

CS36-31

Fourdrinier Wire Cloth

FEB 18 1932

U. S. DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

FOURDRINIER WIRE CLOTH

COMMERCIAL STANDARD CS36-31

Reference book not to be
taken from the Library



A RECORDED STANDARD OF THE INDUSTRY

Below are described some of the series of publications of the Department of Commerce which deal with various phases of waste elimination.

Simplified Practice Recommendations.

These present in detail the development of programs to eliminate unnecessary variety in sizes, dimensions, styles, and types of over 120 commodities. They also contain lists of associations and individuals who have indicated their intention to adhere to the recommendations. These simplified schedules, as formulated and approved by the industries, are indorsed by the Department of Commerce.

American Marine Standards.

These are promulgated by the American Marine Standards Committee, which is controlled by the marine industry and administered as a unit of the division of simplified practice. Their object is to promote economy in construction, equipment, maintenance, and operation of ships. In general, they provide for simplification and improvement of design, interchangeability of parts, and minimum requisites of quality for efficient and safe operation.

Commercial Standards.

These are developed by various industries under a procedure similar to that of simplified practice recommendations. They are, however, primarily concerned with considerations of grade, quality, and such other characteristics as are outside the scope of dimensional simplification.

Lists of the publications in each of the above series can be obtained by applying to the Bureau of Standards, Washington, D. C.

U. S. DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

FOURDRINIER WIRE CLOTH

COMMERCIAL STANDARD CS36-31

Effective Date for New Production November 1, 1931,
and for Clearance of Existing Stocks May 1, 1932

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FOURDRINIER WIRE CLOTH

ACCEPTORS

ASSOCIATIONS

Wire Cloth Manufacturers' Association,
Washington, D. C.

FIRMS

Allied Paper Mills, Kalamazoo, Mich.
American Giese Wire Corporation,
New York, N. Y. (in principle).
American Writing Paper Co. (Inc.),
Holyoke, Mass.
Appleton Wire Works (Inc.), Apple-
ton, Wis.
Badger Paper Mills (Inc.), Peshtigo,
Wis.
Bedford Pulp & Paper Co. (Inc.),
Lynchburg, Va.
Bird & Son (Inc.), East Walpole,
Mass.
Bogalusa Paper Co. (Inc.), Bogalusa,
La.
Buchanan & Bolt Wire Co., Holyoke,
Mass.
Buckeye Cotton Oil Co., The, Mem-
phis, Tenn.
Cable Excelsior Wire Manufacturing
Co., Wm., Brooklyn, N. Y.
Champion Coated Paper Co., The,
Hamilton, Ohio (in principle).
Chapin & Gould Paper Co., Spring-
field, Mass.
Cheney Bigelow Wire Works, Spring-
field, Mass.
Christie (Canada) (Ltd.), George,
Montreal, Quebec, Canada.
Cosgrove Wire Cloth Co., Belleville,
N. J.
Cottrell Paper Co. (Inc.), Rock City
Falls, N. Y. (in principle).
Crane & Co. (Inc.), Dalton, Mass.
Deerfield Glassine Co., Monroe Bridge,
Mass.
Dexter & Sons (Inc.), C. H., Windsor
Locks, Conn.
Diamond Mills Paper Co., New York,
N. Y.
Eastern Manufacturing Co., Bangor,
Me.
Eastman Kodak Co., Rochester, N. Y.
Eastwood Corporation, Belleville, N. J.
Erving Paper Mills, Erving, Mass.
Fox River Paper Co., Appleton, Wis.

Grandfather Falls Co., Merrill, Wis.
Hammermill Paper Co., Erie, Pa.
Harding-Jones Paper Co., The, Middle-
town, Ohio.
Hartford City Paper Co., Hartford
City, Ind.
Hoskin-Morainville Paper Co., Menom-
inee, Mich.
Keystone Wire Cloth Co., Hanover,
Pa.
Kimberly-Clark Corporation, Neenah,
Wis.
Lindsay Wire Weaving Co., The,
Cleveland, Ohio.
Manning Paper Co. (Inc.), John A.,
Troy, N. Y.
Marathon Paper Mills Co., Ashland,
Wis.
Marshall Bros. (Inc.), Yorklyn, Del.
Mazer Paper Mills (Inc.), Lansdowne,
Pa.
McCluskey & Sons (Inc.), H. & T.,
New Haven, Conn.
McDowell Paper Mills, Philadelphia,
Pa.
Minerva Wax Paper Co., Minerva,
Ohio (in principle).
Morgan Paper Co., Division of U. S.
Envelope Co., Lititz, Pa.
Mountain Mill Co., Lee, Mass.
Mount Vernon Straw & Paper Board
Co. (Inc.), Mount Vernon, Ind.
Munising Paper Co., The, Munising,
Mich.
National Vulcanized Fibre Co., Wil-
mington, Del.
Nekoosa Edwards Paper Co., Port Ed-
wards, Wis.
New York State College of Forestry,
Syracuse, N. Y. (in principle).
O'Neill Wire Works, Joseph, Port
Chester, N. Y.
O'Neill Wire Works of Ohio, Newark,
Ohio.
Ontonagon Fibre Co., Ontonagon,
Mich.
Oxford Miami Paper Co., West Car-
rollton, Ohio.
Patten Paper Co. (Ltd.), Appleton,
Wis.
Puget Sound Pulp & Timber Co., Ana-
cortes, Wash.

Puget Sound Pulp & Timber Co., Bell-
 ingham, Wash.
 Rex Paper Co., Kalamazoo, Mich.
 Riegel Paper Corporation, Milford,
 N. J.
 Robinson Manufacturing Co., Muncy,
 Pa.
 Rolock (Inc.), Southport, Conn. (in
 principle).
 Ryegate Paper Co., East Ryegate, Vt.
 St. Croix Paper Co., Woodland, Me.
 Standard Paper Manufacturing Co.,
 Richmond, Va.
 Stevens Paper Mills (Inc.), The, West-
 field, Mass.
 Stevens Paper Mills (Inc.), The,
 Windsor, Conn.
 Strathmore Paper Co., West Spring-
 field, Mass.
 Taggart Oswego Paper & Bag Corpo-
 ration, Oswego, N. Y.

Tarentum Paper Mills, Tarentum, Pa.
 Tyler Co., The W. S., Cleveland, Ohio.
 United States Gypsum Co., Chicago,
 Ill.
 University of Maine, Orono, Me.
 Watab Paper Co., Sartell, Minn.
 Westfield River Paper Co., Russell,
 Mass.
 Weyerhaeuser Timber Co., Longview,
 Wash.
 Wisconsin Wire Works, Appleton, Wis.
 Yellow Pine Paper Mill Co., Orange,
 Tex.

GOVERNMENT

Bureau of Standards Paper Mill,
 Washington, D. C.
 Post Office Department, Washington,
 D. C. (in principle).

FOURDRINIER WIRE CLOTH

COMMERCIAL STANDARD CS36-31

On June 2, 1931, a general conference of representative manufacturers and users of Fourdrinier wire cloth adopted a commercial standard for this commodity. The industry has since accepted and approved for promulgation by the Department of Commerce, through the Bureau of Standards, the commercial standard as shown herein.

The standard became effective for new production on November 1, 1931, while May 1, 1932, was set for the clearance of existing stocks. Promulgation recommended.

Promulgated.

I. J. FAIRCHILD,
Chief, Division of Trade Standards.

APPROVED.

GEORGE K. BURGESS,
Director, Bureau of Standards.

R. P. LAMONT,
Secretary of Commerce.

GENERAL

It is the desire of manufacturers of Fourdrinier wire cloth for paper-making machines that their product shall be of high-grade workmanship and material and thereby provide maximum service and satisfaction in use. Adherence to this policy requires but one high-grade product described below that shall be known as the commercial standard grade. Other grades and meshes are to be considered as special.

PURPOSE

This commercial standard is a basis for clearer understanding between the manufacturers and users of Fourdrinier wire cloth. Its adoption and general use should result in a closer understanding between manufacturer and user through the establishment of standard mesh classifications, nomenclature, wire sizes, methods of inspection, labeling, handling, storage, and installation.

SCOPE

The standard applies to one grade only of Fourdrinier wire cloth—a flexible endless woven wire cloth used on paper-making machines. It establishes the number of wires in both directions for the several mesh classifications and the thickness of the wire. It further provides for inspection, labeling, and method of handling. An appendix includes recommendations of the manufacturers on the installation and use of the product.

GENERAL REQUIREMENTS

Commercial standard Fourdrinier wire cloth shall contain no imperfections that will shorten its period of usefulness or cause a mark or defect in the finished paper.

DETAIL REQUIREMENTS

1. *Kinds of wire.*—Wire used in the manufacture of Fourdrinier wire cloth may be of any metal or alloy with the necessary tensile strength, toughness, and elasticity to stand the physical strain and of sufficient resistance to the action of chemicals used in the preparation of pulp. Brass, bronze, phosphor bronze, Monel, nickel, and stainless steel are in common usage. One or more kinds of material may be used for the warp and shoot wires.

2. *Mesh of wire cloth and size of wire.*—The number of warp wires per inch (number of dents per inch in the reed) and the number of shoot wires (number of beats per inch) determines the mesh of the cloth. The diameter of the single wire is varied according to the mesh of the wire cloth. The mesh, the corresponding number of warp and shoot wires per inch, and the corresponding diameter of wire listed in Table 1 are standard.

3. *Seam.*—The seam, which is one of the most important features of this commodity, shall suit the machine on which it is to be used and shall be flat and straight.

TABLE 1.—Details of standard mesh fourdrinier wire cloth

Stand- ard mesh desig- nation	Warp wires per inch		Shoot wires per inch		Diameter of wire before weaving			
	Dents	Toler- ance	Beats	Toler- ance	Warp wire		Shoot wire	
					Mini- mum	Maxi- mum	Mini- mum	Maxi- mum
					Inch	Inch	Inch	Inch
40	Number 40	Number -2	Number 34	Number ±2	0.0105	0.0115	0.0105	0.0115
50	50	-2	36	±2	.0095	.0105	.0095	.0105
60	60	-2	40	±2	.0090	.0095	.0090	.0105
65	65	(±1)	46	±2	.0080	.0085	.0080	.0090
70	70	-2	52	±2	.0075	.0080	.0075	.0085
75	75	(±1)	56	±2	.0070	.0075	.0070	.0080
80	80	-2	60	±2	.0065	.0070	.0065	.0075
85	85	(±1)	64	±2	.0057	.0063	.0057	.0065
90	90	-2	74	±2	.0055	.0060	.0055	.0060
100	100	-2 *	86	±4	.0045	.0050	.0045	.0055

METHOD OF INSPECTION

The wire cloth shall be given a very rigid inspection while on the stretching table. It shall run true on the rolls. Particular attention shall be given to the seam. The entire area shall be examined for defects.

In measuring the diameter of a strand of wire a micrometer caliper, or V gage, shall be used and the diameters recorded to the nearest ten-thousandth of an inch.

PACKING

The wire cloth shall be wound on three spars, each not less than $2\frac{1}{2}$ inches in diameter, two at the center of the roll and the third inside the loose end as shown in Figure 1. In order to prevent damage to the wire cloth all three spars shall be firmly bound in position at the ends. The wire cloth shall be securely wrapped in heavy moisture-resistant paper, tied, and carefully supported in the packing case by jamming both ends of the spars with pieces of wood securely fastened to them. Each Fourdrinier wire shall be packed in a case made for that particular wire and every precaution shall be taken to guard against the possibility of damage in transit.

LABELING

The wrapper on all commercial standard Fourdrinier wire cloth shall be labeled according to mesh classification, kind of wire (both warp and shoot), and width and length of the cloth, and, in addition, shall contain the following statement:

"The ----- certifies that this Fourdrinier
(Name of company)
wire cloth conforms to the requirements of the U. S. Com-
mercial Standard CS36-31 as issued by the United States
Department of Commerce."

The shipping case shall also be stenciled on side and end according to mesh classification, kind, size, and date of shipment.

STORAGE, UNPACKING, AND INSTALLATION

1. *Storage*.—The Fourdrinier wires shall be stored in a clean, dry place in their original packing cases until required, and shall be used in the order received at the paper mill. No complaints will be recognized by wire-cloth manufacturers unless made within six months of delivery date.

2. *Unpacking*.—The packing case shall be opened with care. The covering of the wire cloth shall be carefully removed with the fingers only, never with a knife or other sharp instrument. The wire cloth shall then be placed on a clean, flat surface covered with heavy wrapping paper, the first turn unwound and the spar under the loose end slowly and evenly withdrawn, carefully followed by insertion of the porter bar.

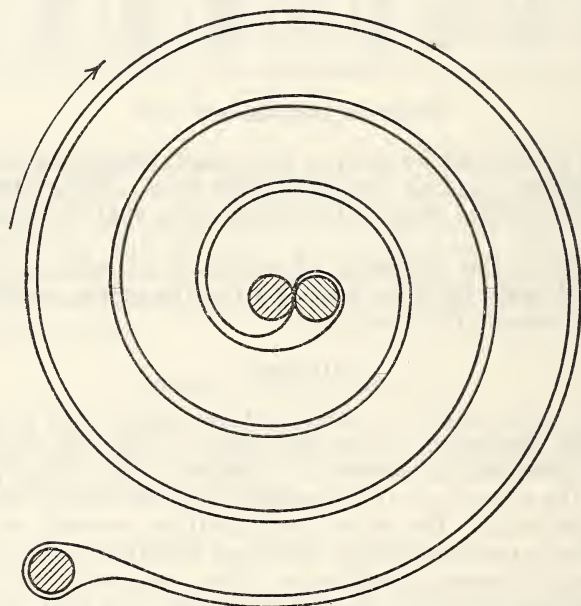


FIGURE 1.—Method of winding Fourdrinier wire on spars for packing

3. *Installation*.—Proper installation and care of the wire cloth in use are important factors influencing its period of usefulness. To put the wire cloth on the machine it shall be lifted by the two remaining spars while the loose end swings free and clear of all obstructions. The wire cloth shall be held in line with the couch roll, unwound far enough to form a sufficiently large loop (both edges of the wire must be opened at the same time to prevent buckling), then slowly and carefully carried over the roll.

The wire cloth, supported by the center spars, is permitted to rest on the couch roll just ahead of top center. The roll for stringing or carrying is then inserted. The wire cloth is unwound on top of the couch roll as the wire cloth is carried slowly along the machine by the stringing or carrying roll. The table rolls are put in place. The breast roll follows and the stretch roll is put in place last. The dis-

tance between the center of the couch roll and the center of the breast roll should be exactly the same on both sides of the machine. The suction boxes shall be leveled and the machine inspected to see that all parts are in their proper places.

The paper machine shall be started slowly, never with a jerk. Run the wire cloth for a few turns to permit it to straighten itself out, and to allow the machine tender to examine it for any defect or damage. The stretch roll shall then be properly tensioned (see p. 6) so that its weight can be evenly applied over the entire width of wire cloth. Unless attempting to eliminate slackness from a damaged local spot, stretch roll tension shall never be applied with the Fourdrinier wire stopped.

APPENDIX ¹

MANUFACTURERS' RECOMMENDATIONS

The following recommendations are not to be considered a part of the commercial standard for Fourdrinier wire cloth and although they come more nearly within the realm of the paper maker, they are offered by the manufacturers of Fourdrinier wire cloth as a guide to better service and extended usefulness of their product.

PROPER CARE OF FOURDRINIER WIRE IN USE

The proper care of Fourdrinier wire cloth in use is extremely important. The life ² of the wire cloth is largely dependent upon the attention given by the machine tender, and if given proper care, weeks of service may be obtained, while under careless handling, it may last only a few days.

Perhaps the most important items in the care of the wire cloth in use are (a) to keep it clean and in good repair, (b) to use proper tension, (c) to have the proper amount of vacuum on suction boxes, and rolls, (d) to take paper off the wire cloth properly, and (e) to carefully remove kinks, ridges, and bulges that may develop.

(a) *Cleaning*.—Wash the wire cloth plentifully with soft water whenever a chance is offered; this keeps the meshes open, washes off the acid, prolongs the life of the wire, improves the appearance of the paper, and reduces the work of the suction boxes.

The use of hard water to clean a Fourdrinier wire should be avoided, because deposits of calcium carbonate are formed. The clogging of mesh by loading, size, etc., is preventable by keeping the wire cloth clean. It should not be cleaned with acid unless this appears to be the only effective method.

The process of cleaning the wire cloth with acid is called "souring the wire." The acid should be diluted with water—5 parts of water to 1 part of sulphuric acid, specific gravity 1.84. (*Important*.—The acid should always be poured into the water, as it is dangerous to pour water into acid.) The solution can be applied to the wire cloth through the shower pipes on the paper machine.

¹ Many definitions and methods pertaining to paper-mill machinery or practice given herein are taken from *The Manufacture of Pulp and Paper*, vol. 4, an official work prepared under the direction of the Joint Executive Committee of the Vocational Educational Committee of the Pulp and Paper Industry of the United States and Canada.

² See life of Fourdrinier wire, p. 9.

A good way to clean a Fourdrinier wire with an acid solution (or a caustic solution which is sometimes used for this purpose) is to make a water-tight box, in which the lowest outside wire roll can run. The roll turning in the solution will "sour the wire" evenly all over and the wire cloth will carry around enough solution to sour and clean the whole Fourdrinier wire. The suction boxes should not be in action during the cleaning process. The wire cloth is clean when it stops frothing and should then be rinsed immediately with water.

The use of a hydrochloric acid solution for cleaning a wire cloth is not recommended.

Pitch or grease apparently from resinous matter carried in the pulp will sometimes accumulate in the meshes of the wire cloth. To remove spots of this kind a strip of felt about 36 inches wide, extending across the machine, is put on the inside of the Fourdrinier wire, and a small steam jet or hose about one-fourth inch in diameter can be used to blow the pitch or grease onto the felt.

Alcohol and ether are solvents for pitch and may be used to dissolve the spots.

Brown scale.—Clogging of the mesh of wire cloth is sometimes caused by a transparent amber scale which has been designated as "brown scale." The "brown scale" itself does not clog the openings, but acts as a cementing agent for particles of sand, pulp, and other material which has become temporarily lodged in the meshes of the wire cloth. When this occurs the wire cloth should be periodically cleaned with concentrated sulphuric acid (specific gravity 1.84) to which at least one-half per cent of formalin has been added. The wire cloth should be subjected to the acid treatment for a very short period of time and thoroughly washed while the paper machine is in operation. This procedure will prevent the "brown scale" and consequently the clogging due to it.

(b) *Tension.*—Proper tension of the wire cloth should not be judged by hand. The strands of wire are capable of a certain amount of extension, but they are not elastic. Once stretched they can not shrink again to their original length. Every square inch of the wire area should have equal tension. A mechanical tension indicator should be used at the stretch rolls. It is not necessary that a Fourdrinier wire be very tight, but the surface on which the paper is formed should be taut and even. The pull of the couch roll on the wire cloth, which drives all the table rolls and the breast roll, will keep the forming part of the Fourdrinier wire tight even though the return of the wire is loose. A Fourdrinier wire can be pulled apart by the stretch roll. A tension of not more than 3 pounds per inch of face of wire cloth should be maintained. Altering the tension of a Fourdrinier wire causes the mesh to loosen and begin to work, and the wire cloth will shear itself into cracks much more quickly. Wire cloth lengthens slightly in use, which may be taken care of by proper use of the stretch roll without increasing the tension. The tension from the boxes to the couch rolls should be equal on both sides.

(c) *Amount of vacuum on suction boxes.*—Increasing the vacuum to above 10 inches (mercury) puts too much strain on the wire cloth; 14 inches of vacuum is bad practice and soon wears the wire cloth. The suction tends to pull the wire cloth down onto the top of the

boxes and makes the cloth drag, causing undue wear. The "suck in" and release as the wire cloth passes the suction boxes causes the mesh to be strained. On free stock, however, such as news, cheap tablet, catalogue, wrapping, etc., it is practically impossible to get too much suction, because air penetrates the sheet easily.

(d) *Taking the paper off the Fourdrinier wire.*—The wire cloth must not be struck hard when picking up the paper, nor the sheet picked off the suction area. Fourdrinier wires may be ruined in this way.

(e) *Removal of kinks, ridges, and bulges.*—Kinks form very quickly and easily, and when not removed they invariably develop into cracks, frequently ruining a Fourdrinier wire. Extreme care should be used to prevent the formation of kinks. If they are formed, they may be removed by one of the following methods:

1. Grease the kink or buckle; bring the kink over the stretch roll, washing the wire cloth with acid (4 parts of sulphuric acid to 1 part of water). (*Important.*—Pour the acid into the water; it is dangerous to pour water into the acid.) The acid weakens the surrounding wire so that it can easily assimilate the slack from the kinked area. Wash off the acid solution with fresh water, clean the grease off with kerosene, use wire brush to brush from center of slack area into the acid-treated area. Tighten down the stretch roll.

2. Bring the kink over the stretch roll and heat the kink red hot with a torch made of a handful of waste that has been dipped in kerosene and fastened to a broomstick. This softens the wire and removes the kink. If done with extreme care, this method does not impair the strength of the wire, while the acid method may weaken the wire.

3. Convex and concave ridges should be removed during a shut-down. They may be rubbed down by using a rounded smooth surface (a darning ball or light bulb, but never a metal object) to press gently and steadily over the ridged portion so as to disperse it over a larger area. After the rubbing is completed the tension should be equalized.

4. Bulges are best removed by cutting a slit in the wire and sewing up the slit. Bulges are difficult to repair, as the remedy is drastic, and prevention is better than cure. Small bulges may be removed as described under kinks.

(f) *Miscellaneous.*—Anything that the machine tender can do to reduce the amount of pull on the wire cloth by the couch roll, without interfering with the paper-making function, will increase the life of the Fourdrinier wire. Men should not be permitted, under any circumstances, to walk across the Fourdrinier wire.

All rolls on the paper machine should be kept clean, and corroded rolls should be replaced.

All rolls should be kept square with the machine. Periodical checking the squareness of the rolls will often prevent undue strains on the wire cloth. Rolls should be level and in line. Table rolls should be as light as possible, should be in contact with the wire cloth, and should be kept turning freely to avoid wear on the wire cloth.

Breast rolls should be amply large in diameter, light as possible, ground straight (without crown), turn easily, be in balance and the

journals well lubricated. The breast roll should have a doctor to keep it clean and to keep pulp from getting under the wire cloth and so stretching it and making bulges in it. The doctor should be true all across the roll.

Couch rolls should not be crowned, because any increase in the diameter at the middle of the roll would tend to stretch the wire cloth or to make it travel faster at the center, which would cause strains and partially close the mesh. The lower couch roll drives the Fourdrinier wire. Very careful attention should be given to the bearings, lubrication, and the proper setting and pressure between the upper and lower couch rolls. Suction couch rolls eliminate the need of a top couch roll with its felt jacket and guard boards which cause many accidents to Fourdrinier wires. Guard boards should scrape off lumps of pulp that might go around and dent the wire cloth. Since the guard board acts like a brake, any reduction of pressure on it reduces the power required to drive the machine and lengthens the life of the Fourdrinier wire.

Deckle straps make the wire cloth dirty and cause more or less ridging, as do the movable ends of the suction boxes owing to a pull over their inner edges. Deckle-strap pulleys should never be allowed to stand still while the machine is running, but should run as freely as possible and be of ample diameter to avoid drag on the wire cloth from the straps. Otherwise the wire is strained on the edges, hardened, and quickly develops cracks. Fourdrinier wires operating under such conditions wear out much faster than they would under better operating conditions.

The shake has a twisting action on the wire cloth just before it is held by the suction boxes, and the shake should be stopped just as soon as the paper is off the wire. The shake should not be applied to an unloaded Fourdrinier wire.

The Fourdrinier wire after being placed on the paper machine should be kept wet when not in use.

In removing stringy fibers from the wire cloth no hard pointed instrument should be used.

Dandy rolls that are too short and have prominent disks on their ends are a source of trouble.

A guide roll stick often causes cracks on the edges of the wire cloth if the wire is not kept in proper alignment.

Suction box covers should be planed often and formation of scoring avoided. Scoring may cause the wire cloth to travel to one side.

Stock should never be allowed to pile up high enough in the save-all to touch the Fourdrinier wire.

GLOSSARY OF TERMS

Annealing.—Relieving internal strains in the wire by means of heat.

Beaming on the wire.—The process of putting the warp wire on the loom preparatory to weaving by means of a creel which temporarily holds the spools. The warp wires are run onto the back beam 1 or 2 inches at a time. Each course of wire shall lie flat and even and the tension shall be uniform.

Beat.—Stroke of reed in weaving process to bring shoot wire into place.

Break or crack.—Broken wires.

Breast roll.—First roll at "wet" end of paper machine.

Bobbin or pirn.—Spindle carrying the shoot wire in the shuttle during weaving.

Bulge.—Local slack area of unequal tension in wire cloth.

Couch (pronounced "cooch") *roll.*—Paper machine roll which drives the Fourdrinier wire.

Crash.—Wires broken in weaving.

(NOTE.—Warp wires are sometimes stretched by broken wires or foreign material, causing an area of slackness running across the cloth. When repaired, this leaves a strained-appearing streak in the finished cloth.)

Crow's feet.—Marks, usually V-shaped or diagonal buckles, in woven wire caused by bending or springing of rolls on which wire cloth is wound.

Dandy roll.—A skeleton roll used to improve formation of top side paper sheet and may be used to make watermark in paper.

Deckle straps.—Large rubber or rubber-coated belts, nearly square in cross section, used to retain paper stock on Fourdrinier wire.

Deckle pulleys.—Pulleys which carry deckle straps.

Dent.—Blade of the reed.

Doctor.—Scraper for cleaning dandy and other rolls.

Double.—Loops or extra pieces of wire woven in with the shoot wire.

Guard board.—Board used to squeeze water out of felt on upper couch roll and to scrape off lumps of pulp from the couch roll.

Guide rolls.—Rolls on paper machine which guide the wire cloth to make it run straight.

Harness.—Mechanism for raising and lowering warp wires during weaving.

Heddle.—The heddle is a blade of steel approximately 0.010-inch thick by three-eighths inch wide and about 10 inches long with an eyelet in the center, or a twisted wire of about the same length with an eyelet through the center, through which the warp wires pass and by means of which the warp wires are raised and lowered during the weaving process.

Kink.—A snick in a single strand of wire, or a short sharp wrinkle or buckle in wire cloth.

Life of the Fourdrinier wire.—Is computed from the weight and kind of paper made in conjunction with the time the wire is on the machine.

Mesh.—The standard mesh number is determined by the number of warp wires per linear inch measured from center of one warp wire to point 1 inch distant parallel to said warp wire. (The wire cloth used for coarse papers, as news or wrapping paper, is ordinarily 60 or 65 mesh; for writing or book papers, it is generally 70 to 75 or 80 mesh. To obtain certain surface characteristics or for lightweight papers, finer mesh is sometimes used.) Special mesh is indicated by two numbers as 73/58, with the first number indicating the number of warp wires, and the second indicating the number of shoot wires per inch.

Palms.—Fenders on wire cloth guides on paper machine.

Pirn.—See Bobbin.

Pole.—See Spar.

Porter bar.—Lifting lever used to put new Fourdrinier wire on paper machine.

Pucker.—Small crease or wrinkle in wire cloth.

Reed.—Mechanism on loom used to space warp wires and beat shoot wires into place.

Ridge.—Slack place of approximately constant width, either convex or concave, lengthwise or crosswise of the wire cloth.

Scoring.—Fine grooves worn in the wire cloth by suction box covers, or vice versa.

Seam.—Joint where ends of the wire cloth are fastened together to make the piece endless.

Selvage.—Extra warp wire, or silk or linen threads or any other arrangement at edge of wire cloth for reinforcing or finishing the edge.

Shake.—A horizontal vibrating motion of “wet” end of paper machine which assists the fibers to interweave in all directions.

Sheepsbank.—A slacked warp wire that doubles in a V and is woven in with the shoot wire.

Shoot or “shute” wire.—Wire carried by shuttle which runs perpendicular to warp wires in the finished cloth.

Single.—A single piece of extra wire woven in with the shoot wire.

Snick.—Sharp kink in single strand of wire caused by a loop pulled tight. These catch and bend warp wire in weaving.

Souring.—The process of cleaning wire cloth with acid.

Spur.—Wooden, iron, or steel rollers or poles used in packing the wire cloth.

Stretch roll.—Roll on paper machine to maintain tension on the wire cloth.

Suction.—Vacuum applied to suction box.

Suction boxes.—Narrow hollow boxes with perforated top bearing against underside of wire cloth and connected to vacuum so as to draw water out of the paper stock through wire cloth.

Table rolls.—Rotating rolls supporting Fourdrinier wire, which constitute forming table for sheet of paper, and assist in the removal of water from the paper stock.

Threading in the wire.—Operation of threading each warp wire separately, first through the eye of the heddle and then between dents in reed.

Warp wire.—Longitudinal wire running parallel to edge.

Winding.—Operation of winding wire onto the warp spools and the shuttle bobbins. Wire shall be free from kinks and other imperfections.

Wrinkle.—A ridge or prominence in the wire cloth.

GENERAL CONFERENCE

Pursuant to a request of the Wire Cloth Manufacturers Association, a general conference of manufacturers, users, and others interested in Fourdrinier wire cloth for paper machines, was held in Washington, D. C., on June 2, 1931, to consider the establishment of standards of quality for this commodity.

The conference, held under the auspices of the division of trade standards, Bureau of Standards, was presided over by G. W. Wray. The conference was opened by I. J. Fairchild, chief of the division of trade standards, who explained the desirability of uniform quality standards as a basis of common understanding for all interests of the industry. The chairman then outlined the procedure for establishment of commercial standards.

The proposed standard was presented to the conference for discussion and adjustment by A. M. Ferry, secretary, Wire Cloth Manufacturers Association. Several constructive changes were made in the specification, and, upon motion, duly seconded, the conference voted to approve the proposed standard and to recommend it to the industry for acceptance as the standard of quality for the industry.

STANDING COMMITTEE

A standing committee was appointed to represent the various interests of the industry and to receive all comments and suggestions for the improvement of the commercial standard. The conference recommended that the specification be considered annually for revisions to keep it continuously in accord with the desires of the industry and advance in the art.

The following were appointed on the standing committee:

G. W. WRAY, chairman, Bureau of Standards.

HAMILTON LINDSAY, The Lindsay Wire Weaving Co.

C. ZIMMERMAN, The W. S. Tyler Co.

JOHN D. WATSON, Wisconsin Wire Works.

A. M. FERRY, Wire Cloth Manufacturers Association.

CARL MAGNUS, The American Pulp and Paper Mill Superintendents Association.

A. D. COFFIN, C. H. Dexter & Sons (Inc.).

R. G. McDONALD, Pulp and Paper Industry.

GEORGE W. BROWNE, Buyers Group for Pulp and Paper Manufacturers, National Association of Purchasing Agents (Inc.).

EFFECTIVE DATE

The conference voted that the commercial standard be made effective for new production on November 1, 1931, and for clearance of existing stocks on May 1, 1932.

CERTIFICATION PLAN

The conference voted its approval of the certification plan for application to Fourdrinier wire cloth made in accordance with the commercial standard specifications.

The certification plan as applied by the Bureau of Standards to commercial standards consists in the compilation and distribution of lists of manufacturers who are willing, when requested to do so, to certify to purchasers that products supplied by them comply with

all the requirements and tests set forth in nationally recognized commercial standards. The plan is also applied to selected Federal specifications.

These lists are available on request to individual consumers, consumer groups, companies, and, in fact, to any prospective purchasers, for their guidance.

The benefits now derived from the use of specifications by large consumers are thus made immediately available to the small consumer, with incidental advantage to the larger consumers of convenience in ordering and accepting material with fewer laboratory tests. The manufacturer also benefits from the well-known economies accompanying "mass production."

The lists of manufacturers "willing-to-certify" to the quality of certain commodities are made by corresponding with, as nearly as possible, all the manufacturers of that product and listing only those who signify their willingness to certify to the purchaser, when requested to do so, that the commodities delivered actually comply with the commercial standard.

Obviously, the purchaser making use of the lists of "willing-to-certify" manufacturers, will select therefrom such manufacturers as are known (or assumed) by him to be reliable.

The trend toward the purchase of materials of certified quality from sources shown on such willing-to-certify lists supplies added incentive to standardization on the part of other producers, and thus the benefits of the certification plan will be felt by purchasers either directly or indirectly, whether or not they make use of the plan themselves.

COMMERCIAL STANDARDS SERVICE

Industry has long sensed the need for a wider application and use of specifications developed and approved by nationally recognized organizations. To assist these bodies and the producers and consumers in securing this result and as a natural outgrowth of the movement toward elimination of waste through simplified practice, the Bureau of Standards has set up a procedure under which specifications, properly indorsed, may be printed as official publications of the Department of Commerce and promulgated as "commercial standards." This service parallels that of simplified practice in many respects and is available only upon request.

Broadly speaking, the aim is to continue the same character of cooperative service in this field that is being rendered in simplification. The division of trade standards is not designed to act as a standardizing body, nor will it engage in the preparation of specifications. Its service is mainly promotional in character, since its chief mission is to invite attention to a standard or a specification which any branch of industry may want to promulgate on a nationwide basis; to determine its eligibility for promulgation; to publish and broadcast it in the event the prerequisites of procedure have been met, including a satisfactory majority acceptance; to facilitate the application of the certification plan for the assurance and convenience of the purchaser; to provide means for periodic audits of adherence; and to cooperate with the Bureau of Foreign and Domestic Commerce in determining the desire of industry relative to

translation and promulgation of such specifications as a basis for foreign commerce.

In general, it may be said that a simplification covers types, sizes, and varieties of a commodity which are retained by industry on the basis of demand, whereas a commercial standard establishes definite requirements as to grade, quality, or dimensional tolerances in addition to any limitation of variety desired and accepted by the industry.

ORGANIZATION AND DUTIES OF STANDING COMMITTEE

In order to carry on the aims and desires of the industry in the standardization of their product, a standing committee is appointed at the general conference. This committee consists of members from each division of the industry, namely, producers, distributors, and consumers, and thus reflects the well-balanced viewpoint of all concerned.

The members of the committee receive all suggestions regarding the commercial standard and consider its revision in the event that such action is desirable and mutually beneficial.

If the commercial standard does not warrant revision, it is reaffirmed in its existing form, but if any important changes are found desirable, their adoption is recommended by the committee, whereupon the industry is again solicited for written acceptance of the standard in its revised form.

The committee is in effect a centralizing agency for criticisms and comments regarding the commercial standard and is charged with the responsibility of recommending revisions to keep the standard abreast with current industrial practice.

The proper functioning of the committee requires that, when necessary, its members be willing to attend meetings held at some central place, although in many cases it will be possible to conduct the work by correspondence.

When any deceptions in reference to the commercial standard are reported to the standing committee, it applies moral suasion or such other corrective measures as seem desirable. The Department of Commerce has no "police power" to compel adherence, therefore it is incumbent upon the standing committees to do all in its power to encourage all divisions of the industry to follow the provisions of the commercial standard and contribute in every way possible to its general adoption and usefulness.

YOUR COOPERATION

As a producer, distributor, or consumer of some of the commodities for which commercial standards have already been established, you are in a position to avail yourself of the benefits arising from the use of quality standards and incidentally to add impetus to this method of eliminating waste.

The first step is a declaration in favor of the standard by recording your intention to adhere, as closely as circumstances will allow, to the standards for those products which you may buy or sell.

The receipt of your signed acceptance will permit the listing of your company in new editions of the commercial standards that you accept.

You will, of course, want to examine any commercial standards before signing a formal acceptance. The Bureau of Standards will, therefore, furnish a copy of any standard under consideration for acceptance. A list of current commercial standards is given on the rear cover.

The publications may also be secured singly or in quantities at a nominal price from the Superintendent of Documents, Washington, D. C. Prices will be furnished upon request.

The acceptance of a commercial standard is an entirely voluntary action and applies to the production, sale, and use of stock items. It is not meant to interfere with the introduction, manufacture, or sale of special sizes and types sometimes required.

Trade associations and individual companies often distribute large numbers of the printed standard for the information and guidance of their members or customers. In such cases it is possible to extend the scope and degree of adherence by urging each recipient to send in an acceptance, bearing in mind that the practical value of any standardization is measured by the observance it receives.

An acceptance form for the commercial standard herein covered is included on page 15.

ACCEPTANCE OF COMMERCIAL STANDARD

Please sign and return this sheet to Division of Trade Standards,
Bureau of Standards, Washington, D. C.

Date-----

DIVISION OF TRADE STANDARDS,
BUREAU OF STANDARDS,
Washington, D. C.

GENTLEMEN: We, the undersigned, do hereby accept the original draft of the commercial standard as our standard practice in the { production¹
distribution¹ } of Fourdrinier wire cloth, beginning-----, and will use our best effort in
(Date)
securing its general adoption.

To permit intelligent review of the effectiveness of the commercial standard every year by an accredited committee of all interests, working in cooperation with the Department of Commerce, we plan to supply all data, upon request, which may be necessary for the development of constructive revisions. It is understood that any suggested modifications will be submitted as soon as formulated, and shall not be promulgated until accepted in form similar to this recommendation.

Signature-----
(Above signature should be in ink)

Kindly typewrite or print the following lines

Title-----

Company-----

Street address-----

City and State-----

We are members of the following associations or other organizations interested in the production, sale, or use of Fourdrinier wire cloth:

¹Please designate which group you represent by drawing lines through the other two. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

TO THE ACCEPTOR

In signing the acceptance blank, please bear the following points clearly in mind:

1. *Adherence.*—The Department of Commerce has no regulatory powers to enforce adherence to the commercial standards. Instead, this waste-elimination program is based on voluntary cooperation and self-government in industry. To make this specific standardization operate as a satisfactory example of self-government, it is highly desirable that it be kept distinct from any plan or method of governmental regulation or control. It will be successful according to the degree to which manufacturers, distributors, and purchasers adhere to its terms and conditions.

2. *The industry's responsibility.*—The department cooperates only on the request of the industry, and assumes no responsibility for industrial acceptance or adherence. This program was developed by the industry on its own initiative. Its success depends wholly on the active cooperation of those concerned.

3. *The acceptor's responsibility.*—You are entering into an entirely voluntary arrangement, whereby the members of the industry—the distributors and consumers of the product, and others concerned—hope to secure the benefits inherent in commercial standardization. Those responsible for this standard realize that instances may occur in which it will be necessary to supply or purchase items not included therein. The purpose is, however, to secure wider support for nationally recognized standards covering grade, quality, and other characteristics of products. Consumers can make the program a success if, in their purchasing, they will make a definite and conscientious effort to specify in terms of this commercial standard.

4. *The department's responsibility.*—The function performed by the Department of Commerce is fourfold: First, to act as a referee to insure adequate consideration of the needs of all interests; second, to supply such assistance and advice in the development of this program as past experience with similar programs may suggest; third, to solicit and record the extent of adoption and adherence to the standard; and, fourth, to add all possible prestige to this standardization movement by publication and promulgation if and when it is adopted and accepted by all elements directly concerned.



COMMERCIAL STANDARDS

CS No.	Item	CS No.	Item
0-30.	The commercial standards service and its value to business.	19-30.	Foundry patterns of wood.
1-23.	Clinical thermometers.	20-30.	Staple vitreous china plumbing fixtures.
2-30.	Mop sticks.	21-30.	Interchangeable ground glass joints.
3-23.	Stoddard solvent.	22-30.	Builders' hardware (nontemplate).
4-29.	Staple porcelain (all-clay) plumbing fixtures.	23-30.	Feldspar.
5-29.	Steel pipe nipples.	24-30.	Standard screw threads.
6-31.	Wrought-iron pipe nipples (first revision).	25-30.	Special screw threads.
7-29.	Standard weight malleable iron or steel screwed unions.	26-30.	Aromatic red cedar closet lining.
8-30.	Plain and thread plug and ring gage blanks.	27-30.	Plate glass mirrors.
9-29.	Builders' template hardware.	28-32.	Cotton fabric tents, tarpaulins, and covers.
10-29.	Brass pipe nipples.	29-31.	Staple seats for water-closet bowls.
11-29.	Regain of mercerized cotton yarns.	30-31.	Colors for sanitary ware.
12-29.	Domestic and industrial fuel oils.	31-31.	Red cedar shingles.
13-30.	Dress patterns.	32-31.	Cotton cloth for rubber and pyroxylin coating.
14-31.	Boys' blouses, button-on waists, shirts and junior shirts.	33-32.	Knit underwear (exclusive of rayon).
15-29.	Men's pajamas.	34-31.	Bag, case, and strap leather.
16-29.	Wall paper.	35-31.	Plywood.
17-30.	Diamond core drill fittings.	36-31.	Fourdrinier wire cloth.
18-29.	Hickory golf shafts.	37-31.	Steel bone plates and screws (in preparation).

NOTICE.—Those interested in commercial standards, with a view toward accepting them as a basis of every-day practice in their industry, may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, Bureau of Standards, Washington, D. C.

