Designation: D 600 – 90 (Reapproved 2001)

Standard Specification for Liquid Paint Driers[1]

This standard is issued under the fixed designation D 600; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers liquids for use in paints, varnishes, enamels, and similar organic coatings and are solutions of metallic salts of:

1.1.1 *Class A*—2-Ethyl hexanoic acids in petroleum spirits.

1.1.2 *Class B*—Naphthenic acids in petroleum spirits.

1.1.3 *Class C*—Neodecanoic acids in petroleum spirits.

1.1.4 *Class D*—Tall oil fatty acids in petroleum spirits.

1.1.5 *Class E*—Any of the above acids or acid blends, but containing additives that make the liquid drier water dispersible. Some other driers may also contain complexing agents.

1.1.6 *Class F*—Other acids and acid blends unidentified by their producers.

1.2 For specific hazard information and guidance, see the supplier's Material Safety Data Sheets for materials listed in this specification.

2. Referenced Documents

2.1 *ASTM Standards:*

D 564 Test Methods for Liquid Paint Driers[2]

D 1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)[2]

D 1545 Test Method for Viscosity of Transparent Liquids by Bubble Time Method[3]

2.2 *U.S. Federal Specification:*

PPP-C-2020 Chemicals, Liquid, Dry, and Paste: Packaging of [4]

3. Chemical and Physical Requirements

3.1 *Quantitative Requirements*—The drier shall conform to the quantitative requirements as specified in Table 1 for metallic content, color, and viscosity.

3.2 *Physical Appearance*—Each type of drier shall be a mobile liquid free of sediment and suspended matter and shall be stable and miscible with oil as listed in Test Methods D 564.

4. Significance and Use

4.1 This specification covers the general requirements for liquid paint driers used in paints, varnishes, enamels, and similar organic coatings.

4.2 The values listed should be considered as general guides to the character of the products, rather than reproducible constants.

5. Test Methods

5.1 The properties enumerated in this specification shall be determined in accordance with Test Methods D 564, except as otherwise provided in this specification.

[1] This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

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[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 06.03.

[4] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 1 Typical Requirements of Liquid Paint Driers[A]

Class	Metal	Metal Concentration, %		Nonvolative Matter, %	Typical Specific Gravity 25/25°C		Color,[B] Gardner (Test Method D 1544)	G-H Viscosity (Test Method D 1545)
		min	max	max	min	max		
A	Calcium	3.9	4.1	50	0.884[C]	—	3	A
A	Calcium	4.9	5.1	60	0.894	0.912	5	C
B	Calcium	3.9	4.1	70	0.902	0.937	10	D
B	Calcium	4.9	5.1	85	0.932	0.970	11	T
C	Calcium	4.9	5.1	46	0.888	—	2	A
D	Calcium	3.9	4.1	66	0.890	0.918	9	B
E	Calcium	3.9	4.1	63	0.905	0.930	8	G
E	Calcium	5.9	6.1	76	0.922	0.960	5	N
F	Calcium	3.9	4.1	50	0.850	0.884	3	A

TABLE
1 *Continued*

Class	Metal	Metal Concentration, %		Nonvolative Matter, %	Typical Specific Gravity 25/25°C		Color,[B] Gardner (Test Method D 1544)	G-H Viscosity (Test Method D 1545)
		min	max	max	min	max		
F	Calcium	4.9	5.1	60	0.900	0.936	4	B
F	Calcium	5.9	6.1	74	0.873	0.948	6	N
F	Calcium	7.9	8.1	70	0.958	—	5	B
F	Calcium	9.9	10.1	65	1.000	1.030	7–8	K
A	Cerium	5.9	6.1	30	0.856	—	8	A
B	Cerium	5.9	6.1	57	0.925	—	17	A1
A	Cobalt	5.9	6.1	45	0.875	0.900	blue/purple	A
A	Cobalt	11.8	12.2	90	1.008	1.060	blue/purple	J
B	Cobalt	5.9	6.1	67	0.918	0.970	blue/purple	B
C	Cobalt	11.8	12.2	65	0.984	—	blue	A
D	Cobalt	5.9	6.1	72	0.912	0.956	purple	C
E	Cobalt	4.9	5.1	60	0.926	—	red/purple	A
E	Cobalt	5.9	6.1	71	0.945	0.960	blue/purple	I
F	Cobalt	5.9	6.1	70	0.870	0.958	blue/violet	A
F	Cobalt	11.8	12.2	80	1.014	1.040	blue/violet	J
A	Iron	5.9	6.1	50	0.900	0.930	dark brown	A
B	Iron	5.9	6.1	67	0.960	0.990	dark brown	M
F	Iron	5.9	6.1	50	0.905	0.930	brown	A
F	Iron	8.9	9.1	78	0.950	0.985	brown	A
F	Iron	11.8	12.2	75	1.068	—	brown	A
A	Lead	23.8	24.2	65	1.090	1.110	3	A
B	Lead	23.8	24.2	67	1.125	1.160	11	B
C	Lead	23.8	24.2	61	1.100	—	2	A2
D	Lead	23.8	24.2	66	1.100	1.125	10	A
E	Lead	23.8	24.2	71	1.125	1.150	7	A
F	Lead	23.8	24.2	67	1.080	1.140	10	A
F	Lead	35.8	36.2	81	1.350	1.393	8	H
A	Manganese	5.9	6.1	50	0.888	0.920	red/brown	A
B	Manganese	5.9	6.1	66	0.930	0.965	17	D
C	Manganese	5.9	6.1	50	0.870	—	10	A
D	Manganese	5.9	6.1	72	0.942	0.972	brown	E
E	Manganese	4.9	5.1	42	0.911	—	brown	A
E	Manganese	5.9	6.1	69	0.942	0.965	brown	E
F	Manganese	5.9	6.1	55	0.870	1.020	18	A
F	Manganese	8.9	9.1	80	0.950	1.020	18	H
F	Manganese	11.8	12.2	75	1.044	—	16	C
A	Nickel	9.9	10.1	70	1.032	—	sh. green	A
A	Rare earth[D]	5.9	6.1	30	0.630	0.880	6	E
A	Rare earth	11.8	12.2	55	0.977	—	yel.-green	C
B	Rare earth	3.9	4.1	35	0.840	0.855	10	A
C	Rare earth	5.9	6.1	35	0.876	—	8	A5
A	Zinc	7.9	8.1	50	0.880	0.906	6	G
A	Zinc	17.8	18.2	90	1.068	1.130	7	Z
B	Zinc	7.9	8.1	70	0.915	0.960	9	A
B	Zinc	9.9	10.1	75	0.980	1.044	8	L
D	Zinc	7.9	8.1	70	1.008	—	11	D
E	Zinc	7.9	8.1	42	0.946	—	2	A
F	Zinc	7.9	8.1	60	0.855	0.963	7	C
F	Zinc	15.8	16.2	80	1.020	1.100	3	B
A	Zirconium	5.9	6.1	30	0.860	0.864	2	A
A	Zirconium	11.8	12.2	56	0.960	0.992	4	A
A	Zirconium	17.8	18.2	55	1.070	1.074	3	A
A	Zirconium	23.8	24.2	77	1.240	—	2	J
C	Zirconium	5.9	6.1	23	0.864	—	2	A5
C	Zirconium	11.8	12.2	46	0.976	—	2	A
E	Zirconium	5.9	6.1	31	0.864	—	4	A
E	Zirconium	11.8	12.2	55	0.975	1.020	4	A
F	Zirconium	5.9	6.1	28	0.855	0.870	2	A5
F	Zirconium	11.8	12.2	55	—	—	—	—
F	Zirconium	17.8	18.2	80	1.090	1.130	4	Z
F	Zirconium	23.8	24.2	93	1.240	1.260	6	J

[A] Source: "Raw Material Index," *National Paint and Coatings Association Guide*, Chemical Specialties Section, April 1978. Available from National Paint and Coatings Assn., 1500 Rhode Island Ave. NW, Washington, DC 20005.
[B] Per Gardner Test Method D 1544. If off the scale, as observed by the unaided eye.
[C] Only one drier was listed in this category.
[D] The metal content represents total rare earth metals calculated as cerium, but the drier contains cerium and lanthanum, as well as minor amounts of other rare earth metals.

6. Packaging and Package Marking

6.1 Package size shall be agreed upon between the purchaser and the supplier.

6.2 Packaging shall conform to applicable carrier rules and regulations or when specified shall conform to Fed. Spec. PPP-C-2020.

7. Keywords

7.1 liquid paint driers