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NATIONAL BUREAU OF STANDARDS

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(May 19, 1947)

PAINT, VARNISH, LACQUER AND RELATED PRODUCTS

List of National Bureau of Standards Publications and Federal Specifications

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General Information

This letter circular lists papers on paint, varnish, lacquer and related materials published by the National Bureau of Standards. It contains also a list of letter circulars and of publications in outside journals reporting work on these subjects by members of the Bureau staff. There is included also a list of Federal specifications covering these materials.

Unless specifically stated, the papers herein listed are not obtainable from the National Bureau of Standards. Those marked "OP" are out of print, but, in general, may be consulted at technical and public libraries.

Where the price of a publication is given it can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The prices quoted are for delivery to addresses in the United States and its territories and possessions and in certain foreign countries that extend the franking privilege. When remitting for delivery to other countries, one-third of the total cost of publications should be added to cover postage.

Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for \$1.00 and good until used), or by check or money order payable to the "Superintendent of Documents, Government Printing Office" and sent to him with order. (Please do not send stamps.)

Circulars of the Paint Manufacturers Association of the United States, of the American Paint and Varnish Manufacturers Association, and of the National Paint, Varnish and Lacquer Association, Inc., that are in print are obtainable from the Institute of Paint and Varnish Research 1500 Rhode Island Avenue, N. W., Washington 5, D. C.

Engineering Societies, 29 W. 39th Street, New York City, maintain a duplicating service and are prepared to supply photostated copies of technical articles that are available in any of the large libraries in New York City.

The publications of the National Bureau of Standards and the Federal Specifications are designated by series letters followed by numbers. The explanation for these letters is as follows:

- RP = "Research Paper". These are reprints of articles appearing in the "Bureau of Standards Journal of Research" (BS.J. Research) and the "Journal of Research of the National Bureau of Standards" (J. Research NBS), the latter being the title of this periodical since July 1934 (volume 13, number 1).
 - T = "Technologic Paper" of the National Bureau of Standards.
 The T202 were issued each independent of the other with individual pagination. Later they were assembled to make the first 15 volumes of this series, and subsequent separates were given volume pagination (Tech. Papers BS).
 This series has been superseded by the Journal of Research.
 - C = "Circular" of the National Bureau of Standards.
- LC = "Letter Circular". These are mimeographed circulars issued without charge by the National Bureau of Standards and are designed to answer many requests for information.
- BMS = Building Materials and Structures Reports of the National Bureau of Standards.

- II = "Hiscellaneous Publication" of the National Bureau of Standards.
- R = "Simplified Practice Recommendations" of the National Bureau of Standards.
- CS = "Commercial Standards" of the National Bureau of Standards.
- TT-P-, etc. = Federal Specifications. Federal Specifications are formulated by the Federal Specifications Board. The current list of Federal Specifications giving titles, symbols, and prices entitled "Federal Specifications Index", revised to Jan. 1, 1947, is for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C., price 35 cents. A simplified list (Price List 75) is available free from the Superintendent of Documents.

For papers in other scientific or technical journals, the name of the journal is given in abbreviated form, with address, in most cases, in parentheses, and with the volume number, page, and year of publication, in the order named. The journals may be obtained from the publisher or consulted in libraries.

Those who wish to keep informed concerning work at the National Bureau of Standards should subscribe to the "Technical News Bulletin". It is a monthly publication which lists all papers published by members of the staff, whether appearing in Bureau publications or in other journals. It contains abstracts of papers appearing in the Journal of Research of the National Bureau of Standards, notes on progress of work in the laboratories, important conferences at the Bureau, and other items of general technical interest. Subscriptions should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The subscription price is \$1.00 a year; single copy, 10 cents.

I. TECHNOLOGIC PAPERS

<u>Title</u>	Series	<u>Prioe</u>
The density and thermal expansion of linseed cil and turpentine. H. W. Bearce. (April 15, 1912)	T 9	OP
Iodine number of linseed oil and petroleum oils. W. H. Smith and J. B. Tuttle. (April 25, 1914)	Т37	OP
Determination of oil and resin in varnish. E. W. Boughton. (February 19, 1916)	т65	OF
Detection of resin in drier. E. W. Boughton. (January 15, 1916)	т66	OP

III. RESEARCH PAPERS

<u>Title</u>	Series	Price
Accelerated tests of organic protective coatings. Percy H. Walker and E. F. Hickson. BS J. Research 1, 1-17 (1928)	RP1	OP
Tinting strength of pigments. H. D. Bruce. BS J. Research 1, 125-150 (1928)	RP7	OP
The ring and ball method of test for softening point of bituminous materials, resins, and similar substances. Percy H. Walker. BS J. Research 4, 195-201 (1930)	RP142	o.P
Durability tests of spar varnish. C. L. Came. BS J. Research 4, 247-259 (1930)	RP146	OP
A new test for predicting the durability of varnishes (The photochemical embrittling test). J. H. Wilson. BS J. Research 7, 73-83 (1931)	RP333	OP
Determination of insoluble matter in shellac. C. C. Hartman. BS J. Research 7, 1105-13 (1931)	.RP391	5¢
Some properties and tests of traffic or zone paints Eugene F. Hickson. J. Research NBS 19, 21-30 (1937)		10¢
Hethod of designating colors. Deam B. Judd and Kenneth L. Kelly, J. Research NBS 23, 355→365 (1939)	RP1239	10₺
Hue, saturation and lightness of surface colors with chromatic illumination. Deane B. Judd. J. Research NBS 24, 293-333 (1942)	RP1285.	OP
Effect of paint on the sound absorption of acoustic materials. V. L. Chrisler. J. Research NBS 24, 547-553 (1940)	RP1298	10£
Apparatus for the study of the photochemistry of sheet materials. Herbert F. Launer. J. Research NBS 24, 567-577 (1940)	RP1300	10₺
Determination of nonvolatile matter and the calculation of "cut" of shellac varnish. Charles C. Hartman. J. Research NBS 25, (1940)	RP1333	5¢

<u>Title</u>	Series	Price
A multipurpose photoelectric reflectometer, Richard S. Hunter. J. Research NBS 25, 581-618 (1940)	RP1345	10£
Measurement of the fading rate of paint. Arnold J. Eickhoff and Richard S. Hunter. J. Research NBS 28, 773-793 (1942)	RP1478	10¢
Tristimulus specification of the Munsell book of color from spectrophotometric measurements. Kenneth L. Kelly, Kasson S. Gibson, and Dorothy Nickerson. J. Research NBS 31, 55-76 (1943)	R⊇15 [‡] 9	20¢
IV. BUILDING MATERIALS AND STRUCTURES REPO	RTS	
<u>Title</u>	Series	Price
Methods of investigation of surface treatment for corrosion protection of steel. Rolla E. Pollard and Wilbur C. Porter. October 11, 1938	FIICK	10½
	DIMOG	102
Surface treatment of steel prior to painting. Rolla E. Pollard and Wilbur C. Porter. (1940)	BMS44	10¢
Solar heating of various surfaces. Herman V. Cottony and Richard S. Dill. January 23, 1941	виз64	10¢
Tests of cement-water paints and other water- proofings for unit-masonry walls.	. `	
Cyrus C. Fishburn and Douglas E. Parsons. March 15, 1943		_
Painting steel. Wilbur C. Porter. October 16, 1944	BMS102	10¢
Paint manual with particular reference to Federal specifications. Percy H. Walker and Eugene F. Hickson. October 11, 1945	BMS105	\$1.00
Paints for exterior masonry walls	BMS110	

V. LETTER CIRCULARS

<u>Title</u>	Series
Painting of steam and hot water radiators	LC445
The reflectance of paints and pigments	LC470
Color harmony	L0525
Preparation and colorimetric properties of a magnesium oxide reflectance standard	LC547
Fluorescence and phosphorescence	LC550
Luminous and fluorescent paints	LC703
Paints and other protective coatings for tires	LC709
Conservation of linseed oil in paint	LC717
Dampness in masonry walls above grade	LC721
Color and legibility	LC730
Painting steel potable water tanks	LC744
Paints for swimming pools	LC746
Painting exterior walls of porous masonry	LC747
Refinishing wood furniture	LC748
Paint and varnish removers	LC749
Control of humidity by saturated salt solutions	' -
Polishes	LC753
Finishes for concrete floors	LC758
Care of floors	LC764
Spray painting	LC773
Automobile painting	LC797
Color charts	LCS09
The painting of exterior wood surfaces	LCS10
Dampness in basements and ground floors	LC813
Fluorescent lamps	LCS17

<u>Title</u>	<u>Series</u>
Plastic paint	rcg50
The painting of exterior metal surfaces	LC831
Painting interior walls and trim	LC837
Paint, varnish, Lacquer and related products. List of National Bureau of Standards publications and Federal specifications	LC559
Inside wall paint for chemical laboratories (fume- resisting enamel paint)	LCS61
Wood and shingle stains	LC867
VI. SIMPLIFIED PRACTICE RECOMMENDATIONS	
<u>Title</u> <u>Series</u> F	rice
Paint and varnish brushes	5¢
Color for school furniture Rl11-30	5¢
Paints, varnishes and related products R144-45	5¢
Color code for marking steel bars R166-37	5¢
Color marking for anesthetic gas cylinders R176-41	5¢
VII. COLLERCIAL STANDARDS	
<u>Title</u> <u>Series</u>	<u>Price</u>
Colors for sanitary ware CS30-31	OP
Colors for kitchen accessories CS62-38	5¢
Colors for bathroom accessories CS63-38	5¢
Artist's oil paints	5¢
Color materials for art education in schools CS130-46	10¢

VIII. OUTSIDE PUBLICATIONS

- Some tests of paints for steel subjected to alternate exposure to air and fresh water. Percy H. Walker and S. S. Voorhees, J. Ind. Eng. Chem. (1155 16th Street, Washington 6, D. C.), 5, 899 (November 1913).
- Notes on the color designation of oil varnish, F. A. Wertz, J. Ind. Eng. Chem. 10, 175 (June 1918).
- A new hexabromide method for linseed oil, L. L. Steele and F. II. Washburn, J. Ind. Eng. Chem. 12, 52 (January 1920).
- The determination of acid number of tung and other vegetable oils, L. L. Steele and G. G. Sward, J. Ind. Eng. Chem. 14, 57 (January 1922).
- Some physical properties of paint, Percy H. Walker and J. G. Thompson, Proc. Am. Soc. Test. Materials (1916 Race Street, Philadelphia, Pa.) 22, Part 2, 464 (1922).
- Abjetic acid and certain metal abjetates, L. L. Steele, J. An. Chem. Soc. (1155 16th Street, Washington 6, D. C.)
 44, 1333 (June 1922).
- Notes on two fessil coal resins, L. L. Steele, An. J. Sci. (New Haven, Connecticut) 7, 389 (Hay 1924).
- Importance of position in weather tests, Percy H. Walker. Ind. Eng. Chem. 16, 58 (May 1924).
- Some observations on red lead as a paint pigment, E. F. Hickson and H. R. Snoke, Faint Mfrs. Assoc. of the U. S. (1500 Rhode Igland Avenue, N. W., Washington 5, D. C.), Circ. 207, (July 1924).
- Some properties and tests of traffic or zone paints. E. F. Hickson, National Paint, Varnish and Lacquer Assoc., Inc., (1500 Rhode Island Ave., N. W., Washington 5, D. C.) Circular No. 532 (1937).
- Effect of certain metallic scaps on the drying of raw linseed oil. L. L. Steele, Ind. Eng. Chem. 16, 957 (Sept., 1924).
- Paints resistant to sulphide fumes, Percy H. Walker and E. F. Hickson, Ind. Eng. Chem. 16, 1142 (November 1924).
- Some observations on aluminum paint, Percy H. Walker and E. F. Hickson, Chem. and Het. Eng. (330 West 42nd Street, New York 15, N. Y.) 31, No. 18 (November 3, 1924).

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- The swinging beam method of testing varnish films, Percy H. Walker and L. L. Steele, Paint Mfrs. Assn. of the U. S., Circ. 229 (March 1925).
- Paint and varnish research at the Bureau of Standards, Percy H. Walker, J. Chen. Education (Metcalf Chemical Laboratory, Brown University, Providence, R. I.), 3, 777 (July 1926).
- A study of the peroxide and persulphate methods for determining chronium in chrome paint pigments, E. F. Hickson, An. Paint and Varnish Mfrs. Assn. Circ. 294 (November 1926).
- Penetration tests on paste paints, E. F. Hickson, Am. Paint and Varnish Hfrs. Assn., Circ. 300 (January 1927).
- A study of commercial flat wall paints (lithopone type), E. F. Hickson, Am. Paint and Varnish Mfrs. Assn., Circ. 305, (March 1927).
- The measurement of the gloss of paints by the Ingersoll Glarimeter, E. F. Hickson, Am. Paint and Varnish Hfrs. Assn., Circ. 307 (April 1927).
- Some precautions to be observed in using saturated solutions for controlling the humidity of air spaces, Percy H. Walker, L. L. Steele and E. F. Hickson, Am. Paint and Varnish lifts. Assn., Circ. 310, 292 (May 1927).
- Effect of certain organic bases in plasticized nitrocellulose films, L. L. Steele, Ind. Eng. Chen. 19, 807 (July 1927).
- Some methods of testing paint and varnish materials, Percy H. Walker, International Congress for Testing Materials, Part II, 603 (1927).
- Accelerated tests of organic protective coatings, Percy H. Walker and E. F. Hickson, Ind. Eng. Chen. 20, 591 (June 1927).
- Unreliability of visual inspection of exposure tests of paints, Percy H. Walker and E. F. Hickson, Ind. Eng. Chen. 20, 997 (October 1928).
- Present status of the technic of evaluating paint service, Percy H. Walker, Proc. Wood Painting Conference, Madison, Wis. (September 13 and 14, 1929). (Issued in mineographed form by Forest Products Laboratory, Madison 5, Wisconsin).

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- Some random suggestions on the purchase of paint, Percy H. Walker. Connercial Standards Honthly 7, No. 1 (July 1930).
- Preparation of surfaces other than wood and composition board for paint and similar coatings, Percy H. Walker. (Read April 11, 1930, to Paint and Varnish Superintendents! Jlub of the Philadelphia District. Published by Adelphia Reporting Board, Philadelphia, Pa.)
- Advantages of oxide films as bases for aluminum pigmented surface coatings for aluminum alloys, R. W. Buzzard and W. H. Mutchler. Nat. Advisory Com. for Aeronautics, Washington 25, D. C. Technical Note 400 (November 1931).
- Preparation, use and abuse of specifications for paint materials, P. H. Walker. Symposium on paint and paint materials, Am. Soc. Test. Mtls. (March 6, 1935).
- Laboratory testing of inside flat wall finishes from the consumer's viewpoint, E. F. Hickson. Symposium on correlation between accelerated laboratory tests and service tests on protective and decorative coatings, Am. Soc. Test. Mtls. (June 29, 1937).
- Outdoor exposure test of paints for exterior masonry walls, Clara Sentel, National Paint, Varnish and Lacquer Assoc., Inc., Circular 609 (1941).
- Determining the flash points of heavy-bodied paints by the Tag closed cup and the Pensky-Mirtens tester, David Busker, A.S.T.M. Bulletin (1916 Race Street, Philadelphia 3, Pa.), No. 124, October 1943.
- The influence of metallic driers on certain properties of linseed-replacement oils, Chas. C. Hartman and Eugene F. Hickson, National Paint, Varnish and Lacquer Association, Circular 673 (April 1944).
- A method of preparing paint films for determining their dry contrast ratio, Paul T. Howard, National Paint, Varnish and Lacquer Assoc., Inc., Circular 695 (September 1944).

IX. FEDERAL SPECIFICATIONS FOR PAINT, VARNISH AND LACQUER MATERIALS

The following list of Federal specifications is arranged alphabetically by titles, with the appropriate Federal specification symbol also given. In some cases the titles are not exactly the same as are given in the specification, but are chosen for the convenience of the reader. Some materials are cross referenced as a further aid to the reader. For example, "Damar Varnish -- TT-V-61" is the same material as is found under "Varnish, damar -- TT-V-61". A lower case letter at the end of the symbol indicates a revision of the specification. For example, "TT-V-121b" indicates that since the first specification was prepared as TT-V-121 there have been two revisions. The symbol given in the following list is the latest at the time this letter circular was prepared. Assume that later on specification TT-V-121b for example is revised and comes out as "TT-V-121c", this will be the copy received from the Superintendent of Documents, even though the "TT-V-121b" symbol is used in ordering.

Federal Specifications may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 5 cents each (no stamps), except TT-P-141a, Methods of Sampling and Testing, 20 cents.

Federal Specifications Index may be obtained from the Superintendent of Documents, Washington 25, D. C., price 35 cents.

1. Paints, Pignents, Varnishes, Lacquers, Thinners, Stains, Oils, Etc.

Title	Symbol
Acetone Aluminum pigment Aluminum, varnish for Benzel Black enamel Black enamel, heat resisting Black paint, carbon Black paint, graphite Blue lead, dry and in oil Blue lead, paint Bone black, dry Bene black, paste-in-oil Calcinine Calking compound	O-A-51a TT-A-468 TT-V-81a VV-B-231 TT-E-521 TT-E-496 TT-P-61a TT-P-27 TT-B-466 TT-P-20 TT-B-600 TT-P-381 TT-C-96 TT-C-598
Carbon black, dry	TT-C-120
Carbon black, paste-in-oil	TT-P-381 TT-P-22 TT-P-23a
Casein paint, interior	11-1-2700

Title Cement-water paint	Symbol
Cement-water paint	TT-P-21
Chrome green, dry	TT-C-235
Chrone green, paste-in-oil	TT-P-381
Chrome orange, dry	TT-C-290
Chrone orange, paste-in-oil	TT-F-381
Chrone oxide, dry	TT-C-306
Chrone oxide, paste-in-oil	TT-P-381
Chrome yellow, dry	TT-C-290
Chrome yellow, paste-in-oil	TT-P-381
Cold water paint, exterior	TT-P-22 TT-P-23α ·
Cold water paint, interior	
Copper phthalocyanine blue	TT-C-610
Danar varnish	TT-V-61
Drier, liquid paint	.TT-D-651a
Drum coating enamel	TT-E-485a
Eggshell interior paint	TT-P-51a
Enulsion paint, exterior	TT-P-18
Enulsion paint, interior	TT-P-88a
Enamel, black	TT-E-521
Enanel, black, heat-resisting	TT-E-496
Enanel, drun coating	TT-E-485a
Enamel, exterior and interior, synthetic	TT-E-489
Enamel, hospital furniture	TT-E-491
Enguel, interior, gloss	TT-E-506a TT-E-508
Enamel, interior, semi-gloss	TT-E-514
Enanel, red	TT-E-531a
Exterior and interior enamel, synthetic	TT-E-489
Exterior paint, linseed oil	TT-1-40
Exterior paint, resin emulsion	TT-P-18
Exterior primer for wood	TT-P-25
Exterior varnish	TT-V-121b
Ferrous metal and wood primer	
Filler, paste wood	
Flat interior paint	TT-P-51a
Floor paint, rubber base	TT-P-91
Floor paint, varnish base	TT-P-146, TT-P-641
Galvanized iron primer	QQ-G-566
Graphite paint	TT-P-27
Green paint	TT-P-71b
Heat-resisting enamel	TT-E-496
House paint, white and tints	TT-P-40
House paint, see under color or type	
Indian red, dry	TT-I-511a
Indian red, paste-in-oil	TT-P-381
Ink, stencil, marking metal, glass, etc	TT-I-558
Ink, stencil, marking wood, filber, etc	TT-I-559

<u>Title</u>	Symbol .
Interior enamel, gloss	• TT-E-506a
Interior enamel, gloss, hospital furniture	TT-E-491
Interior enamel, semigloss	. TT-E-508
Interior cold water paint	. TT-P-23a
Interior emulsion paint	• TT-P-8Śa
Interior flat paint	. TT-P-51a
Interior one-coat flat paint	
Interior varnish	• TT-V-71a
International orange paint	
Iron blue, dry (formerly "Prussian blue")	• TT-I-677
Iron blue, paste-in-oil	
Iron oxide, black, dry	• TT-I-698
Iron oxide, bright red, paste-in-oil	TT-I-511a TT-P-381
Iron oxide, brown, dry	• TT-I-702
Iron oxide paint	
Lacquer, spraying	
Lacquer, thinner	TT-T-266
Lampblack, dry	TT-L-70
Lampblack, paste-in-oil	
Lead-zinc-titanium paint	TT-P-40
Lithopone, dry	
Lusterless olive drab enamel	
Magnesium silicate	• TT-M-90
Masonry paint	
Metallic brown, dry	
Metallic brown, paste-in-oil	
Methods of test	
Mineral spirits	
Mineral red iron oxide, dry	
Mineral red iron oxide, paste-in-oil	TT-P-381
Mixing varnish for aluminum	
Olive drab exterior paint	
Ochre, dry	
Ochre, paste-in-oil	, hu-b-281
Oil, flatting	TT-0-3560
Oil, linseed, boiled	
Oil, linseed, heat-polymerized	
Oil, linseed, raw	JJJ-0-336
Oil, linseed, replacement	TT-0-371
Oil, soybean	
Oil, tung	
Orange paint, international	TT-P-59
Paint, see under color or type	10m = 70m
Pignents, pastes-in-oil	111-1-381 frr m 101
Pine tar	MM_D_EQ
Primer, exterior wood	mm_5_5E
TTTHOT & CVACTION MONEY OF STREET	11-1-1-0

<u>Title</u>	Symbol
Priner, ferrous metal and wood Priner, galvanized iron Priner, plaster Priner-surfacer, hospital furniture Protein base exterior paint Protein base interior paint Prussian blue, dry Prussian blue, paste-in-oil Putty, wood sash glazing Putty, metal sash glazing Radioactive luminous compound Red enamel Red lead, dry and paste Red lead paint Renover, paint and varnish Rubbing varnish Sealer, floor, lacquer type Sealer, floor, varnish type Shellac, orange Shellac, orange Shellac varnish Sienna, raw and burnt, dry Sienna, raw and burnt, paste-in-oil Spirit varnish Stain, wood, exterior Stencil paint Tar, pine Testing methods Thinner, lacquer Thinner, paint, mineral spirits Thinner, synthetic enamel Titenium-lead-zine paint	TT-P-636 TT-P-641 TT-P-646 TT-P-6569 TT-P-22 TT-P-23 TT-P-23 TT-P-351 TT-P-758 TT-P-758 TT-P-58 TT-P-86 TT-P-86 TT-P-86 TT-S-176 TT-S-176 TT-S-176 TT-S-176 TT-S-176 TT-S-176 TT-P-186 TT-T-P-186 TT-T-T-P-181 JJJ-T-18-186 TT-T-T-P-181 JJJ-T-18-18-18-18-18-18-18-18-18-18-18-18-18-
Toluidine red	TT-T-562 TT-P-115 LLL-T-791b
Turpentine, steam distilled wood	LLL-T-791b LLL-T-792a TT-U-450 TT-P-381
Umber, raw and burnt, dry Umber, raw and burnt, paste-in-oil Varnish, aluminum Varnish, asphalt	TT-U-481 TT-P-381 TT-V-81a TT-V-51a
Varnish, danar	TT-V-61 TT-V-121b TT-V-71a TT-V-86

	Symbol
Venetian red, dry Venetian red, paste-in-oil White lead, basic carbonate White lead, basic sulfate White lead paint Yellow exterior paint Yellow iron oxide, dry Yellow iron oxide, paste-in-oil Zinc-dust, dry Zinc dust-zinc oxide primer	TT-V-121b TT-V-130 TT-V-226 TT-P-361 TT-W-251b TT-W-261a
Zinc oxide, leaded T	PT-Z-321