U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON

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LEATHER:
Publications by Members of the Staff of the National Bureau of Standards.

GENERAL INFORMATION

Some of these publications were printed in the regular series of publications of the Bureau and others in the various scientific and technical journals. Copies can usually be consulted at the leading libraries of large cities.

For ready reference and convenience in ordering the separate papers of the Bureau, these have been listed with the serial letter and number in one column and the price in the last column. Those marked "OP" are out of print, but may be consulted in libraries as stated in the first paragraph. A complete list of the Bureau's publications (Circular No. 24 and Supplements) is also generally available at such libraries.

Where the price is stated, the publication 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 which extend the franking privilege. In the case of all other countries, one-third the cost of the publication 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.

Serial letters are used to designate Bureau publications:

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 19[illegible] (volume 13, number 1).

C - "Circular" of the National Bureau of Standards.

T - "Technologic Paper" of the National Bureau of Standards. Nos. T1 to T370. This series was supersede by the "Bureau of Standards Journal of Research" in 1928.

For papers in other scientific or technical journals, the name of the journal or of the organization publishing the article is given in abbreviated form, with the volume number (underscored), page, and year of publication, in the order named. Reprints of these articles are not available, except as noted for articles published in the Journal of the American Leather Chemists Association.

RESEARCH PAPERS

Title	Series	Price
A comparison of the quinhydrone and hydrogen electrodes in solutions containing tannin. E. L. Wallace and John Beek, Jr. BS J. Research 4, 737 (1930)	RP176	0P
A study of the adsorption of sulphuric acid by leather. John Beek, Jr. BS J. Research 5, 1109 (1930) (See also Ind. Eng. Chem.)	RP249	0P
The hydrolysis of chestnut and quebracho tanned leathers by sulphuric acid. E. L. Wallace. BS J. Research 7, 621 (1931) (See also J. Am. Leather Chem. Assn.)	RP362	5c
A contribution relative to the structure of collagen. John Beek, Jr. BS J. Research 8, 549 (1932)	RP434	5c
The influence of pH on the deterioration of vegetable-tanned leather by sulphuric acid. R. C. Bowker and E. L. Wallace. BS J. Research 10, 559 (1933) (See also J. Am. Leather Chem. Assn.)	RP547	5c
The effects of atmospheric moisture on the physical properties of vegetable and chrome tanned calf leathers. W. D. Evans and C. L. Critchfield. BS J. Research 11, 147 (1933)	RP583	5c

Title	Series	Price
Influence of magnesium sulphate on the deterioration of vegetable-tanned leather by sulphuric acid. Roy C. Bowker, Everett L. Wallace and Joseph R. Kanagy. J. Research NBS 14, 121 (1935). (See also J. Am. Leather Chem. Assn.)	RP761	5c
Combining weight of collagen. John Beek, Jr. J. Research NBS 14, 217 (1935)	RP765	5c
Amino-nitrogen contents of wool and collagen. Joseph R. Kanagy and Milton Harris. J. Research NBS 14, 563 (1935) (See also Am. Dyestuff Reporter)	RP787	5c
Effect of sulphuric acid on chrome-tanned leather. Everett L. Wallace, John Beek, Jr., and Charles L. Critchfield. J. Research NBS 14, 771 (1935) (See also J. Am. Leather Chem. Assn.)	RP802	5c
Method for measuring the pH of leather using a simple glass-electrode assembly. Everett L. Wallace, J. Research NBS 15, 5 (1935) (See also J. Am. Leather Chem. Assn.)	RP805	5c
Influence of sulphonated cod-liver oil on the deterioration of vegetable-tanned leathers by sulphuric acid. Everett L. Wallace, Charles L. Critchfield and John Beek, Jr. J. Research NBS 15, 73 (1935) (See also J. Am. Leather Chem. Assn.)	RP811	5c
Comparative wear of chrome-tanned, vegetable-tanned, and retanned sole leather. Roy C. Bowker and Warren E. Emley. J. Research NBS 15, 363 (1935) (See also J. Am. Leather Chem. Assn.)	RP834	5c
Influence of some sulphur containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. Everett L. Wallace, Joseph R. Kanagy and Charles L. Critchfield. J. Research NBS 15, 369 (1935) (See also J. Am. Leather Chem. Assn.)	RP835	5c

Title	Series	Price
Deterioration of vegetable-tanned leathers containing sulphuric acid and glucose. Everett L. Wallace and Joseph R. Kanagy. J. Research NBS 15, 523 (1935) (See also J. Am. Leather Chem. Assn.)	RP846	5c
The soluble decomposition products in aged vegetable-tanned leathers. Joseph R. Kanagy. J. Research NBS 17, 247 (1936) (See also J. Am. Leather Chem. Assn.)	RP909	5c
Behavior of leather in the oxygen bomb. Joseph R. Kanagy. J. Research NBS 18, 713 (1937) (See also J. Am. Leather Chem. Assn.)	RP1004	5c
Influence of copper and iron salts on the behavior of leather in the oxygen bomb. Joseph R. Kanagy. J. Research NBS 20, 849 (1938) (See also J. Am. Leather Chem. Assn.)	RP1109	5c
Combination of hydrochloric acid and sodium hydroxide with hide, tendon, and bone collagen. John Beek, Jr. J. Research NBS 21, 117 (1939).	RP1119	5c
Accelerated aging of leather in the oxygen bomb at 100°C. Joseph R. Kanagy. J. Research NBS 21, 241 (1939) (See also J. Am. Leather Chem. Assn.)	RP1128	5c
Electrophoresis of collagen. John Beek, Jr., and Arnold M. Sookne. J. Research NBS 23, 271 (1939)	RP1230	5c
Effect of oxygen and moisture on the stability of leather at elevated temperatures. Joseph R. Kanagy. J. Research NBS 25, 149 (1940) (See also J. Am. Leather Chem. Assn.)	RP1319	5c
Effect of speed of pulling jaws on the tensile strength and stretch of leather. Robert B. Hobbs. J. Research NBS 25, 207 (1940) (See also J. Am. Leather Chem. Assn.)	RP1321	5c

Title	Series	Price
Evolution of carbon dioxide and water from vegetable-tanned leathers at elevated temperatures. Joseph R. Kanagy. J. Research NBS 27, 257 (1941) (See also J. Am. Leather Chem. Assn.)	RP1418	5c
The carbohydrate content of collagen. John Beek, Jr. J. Research NBS 27, 507 (1941) (See also J. Am. Leather Chem. Assn. and J. Am. Chem. Soc.)	RP1438	5c
Accelerated aging of lace leather. Joseph R. Kanagy and Philip E. Tobias. J. Research NBS 29, 51 (1942) (See also J. Am. Leather Chem. Assn.)	RP1483	5c
Density of leather and its significance. Joseph R. Kanagy and Everett L. Wallace, J. Research NBS 31, 169 (1943) (See also J. Am. Leather Chem. Assn.)	RP1556	5c
Iron as a tanning agent. Joseph R. Kanagy and Ruth A. Kronstadt. J. Research NBS 31, 279 (1943) (See also J. Am. Leather Chem. Assn. and Hide and Leather and Shoes)	RP1566	5c
Thermal-density coefficients and hydrometer correction tables for vegetable tanning extracts. Mary Grace Blair and Elmer L. Peffer. J. Research NBS 33, 341 (1944)	RP1612	5c
Wearing quality of some vegetable-tanned sole leathers. Robert B. Hobbs and Ruth A. Kronstadt. J. Research NBS 34, 33 (1945) (See also J. Am. Leather Chem. Assn.)	RP1626	10c
CIRCULAR		
Shoe constructions. R. C. Bowker. (1938)	C419	10c

TECHNOLOGIC PAPERS

Title	Series	Price
Effects of glucose and salts on the wearing quality of sole leather. P. L. Wormeley, R. C. Bowker, R. W. Hart and L. M. Whitmore. Tech. Pap. BS 12 (1919)	T138	OP
An apparatus for measuring the relative wear of sole leathers, with results obtained with leather from different parts of a hide. R. W. Hart and R. C. Bowker. Tech, Pap. BS 13 (1919-20)	T147	5c
Area measurement of leather. F. J. Schlink. Tech. Pap. BS 13 (1919-20)	T153	OP
Effects of oils, greases, and degree of tannage of the physical properties of russet harness leather. R. C. Bowker and J. B. Churchill. Tech. Pap. BS 13 (1919-20)	T160	5c
Laboratory wearing test to determine the relative wear resistance of sole leather at different depths throughout the thickness of a hide. R. W. Hart. Tech. Pap. BS 13 (1919-20)	T166	OP
Durability of sole leather filled with sulphite cellulose extract. R. C. Bowker. Tech. Pap. BS 16, 495 (1921-22)	T215	5c
Comparative durability of chrome and vegetable-tanned sole leathers. R. C. Bowker and M. N. V. Geib. Tech. Pap. BS 19, 267 (1924-25)	T286	10c
Investigation of synthetic tanning materials. E. Wolesensky. Tech. Pap. BS 20, 1 (1925-26)	T302	15c
Behavior of synthetic tanning materials toward hide substance. E. Wolesensky. Tech. Pap. BS 20, 275 (1925-26)	T309	5c

Title	Series	Price
Analysis of synthetic tanning materials. E. Wolesensky. Tech. Pap. BS 20, 519 (1925-26)	T316	5c
Action of sodium sulphate in synthetic tanning materials. E. Wolesensky. Tech. Pap. BS 20, 529 (1925-26)	T317	10c
Use of sulphite cellulose extract as a tanning material. E. L. Wallace, and R. C. Bowker. Tech. Pap. BS 21, 309 (1926-27)	T339	30c
Cleaning of fur and leather garments. M. H. Goldman and C. C. Hubbard. Tech. Pap. BS 22, 183 (1927-28)	T360	OP

PUBLICATIONS IN JOURNAL OF THE AMERICAN LEATHER CHEMISTS ASSOCIATION

The following publications were printed in the Journal of the American Leather Chemists Association, Dept. of Leather Research, University of Cincinnati, Cincinnati 21, Ohio. Reprints of those marked with an asterisk may be secured without charge (until the supply is exhausted) by addressing the Leather Section, National Bureau of Standards, Washington 25, D.C.

The effect of grease on the tensile strength of strap and harness leather. L. M. Whitmore, R. W. Hart and A. J. Beck. 14, 128 (1919).

Analyses of different tannages of strap, harness and side leathers. L. M. Whitmore. 14, 567 (1919).

Sampling of leather for chemical analysis. R. C. Bowker and E. L. Wallace. 17, 217 (1922).

Progress report on the effects of acids on leather. R. C. Bowker. 23, 82 (1928)*.

The influence of splitting on the strength and stretch of commercial leathers. R. C. Bowker and E. S. Olson. 25, 275 (1930)*.

Analysis of salt used for curing skins. R. C. Bowker and John Beek, Jr. 26, 312 (1931)*.

The deterioration of chestnut and quebracho-tanned leathers by sulphuric acid. R. C. Bowker. 26, 444 (1931)*.

The hydrolysis of chestnut and quebracho tanned leathers by sulphuric acid. E. L. Wallace, 26, 545 (1931)*. (See also J. Research NBS)

The influence of grease on the deterioration of chestnut and quebracho leathers by sulphuric acid. R. C. Bowker. 26, 667 (1931)*.

The effect of atmospheric moisture on the deterioration of commercial and quebracho tanned leathers containing sulphuric acid. R. C. Bowker and W. D. Evans. 27, 81 (1932)*.

The addition of a definite quantity of sulphuric acid to leather. John Beek, Jr. 27, 79 (1932)*.

The deterioration of leather by sulphuric acid as influenced by tanning with blends of chestnut and quebracho extracts. R. C. Bowker and C. L. Critchfield. 27, 173 (1932)*.

The influence of pH on the deterioration of vegetable-tanned leather by sulphuric acid. R. C. Bowker and E. L. Wallace, 28, 125 (1933). (See also J. Research NBS)

The influence of sodium chloride and magnesium sulphate on the hydrolysis of leather by sulphuric acid. E. L. Wallace and J. R. Kanagy. 28, 186 (1933)*.

Report of the Committee on the determination of acid in leather, 1934. R. C. Bowker, Chairman. 29, 403 (1934).

Comments on the Procter and Searle method for determining the acidity of vegetable-tanned leather. R. C. Bowker and E. L. Wallace, 29, 421 (1934).

Effect of temperature on the deterioration of leather containing sulphuric acid. R. C. Bowker and E. L. Wallace. 29, 623 (1934)*.

The deterioration of vegetable-tanned leather by oxalic acid. R. C. Bowker and J. R. Kanagy. 30, 26 (1935)*.

Influence of magnesium sulphate on the deterioration of vegetable-tanned leather by sulphuric acid. R. C. Bowker, E. L. Wallace and J. R. Kanagy. 30, 93 (1935)*. (See also J. Research NBS)

The effect of sulphuric acid on chrome-tanned leather. Everett L. Wallace, John Beek, Jr., and Charles L. Critchfield. 30, 311 (1935)*.
(See also J. Research NBS)

Method of measuring the pH of leather using a simple glass electrode assembly. Everett L. Wallace, 30, 370 (1935)*.
(See also J. Research NBS)

Influence of sulphonated cod-liver oil on the deterioration of vegetable-tanned leathers by sulphuric acid. Everett L. Wallace, 30, 438 (1935)*.
(See also J. Research NBS)

Comparative wear of chrome-tanned, vegetable-tanned, and retanned sole leather. Roy C. Bowker and Warren E. Emley. 30, 572 (1935)*.
(See also J. Research NBS)

Influence of some sulphur-containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. Everett L. Wallace, Joseph R. Kanagy and Charles L. Critchfield. 30, 510 (1935)*.
(See also J. Research NBS)

Deterioration of vegetable-tanned leather containing sulphuric acid and glucose. Everett L. Wallace and Joseph R. Kanagy. 30, 614 (1935)*.
(See also J. Research NBS)

Effect of acid on leather - a summary. Warren E. Emley. 30, 621 (1935)*.

The probable error in the measurement of the tensile strength of heavy leather. John Beek, Jr. 32, 4 (1937)*.

The soluble decomposition products in aged vegetable-tanned leather. J. R. Kanagy. 32, 12 (1937)*.
(See also J. Research NBS)

Behavior of leather in the oxygen bomb. J. R. Kanagy. 32, 314 (1937)*.
(See also J. Research NBS)

Laboratory apparatus and method for determining the resistance of sole leather to abrasion. E. L. Wallace, 32, 325 (1937).

Methods for measuring physical properties of leather and method of preparing samples of leather for analysis. W. E. Emley. 32, 418 (1937).

Influence of copper and iron salts on the behavior of leather in the oxygen bomb. Joseph R. Kanagy. 33, 352 (1938)*. (See also J. Research NBS)

Accelerated aging of leather in the oxygen bomb at 100°C Joseph R. Kanagy. 33, 565 (1938)*. (See also J. Research NBS)

Note on the evaluation of leather by means of the X-ray diffraction patterns. Roy C. Bowker and Harry J. McNicholas. 34, 101 (1939)*.

Report of the A. L. C. A. committee on the determination of pH in tannery practice. Roy C. Bowker. 34, 280 (1939)*.

Stability of leather as indicated by different Proctor and Searle values and by pH values. Roy C. Bowker and Everett L. Wallace, 34, 551 (1939)*.

Influence of natural non-tannins on the deterioration of chestnut and quebracho leathers by sulfuric acid. Roy C. Bowker and Robert B. Hobbs. 35, 5 (1940)*.

Shrinkage temperature of leather. Robert B. Hobbs. 35, 272 (1940)*.

Effect of oxygen and moisture on the stability of leather at elevated temperatures. Joseph R. Kanagy. 35, 632 (1940)*. (See also J. Research NBS)

Effect of speed of pulling jaws on the tensile strength and stretch of leather. Robert B. Hobbs. 35, 715 (1940)*. (See also J. Research NBS)

Some applications of statistical methods to sampling of leather. John Beek, Jr. and Robert B. Hobbs. 36, 190 (1941)*.

Note on the measurement of the permeability of leather to water vapor. Robert B. Hobbs. 36, 346 (1941)*.

An improvement in the method for determining moisture in leather. Everett L. Wallace, 36, 7 (1941)*.

Evolution of carbon dioxide and water from vegetable-tanned leathers at elevated temperatures. Joseph R. Kanagy. 36, 609 (1941)*.
(See also J. Research NBS)

The carbohydrate content of collagen. John Beek, Jr. 36, 696 (1941)*.
(See also J. Research NBS)

Some physical and chemical tests of belting leather. Robert B. Hobbs and Philip E. Tobias. 37, 131 (1942)*.

Accelerated aging of lace leather. Joseph R. Kanagy and Philip E. Tobias. 37, 426 (1942)*.
(See also J. Research NBS)

Density of leather and its significance. Joseph R. Kanagy and Everett L. Wallace. 38, 314 (1943)*.
(See also J. Research NBS)

Iron as a tanning agent. Joseph R. Kanagy and Ruth A. Kronstadt. 38, 459 (1943)*.
(See also J. Research NBS and Hide and Leather and Shoes)

Service tests of some oil-treated sole leathers. Robert B. Hobbs and Howard E. Bussey. 39, 109 (1944)*.
(See also Hide and Leather and Shoes)

Wearing quality of some vegetable-tanned sole leathers. Robert B. Hobbs and Ruth A. Kronstadt. 40, 12 (1945)*.
(See also J. Research NBS)

OTHER OUTSIDE PUBLICATIONS

Organ and piano leathers. R. C. Bowker. The Leather Manufacturer 31, 259 (1920).

Polishing leather for cutlery. R. C. Bowker. The American Cutler. (Feb. 1925).

Increasing the wear of sole leather. R. C. Bowker. Hide and Leather (Oct. 1925).

Analyze polishing wheel leather. R. C. Bowker. Abrasive Industry. (Jan. 1926).

The adsorption of sulphuric acid by leather. John Beek, Jr. Ind. Eng. Chem. 22, 1373 (1930).
(See also BS J. Research)

The supply of chestnut wood extract for tanning purposes. R. C. Bowker. Hide and Leather (Dec. 20, 1930).

Some physical properties of fur-seal skins. R. C. Bowker. J. Tech. Assn. Fur Ind. 2, 34 (1931).

The amino-nitrogen contents of wool and collagen. Milton Harris and Joseph R. Kanagy. Am. Dyestuff Reporter 24, No. 7, p. 182 (1935).
(See also J. Research NBS)

Apparatus for testing coated fabrics. R. C. Bowker. Rayon Textile Monthly 28, 57 (25) (Jan. 1937).

The deterioration of leather by acid. R. C. Bowker. Stiasny Festschrift (1937). Eduard Roether Verlag, Darmstadt, Germany.

National Bureau of Standards experimental tannery. Roy C. Bowker. Hide and Leather and Shoes 97, No. 23 (June 1939).

The physical properties of sole leather. Dorothy Jordan Lloyd, R. C. Bowker, F. O'Flaherty, E. Norlin, J. Gordon Parker and E. L. Wallace, J. Int. Soc. Leather Trades' Chemists 23, 461-480 (Aug. 1939).

Performance tests for leather. Everett L. Wallace, Hide and Leather and Shoes. Vol. 102, No. 3 (July 19, 1941).

The carbohydrate in collagen. John Beek, Jr. J. Am. Chem. Soc. 63, 1483 (1941).

Iron as a tanning agent. Joseph R. Kanagy and Ruth A. Kronstadt. Hide and Leather and Shoes. Vol. 106, No. 25. p. 29 (December 11, 1943).
(See also J. Research NBS and J. Am. Leather Chem. Assn.)

Service tests of some oil treated leathers. Robert B. Hobbs and Howard E. Bussey. Hide and Leather and Shoes. Vol. 107, No. 3, p. 21 (January 15, 1944).
(See also J. Am. Leather Chem. Assn.)

COMMERCIAL STANDARDS

Title	CS No.	Price
Bag, case, and strap leather. (Thickness). ------	CS34-31	5c

SIMPLIFIED PRACTICE RECOMMENDATION

Title	SPR No.	Price
Braided shoe laces. (Lengths).	R168-37	5c

FEDERAL SPECIFICATIONS

These specifications deal with leather, leather products, or materials used for treating leather. Most of them were prepared by the Technical Committee on Leather and Leather Products of the Federal Specifications Executive Committee.

Title	Designation	Price
Aprons; leather, blacksmiths'	KK-A-606a	5c
Bags; hand, leather	KK-B-50	5c
Belts and belting; flat, leather, vegetable-tanned	KK-B-201a	5c
Belts; linemen's, safety, leather	KK-B-151	10c
Belting; round, leather, vegetable-tanned, smooth	KK-B-211a	5c
Cases; brief, leather	KK-C-121a	5c
Dressing; leather, transmission-belt	TT-D-636	5c
Envelopes; leather	KK-E-561	5c
Gloves; working, cotton with leather palm	JJ-G-451	5c
Holsters; pistol, leather	KK-H-566a	5c
Leather and leather products; general specifications (methods of sampling, inspection, and tests)	KK-L-311	
Leather; artificial, (upholstery)	KK-L-136a	5c
Leather; bag	KK-L-151b	5c
Leather; case	KK-L-166a	5c
Leather; harness, black and russet, (vegetable-tanned)	KK-L-171a	5c
Leather; hydraulic-packing, mineral-tanned (regular and non-corrosive)	KK-L-177	5c
Leather; hydraulic-packing, vegetable-tanned	KK-L-181a	5c
Leather; lace	KK-L-201a	5c
Leather; packing, chrome-vegetable retanned	KK-L-231	5c
Leather; rigging	KK-L-241a	5c
Leather; sole (cut, outer, and top-lift), vegetable-tanned, factory	KK-L-261b	5c
Leather; strap, black or russet	KK-L-271a	5c
Leather; upholstery	KK-L-291a	5c

Title	Designation	Price
Lubricants and liquid-fuels; general specifications (methods of sampling and testing)	VV-L-791b	25c
Palms; sewing (sailmakers' and saddlers')	KK-P-91	5c
Polish, shoe; paste	P-P-567	5c
Satchels; leather, physicians'	KK-S-151	5c
Skins; chamois	KK-S-416a	5c
Soap; saddle	P-S-609	5c
Soap and soap products; general specifications (methods of sampling and testing)	P-S-536a	10c
Welting; leather, shoe	KK-W-231	10c