E. and O. Fischer, *Ber.* **12** (1879), 2351

Soluble in water (blue green)
Insoluble in ethanol and amyl alcohol
H_2SO_4 conc. — reddish yellow; on dilution — yellowish green
Aqueous solution + NaOH — colourless

42590 Basic Dye

Zinc double chloride of

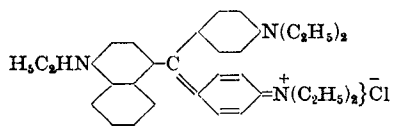


React ethyl bromide with **Methyl Violet (C.I.42535)**

Discoverer — Holliday 1866
Methyl Green (St.D), (A), (By), (tM)
Read Holliday & Sons, *BP* 1340/66

Soluble in water (greenish blue)
H_2SO_4 conc. — yellow; on dilution — green
Aqueous solution + NaOH — colourless with orange brown ppt.

42595 C.I. Basic Blue 7 (*Bright reddish blue*)
42595:1 (C.I. Solvent Blue 5) is the free base
42595:2 (C.I. Pigment Blue 1) is the phosphotungstomolybdic acid salt

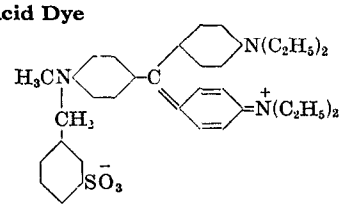


Condense 4,4′-bis(diethylamino)benzophenone with *N*-ethyl-1-naphthylamine in toluene with phosphorus oxychloride

Discoverer — Bayer Co. 1893
Bayer Co., *BP* 23392/93
BIOS 959, 16. *FIAT* 1313, **2**, 326; **3**, 539
FIAT 764 — Viktoriareinblau BO

Slightly soluble in cold, soluble in hot water (blue)
Very soluble in ethanol (blue)
H_2SO_4 conc. — brownish yellow; on dilution — reddish yellow
Aqueous solution + NaOH — red brown

42596 Acid Dye



Condense 4,4′-bis(diethylamino)benzophenone with *N*-methyl-*N*-phenylbenzylamine and phosphorus oxychloride, and sulfonate with 30% oleum

Discoverer — Badische Co.

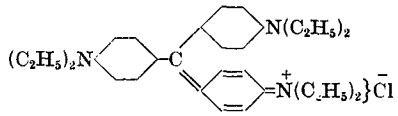
Alkali Violet 4BNOO (B)

Dyes wool in presence of sulfuric acid violet shades of poor light and moderate alkali fastness

BIOS 959, 1

42600 C.I. Basic Violet 4 (*Bluish violet*)

42600:1 (C.I. Pigment Blue 14) is the phosphotungstomolybdic acid salt



Preparation as for **C.I.42555** with *N*,*N*-diethyl- instead of *N*,*N*-dimethylaniline

Fanal Blue RM (IG) is the copper ferrocyanide lake

H_2SO_4 conc. — orange; on dilution — yellow orange to green
Aqueous solution + NaOH — grey violet ppt.

Discoverers — Kern 1883; Caro 1883

Ethyl Violet

Badische Co., *BP* 4428/83, 5450/83, 5038/84, 11030/84, 8634/92; *USP* 290856, 290891, 290892, 290893, 327953; *FP* 158438, 160090; *GP* 26016, 27032, 27789, 29943, 29962, (*Fr.* **1**, 78, 75, 80, 79, 86), 66511 (*Fr.* **3**, 102)
S.A. St. Denis, *GP* 61815 (*Fr.* **3**, 101)
BIOS 959, 7, No. 28. *FIAT* 1313, **2**, 319
FIAT 764 — Aethylviolett BOO
Holmes, *Ind. Eng. Chem.* **17** (1925), 918

Fanal Blue RM (IG)

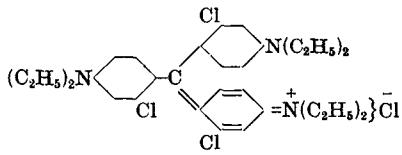
Bright blue pigment, chiefly used in printing inks

M. Michels, *BP* 407856; *FP* 889442; *GP* 657740 (*Fr.* **24**, 607)
BIOS 961, 29. *BIOS* 1661, 19. *FIAT* 1313, **3**, 553
FIAT 764 — Fanalblau RM Plv.

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

42605 Acid Dye

Zinc double chloride of



Condense 2-chloro-4-diethylaminobenzaldehyde (1 mol.) with *m*-chloro-*N*,*N*-diethylaniline (2 mol.), oxidise in nitric acid with lead peroxide, and isolate as zinc double chloride

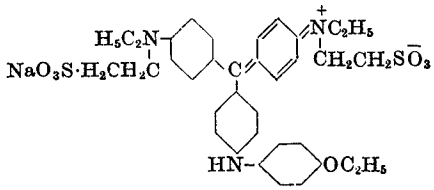
Discoverer — Agfa 1896

Brilliant Silk Blue 10B (A), (By)

Dyes wool and silk bright blue shades in presence of acids, of poor fastness to light and washing

Geigy, *BP* 27372/03; *GP* 90771 (*Fr.* **4**, 194), Pat. addn. 13106 (*Fr.* **5**, 212) refused

42610 Acid Dye



Condense *p*-chlorobenzaldehyde (1 mol.) with *N*-ethyl-*N*-phenyltaurine (2 mol.), oxidise with dichromate–oxalic acid, and fuse with *p*-phenetidine

Discoverer — I.G. 1931

Brilliant Wool Blue FFRL (IG)

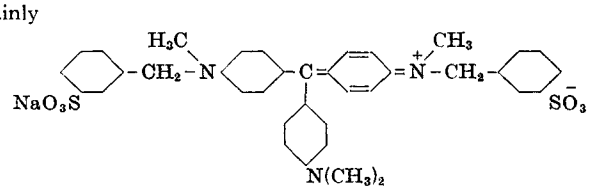
Dyes wool from an acetic acid dyebath in bright blue shades of poor fastness to light and moderate fastness to washing

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756; *GP* 574021 (*Fr.* **19**, 1574), 590748 (*Fr.* **20**, 1040), 597078, 606248, (*Fr.* **21**, 794, 792)
BIOS-MISC 20, App. No. 27
FIAT 764 — Brillantwollblau FFRL

Very soluble in water (blue violet)
Soluble in ethanol (pure blue)
H_2SO_4 conc. — red orange brown; on dilution — turquoise blue

42615 Acid Dye

Mainly



Condense formaldehyde with α-(*N*-methylanilino)-*m*-toluenesulfonic acid, and air oxidise the product formed with an excess of *N*,*N*-dimethylaniline in the presence of copper salts

Discoverer — Bayer Co. 1896

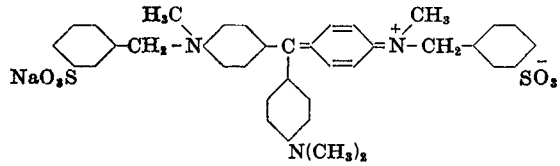
Acid Violet 4BN extra (By)

Dyes wool in presence of sulfuric acid

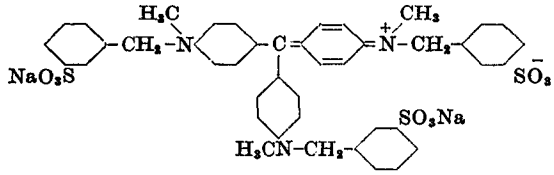
Soluble in water (violet blue to blue violet)
Slightly soluble in ethanol (pure blue)
H_2SO_4 conc. — orange brown; on dilution — grey blue

42620 Acid Dye

Mixture of



and



Condense formaldehyde with α-(*N*-methylanilino)-*m*-toluenesulfonic acid, and air oxidise the products formed with a deficiency of *N*,*N*-dimethylaniline in the presence of copper salts

Discoverer — Bayer Co. 1896

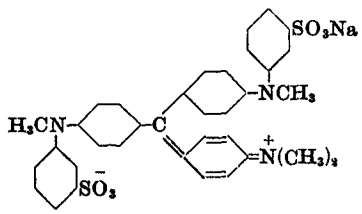
Acid Violet 3BN extra (By)

Dyes wool from a sulfuric acid and silk from an acetic acid or neutral dyebath, levelling moderate

Fastness Properties (C): Alkali 2, Light 1, Milling 3, Perspiration 3, Sea water 3–4, Washing 3, 3, 4

Soluble in water (red violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow to brown yellow; on dilution — pale green
Aqueous solution + NaOH — decolorised to pale dull grey blue

42625 C.I. Acid Blue 17 (*Reddish blue*)

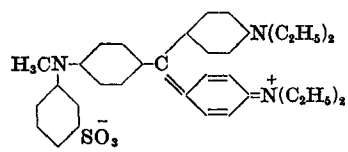


Condense *p*-dimethylaminobenzoyl chloride with *N*-methyldiphenylamine, disulfonate the product, and convert to the sodium salt

Discoverers — Fuchs and Hörmann 1885
M.L.B., *BP* 4961/84; *GP* 34463 (*Fr.* **1**, 88)
Suter, *Organic Chemistry of Sulfur* (1944), 245

Soluble in water (blue)
Slightly soluble in ethanol (blue)
H_2SO_4 conc. — orange yellow; on dilution — blue
Aqueous solution + NaOH — colourless

42630 Acid Dye



Condense 4,4′-bis(diethylamino)benzophenone with *N*-methyldiphenylamine and phosphorus oxychloride in toluene and monosulfonate the product

Discoverer — Müller 1886

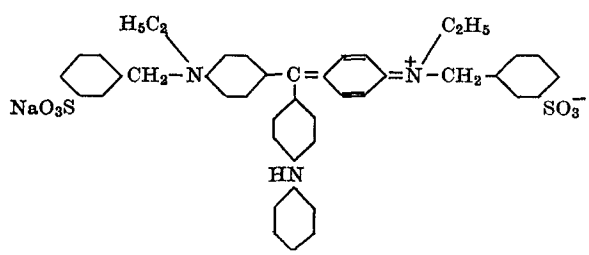
Alkali Violet (Ciba) (K); 6B (Ciba) (B); LR (By); C, CA (C); O (MLB); A (tM). Neutral Violet (WDC)

Dyes wool under acid, neutral, and alkaline conditions

Badische Co., *BP* 5038/84; *USP* 353264; *FP* 160090; *GP* 27789 (*Fr.* **1**, 80)
BIOS 959, 1. No. 2
FIAT 764 — Alkaliviolett R; Alkaliviolett ex. A (f. Lack)

Soluble in water (bluish violet)
Soluble in ethanol (blue)
H_2SO_4 conc. — yellowish-brown; on dilution — brown with dull green ppt.
Aqueous solution + NaOH — blue ppt.

42634 C.I. Acid Blue 269



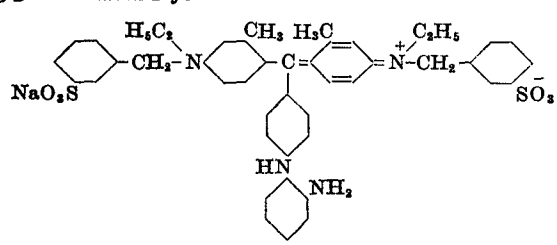
Discoverers — O. Wahl, E. Teupel, and K. Schmidt 1933

Wool Discharge Blue GN (IG), Wool Blue NG extra (IG)

Dyes wool in presence of a weak acid bright blue of good fastness to sea water and moderate fastness to light

I.G., *BP* 439200; *USP* 2039571; *FP* 773820; *GP* 607487 (*Fr.* **21**, 785)
FIAT 764 — Wollaetzblau GN

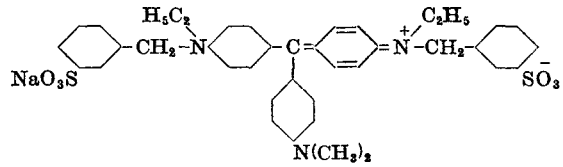
42635 Acid Dye



Condense benzaldehyde (1 mol.) with *N*-benzyl-*N*-ethyl-*m*-toluidine (2 mol.), trisulfonate, oxidise with lead peroxide, and condense with *o*-phenylenediamine

Soluble in water (cornflower blue)
Soluble in ethanol (pure blue)
H_2SO_4 conc. — yellow brown; on dilution — green
Aqueous solution + NaOH — pale red brown

42640 **C.I. Acid Violet 49** (*Bright bluish violet*)
C.I. Food Violet 2 (*Bright violet*)
42640:1 is the aluminium salt, used in pharmaceuticals



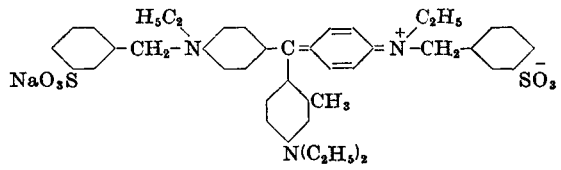
(*a*) Condense *p*-dimethylaminobenzaldehyde (1 mol.) with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid (2 mol.), oxidise the product and convert to the sodium salt

(*b*) Condense α-(*N*-ethylanilino)-*m*-toluenesulfonic acid with formaldehyde and oxidise in presence of *N*,*N*-dimethylaniline

Discoverers — Schultz and Zierold 1889
Agfa, *BP* 7550/89; *FP* 198415; *GP* 50782 (*Fr.* **2**, 47)
Cassella. Co., *BP* 857/91; *USP* 464538; *FP* 211026; *GP* 62339 (*Fr.* **3**, 117)
Geigy, *BP* 21284/90; *GP* 59811 (*Fr.* **3**, 115)
FIAT 1313, **2**, 345
FIAT 764 — Formylviolett S4BN

Very soluble in cold and hot water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — orange; on dilution — mustard
Aqueous solution + NaOH — dull blue ppt.

42645 **C.I. Acid Blue 15** (*Bright blue*)

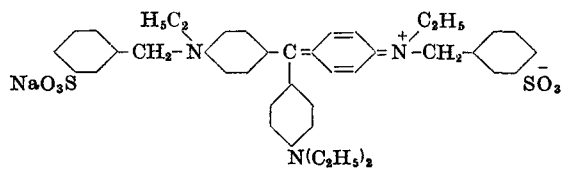


Condense formaldehyde (1 mol.) with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid (2 mol.), and oxidise with dichromate-sulfuric acid in the presence of *N*,*N*-diethyl-*m*-toluidine

Discoverer — A. Hausdörfer 1910
FIAT 1313, **2**, 344
FIAT 764 — Brillantwalkblau B

Slightly soluble in cold, soluble in hot water (bright blue)
Soluble in ethanol (bright blue)
H_2SO_4 conc. — golden yellow; on dilution — pale yellow green
Aqueous solution + NaOH — pale blue with ppt.

42650 **C.I. Acid Violet 17** (*Bright bluish violet*)
C.I. Food Violet 1 (*Bright bluish violet*)
42650:1 is the aluminium salt, used in pharmaceuticals

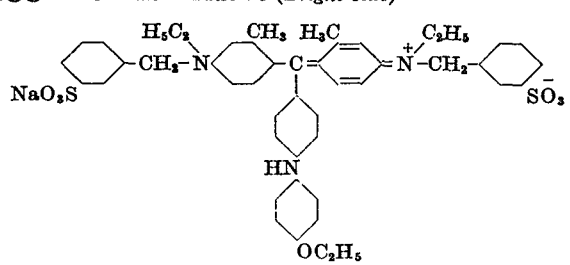


Condense α-(*N*-ethylanilino)-*m*-toluenesulfonic acid with formaldehyde, (*a*) oxidise to the hydrol, condense with *N*,*N*-diethylaniline, oxidise and convert to the sodium salt, or (*b*) directly oxidise with dichromate-sulfuric acid in the presence of *N*,*N*-diethylaniline

Discoverers — Sandmeyer 1890; Weinberg 1890
Geigy, *BP* 21284/90; *GP* 59811 (*Fr.* **3**, 115)
Cassella Co., *BP* 857/91; *USP* 464538; *FP* 211026; *GP* 62339 (*Fr.* **3**, 117)
FIAT 764 — Formylviolett S4B

Very soluble in cold and hot water (violet)
Very soluble in ethanol (violet blue)
H_2SO_4 conc. — reddish yellow; on dilution — weak green
Aqueous solution + NaOH — weak dull violet

42655 **C.I. Acid Blue 90** (*Bright blue*)

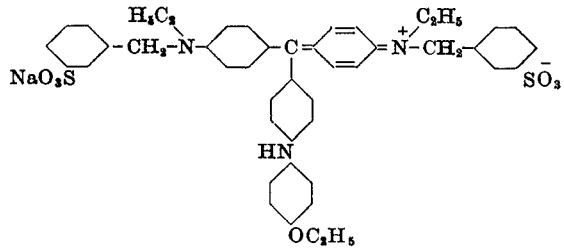


Condense benzaldehyde (1 mol.) with *N*-benzyl-*N*-ethyl-*m*-toluidine (2 mol.), sulfonate the product to the trisulfonic acid, oxidise with lead peroxide, and react with *p*-phenetidine whereby the sulfonic acid group in the phenyl ring is replaced with the *p*-phenetidino group

Discoverer — M. Weiler 1913
Bayer Co., *BP* 275609; *USP* 1218232, 1731637; *FP* 474260; *GP* 287003, 293352, (*Fr.* **12**, 210, 915), 292998, 293322, (*Fr.* **13**, 337, 338)
BIOS 1157, 53. *FIAT* 1313, **2**, 339
FIAT 764 — Brillantindocyanin G
Fierz-David, suppl. (1935), 13

Slightly soluble in cold, soluble in hot water (bright blue)
Soluble in ethanol (bright blue)
H_2SO_4 conc. — blood red; on dilution — orange red
Aqueous solution + NaOH — violet

42660 C.I. Acid Blue 83 (*Bright blue*)



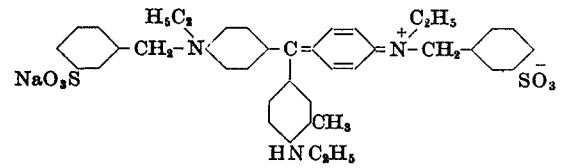
Condense *p*-chlorobenzaldehyde (1 mol.) with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid (2 mol.), oxidise the product with dichromate–oxalic acid, and condense with *p*-phenetidine

Discoverer — M. Weiler 1913

Bayer Co., *BP* 275609; *USP* 1218232, 1731637; *FP* 474260, 636600; *GP* 287003, 293352, (*Fr.* **12**, 210, 915), 292998, 293322, (*Fr.* **13**, 337, 338)
BIOS 1157, 53. *FIAT* 1313, **2**, 337
FIAT 764 — Brillantindocyanin 6B
Fierz-David, suppl. (1935), **13**

Insoluble in cold, slightly soluble in hot water (bright red blue)
Slightly soluble in ethanol (bright blue)
H_2SO_4 conc. — orange red; on dilution — cornflower blue
Aqueous solution + NaOH — violet

42665 C.I. Acid Violet 72 (*Bright bluish violet*)



Condense formaldehyde with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid, and oxidise the product with dichromate–sulfuric acid in the presence of *N*-ethyl-*o*-toluidine

Discoverer — Bayer Co.

Acid Violet CBB (By)

FIAT 764 — Saeureviolett CBB

Soluble in water (violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow to golden orange; on dilution — pale green
Aqueous solution + NaOH — dull violet ppt.

42666 Acid Dye

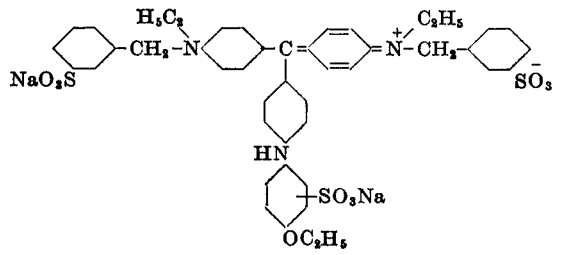
Probably a mixture of **C.I.42650** and **C.I.42665**

Condense formaldehyde (1 mol.) with α-(*N*-ethylanilino)-*m*-toluenesulfonic acid (2 mol.) and co-oxidise the product with *N*-ethyl-*o*-toluidine and *N*,*N*-diethylaniline

Discoverer — I.G.

FIAT 764 — Guineaviolett R kz., Saeureviolett CBB

42670 Acid Dye



Sulfonate **C.I.42660** with sulfuric acid monohydrate

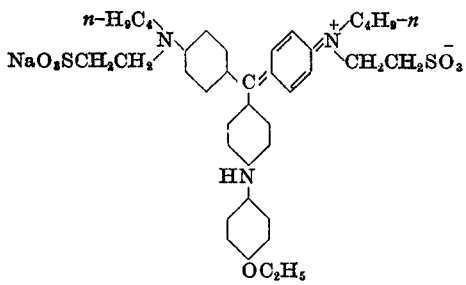
Discoverer — M. Weiler 1913

Brilliant Indocyanine 6BS (IG)

Dyes wool in presence of weak acid in bright blue shades of poor to moderate fastness to light and good fastness to washing

Patents as for **C.I.42660**
FIAT 764 — Brillantindocyanin 6BS

42675 C.I. Acid Blue 100 (*Bright blue*)

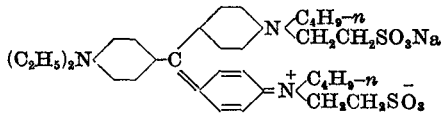


Condense *p*-chlorobenzaldehyde (1 mol.) with *N*-butyl-*N*-phenyltaurine (2 mol.), oxidise the product with dichromate–oxalic acid, and fuse with *p*-phenetidine

Discoverer — I.G. 1931

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756; *GP* 574021 (*Fr.* **19** 1574), 590748 (*Fr.* **20**, 1040), 597078, 606248, (*Fr.* **21**, 794, 792)
FIAT 764 — Brillantindocyanin 7BF

42680 C.I. Acid Violet 23 (*Bright violet*)



Condense formaldehyde (1 mol.) with *N*-butyl-*N*-phenyltaurine (2 mol.), and oxidise with dichromate–sulfuric acid in presence of *N*,*N*-diethylaniline

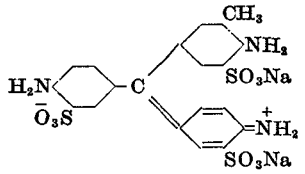
Discoverer — I.G. 1931

Brilliant Acid Violet 6B (IG)

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756; *GP* 574021 (*Fr.* **19**, 1574), 590748 (*Fr.* **20**, 1040), 597078, 606248, (*Fr.* **21**, 794, 794)
FIAT 764 — Brillantsaeureviolett 6B

Soluble in water (violet)
Very soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — blue green
Aqueous solution + NaOH — decolorised to very pale violet

42685 C.I. Acid Violet 19 (*Bright reddish violet*)



Trisulfonate **C.I.42510** with oleum and convert the product into the sodium or ammonium salt

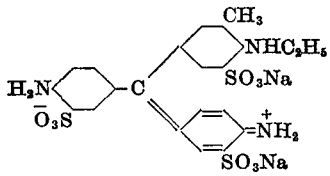
Discoverer — Caro 1877

Badische Co., *BP* 3731/77; *USP* 250201; *FP* 122721; *GP* 2086 (*Fr.* **1**, 108)
Read Holliday & Sons, *USP* 250247
Jacobsen, *BP* 2828/79; *GP* 8764 (*Fr.* **1**, 110)
FIAT 764 — Saeurefuchsin O and Kaliumsalz
Schoop, *Chem. Zeitsch.* **11** (1887), 572

Soluble in cold and hot water (bluish red)
Insoluble in ethanol
H_2SO_4 conc. — orange; on dilution — red violet
Aqueous solution + NaOH — decolorised

42690 Acid Dye

A mixture of the sodium salts of the di- and tri-sulfonic acids obtained by sulfonation of *N*-ethylrosaniline (**Red Violet 5R**) with oleum, and mainly



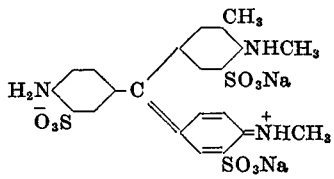
Discoverer — Caro 1877

Red Violet 5RS (B)

Badische Co., *BP* 3731/77; *USP* 204798; *GP* 2096 (*Fr.* **1**, 108)
FIAT 764 — Rotviolett für Fanalfarben

Soluble in water (magenta red)
Insoluble in alcohol
H_2SO_4 conc. — yellow; on dilution — magenta red

42695 Acid Dye



Trisulfonate *N*,*N*′-dimethylrosaniline with oleum and convert to the sodium salt

Discoverer — Caro 1877

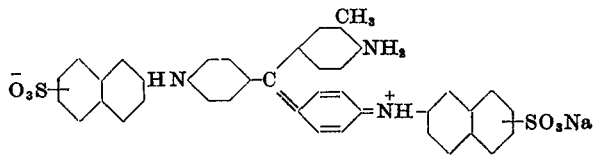
Acid Violet 4RSN (SCI), 4RS (MLB), Red Violet 4RS (B)

Dyes wool in presence of acid in bluish violet shades of poor fastness to light and washing

Badische Co., *BP* 3731/77; *USP* 204797, 204798; *GP* 2096 (*Fr.* **1**, 108)

Soluble in water (magenta red)
H_2SO_4 conc. — brownish yellow; on dilution — magenta red
Aqueous solution + NaOH — pale reddish yellow on heating

42700 C.I. Direct Blue 41 (*Bright greenish blue*)



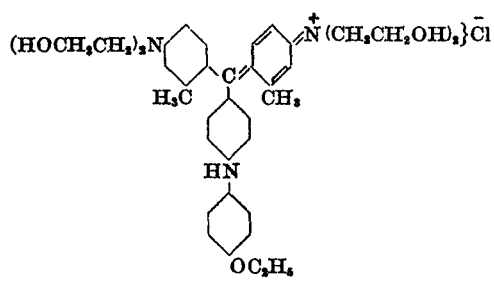
Heat **C.I.42510** with 2-naphthylamine, disulfonate the product and convert to the sodium salt

Discoverer — Meldola 1883

Meldola, *Chem. News*, **47** (1883), 133, 146
Nölting & Collin, *Ber.* **17** (1884), 259
FIAT 764 — Brillantreinblau 8G, 8GZ

Slightly soluble in cold, soluble in hot water (green blue)
Insoluble in ethanol
H_2SO_4 conc. — reddish brown; on dilution — blue ppt.
Aqueous solution + NaOH — violet black and ppt.

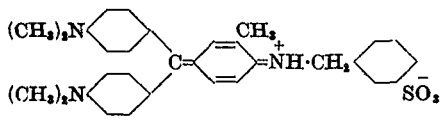
42705 C.I. Basic Blue 18 (*Bright blue*)



Condense 2,2′-(*m*-tolylimino)diethanol (2 mol.) with *p*-chlorobenzaldehyde at 100°C in very dilute sulfuric acid, precipitate the base by ammonia, dissolve the ppt. in dilute hydrochloric acid, oxidise with dichromate–oxalic acid, and condense with *p*-phenetidine

Discoverers — P. Wolff and W. Werner
I.G., *BP* 425041; *USP* 2044963; *GP* 606078 (*Fr.* **21**, 784)
BIOS 1433, 40
FIAT 764 — Astracyanin B

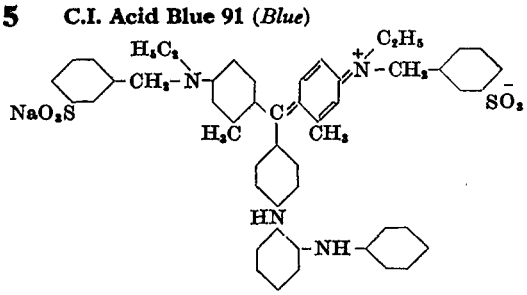
42710 C.I. Acid Violet 38 (*Bluish violet*)



Condense 4,4′-bis(dimethylamino)benzophenone and *N*-benzyl-*o*-toluidine with phosphorus oxychloride, and sulfonate the product with 30% oleum

Discoverer — Badische Co.
Alkali Violet 3ROO (B)
BIOS 959, 2
FIAT 764 — Alkaliviolett 3ROO

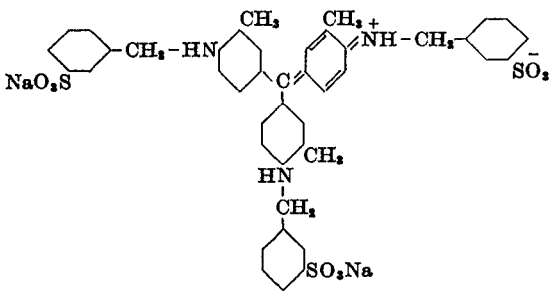
42715 C.I. Acid Blue 91 (*Blue*)



Condense benzaldehyde (1 mol.) with *N*-benzyl-*N*-ethyl-*m*-toluidine (2 mol.), trisulfonate the product with oleum, oxidise with lead peroxide and finally react with *N*-phenyl-*o*-phenylenediamine, which replaces the sulfonic acid group originally introduced in the *para* position of the unsubstituted phenyl nucleus

Discoverers — E. Teupel and O. Wahl
Brilliant Discharge Blue G (IG)
I.G., *BP* 449090; *FP* 773820; *GP* 637939 (*Fr.* **23**, 702)
FIAT 764 — Brillantaetzblau G
Fierz-David, Blangey & Stamm, *Helv. Chim. Acta*, **25** (1942), 1162

42720 Acid Dye



Condense formaldehyde (1 mol.) with *α-o*-toluidino-*m*-toluenesulfonic acid (2 mol.), and air oxidise the product formed with *α-o*-toluidino-*m*-toluenesulfonic acid (1 mol.) in the presence of cupric chloride

Discoverer — Bayer Co.
Acid Violet 3R (By)

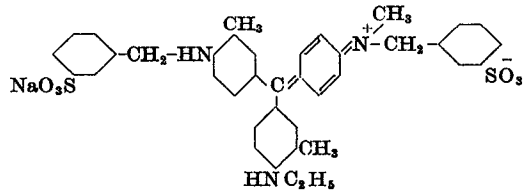
Wool dyed in presence of sulfuric acid and silk with acetic acid to violet shades; levelling moderate

Fastness Properties (C): Alkali 4, Light 1, Milling 3, Perspiration 3–4, Sea water 4, Washing 3

FDX 885 — Saeureviolett 3R

Soluble in water (red violet)
Slightly soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — red violet
Aqueous solution + NaOH — red violet to wine red ppt.

42725 Acid Dye



Condense formaldehyde (1 mol.) with α-(*N*-methylanilino)-*m*-toluenesulfonic acid (1 mol.) and *N*-ethyl-*o*-toluidine (1 mol.), and air oxidise the product formed with α-*o*-toluidino-*m*-toluenesulfonic acid in the presence of copper salts

Discoverer — Bayer Co. 1896

Acid Violet R extra

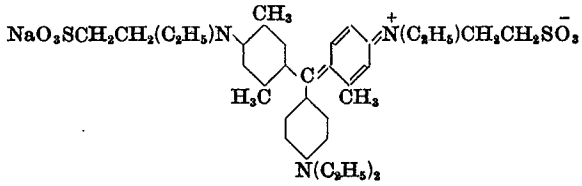
Wool dyed from a sulfuric acid and silk from an acetic acid or neutral dyebath; levelling moderate, suitable for direct print styles

Fastness Properties (C): Alkali 4–5, Milling 2–3, Perspiration 3, Sea water 3, Washing 3, 3, 3

FIAT 764 — Saeureviolett R ex.

Soluble in water (red violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — cornflower blue
Aqueous solution + NaOH — pale wine red

42730 C.I. Acid Blue 24 (*Blue*)



Condense *p*-diethylaminobenzaldehyde (1 mol.) with *N*-ethyl-*N*-*m*-tolyltaurine (2 mol.) in sulfuric acid, and oxidise with dichromate–oxalic acid

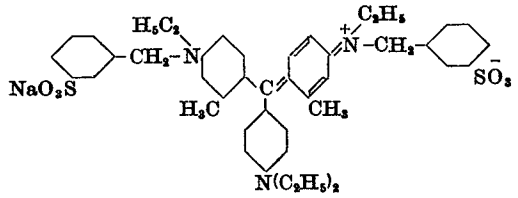
Discoverer — I.G. 1931

I.G., *BP* 387956, 420307, 421592, 430499; *USP* 1921334, 2003407; *FP* 742756; *GP* 574021 (*Fr.* 19, 1574), 590748 (*Fr.* 20, 1040), 597078, 606248, (*Fr.* 21, 794, 792)

FIAT 764 — Saeurebrillantblau R

Soluble in water (blue violet to violet blue)
Soluble in ethanol (pure blue)
H_2SO_4 conc. — yellow to golden yellow; on dilution — light green
Aqueous solution + NaOH — unchanged

42735 C.I. Acid Blue 104 (*Bright blue*)



Condense *p*-diethylaminobenzaldehyde (1 mol.) with α-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (2 mol.), and oxidise with dichromate–oxalic acid

Discoverer — A. Hausdörfer 1900

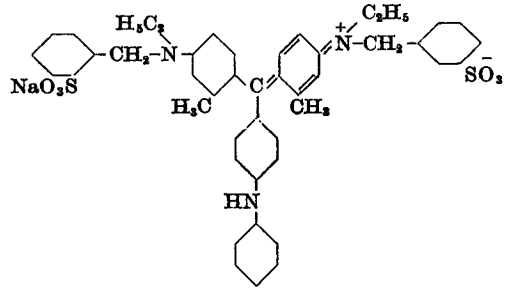
Bayer Co., *BP* 18448/00; *GP* 125134 (*Fr.* 6, 258)

FIAT 1313, 2, 343

FIAT 764 — Brillantwollblau FFR extra

Very soluble in water (violet blue)
Very soluble in ethanol (pure blue)
H_2SO_4 conc. — yellow to golden yellow; on dilution — citron yellow
Aqueous solution + NaOH — cornflower blue and ppt.

42740 C.I. Acid Blue 109 (*Bright blue*)



(*a*) Condense benzaldehyde (1 mol.) with *N*-benzyl-*N*-ethyl-*m*-toluidine (2 mol.), trisulfonate, oxidise with lead peroxide, and condense with aniline, replacing the *para* sulfonic acid group with the anilino group

(*b*) Condense *p*-chlorobenzaldehyde (1 mol.) with α-(*N*-ethyl-*m*-toluidino)-*m*-toluenesulfonic acid (2 mol.), oxidise and condense with aniline

Discoverer — M. Weiler 1913

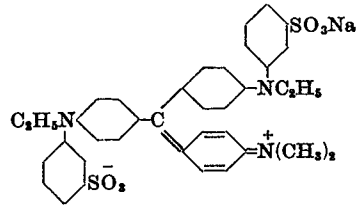
Bayer Co., *BP* 275609; *USP* 1218232, 1731637; *FP* 474260/636600; *GP* 287003, 293352, (*Fr.* 12, 210, 915), 292998, 293322, (*Fr.* 13, 337, 338)

FIAT 1313, 2, 341

FIAT 764 — Brillantwollblau FFB ex.

Very soluble in water (violet blue)
Very soluble in ethanol (pure blue)
H_2SO_4 conc. — yellow brown; on dilution — olive yellow
Aqueous solution + NaOH — red brown and ppt.

42745 C.I. Acid Violet 25 (*Bluish violet*)



Condense *p*-dimethylaminobenzoyl chloride with *N*-ethyldiphenylamine, and disulfonate the product

Discoverer — Müller 1884

Acid Violet 7B (IG)

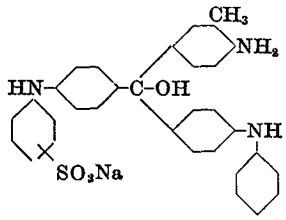
M.L.B., *BP* 4961/84; *USP* 353266; *FP* 181351; *GP* 34463 (*Fr.* 1, 88)

Soluble in water (bluish violet)
Soluble in ethanol (bluish violet)
H_2SO_4 conc. — orange brown; on dilution — olive green to bluish green
Aqueous solution + NaOH — bluish violet ppt.

42750 C.I. Acid Blue 110 (*Blue*)

42750:1 (**C.I. Pigment Blue 19**) is the acid derivative

Carbinol base



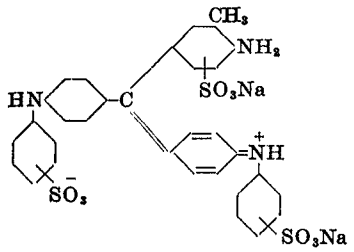
Sulfonate **C.I.42775** with conc. sulfuric acid and convert to the sodium salt

Discoverers — Nicholson 1862; Gilbee 1862

Nicholson, *BP* 1857/62
Gilbee, *BP* 1939/62
Bulk, *Ber.* **5** (1872), 417
Knecht & Batey, *JSDC*, **25** (1908), 198
BIOS 1433, 35–37; *BIOS-MISC* 20, App. 72
FIAT 764—Alkaliblau 2, 4, 7, H5B

Insoluble in cold, slightly soluble in hot water (colourless)
Slightly soluble in ethanol
H_2SO_4 conc. — brownish red; on dilution — blue ppt.

42755 C.I. Acid Blue 22 (*Blue*)



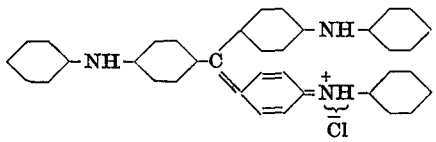
Trisulfonate **C.I.42775** with conc. sulfuric acid and convert to the sodium salt

Discoverer — Nicholson 1862

Nicholson, *BP* 1857/62
Friedländer, **1**, 105, 106
Bulk, *Ber.* **5** (1872), 419
Erhardt, *Dingl.* **230** (1878), 346
Knecht & Batey, *JSDC*, **25** (1909), 198
FIAT 764 — Wasserblau I alt, Kristalle B, R, and TR

Soluble in cold and hot water (blue)
Slightly soluble in ethanol
H_2SO_4 conc. — reddish yellow; on dilution — blue with blue ppt.
Aqueous solution + NaOH — brownish red

42760 C.I. Solvent Blue 23 (*Greenish blue*)



Heat **C.I.42500** with excess aniline in presence of benzoic acid at about 180°C

Discoverers — Girard and de Laire 1866

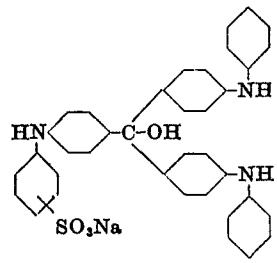
Girard & de Laire, *BP* 1093/66, 2686/66; *FP* 70876, 75101, 75168
BIOS 1433, 30
FIAT 764 — Blau II T Base

Insoluble in water
Slightly soluble in alcohol (blue)
H_2SO_4 conc. — brownish yellow; on dilution — blue ppt.

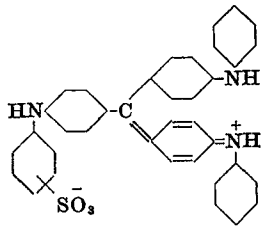
42765 C.I. Acid Blue 119 (*Blue*)

42765:1 (**C.I. Pigment Blue 61**) is the acid derivative

Carbinol base



Blue dye



Sulfonate **C.I.42760** with conc. sulfuric acid, and convert to the sodium salt

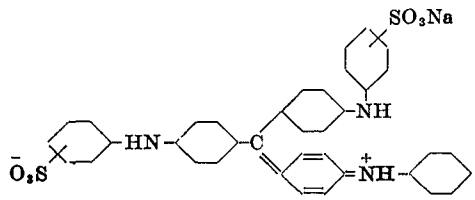
Discoverers — Nicholson 1862; Girard and de Laire 1866

Manual, 544

Insoluble in cold, soluble in hot water (blue)
Soluble in ethanol (greenish blue)
H_2SO_4 conc. — reddish-brown; on dilution — blue ppt.

42770 C.I. Acid Blue 48 (*Blue*)*

42770:1 (**C.I. Pigment Blue 18**) is the acid derivative



Disulfonate **C.I.42760** and convert to the sodium salt

* On silk

Discoverer — Nicholson 1862

Kalle, *Z. Chem. Grossgew.* **1** (1877), 189
Bulk, *Ber.* **5** (1872), 419
BIOS 1433, 30
FIAT 764 — Reflexblau B

Very soluble in cold and hot water (blue)
Soluble in ethanol (greenish blue)
H_2SO_4 conc. — reddish brown; on dilution — blue with bluish violet ppt.
Aqueous solution + NaOH

42775 C.I. Solvent Blue 3 (*Blue*)

Hydrochloride, sulfate or acetate of variable mixtures of *N*-phenylated pararosaniline and rosaniline, obtained by heating **C.I.42510** with an excess of aniline in the presence of benzoic acid (for the best blue brands), or of acetic acid or sodium acetate (for red brands) at about 180°C

Formerly used as a basic dye

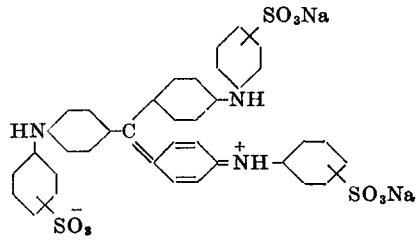
Insoluble in water
Readily soluble in ethanol
H_2SO_4 conc. — brownish yellow; on dilution — blue ppt.
Aqueous solution + NaOH — brown red

Discoverers — Girard and de Laire 1861; Nicholson 1862; Monnet and Drury 1862; Wanklyn (use of benzoic acid) 1862

Spirit Blue, various brands

Girard & de Laire, *FP* 45826
Nicholson, *BP* 1857/62; *FP* 54827
Monnet & Drury, *BP* 1939/62
FIAT 764 — Spritblau T
Girard & de Laire, *Dingl.* **162** (1861), 297; **170** (1863), 58; *Jahresber.* (1862), 696
Baeyer & Villiger, *Ber.* **37** (1904), 2870
Knecht, *JSDC*, **21** (1905), 295; **23** (1907), 119
Lambrecht, *Ber.* **40** (1907), 249
Knecht, *Deutscher Färberkalender*, (1909), 86

42780 C.I. Acid Blue 93 (*Bright blue*)



(*a*) Trisulfonate **C.I.42760** and convert to the sodium salt

(*b*) Condense formaldehyde with *N*-phenylsulfanilic (or metanilic) acid (2 mol.) and oxidise the product formed in presence of another mol. of the latter compound

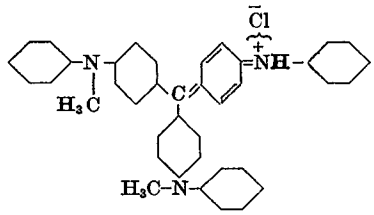
(*c*) Condense diphenylamine with carbon tetrachloride and sulfonate the product

Discoverers — A. W. Hofmann 1858; Nicholson 1862; Girard and de Laire 1866; K. Heumann 1892; Sandmeyer 1892; M. Weiler 1906

Nicholson, *BP* 1857/62
Bayer Co., *BP* 8634/92; *GP* 66511 (*Fr.* **3**, 102) (*Fr.* **3**, 115)
Geigy, *BP* 12720/92; *USP* 538215; *FP* 223032; *GP* 73092 (*Fr.* **3**, 115)
Erhardt, *Dingl.* **230** (1878), 342
Knecht & Batey, *JSDC*, **25** (1909), 198

Very soluble in cold and hot water (blue)
H_2SO_4 conc. — reddish brown; on dilution — blue violet

42785 Basic Dye



React *N*-methyldiphenylamine with oxalic acid

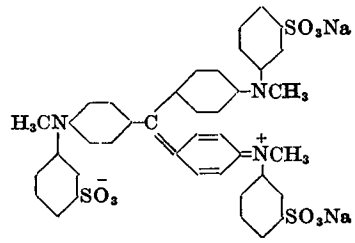
Discoverers — Girard 1874; Bardy and Dusart

Methyldiphenylamine Blue (MLB)

Girard, *BP* 2347/74
M.L.B., *GP* 8251 (*Fr.* **1**, 66)
Girard, *Ber.* **9** (1876), 641
Chem. Ind. **2** (1879), 429
Neumann & Gould, *Anal. Chem.* **25** (1953), 751
Feigl, *Spot Tests*, **2** (1954), 257

Insoluble in water
Soluble in ethanol (blue)
H_2SO_4 conc. — brown yellow; on dilution — blue ppt.

42790 Acid Dye



Condense *N*-methyldiphenylamine with phosgene and trisulfonate the product

Discoverer — M.L.B. 1884

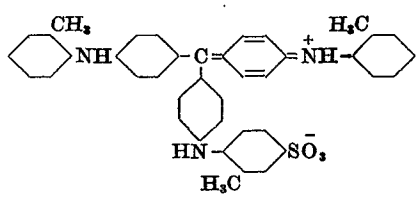
Hoechst New Blue (MLB)

Wool dyed to a blue shade from a neutral dyebath followed by treatment in dilute acid. Silk dyed from a faintly acid soap bath. Moderate fastness to light and washing

M.L.B., *BP* 4761/84; *GP* 34463 (*Fr.* **1**, 88)

Soluble in water (blue)
Slightly soluble in ethanol
H_2SO_4 conc. — brownish red; on dilution — blue with ppt.

42795 C.I. Pigment Blue 57 (*Reddish blue*)



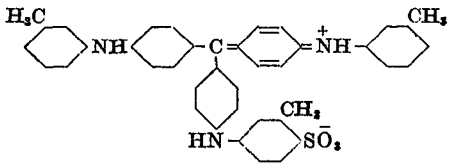
Heat **C.I.42500** with excess *o*-toluidine in presence of benzoic acid at 180–185°C for 1½–2 hours, and sulfonate with conc. H_2SO_4

Discoverer — I.G.

Pigment for printing inks with similar properties to **C.I. Pigment Blue 18**

BIOS 1433, 32
FIAT 764 — Reflexblau RB

42800 **C.I. Pigment Blue 56** (*Greenish blue*)



Heat **C.I.42500** with excess *m*-toluidine in presence of benzoic acid at 180–185°C for 1½–2 hours, and sulfonate with 90% H_2SO_4

Discoverer — I.G.

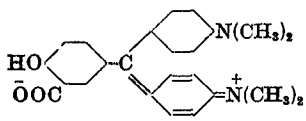
Reflex Blue 2G (IG)

Pigment for printing inks with similar properties to **C.I. Pigment Blue 18**

BIOS 1433, 35; *BIOS-MISC* 20, App. 73
FDX 885
FIAT 764 — Reflexblau 2G

(*c*) Aminohydroxy derivatives of Triphenylmethane

43500 **Mordant Dye**



Condense 4,4′-bis(dimethylamino)benzhydrol with salicylic acid and oxidise the product

Discoverer — Runkel 1890

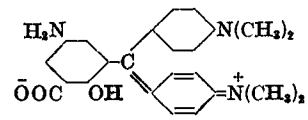
Chrome Violet (By)

Dyes chrome-mordanted wool violet. Moderately fast to milling and washing but not fast to light. Used mainly in calico printing with a chromium mordant

Bayer Co., *BP* 14621/90; *USP* 476413, 476414; *FP* 208330, *GP* 58483 (*Fr.* **3**, 120)

Slightly soluble in water (green)
Slightly soluble in ethanol (reddish violet)
H_2SO_4 conc. — yellowish brown; on dilution — red brown
Aqueous solution + NaOH — reddish violet and black ppt.

43505 **C.I. Mordant Red 29**



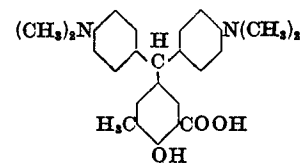
Condense 4,4′-bis(dimethylamino)benzhydrol with 5-aminosalicylic acid and oxidise the product formed

Discoverer — Bayer Co. 1891

Bayer Co., *BP* 14621/90; *FP* 208330; *GP* 58483 (*Fr.* **3**, 120)
Chem. Ind. **15** (1892), 373

Insoluble in water
Slightly soluble in boiling ethanol (red)
H_2SO_4 conc. — bluish red; on dilution — reddish brown ppt.
Aqueous solution + NaOH — brownish red

43510 **C.I. Mordant Violet 6** (*Bright violet*)



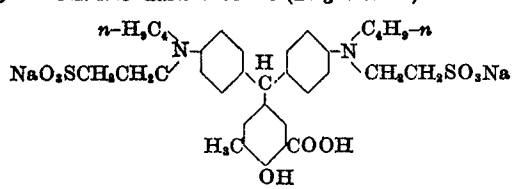
Treat *N*,*N*-dimethylaniline with formaldehyde and *N*,*N*-dimethyl-*p*-nitrosoaniline hydrochloride in sulfuric acid solution, and then react with 2,3-cresotic acid. The product is oxidised on the fibre

Discoverers — Bayer Co.; Agfa 1912

Bayer Co., *GP* 67429 (*Fr.* **3**, 126); Agfa, *GP* 250366 (*ap.* A 20544) (*Fr.* **10**, 236)

Slightly soluble in water (light grey violet)
Soluble in ethanol (violet)
H_2SO_4 conc. — light yellow brown; on dilution — salmon colour
Aqueous solution + NaOH — pale violet ppt.

43515 **C.I. Mordant Violet 8** (*Bright violet*)



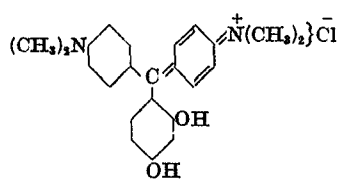
Condense 5-formyl-2,3-cresotic acid (1 mol.) with *N*-butyl-*N*-phenyltaurine (2 mol.). The product is developed on the fibre by chroming

Discoverers — H. Krzikalla and C. Thode 1936

I.G., *BP* 472407; *FP* 816768; *GP* 654573 (*Fr.* **24**, 262)
BIOS-MISC 20, App. 28
FIAT 1313, **2**, 356
FIAT 764 — Chromoxanbrillantviolett BR

Soluble in water (bluish green)
Soluble in ethanol (green)
H_2SO_4 conc. — light golden yellow; on dilution — light blue green
Aqueous solution + NaOH — bright red violet

43520 **Basic Dye**



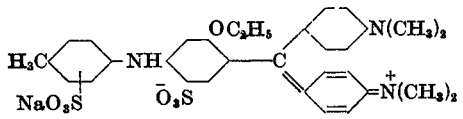
Condense resorcinol with *p*,*p*′-(dichloromethylene)bis[*N*,*N*-dimethylaniline]

Discoverer — Caro 1883

Resorcine Violet

Bayer Co., *GP* 58483 (*Fr.* **3**, 120)

43525 C.I. Acid Violet 15 (*Bright reddish blue → Bluish violet*)

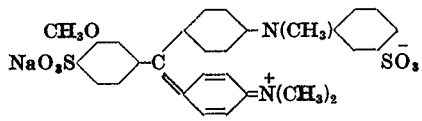


Condense 4,4′-bis(dimethylamino)benzophenone with *N*-*p*-tolyl-*m*-phenetidine and phosphorus oxychloride, then disulfonate and convert into the sodium salt

Discoverer — Müller 1891
Badische Co., *BP* 11275/91; *USP* 501434; *FP* 214571; *GP* 62539 (*Fr.* 3, 142)
BIOS 1433, 53
FIAT 764 — Saeureviolętt 6BNOO 3130

Soluble in water (blue violet)
Soluble in ethanol (blue violet)
H_2SO_4 conc. — brown; on dilution — violet red to bluish violet
Aqueous solution + NaOH — slowly decolorised

43530 Acid Dye

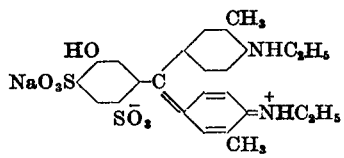


Condense 4′-dimethylamino-3-methoxybenzophenone with *N*-methyldiphenylamine and phosphorus oxychloride, then disulfonate and convert to the sodium salt

Discoverers — Fuchs and Kees 1890
Ketone Blue 4BN (MLB)
Dyes wool and silk pure blue shades fast to acids and washing
M.L.B., *BP* 8269/92; *FP* 221333; *GP* 65952 (*Fr.* 3, 164)

Soluble in water (blue)
Soluble in alcohol
H_2SO_4 conc. — reddish-yellow; on dilution — bluish green
Aqueous solution + NaOH — brownish red

43535 Acid Dye

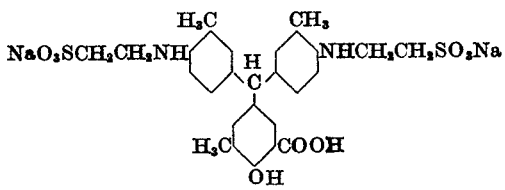


Condense *m*-hydroxybenzaldehyde with *N*-ethyl-*o*-toluidine (2 mol.), disulfonate the product, oxidise, and convert to the sodium salt

Discoverer — Weinberg 1891
Cyanol FF (C)
Dyes wool and silk from a sulfuric acid bath in bright bluish shades of poor to moderate fastness to light and washing
Cassella Co., *BP* 15143/91; *USP* 472091; *FP* 215835; *GP* 73717 (*Fr.* 3, 158)
Hickman & Linstead, *JCS*, **121** (1922), 2504
Holmes, *Ind. Eng. Chem.* **15** (1923), 833

Soluble in water (reddish blue)
Very soluble in ethanol (royal blue)
H_2SO_4 conc. — yellow; on dilution — yellowish green to blue
Aqueous solution + NaOH — dichroic green and red, converted into wine red on boiling

43540 C.I. Mordant Violet 23 (*Bright reddish violet*)

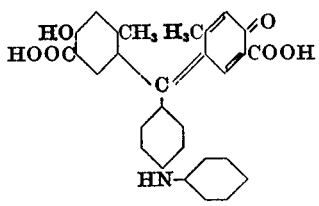


Condense 5-formyl-2,3-cresotic acid with *N*-*o*-tolyltaurine. The product is developed on the fibre by chroming

Discoverers — H. Krzikalla and C. Thode 1936
I.G., *BP* 472407; *FP* 816768; *GP* 654573 (*Fr.* **24**, 562)
BIOS 1433, 125. *FIAT* 1313, **2**, 365
FIAT 764 — Chromoxanbrillantviolett 5R

Very soluble in water (red violet)
Very soluble in ethanol (violet)
H_2SO_4 conc. — golden yellow; on dilution — pale violet
Aqueous solution + NaOH — decolorised

43545 Mordant Dye

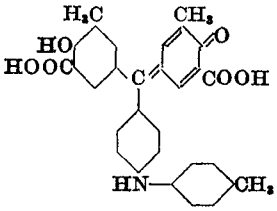


Condense *p*-chlorobenzaldehyde (1 mol.) with 2,4-cresotic acid (2 mol.) oxidise the product with nitrosylsulfuric acid, and condense with aniline

Discoverers — A. Stock and F. Heim 1909
Chromogen Blue R (By)
M.L.B., *BP* 1213/10; *USP* 995494; *FP* 417490; *GP* 227105 (*Fr.* **10**, 233)

Soluble in water (corinth)
Soluble in ethanol (violet)
H_2SO_4 conc. — orange brown; on dilution — wine red
Aqueous solution + NaOH — wine red

43550 C.I. Mordant Violet 11 (*Bright bluish violet*)



(*a*) Condense benzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.) in sulfuric acid solution, sulfonate the condensation product with monohydrate, oxidise the product with nitrous acid, and condense with *p*-toluidine

(*b*) Condense *p*-chlorobenzaldehyde (1 mol.) with 2,3-cresotic acid, oxidise, and react the product with *p*-toluidine and its hydrochloride

Discoverers — A. Stock and F. Heim 1909; M. Weiler 1914
M.L.B., *BP* 1213/10; *USP* 995494; *FP* 417490; *GP* 227105 (*Fr.* **10**, 233)
Bayer Co., *USP* 1218232; *GP* 287003 (*Fr.* **12**, *210*)
FIAT 1313, **2**, 363
FIAT 764 — Chromoxanbrillantviolett SB

Slightly soluble in cold, soluble in hot water (violet)
H_2SO_4 conc. — bright orange red; on dilution — violet

43551 C.I. Mordant Violet 19 (*Violet*)

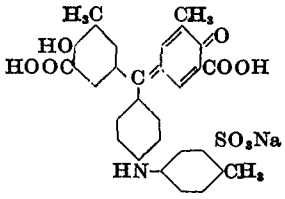
Sulfite salt of **C.I.43550**

Dissolve **C.I.43550** in neutral sodium sulfite and evaporate to dryness

Discoverers — B. Franke and H. Moehrke 1926
I.G., *BP* 263879; *USP* 1747541; *GP* 457495 (*Fr.* **16**, 832)
FIAT 1313, **2**, 364
FIAT 764 — Chromogenviolett B

Soluble in water (bordeaux)

43552 C.I. Mordant Violet 36 (*Violet*)

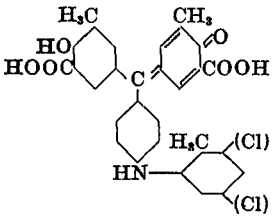


Sulfonate **C.I.43550** with oleum

Discoverer — M. Weiler 1914
Bayer Co., *USP* 1244149; *FP* 515000; *GP* 318956 (*Fr.* **13**, 343)
BIOS 1433, 120. *FIAT* 1313, **2**, 364
FIAT 764 — Chromoxanbrillantviolett BD

Soluble in water (violet)
H_2SO_4 conc. — wine red; on dilution — violet

43555 C.I. Mordant Violet 10 (*Bright violet*)

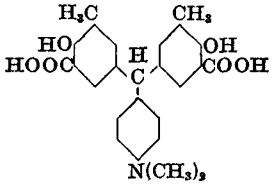


Condense benzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), sulfonate the product with oleum, oxidise with nitrosylsulfuric acid, and condense with 3(and 5)-chloro-*o*-toluidine

Discoverers — W. Duisberg, W. Hentrich, and W. Schepss 1923
Bayer Co., *BP* 237096; *USP* 1582909; *FP* 583703; *GP* 411593 (*Fr.* **15**, 440)
FIAT 764 — Chromoxanbrillantviolett SR

Soluble in water (wine red)
Soluble in ethanol (red violet)
H_2SO_4 conc. — bright orange red; on dilution — violet
Aqueous solution + NaOH — bright magenta red

43560 C.I. Mordant Violet 15 (*Reddish violet*)

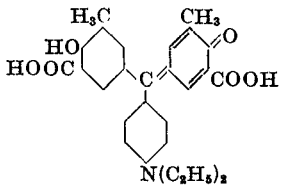


Condense *p*-dimethylaminobenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), and oxidise on the fibre

Discoverer — Agfa 1911
Agfa, *GP* 250365 (*ap.* A 20224) (*Fr.* **10**, 236)
Geigy, *GP* 209535 (*Fr.* **9**, 211)
FIAT 764 — Metachromviolett RR

Soluble in water (light currant)
Soluble in ethanol (magenta to wine red)
H_2SO_4 conc. — pale red orange brown; on dilution — light pink
Aqueous solution + NaOH — very pale currant

43565 **C.I. Mordant Violet 1** (*Bright violet*)



Condense *p*-diethylaminobenzaldehyde (1 mol.) with 2,3-cresotic acid in sulfuric acid solution and oxidise the product with nitrous acid

Discoverer — Geigy 1908
Geigy, *GP* 209535 (*Fr.* **9**, 211)
BIOS 1239, 22; 1433, 121; *BIOS-MISC* 20, App. 29
FIAT 1313, **2**, 364
FIAT 764 — Chromoxanbrillantviolett RE

Soluble in cold or hot water (violet red)
Soluble in ethanol (red violet)
H_2SO_4 conc. — bright yellow red; on dilution — cherry red ppt.
Aqueous solution + NaOH — bright red violet prior to decolorisation

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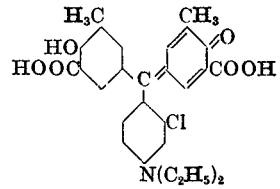
43570 **C.I. Mordant Violet 28** (*Bright bluish violet*)



Condense 2-chloro-4-diethylaminobenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.) and oxidise the product with nitrosylsulfuric acid

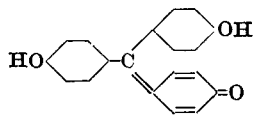
Discoverer — Geigy 1907
Geigy, *GP* 198729 (*Fr.* **9**, 210)
FIAT 764 — Chromoxanbrillantviolett BE

Soluble in water (currant)
Soluble in ethanol (red violet)
H_2SO_4 conc. — bright magenta red; on dilution — very pale corinth
Aqueous solution + NaOH — red violet

(*d*) Hydroxy derivatives of Triphenylmethane

43800 **Solvent Dye**

Classical names — **Aurine, Rosolic Acid**



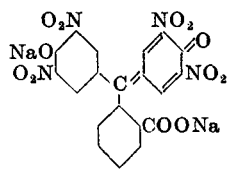
Sodium Salt is **Yellow Coralline**

Heat phenol with oxalic acid in conc. sulfuric acid

Discoverer — Runge 1834
Corallin Spirit Soluble (B), Spirit Aurine (BSS)
Formerly used as a solvent dye in alcoholic solvents for spirit lacquers. Light, fair; Heat, stable to 140°C; m.p. 130°C
Persoz, *GP* 68976 (*Fr.* **3**, 103)
BIOS 569, 12
Runge, *Ann. Phys. Chem.* **31** (1834), 31, 65, 70, 513
Persoz, *Jahresber.* **8** (1862), 583
Caro & Wanklyn, *Z. angew. Chem.* **2** (1866), 563; *Sci. Proc. R. Dublin Soc.* **15** (1866), 210
Baines & Driver, *JCS*, **123** (1923), 1214; **125** (1924), 907
Spiers, *JCS*, **125** (1924), 450
Gomberg & Snow, *JACS*, **47** (1925), 198
Ramart-Lucus, *Compt. rend.* **213** (1941), 67, 244

Insoluble in water; sodium salt soluble (red)
Soluble in ethanol (golden yellow) sodium salt soluble (magenta red)
H_2SO_4 conc. — yellow; on dilution — yellow with ppt.
Aqueous solution + NaOH — cherry red

43805 **Acid Dye**

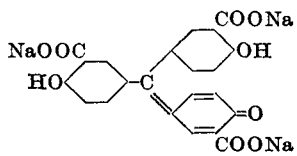


Nitrate phenolphthalein in sulfuric acid

Discoverers — Dreyfus, Bull and Hall 1889
Aurotine (CAC)
Dyes wool or chrome-mordanted wool, or wool in the presence of acetic acid, an orange yellow, the mordanted shade being somewhat faster
Clayton Aniline, *BP* 3441/89; *GP* 52211 (*Fr.* **2**, 89)
JSDC, **6** (1890), 32

Soluble in water (dark yellow)
Soluble in alcohol (dark yellow)
H_2SO_4 conc. — brownish orange; on dilution — orange ppt.
Aqueous solution + NaOH — sodium stannite — deep indigo blue

43810 **C.I. Mordant Violet 39** (*Reddish violet*)

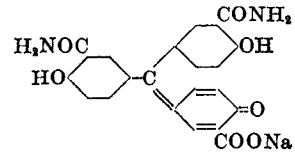


React formaldehyde (or methyl alcohol and sodium nitrite) with salicylic acid in concentrated sulfuric acid

Discoverer — Sandmeyer 1889
Geigy, *BP* 3333/89; *USP* 410739; *FP* 196292; *GP* 49970 (*Fr.* **2**, 50)
Knecht, *JSDC*, **5** (1889), 170
Caro, *Ber.* **25** (1892), 939

Soluble in water (dark red)
Insoluble in ethanol
H_2SO_4 conc. — brown; on dilution — ppt.
Aqueous solution + NaOH — light brown

43815 Mordant Dye



Condense salicylamide with formaldehyde, then with salicylic acid, oxidise the product with sodium nitrite, and convert into the sodium salt

Discoverers — Alioth and Bodmer 1921

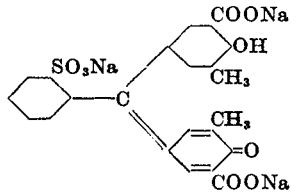
Chrome Garnet B (DH)

Durand & Huguenin, *BP* 166530, 183123; *USP* 1403888; *FP* 529185, and addn. 25268; *Sw.P* 97636, 98560; *GP* 370468, 382428, (*Fr.* **14**, 731, 733)

Soluble in water (blue red)

H_2SO_4 conc. — yellow red; on dilution — yellow red ppt.

43820 C.I. Mordant Blue 3 (*Bright reddish blue*)



Condense *o*-formylbenzenesulfonic acid with 2,3-cresotic acid, oxidise the product with nitrosylsulfuric acid, and convert into the sodium salt

Discoverer — Conzetti 1906

Geigy, *BP* 15204/07; *USP* 877052, 877053, 877054; *FP* 384979; *GP* 189938 (*Fr.* **9**, 200)

Bayer Co., *GP* 287004 (*Fr.* **12**, 214)

FIAT 764 — Chromoxancyanin R

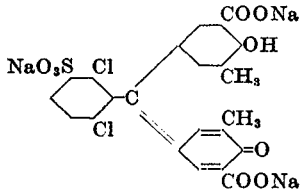
Soluble in cold and hot water (red)

Soluble in ethanol (orange yellow)

H_2SO_4 conc. — orange red; on dilution — orange yellow with red ppt.

Aqueous solution + NaOH — red violet solution

43825 C.I. Mordant Blue 29 (*Reddish blue*)



Condense a sulfo-*o*-chlorobenzaldehyde (e.g. 2,4-dichloro-3-formylbenzenesulfonic acid) with 2,3-cresotic acid, oxidise the product, and convert into the sodium salt

Discoverer — Conzetti 1906

Geigy, *BP* 15204/07; *USP* 877054; *FP* Cert. d'Addition 9500; *GP* 199943 (*Fr.* **9**, 204)

Bayer Co., *GP* 286433, 287004, (*Fr.* **12**, 212, 214)

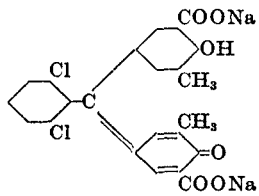
FIAT 764 — Chromoxanreinblau BLD

Soluble in water (brownish yellow) and more sparingly soluble in ethanol (reddish brown)

H_2SO_4 conc. — bright magenta red; on dilution — orange and then orange yellow ppt.

Aqueous solution + NaOH — violet blue

43830 C.I. Mordant Blue 1 (*Bright blue → Reddish navy*)



Condense 2,6-dichlorobenzaldehyde with 2,3-cresotic acid, oxidise the product, and convert into the sodium salt

Discoverer — Conzetti 1906

Geigy, *BP* 15204/07; *USP* 877053, 877054; *FP* 384979; *GP* 198909, 199943, 213502, (*Fr.* **9**, 201, 204, 207), 234027 (*Fr.* **10**, 231)

Ciba, *BP* 231446

Bayer Co., *GP* 286433, 287004, (*Fr.* **12**, 212, 214)

FIAT 1313, **2**, 365

FIAT 764 — Chromoxanreinblau B

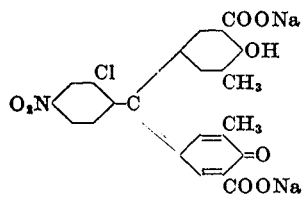
Slightly soluble in cold, soluble in hot water (brownish yellow)

Very slightly soluble in ethanol (yellowish olive brown)

H_2SO_4 conc. — red; on dilution — golden orange

Aqueous solution + NaOH — violet blue

43835 C.I. Mordant Blue 55 (*Bright greenish blue*)



Condense 2,3-cresotic acid with a nitro-*o*-chlorobenzaldehyde, e.g. 2-chloro-4(or 5)-nitrobenzaldehyde or 2,6-dichloro-3-nitrobenzaldehyde, oxidise the product formed and convert into the sodium salt

Discoverer — Conzetti 1906

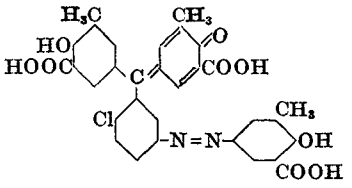
Geigy, *BP* 15204/07; *USP* 877053, 877054; *FP* 384979; *GP* 198909, 199943, 213502, (*Fr.* **9**, 201, 204, 207)

Soluble in water (brownish yellow), and less soluble in ethanol

H_2SO_4 conc. — bluish red; on dilution — red ppt.

Aqueous solution + NaOH — violet blue

43840 Mordant Dye



Condense 5-amino-2-chlorobenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), diazotise the product and couple with 2,3-cresotic acid, and oxidise the azo-compound with nitrosylsulfuric acid

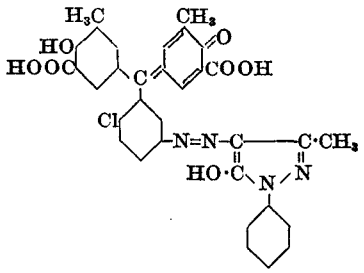
Discoverers — A. Hausdörfer and C. Heidenreich 1909

Chromoxane Green GG (By)

Bayer Co., *BP* 2394/10; *USP* 980251, 1021364; *FP* 413383; *GP* 223879, 226348, (*Fr.* **10**, 245, 248)

Soluble in water (brown olive yellow)
Soluble in ethanol (wine red)
H_2SO_4 conc. — red orange; on dilution — light orange
Aqueous solution + NaOH — red olive yellow

43845 C.I. Mordant Green 21 (*Yellowish green*)



Condense 5-amino-2-chlorobenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), diazotise the product, couple with 3-methyl-1-phenyl-5-pyrazolone, and oxidise the azo-compound with nitrosylsulfuric acid

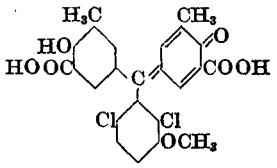
Discoverers — A. Hausdörfer and C. Heidenreich 1909

Bayer Co., *BP* 29751/09, 2394/10; *USP* 980251, 1021364; *FP* 413383; *GP* 223879, 226348 (*Fr.* **10**, 245, 248)

Note — For another example of a Triarylmethane–Pyrazolone Azo dye *see* **C.I.18775**

Soluble in water (golden yellow)
Soluble in ethanol (olive yellow brown)
H_2SO_4 conc. — red orange; on dilution — pale golden yellow

43850 Mordant Dye



Condense 2,6-dichloro-3-methoxybenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.) and oxidise the product with oxygen-containing gases in presence of copper salts

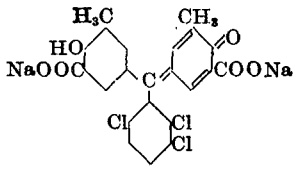
Discoverer — M. Weiler 1911

Chromoxane Brilliant Blue GM (By)

Bayer Co., *BP* 30105/10, 17129/11; *USP* 1004609, 1004610; 1044836; *FP* 404800, 437667; *GP* 31607; 244826, (*Fr.* **10**, 223, 217)

Soluble in water (olive yellow brown)
Soluble in ethanol (olive yellow brown)
H_2SO_4 conc. — bright magenta red; on dilution — golden orange
Aqueous solution + NaOH — clear violet

43855 C.I. Mordant Blue 47 (*Bright blue*)



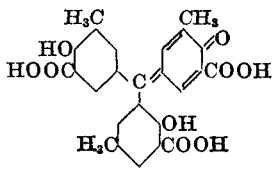
Condense 2,3,6-trichlorobenzaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.) in sulfuric acid, oxidise with nitrous acid, and isolate as sodium salt

Discoverer — Geigy 1906

Geigy, *USP* 877054; *FP* 384979; *GP* 198909, 199943, (*Fr.* **9**, 201, 204)
Cassella Co., *GP* 363290 (*Fr.* **14**, 725)
FIAT 1313, **2**, 366
FIAT 764 — Radiochromblau B

Soluble in water (yellow brown)
Soluble in ethanol (yellow brown)
H_2SO_4 conc. — bright magenta red; on dilution — pale golden orange
Aqueous solution + NaOH — violet

43860 C.I. Mordant Violet 27 (*Violet*)



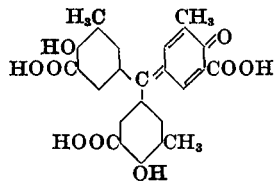
Condense formaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), and co-oxidise the product with 2,5-cresotic acid in nitrosylsulfuric acid

Discoverer — M. Weiler 1909

Bayer Co., *BP* 1411/10; *USP* 978799, 978801, 978802; *FP* 415229; *GP* 230408 (*Fr.* **10**, 226)

Soluble in water (olive)
Soluble in ethanol (red violet)
H_2SO_4 conc. — red orange; on dilution — violet
Aqueous solution + NaOH — magenta to red violet ppt.

43865 **C.I. Mordant Violet 16** (*Bright reddish violet*)



(*a*) Condense 5-formyl-2,3-cresotic acid (1 mol.) with 2,3-cresotic acid (2 mol.), and oxidise the product with nitrosylsulfuric acid

(*b*) Condense formaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.) and co-oxidise the product with 2,3-cresotic acid in nitrosylsulfuric acid

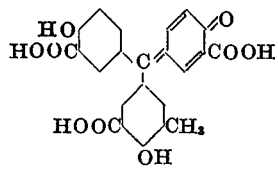
Discoverer — M. Weiler 1908

Bayer Co., *BP* 14312/09; *USP* 950359; *FP* 404800; *GP* 216924 (*Fr.* **10**, 210)

FIAT 764 — Chromoxanviolett R

Soluble in water (light orange red)
Soluble in ethanol (raspberry)
H_2SO_4 conc. — orange; on dilution — orange
Aqueous solution + NaOH — bright magenta red

43866 **C.I. Mordant Violet 17** (*Bright reddish violet*)

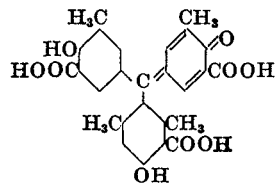


(*a*) Condense 5-formyl-2,3-cresotic acid (1 mol.) with salicylic acid (2 mol.), and oxidise the product with nitrosylsulfuric acid

(*b*) Condense formaldehyde (1 mol.) with salicylic acid (2 mol.) and co-oxidise the product with 2,3-cresotic acid in nitrosylsulfuric acid

For analogous dyes and preparation method (*a*) *see* patents cited under C.I.43865

43870 **C.I. Mordant Violet 33** (*Dull bluish violet*)



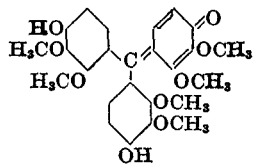
Condense formaldehyde (1 mol.) with 2,3-cresotic acid (2 mol.), and co-oxidise the product with 6-hydroxy-2,4-xylic acid in nitrosylsulfuric acid

Discoverer — M. Weiler 1910

Bayer Co. *BP* 11083/11; *USP* 1034173; *FP* 436288; *GP* 243086 (*Fr.* **10**, 230)

Soluble in water (wine red)
Soluble in ethanol (wine red)
H_2SO_4 conc. — bright magenta red; on dilution — red orange
Aqueous solution + NaOH — wine red

43875 **Acid Dye**



Heat a mixture of the sodium salts of 2,3-dimethoxyphenol and 2,3-dimethoxy-*p*-cresol with a little sodium hydroxide at 200–220°C in presence of acid

Discoverers — Reichenbach 1835; Grätzel 1876

Pittacal, Eupittone, Eupittonic Acid

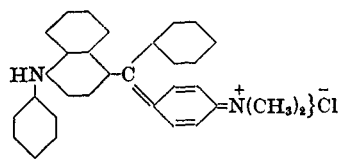
Dyes wool and silk in presence of acid to an orange shade

Reichenbach, *Berzelius' Jahresber.* **14** (1835), 385
Grätzel, *Z. Chem. Grossgew.* (1876), 204; *Wagner's Jahresber.* **23** (1877), 940; *Ber.* **11** (1878), 2085
Liebermann, *Ber.* **9** (1876), 334; **11** (1878), 1104
A. W. Hofmann, *Ber.* **11** (1878), 1455; **12** (1879), 1371, 2216
Liebermann & Wiedermann, *Ber.* **34** (1901), 1031

Soluble in ethanol (brown)
H_2SO_4 conc. — red turned to blue on heating through formation of **Eupittone Black** (hexahydroxyaurine)
Aqueous solution + NaOH — blue

(*e*) Derivatives of Diphenylnaphthylmethane

44000 **Basic Dye**



Condense α,α-dichloro-*N*,*N*-dimethyl-α-phenyl-*p*-toluidine with *N*-phenyl-1-naphthylamine, and oxidise the product

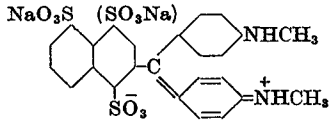
Discoverer — M.L.B.

New Green (MLB)

Used as a yellowish green in calico printing

M.L.B., *FP* 181351; *GP* 41751 (*Fr.* **1**, 44)

44005 Acid Dye



Oxidise **C.I.44020** with chromic acid in sulfuric acid solution whereby one or two methyl groups are split off

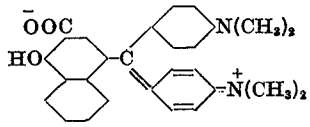
Discoverer — O. Nastvogel 1897

New Patent Blue 4B (By)

Bayer Co., *BP* 15478/97; *USP* 605119; *FP* 263999 (Combined Pat.); *GP* 95830, 97286, (*Fr.* **5**, 43, 202)

Very soluble in water (pure blue)
Very soluble in ethanol (pure blue)
H_2SO_4 conc. — pale brownish yellow; on dilution — chrome green to yellow green

44010 Mordant Dye



Condense 4,4′-bis(dimethylamino)benzhydrol with 1-hydroxy-2-naphthoic acid, and oxidise the product

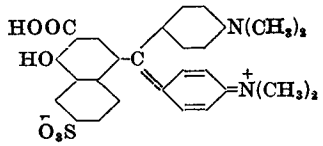
Discoverer — Runkel 1890

Chrome Blue R (By)

Bayer Co., *BP* 14621/90; *USP* 476413, 476414; *FP* 208330; *GP* 58483 (*Fr.* **3**, 120)

Soluble in water (blue)
Slightly soluble in ethanol (blue)
H_2SO_4 conc. — dark bordeaux red; on dilution — reddish brown

44015 C.I. Mordant Violet 18 (*Bright violet*)



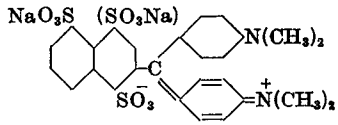
Condense 4,4′-bis(dimethylamino)benzhydrol with 1-hydroxy-7-sulfo-2-naphthoic acid, and oxidise the product with manganese dioxide in acetic–hydrochloric acid

Discoverer — M. Weiler 1922

Bayer Co., *BP* 234569; *USP* 1503177; *GP* 406538 (*Fr.* **14**, 730)
FIAT 764 — Chromoxanazurol BD

Soluble in water (cornflower blue)
Soluble in ethanol (violet)
H_2SO_4 conc. — red violet; on dilution — orange brown
Aqueous solution + NaOH — violet

44020 Acid Dye



Condense 4,4′-bis(dimethylamino)benzhydrol with 4(or 5)-amino-1-naphthalenesulfonic acid, replace the amino- by the sulfonic acid group, oxidise the product and convert into the sodium salt

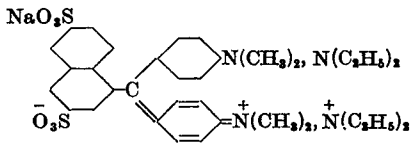
Discoverer — Nastvogel 1897

New Patent Blue B, G (By)

Bayer Co., *BP* 15478/97; *USP* 605119; *FP* addn. to 263999; *GP* 97286 (*Fr.* **5**, 202)
Erdmann, *Chem. Ind.* (1900), No. 31
Holmes, *Ind. Eng. Chem.* **15** (1923), 833; cf. *JSDC*, **39** (1923), 354

Very soluble in water (pure blue)
Soluble in ethanol (pure blue)
H_2SO_4 conc. — brown olive yellow; on dilution — brown to green and then to blue
Aqueous solution + NaOH — bluish green cold, reddish violet hot

44025 C.I. Acid Green 16 (*Green*)



Condense 4,4′-bis(dimethylamino)benzhydrol* with 2,7-naphthalenedisulfonic acid in 15% sulfuric acid, oxidise with lead peroxide and convert into the sodium salt

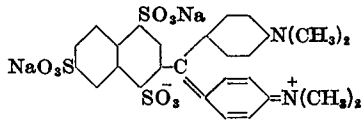
* Yellower hues are obtained with 4,4′-bis(diethylamino)benzhydrol

Discoverer — Hermann 1899

M.L.B., *BP* 21596/98, 21839/98; *USP* 628243, 630224, 639976, 639977; *FP* 282128 and addns, 282271; *GP* 108129, 110086, 111506, (*Fr.* **5**, 196, 199, 198)
Geigy, *GP* 169929 (*Fr.* **8**, 195)
BIOS 1433, 49
FIAT 764 — Naphtalingruen V
F. Frisch, *Helv. Chim. Acta*, **14** (1931), 669

Soluble in water (bluish green)
Soluble in ethanol (green)
H_2SO_4 conc. — yellowish brown; on dilution — yellow

44030 Acid Dye



Preparation as for **C.I.44020** with 4-amino-1,6-naphthalenedisulfonic acid instead of 5-amino-1-naphthalenesulfonic acid

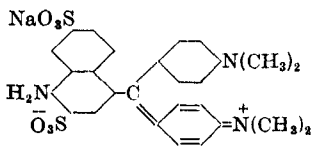
Discoverer — O. Nastvogel 1897

New Patent Blue GA (By)

Bayer Co., *BP* 15478/97; *USP* 605119; *FP* 263999 (Combined Pat.); *GP* 95830, 97286, (*Fr.* **5**, 43, 202)

Very soluble in water (pure blue)
Slightly soluble in ethanol (pure blue)
H_2SO_4 conc. — pale brownish yellow; on dilution — chrome green to yellow green
Aqueous solution + NaOH — violet blue grey with ppt.

44035 Acid Dye



(*a*) Condense 4,4′-bis(dimethylamino)benzhydrol with 1-amino-2,7-naphthalenedisulfonic acid, oxidise the product and convert into the sodium salt

(*b*) Condense 4,4′-bis(dimethylamino)benzhydrol with 1-amino-2-naphthalenesulfonic acid, sulfonate the product with 34% oleum at 20°C, oxidise and convert into the sodium salt

Discoverer — Kothe 1892

Acid Fast Blue B (By)

Bayer Co., *BP* 14728/92, 19246/92, 21139/92; *FP* 225980; *GP* 76073, 80510, (*Fr.* **4**, 209, 210)

JSDC, **9** (1893), 160; **14** (1898), 230

Very soluble in water (bluish violet)

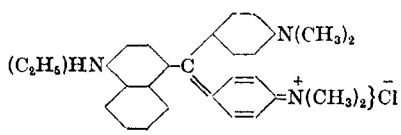
Very soluble in ethanol (blue)

H_2SO_4 conc. — brown; on dilution — blue

44040 C.I. Basic Blue 11 (*Bright reddish blue*)

44040:1 (**C.I. Solvent Blue 6**) is the free base

44040:2 (**C.I. Pigment Blue 10 and 11**) are the phosphomolybdic, phosphotungstic, and phosphotungstomolybdic acid salts



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

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

Discoverers — Nastvogel and Reingruber 1892

Bayer Co., *BP* 19062A/91; *USP* 517473; *FP* 217020

BIOS 959, 16; *FIAT* 1313, **2**, 327–8

FIAT 764 — Viktoriablau R

Nölting & Philipp, *Ber.* **41** (1908), 583

Slightly soluble in cold, soluble in hot water (blue)

Very soluble in ethanol (blue)

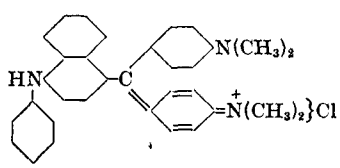
H_2SO_4 conc. — brownish yellow; on dilution — light green to blue

Aqueous solution + NaOH — brown flocculent ppt.

44045 C.I. Basic Blue 26 (*Bright blue*)

44045:1 (**C.I. Solvent Blue 4**) is the free base

44045:2 (**C.I. Pigment Blue 2**) is the phosphotungstomolybdic acid salt



(*a*) Condense *p,p*′-(dichloromethylene)bis[*N,N*-dimethylaniline] with *N*-phenyl-1-naphthylamine

(*b*) Condense 4,4′-bis(dimethylamino)benzhydrol with *N*-phenyl-1-naphthylamine, convert the product to the *N*-nitroso derivative, oxidise, and remove the nitroso group

Discoverers — Caro and Kern 1883

Badische Co., *BP* 5038/84, 11159/84, 12022/86; *USP* 297413, 297414; *FP* 160090; *GP* 27789, 29962, (*Fr.* **1**, 80, 86)

Bayer Co., *BP* 19062A/91; *USP* 496435

BIOS 959, 15. *FIAT* 1313, **2**, 321–323

FIAT 764 — Viktoriablau B, base B

Nathansohn & Müller, *Ber.* **22** (1889), 1888

Note — The *N*-methylated dye (obtained with *N*-methyl-*N*-phenyl-1-naphthylamine instead of *N*-phenyl-1-naphthylamine) is **Victoria Blue 4R** — *see* C.I.42563

Soluble in cold and hot water (blue)

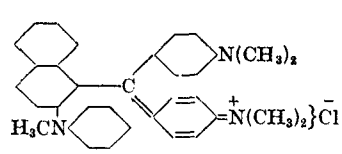
Soluble in ethanol (blue)

H_2SO_4 conc. — reddish brown; on dilution — yellow to green and then to blue

Aqueous solution + NaOH — dark reddish brown ppt.

44055 C.I. Acid Violet 24 (*Bright bluish violet*)

Sulfonated



Condense *p,p*′-(dichloromethylene)bis[*N,N*-dimethylaniline] with an *N*-methyl(or other alkyl)-*N*-phenyl-2-naphthylamine and sulfonate with monohydrate or oleum

Discoverer — Steiner 1895

Sandoz, *BP* 30015/96; *USP* 603016; *FP* 257887; *GP* 96402 (*Fr.* **5**, 184)

Soluble in water (violet)

Soluble in ethanol (violet)

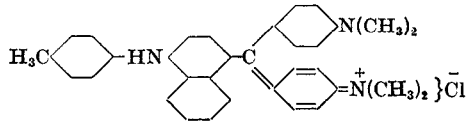
H_2SO_4 conc. — yellowish brown; on dilution — green and then blue

Aqueous solution + NaOH — blue

44060 C.I. Acid Blue 88 (*Reddish blue*)

Discoverer — I.G.
BIOS 959, 18

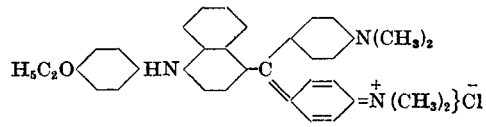
Disulfonated



Condense 4,4′-bis(dimethylamino)benzophenone with *N*-*p*-tolyl-1-naphthylamine in toluene with phosphorus oxychloride and disulfonate with 65% oleum

44065 Solvent Dye

Ceres Blue I (IG)
BIOS 959, 18; 1433, 68 and 71; 1661, 22



Condense 4,4′-bis(dimethylamino)benzophenone with *N*-*p*-phenetyl-1-naphthylamine in toluene with phosphorus oxychloride

44070 Pigment

Discoverer — I.G.
Fanal Blue 3B supra (IG)
Used as a pigment for printing inks
BIOS 959, 18; 1433, 71, 110
FIAT 764 — Fanalblau 3B Supra

Phosphotungstomolybdic acid salt of **C.I.44065**

44075 C.I. Acid Blue 86 (*Blue*)

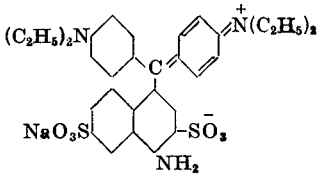
Discoverer — I.G.
BIOS 959, 18; 1433, 68
FIAT 764 — Brillantwollblau G ex.

Disulfonic acid of **C.I.44065**

Very soluble in water (blue)
Slightly soluble in ethanol (blue)
H_2SO_4 conc. — blood red; on dilution — deep green
Aqueous solution + NaOH — grey

44080 C.I. Acid Blue 108 (*Blue*)

Discoverer — I.G.
Cyanol Silk Blue B (IG)
BIOS 1433, 43
FIAT 764 — Cyanolseidenblau B

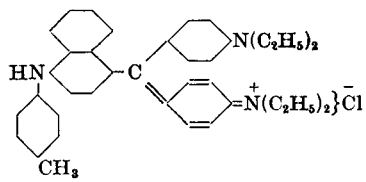


Sulfonate Cleve's acid (8-amino-2-naphthalenesulfonic acid) with 65% oleum, condense in sulfuric acid with *p*,*p*′-methylenebis[*N*,*N*-diethylaniline] and oxidise with manganese dioxide

Soluble in water (blue)

44085 C.I. Basic Blue 15 (*Blue*)

Discoverers — Caro and Kern 1883
Badische Co., *BP* 5038/84, 11159/84, 12022/86; *USP* 297413, 297414; *FP* 160090; *GP* 27789, 29962, (*Fr.* **1**, 80, 86)
JSDC, **1** (1885), 250
Rawsch, *JSDC*, **4** (1888), 82
Seyewetz, *Rev. gén. mat. col.* **5** (1901), 44
Biltz & Vegesack, *Z. phys. Chem.* **73** (1910), 493
von Hahn, *Koll. Z.* **34** (1924), 162

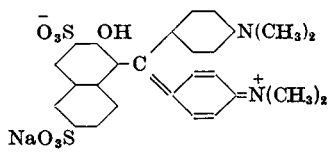


Condense *p*,*p*′-(dichloromethylene)bis[*N*,*N*-diethylaniline] with *N*-*p*-tolyl-1-naphthylamine

Soluble in water (bluish violet)
Readily soluble in ethanol (violet)
H_2SO_4 conc. — yellow brown; on dilution — green and then blue
Aqueous solution + NaOH — pale reddish brown ppt.

44090 C.I. Acid Green 50 (*Bluish green*)
C.I. Food Green 4 (*Greenish blue*)

Discoverer — Badische Co. 1883
Ewer & Pick, *GP* 31321 (*Fr.* **1**, 90)
Bayer Co., *BP* 14621/90; *FP* 208330; *GP* 58483 (*Fr.* **3**, 120)
FIAT 1313, **2**, 350
FIAT 764 — Wollgruen S
JSDC, **9** (1893), 77
Calcott & English, *Ind. Eng. Chem.* **15** (1923), 1042

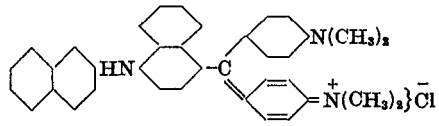


(*a*) Condense *p*,*p*′-(dichloromethylene)bis[*N*,*N*-dimethylaniline] with 2-naphthol, sulfonate with oleum, and convert into the sodium salt
(*b*) Condense 4,4′-bis(dimethylamino)benzhydrol with 2-naphthol-3,6(or 6,8)-disulfonic acid, oxidise the product and convert into the sodium salt

Standard
BS 4153 (1967), Green 5 for use in foodstuffs, Metric units
Soluble in cold, very soluble in hot water (green blue)
Soluble in ethanol (turquoise blue)
H_2SO_4 conc. — orange; on dilution — greenish amber

44095 C.I. Acid Blue 97 (*Bright blue*)

Disulfonated



Condense 4,4′-bis(dimethylamino)benzophenone with *N*-2-naphthyl-1-naphthylamine in toluene with phosphorus oxychloride, disulfonate the product with oleum and convert to the sodium salt

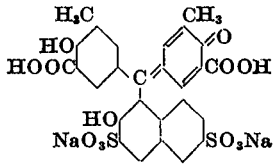
Discoverer — Steiner 1895

Wool Blue G Extra (IG)

Sandoz, *BP* 30015/96; *USP* 603016; *FP* 257887; *GP* 96402 (*Fr.* 5, 184)
BIOS 959, 18, No. 63
FIAT 764 — Wollblau G ex.

Soluble in water (blue)
Soluble in ethanol (blue)
H_2SO_4 conc. — reddish brown; on dilution — bluish green

44100 C.I. Mordant Blue 42 (*Bright navy*)



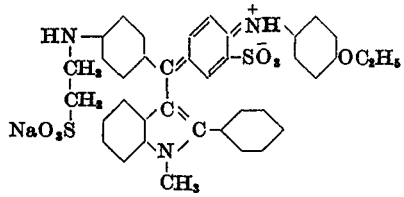
Condense formaldehyde with 2,3-cresotic acid, and co-oxidise the product in nitrosylsulfuric acid with R acid (2-naphthol-3,6-disulfonic acid)

Discoverer — M. Weiler 1910
BP 1411/10; *USP* 978799, 978801, 978802; *FP* 415229; *GP* 230408 (*Fr.* 10, 226)
BIOS 1433, 122
FIAT 764 — Chromoxanazurolblau R, RD

Very soluble in water (wine red)
Very soluble in ethanol (wine red)
H_2SO_4 conc. — dark violet; on dilution — wine red
Aqueous solution + NaOH — clear violet

(*f*) Miscellaneous Triarylmethane derivatives

44500 Acid Dye



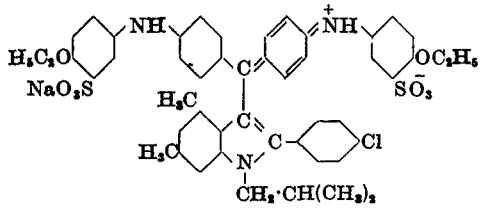
Condense dichloro(*p*-chlorophenyl)phenylmethane with 1-methyl-2-phenylindole, then condense with taurine and *p*-phenetidine, with subsequent sulfonation and oxidation

Discoverer — I.G.

Wool Fast Violet FB (IG)

BIOS 959, 86–95
FIAT 1313, 2, 336
FIAT 764 — Wollechtviolett FB

44505 Acid Dye



Condense 4,4′-dichlorobenzophenone with 2-(*p*-chlorophenyl)-1-isobutyl-4,6-dimethylindole and phosphorus oxychloride, then react with *p*-phenetidine and disulfonate

Discoverer — P. Wolff 1932

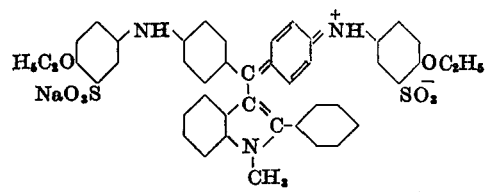
Wool Fast Blue FGL (IG)

Dyes wool in presence of acetic, formic, or sulfuric acid, and is suitable also for silk

Fastness Properties (C): Alkali 2–3, Light 4–5, Milling 4, Perspiration 4, Washing 4. The fastness properties are similar on unweighted silk

I.G., *BP* 417014; *USP* 2032033; *GP* 604429 (*Fr.* 21, 787)
FIAT 1313, 2, 335
FIAT 764 — Wollechtblau FGL

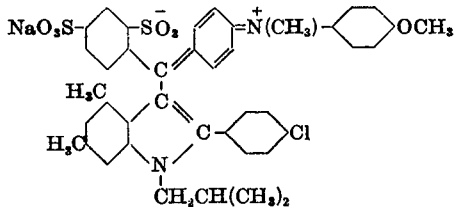
44510 C.I. Acid Blue 123 (*Blue*)



Condense 4,4′-dichlorobenzophenone with 1-methyl-2-phenylindole and phosphorus oxychloride, then react the product with *p*-phenetidine and disulfonate

Discoverer — P. Wolff 1932
I.G., *BP* 417014; *USP* 2032033; *GP* 604429 (*Fr.* 21, 787)
FIAT 1313, 2, 334

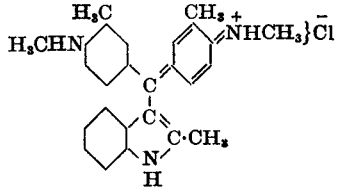
44515★ Acid Dye



Condense dichloro(*p*-chlorophenyl)phenylmethane with 2-(*p*-chlorophenyl)-1-isobutyl-4,6-dimethylindole, and then condense the product with *N*-methyl-*p*-anisidine with subsequent disulfonation

Discoverer — I.G.
Wool Fast Green FG (IG)
FIAT 1313, 2, 360

44520★ Basic Dye

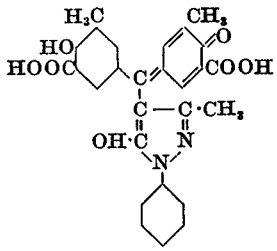


(*a*) Condense Auramine G (**C.I.41005**) with 2-methylindole in hydrochloric acid solution

(*b*) Condense 3,3′-dimethyl-4,4′-bis(methylamino)benzhydrol with 2-methylindole, and oxidise the product with ferric chloride in hydrochloric acid solution

Discoverer — F. Runkel 1901
Brilliant Rhoduline Violet R (By)
Bayer Co., *BP* 2913/01; *USP* 677279; *FP* 308033; *GP* 121837 (*Fr.* 6, 235)
BIOS 959, 3, No. 11

44525 C.I. Mordant Brown 26 (*Reddish brown*)

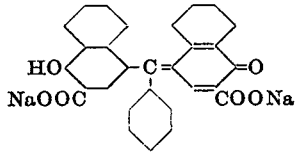


Condense formaldehyde with 2,3-cresotic acid, then co-oxidise the product with 3-methyl-1-phenyl-5-pyrazolone in nitrous acid

Discoverer — M. Weiler 1909
Bayer Co., *BP* 6364/10, 26677/10; *USP* 1023977; *FP* 419902; *GP* 230410 (*Fr.* 10, 229)
BIOS 1433, 124. · *FIAT* 1313, 2, 358, 367
FIAT 764 — Chromoxanbraun 5R
GP 355115

Soluble in water (golden orange)
Soluble in ethanol (red orange brown)
H_2SO_4 conc. — orange; on dilution — golden yellow
Aqueous solution + NaOH — magenta red

44530 C.I. Mordant Green 31 (*Green*)

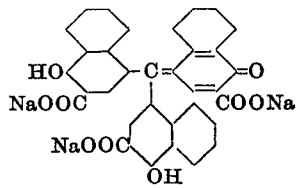


Condense benzotrichloride (1 mol.) with 1-hydroxy-2-naphthoic acid (2 mol.) in aqueous sodium hydroxide in presence of copper

Discoverers — G. de Montmollin, J. Spieler, and G. Bonhôte 1921
Ciba, *BP* 191854; *USP* 1460315; *FP* 542720; *Sw.P* 92406; *GP* 355115

Soluble in water (yellow brown)
H_2SO_4 conc. — blue; on dilution — green with brown red ppt.

44535 C.I. Mordant Blue 28 (*Bright blue → Reddish navy*)



React carbon tetrachloride with 1-hydroxy-2-naphthoic acid in aqueous sodium hydroxide solution in the presence of copper

Discoverers — G. de Montmollin and J. Spieler 1919
Ciba, *BP* 172177; *USP* 1387596; *FP* 525598; *Sw.P* 91774

Soluble in water (blue violet)
H_2SO_4 conc. — pure blue; on dilution — violet ppt.