

Table 3: Artificial Cosmetic Coloring

Color Name	Heavy Metal Content	Chemical Content
D&C Black No. 2	Lead not more than 10 ppm Mercury not more than 1 ppm Arsenic no more than 3 ppm	Ash content, not more than 0.15 percent. Total sulfur, not more than 0.65% Total PAHs, not more than 500 ppb. Benzo[e]pyrene, not more than 5 ppb Dibenz[a,h]anthracene, not more than 5 ppb Total color (as carbon), not less than 95%.
D&C Brown No. 1	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Please see http://www.cfsan.fda.gov/~lrd/cf742151.html for complete list.
FD&C Blue No. 1	Chromium not more than 50 ppm Manganese not more than 100 ppm Arsenic not more than 3 ppm Lead not more than 10 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 15.0%. Water-insoluble matter, not more than 0.2%. Leuco base, not more than 5%. Sum of o-, m-, and p-sulfobenzaldehydes, not more than 1.5%. N-Ethyl,N-(m-sulfobenzyl)sulfanilic acid, not more than 0.3%. Total color, not less than 85.0%
D&C Blue No.4	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 15.0%. Water-insoluble matter, not more than 0.2% Leuco base, not more than 5% Sum of o-, m, and p- sulfobenzaldehydes, ammonium salt, ≤ 1.5% N-ethyl, N-(m- sulfobenzyl) sulfanilic acid ammonium salt, ≤ .3%
FD&C Green No. 3	Chromium not more than 50 ppm Arsenic not more than 3 ppm Lead not more than 10 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 15.0%. Water-insoluble matter, not more than 0.2%. Leuco base, not more than 5 percent. The leuco base is oxidized with lead dioxide and acid or with dichromate and acid to form the dye. Sum of 2-,3-,4-formylbenzenesulfonic acids, sodium salts, not more than 0.5% Sum of 3- and 4-[[ethyl(4-sulfophenyl)amino]methyl] benzenesulfonic acid, disodium salts, not more than 0.3%. 2-Formyl-5-hydroxybenzenesulfonic acid, sodium salt, not more than 0.5% Total color, not less than 85.0%
D&C Green No. 5	Information not available	Information not available.
D&C Green No. 6	Information not available	Information not available.
D&C Green No. 8	Information not available	Information not available.
D&C Orange No. 4	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 13.0%. Water-insoluble matter, not more than 0.2%. 2-Naphthol, not more than 0.4% Sulfanilic acid, sodium salt, not more than 0.2% Subsidiary colors, not more than 3% 4,4'-(Diazamino)-dibenzenesulfonic acid, not more than 0.1%
D&C Orange No. 5	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 10.0%. 4',5'-dibromofluorescein, not less than 50% and not more than 65% 2',4',5'-tribromofluorescein, not less than 30 % and not more than 40% Sum of 2',4'-dibromofluorescein and 2',5'-dibromofluorescein, not more than 2% 4'-Bromofluorescein, not more than 2%. Fluorescein, not more than 1%. Phthalic acid, not more than 1%. 2-(3,5-Dibromo-2,4-dihydroxybenzoyl) benzoic acid, not more than 0.5%. Brominated resorcinol, not more than 0.4%.
D&C Orange No. 10	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 8.0%. Insoluble matter (alkaline solution), not more than 0.5%. Phthalic acid, not more than 0.5%. 2-[3',5'-Diiodo-2',4'-dihydroxybenzoyl] benzoic acid, not more than 0.5%. Fluorescein, not more than 1%. 4'-Iodofluorescein, not more than 3%. 2',4'-Diiodofluorescein and 2',5'-diiodofluorescein, not more than 2%. 2',4',5'-Triiodofluorescein, not more than 35%. 2',4',5',7'-Tetraiodofluorescein, not more than 10%. 4',5'-Diiodofluorescein, not less than 60 percent and not more than 95%.

D&C Orange No. 11	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 8.0%. Water-insoluble matter, not more than 0.5%. Phthalic acid, not more than 0.5 percent. 2-[3',5'-Diiodo-2',4'-dihydroxybenzoyl] benzoic acid, sodium salt, not more than .5% Fluorescein, disodium salt, not more than 1% 4'-Iodo fluorescein, disodium salt, not more than 3% 2',4'-Diiodo fluorescein and 2',5'-diiodo fluorescein, not more than 2%. 2',4',5'-Triiodo fluorescein, not more than 35%. 2',4',5',7'-Tetraiodo fluorescein, disodium salt, not more than 10%. 4',5'-Diiodo fluorescein, disodium salt, not less than 60% and not more than 95%.
FD&C Red No. 4	Lead not more than 10 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 13.0%. Water-insoluble matter, not more than 0.2%. 5-Amino-2,4-dimethyl-1-benzenesulfonic acid, sodium salt, not more than .2% 4-Hydroxy-1-naphthalenesulfonic acid, sodium salt, not more than 0.2%.
D&C Red No. 6	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 10.0%. 2-Amino-5-methylbenzenesulfonic acid, sodium salt, not more than 0.2%. 3-Hydroxy-2-naphthalenecarboxylic acid, sodium salt, not more than 0.4%. 3-Hydroxy-4-[(4-methylphenyl)azo]-2-naphthalenecarboxylic acid, sodium salt ≤ .5%. p- Toluidine, not more than 15 parts per million.
D&C Red No. 7	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 10.0%. 2-Amino-5-methylbenzenesulfonic acid, calcium salt, not more than 0.2% 3-Hydroxy-2-naphthalenecarboxylic acid, calcium salt, not more than 0.4% 3-Hydroxy-4-[(4-methylphenyl)azo]-2-naphthalenecarboxylic acid, calcium salt ≤ .5% p-Toluidine, not more than 15 parts per million.
D&C Red No. 17	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Volatile matter (at 275 degrees), not more than 5%. Matter insoluble in both toluene and water not more than 0.5% Chlorides and sulfates (calculated as sodium salts), not more than 3%. Aniline, not more than 0.2%. 4-Aminoazobenzene, not more than 0.1%. 2-Naphthol, not more than 0.2%. 1-(Phenylazo)-2-naphthol, not more than 3%. 1-[[2-(phenylazo) phenyl]azo]-2-naphthalenol, not more than 2%.
D&C Red No. 21	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 135 deg.C) and halides and sulfates not more than 10% Insoluble matter (alkaline solution), not more than 0.5%. Phthalic acid, not more than 1%. 2-(3,5-Dibromo-2,4-dihydroxybenzoyl) benzoic acid, not more than 0.5% 2',4',5',7'-Tetrabromofluorescein, ethyl ester, not more than 1%. Brominated resorcinol, not more than 0.4%. Fluorescein, not more than 0.2%. Sum of mono- and dibromofluoresceins, not more than 2%.. Tribromofluoresceins, not more than 11%. 2',4',5',7'-Tetrabromofluorescein, not less than 87%.
D&C Red No. 22	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 135 deg.C) and halides and sulfates not more than 10% Water-insoluble matter not more than 0.5%. Disodium salt of phthalic acid, not more than 1%. Sodium salt of 2-(3,5-Dibromo-2,4-dihydroxybenzoyl)benzoic acid, not more than .5%. 2',4',5',7'-Tetrabromofluorescein, ethyl ester, not more than 11%. Brominated resorcinol, not more than 0.4%. Sum of disodium salts of mono- and dibromofluoresceins, not more than 2%. Sum of disodium salts of tribromofluoresceins, not more than 25%. Disodium salt of 2',4',5',7'-Tetrabromofluorescein, not less than 72%.
D&C Red No. 28	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 135 deg.C) and halides and sulfates not more than 15% Insoluble matter (alkaline solution), not more than 0.5%. Tetrachlorophthalic acid, not more than 1.2%. Brominated resorcinol, not more than 0.4%. 2,3,4,5-Tetrachloro-6-(3,5-dibromo-2,4-dihydroxybenzoyl) benzoic acid, ≤ .7% 2',4',5',7'-Tetrabromo-4,5,6,7-tetrachlorofluorescein, ethyl ester, ≤ 2%. Lower halogenated subsidiary colors, not more than 4%.
D&C Red No. 30	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Volatile matter (at 135 deg.C), not more than 5%. Chlorides and sulfates (calc. as sodium salts), not more than 3%. Matter soluble in acetone, not more than 5%.
D&C Red No. 31	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 10.0%. Aniline, not more than 0.2%. 3-Hydroxy-2-naphthoic acid, calcium salt, not more than 0.4%. Subsidiary colors, not more than 1%..

D&C Red No. 33	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 18%. Water-insoluble matter, not more than 0.3%. 4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid, disodium salt, not more than .3% 4,5-Dihydroxy-3-(phenylazo)-2,7-naphthalenedisulfonic acid, disodium salt ≤ 3%. Aniline, not more than 25 ppm 1,3-Diphenyltriazene, not more than 125 ppb 4-Aminobiphenyl, not more than 275 ppb Azobenzene, not more than 1 ppm Benzidine, not more than 20 ppb
D&C Red No. 34	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 15%. 2-Amino-1-naphthalenesulfonic acid, calcium salt, not more than 0.2% 3-Hydroxy-2-naphthoic acid, not more than 0.4% Subsidiary colors, not more than 4%.
D&C Red No. 36	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Volatile matter at 275 deg.F not more than 1.5%. Matter insoluble in toluene, not more than 1.5%. 2-Chloro-4-nitrobenzamine, not more than 0.3%. 2-Naphthalenol, not more than 1%. 2,4-Dinitrobenzamine, not more than 0.02%. 1-[(2,4-Dinitrophenyl)azo]-2-naphthalenol, not more than 0.5%. 4-[(2-Chloro-4-nitrophenyl)azo]-1-naphthalenol, not more than 0.5%. 1-[(4-Nitrophenyl)azo]-2-naphthalenol, not more than 0.3 percent. 1-[(4-Chloro-2-nitrophenyl)azo]-2-naphthalenol, not more than 0.3%.
FD&C Red No. 40	Lead not more than 10 ppm Arsenic not more than 3 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 14.0%. Water-insoluble matter, not more than 0.2%. Higher sulfonated subsidiary colors (as sodium salts), not more than 1.0% Lower sulfonated subsidiary colors (as sodium salts), not more than 1.0% Disodium salt of 6-hydroxy-5-[(2-methoxy-5-methyl-4-sulfophenoxy)-2-naphthalenesulfonic acid, ≤ 8-(2-methoxy-5-methyl-4-sulfophenoxy)-2-naphthalenesulfonic acid, ≤ 1.0% Sodium salt of 6-hydroxy-2-naphthalenesulfonic acid (Schaeffer's salt), ≤ .3% 4-Amino-5-methoxy-o- toluenesulfonic acid, not more than 0.2% Disodium salt of 6,6'-oxybis (2-naphthalene-sulfonic acid), ≤ 1.0% Total color, not less than 85.0%
D&C Violet No. 2	Lead not more than 20 ppm Arsenic not more than 3 ppm	Volatile matter at 275 deg F, not more than 2.0%. Matter insoluble in both carbon tetrachloride and water, not more than .5% p- Toluidine, not more than 0.2%. 1-Hydroxy-9,10-anthracenedione, not more than 0.5%. 1,4-Dihydroxy-9,10-anthracenedione, not more than 0.5%. Subsidiary colors, not more than 1%.
FD&C Yellow No. 5	Lead not more than 10 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 13.0%. Water-insoluble matter, not more than 0.2%. 4,4'-[4,5-Dihydro-5-oxo-4-[(4-sulfophenyl)hydrazono]-1H-pyrazol-1,3-diyl]bis[benzenesulfonic acid], trisodium salt, not more than 1%. 4-[(4',5'-Disulfo[1,1'-biphenyl]-2-yl)hydrazono]-4,5-dihydro-5-oxo-1-(4-sulfophenyl)-1H-pyrazole-3-carboxylic acid, tetrasodium salt ≤ 1.0% Ethyl or methyl 4,5-dihydro-5-oxo-1-(4-sulfophenyl)-4-[(4-sulfophenyl)hydrazono]-1H-pyrazole-3-carboxylate, disodium salt, ≤ 1.0% Sum of 4,5-dihydro-5-oxo-1-phenyl-4-[(4-sulfophenyl)azo]-1H-pyrazole-3- carboxylic acid, disodium salt, and 4,5-dihydro-5-oxo-4-(phenylazo)-1- (4-sulfophenyl)-1H-pyrazole-3-carboxylic acid, disodium salt, ≤ .5% (4-sulfophenyl)-1H-pyrazole-3-carboxylic acid, disodium salt, ≤ .5% 4-Aminobenzenesulfonic acid, sodium salt, not more than 0.2%. 4,5-Dihydro-5-oxo-1-(4-sulfophenyl)-1H-pyrazole-3-carboxylic acid, disodium salt, ≤ 0.2% Ethyl or methyl 4,5-dihydro-5-oxo-1-(4-sulfophenyl)-1H-pyrazole-3- carboxylate, sodium salt, ≤ 0.1% 4,4'-(1-Triazene-1,3-diyl)bis[benzenesulfonic acid], disodium salt, ≤ .005% 4-Aminoazobenzene, not more than 75 ppb. 4-Aminobiphenyl, not more than 5 ppb. Aniline, not more than 100 ppb. Azobenzene, not more than 40 ppb. Benzidine, not more than 1 ppb. 1,3-Diphenyltriazene, not more than 40 ppb. Total color, not less than 87.0%

FD&C Yellow No. 6	Lead not more than 10 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of volatile matter (at 275 degrees) and chlorides and sulfates not more than 13.0%. Water insoluble matter, not more than 0.2 % Sodium salt of 4-aminobenzenesulfonic acid, not more than 0.2%. Sodium salt of 6-hydroxy-2-naphthalenesulfonic acid, not more than 0.3% Disodium salt of 6,6'-oxybis[2-naphthalenesulfonic acid], not more than 1.0% Disodium salt of 4,4'-(1-triazene-1,3-diyl)bis[benzenesulfonic acid], ≤ .1% Sum of the sodium salt of 6-hydroxy-5-(phenylazo)-2-naphthalenesulfonic acid and the sodium salt of 4-[(2-hydroxy-1-naphthalenyl)azo]benzenesulfonic acid, not more than Sum of the trisodium salt of 3-hydroxy-4-[(4-sulfophenyl)azo]-2,7-naphthalenedisulfonic acid and other higher sulfonated subsidiaries, ≤ 5.0% 4-Aminoazobenzene, not more than 50 ppb. 4-Aminobiphenyl, not more than 15 ppb. Aniline, not more than 250 ppb. Azobenzene, not more than 200 ppb. Benzidine, not more than 1 ppb. 1,3-Diphenyltriazene, not more than 40 ppb. 1-(Phenylazo)-2-naphthalenol, not more than 10 ppm. Total color, not less than 87.0%
D&C Yellow No. 7	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of water and chlorides and sulfates not more than 6%. Matter insoluble in alkaline water, not more than 0.5%. Resorcinol, not more than 0.5%. Phthalic acid, not more than 0.5%. 2-(2,4-Dihydroxybenzoyl) benzoic acid, not more than 0.5%.
D&C Yellow No. 8	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of water and chlorides and sulfates not more than 15%. Matter insoluble in alkaline water, not more than 0.3%. Resorcinol, not more than 0.5%. Phthalic acid, not more than 1%. 2-(2,4-Dihydroxybenzoyl) benzoic acid, not more than 0.5%.
D&C Yellow No. 10	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Sum of water and chlorides and sulfates not more than 15%. Matter insoluble in both water and chloroform, not more than 0.2%. Total sulfonated quinaldines, sodium salts, not more than 0.2%. 2-(2-Quinoliny)-1H-indene-1,3 (2H)-dione, not more than 4 ppm. Sodium salts sum of monosulfonates of 2-(2-quinoliny)-1H-indene-1,3 (2H)-dione, ≥ 75 %. Sodium salt sum of disulfonates of 2-(2-quinoliny)-1H-indene-1,3 (2H)-dione, ≤ 15 %. 2-(2,3-Dihydro-1,3-dioxo-1H-indene-2-yl)-6, 8-quinolinedisulfonic acid, disodium salt, ≤ 3%. Diethyl ether soluble matter other than that specified, not more than 2 ppm using added 2-(2-quinoliny)-1H-indene-1,3 (2H)-dione for calibration.
D&C Yellow No. 11	Lead not more than 20 ppm Arsenic not more than 3 ppm Mercury not more than 1 ppm	Volatile matter (at 275 deg.F), not more than 1%. Ethyl alcohol-insoluble matter, not more than 0.4%. Phthalic acid, not more than 0.3% Quinaldine, not more than 0.2%. Subsidiary colors, not more than 5%.

Source: FDA¹