

U. S. DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

FOUNDRY PATTERNS OF WOOD

(COLOR SYSTEM FOR)

COMMERCIAL STANDARD CS19-32



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 Division of Trade Standards, Bureau of Standards, Washington, D. C.

U. S. DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

FOUNDRY PATTERNS
OF WOOD
(COLOR SYSTEM FOR)

COMMERCIAL STANDARD CS19-32

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FOUNDRY PATTERNS OF WOOD, CS19-32

ACCEPTORS

ASSOCIATIONS

American Foundrymen's Association, Chicago, Ill.
Associated Brass Founders of New England, Boston, Mass.
Buffalo Foundrymen's Association, Buffalo, N. Y.
California Metal & Trades Association, San Francisco, Calif.
Connecticut Foundrymen's Association, New Britain, Conn.
East Bay Foundrymen's Association, Berkeley, Calif.
Electric Steel Founders Research Group, Chicago, Ill. (in principle).
Gray Iron Institute (Inc.), Cleveland, Ohio.
Malleable Iron Research Institute (Inc.), Cleveland, Ohio.
Metal Trades Manufacturers Association of Southern California, Los Angeles, Calif.
National Association of Pattern Manufacturers, New York branch, Jersey City, N. J.
New England Foundrymen's Association, Cambridge, Mass.
Ohio Foundries Association (Inc.), The, Cleveland, Ohio (in principle).
Pacific Coast Founders Association, San Francisco, Calif.
Philadelphia Foundrymen's Association, Philadelphia, Pa.
Pittsburgh Foundrymen's Association, Pittsburgh, Pa.
Quad-City Foundrymen's Association, Moline, Ill.
Steel Founders' Society of America, New York, N. Y.
Tri-State Foundrymen's Association, Cincinnati, Ohio.
Twin City Foundrymen's Association, Minneapolis, Minn.
United Metal Trades Association, Portland, Oreg.
Wisconsin Grey Iron Foundry Group, Milwaukee, Wis.

FIRMS

Acme Foundry Corporation, The, Cleveland, Ohio.
Acme Works (Inc.), Indianapolis, Ind.
Adams & Westlake Co., The, Elkhart, Ind.

Adams Co., The, Dubuque, Iowa.
Adams Foundry, Rome, N. Y.
Adirondack Steel Foundries Corporation, Watervliet, N. Y.
Air Preheater Corporation, The, Wellsville, N. Y.
Albany Malleable Iron Co., Voorheesville, N. Y.
Allegheny Foundry & Machine Co., Glassmere, Pa.
Allen Manufacturing Co. (Inc.), Nashville, Tenn.
Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
Allis Chalmers Manufacturing Co., Norwood works, Norwood, Ohio.
Alloy Steel & Metals Co., Los Angeles, Calif.
Alten's Foundry & Machine Works, Lancaster, Ohio.
Aluminum Cooking Utensil Co., Oakland, Calif.
American Brake Shoe Foundry, Los Angeles, Calif.
American Car & Foundry Co., Berwick, Pa.
American Chain Co. (Inc.), and associate companies, Bridgeport, Conn.
American Foundry & Machine Co., Salt Lake City, Utah.
American Foundry & Manufacturing Co., St. Louis, Mo.
American Iron Works Corporation, The, Denver, Colo.
American Manganese Steel Co., Oakland, Calif.
American Seating Co., Grand Rapids, Mich.
American Steel Foundries, Chicago, Ill.
Anaconda Copper Mining Co., Anaconda, Mont.
Anderson Co., The George S., Jeffersonville, Ind.
Anderson Foundry Co., William B., Chicago, Ill.
Apex Bronze & Brass Works, Oakland, Calif.
Arcade Manufacturing Co., Freeport, Ill.
Atlantic Basin Iron Works, Brooklyn, N. Y.
Atlantic Steel Castings Co., The Chester, Pa.
Atlas Foundry Co., Detroit, Mich.
Atlas Foundry Co., Irvington, N. J.
Atlas Foundry Co., Marion, Ind.

Atlas Iron Works, Los Angeles, Calif.
 Auburn Foundry, The, Auburn, Ind.
 Augustine Brass Foundry, Stockton, Calif.
 Austin Co., The, Cleveland, Ohio (in principle).
 Badger Malleable & Manufacturing Co., South Milwaukee, Wis.
 Baltimore Malleable Iron & Steel Casting Co., The, Baltimore, Md.
 Barbour-Stockwell Co., Cambridge, Mass.
 Barnes Manufacturing Co., The, Mansfield, Ohio.
 Bartlett Hayward Co., Baltimore, Md.
 Bass Foundry & Machine Co., Fort Wayne, Ind.
 Bausch & Lomb Optical Co., Rochester, N. Y.
 Bawden & Co., J. H., Freehold, N. J.
 Beardsley & Piper Co., The, Chicago, Ill.
 Beaumont Iron Works Co., Beaumont, Tex.
 Beckley Machine & Electric Co., Beckley, W. Va.
 Belle City Malleable Iron Co., Racine, Wis.
 Benton Harbor Malleable Industries, Benton Harbor, Mich.
 Berks Foundry & Manufacturing Co., West Hamburg and Watsontown, Pa.
 Berkshire Manufacturing Co., The, Cleveland, Ohio.
 Binney Castings Co., The, Toledo, Ohio.
 Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
 Black, Sivalls & Bryson Manufacturing Co., Kansas City, Mo.
 Bohn Aluminum & Brass Corporation, Detroit, Mich.
 Bradley Manufacturing Works, David (Sears, Roebuck & Co.), Bradley, Ill.
 Bridge & Beach Manufacturing Co., St. Louis, Mo.
 Buckeye Iron & Brass Works, Dayton, Ohio.
 Burgess-Parr Co., Moline, Ill.
 Calumet Foundry & Machine Co., East Chicago, Ind.
 Carborundum Co., The, Perth Amboy, N. J.
 Card Iron Works Co., The C. S., Denver, Colo.
 Catskill Foundry & Machine Works, Catskill, N. Y.
 Centre Foundry & Machine Co., Wheeling, W. Va.
 Champion Foundry & Machine Co., Chicago, Ill.
 Chase (Inc.), Frank D., Chicago, Ill.
 Chicago Hardware Foundry Co., North Chicago, Ill.
 Chicago Malleable Castings Co., Chicago, Ill.
 Chicago Steel Foundry Co., Chicago, Ill. | City Brass Foundry, Pawtucket, R. I.
 City Foundry Co., The, Cleveland, Ohio.
 City Pattern Works, Detroit, Mich.
 Clark Blast Meter Co., Charles J., Gladbrook, Iowa.
 Clark Co., H. W., Mattoon, Ill.
 Clearfield Machine Co., Clearfield, Pa.
 Cleveland Co-Operative Stove Co., The, Cleveland, Ohio.
 Cleveland Crane & Engineering Co., Wickliffe, Ohio.
 Cleveland Vibrator Co., Cleveland, Ohio.
 Clow & Sons, James B., Coshocton, Ohio.
 Clyde Iron Works, Duluth, Minn.
 Cochrane Corporation, Philadelphia, Pa.
 Colorado Fuel & Iron Co., The, Pueblo, Colo.
 Columbia Malleable Castings Corporation, Columbia, Pa.
 Columbus Iron Works Co., Columbus, Ga.
 Columbus Malleable Iron Co., The, Columbus, Ohio.
 Commercial Steel Casting Co., Marion, Ohio.
 Conemaugh Iron Works, Latrobe, Pa.
 Confer Smith & Co., (Inc.) Hamburg, Pa.
 Consolidated Concrete Machinery Corporation, Adrian, Mich.
 Consolidated Steel Corporation, Los Angeles, Calif.
 Cooper-Bessemer Corporation, The, Mount Vernon, Ohio.
 Coppus Engineering Corporation, Worcester, Mass.
 Corbin, P. & F., New Britain, Conn.
 Cornell University, College of Engineering, Ithaca, N. Y. (in principle).
 Cox Co., Abram, Lansdale, Pa.
 Crescent Park Brass Foundry, Waltham, Mass.
 Crouse & Pope Foundry Corporation, Auburn, N. Y.
 Crucible Steel Casting Co., The, Cleveland, Ohio.
 Curtis Manufacturing Co., St. Louis, Mo.
 Danville Malleable Iron Division, Allith-Prouty Co., Danville, Ill.
 Davenport Machine & Foundry Co., Davenport, Iowa.
 Dayton Dowd Co., Quincy, Ill.
 Dayton Oil Co., The, Dayton, Ohio.
 Decatur Malleable Iron Co., Decatur, Ill.
 Deemer Steel Casting Co., New Castle, Del.
 Deere Harvester Works, John, East Moline, Ill.
 Deere Tractor Co., John, Waterloo, Iowa.

DeRome's L Foundry, Oakland, Calif.
 Des Moines Foundry & Machine Co.,
 Des Moines, Iowa.
 Desoto Foundry & Machine Co. (Ltd.),
 Mansfield, La.
 Detroit Aluminum & Brass Corpora-
 tion, Detroit Mich.,
 Detroit Piston Ring Co., Detroit,
 Mich.
 Detroit Steel Casting Co., The, De-
 troit, Mich.
 Detroit Testing Laboratory, The, De-
 troit, Mich. (in principle).
 Deuscher Co., The H. P., Hamilton,
 Ohio.
 Dexter Folder Co., Pearl River, N. Y.
 District of Columbia penal institutions,
 Lorton, Va.
 Dixie Brass & Foundry Co., Birming-
 ham, Ala.
 Dodge Steel Co., Tacony, Philadel-
 phia, Pa.
 Dow Chemical Co., The, Midland,
 Mich.
 Drummond Manufacturing Co. (Inc.),
 Louisville, Ky.
 Dunham Co., C. A., Marshalltown,
 Iowa.
 Duquesne Steel Foundry Co., Cora-
 polis, Pa.
 Eastern Foundry Co., The, Boyertown,
 Pa.
 Eastern Steel Castings, Newark, N. J.
 Eberhard Manufacturing Co., The,
 Cleveland, Ohio.
 Ebinger Sanitary Manufacturing Co.,
 The D. A., Columbus, Ohio.
 Edward Valve & Manufacturing Co.,
 The, East Chicago, Ind.
 Egyptian Iron Works, Murphysboro,
 Ill.
 Electric Steel & Manufacturing Co.,
 Los Angeles, Calif.
 Electric Steel Foundry Co. (Inc.),
 Berkeley, Calif.
 Electro-Alloys Co., The, Elyria, Ohio.
 Elliott Co., Jeannette, Pa.
 Elliott-Wehner Foundry & Manufac-
 turing Co., Kansas City, Mo.
 Empire Foundry Co., Syracuse, N. Y.
 Engelberg Huller Co. (Inc.), The, Syra-
 cuse, N. Y.
 Engineering & Foundry Co., Stockton,
 Calif.
 Engineering Works, The, Van Buren,
 Ark.
 Enterprise Foundry Co., Detroit, Mich.
 Enterprise Foundry Co., San Francisco,
 Calif.
 Erie Foundry Co., Erie, Pa.
 Erie Foundry Co., The, Rochester, N.Y.
 Erie Malleable Iron Co., Erie, Pa.
 Eriez Stove & Manufacturing Co., Erie,
 Pa.
 Fairbanks Co., The, Binghamton, N.Y.
 Fairmont Railway Motors (Inc.), Fair-
 mont, Minn.

Falk Corporation, The, Milwaukee,
 Wis.
 Farquhar Co. (Ltd.), A. B., York, Pa.
 Farrel-Birmingham Co. (Inc.), An-
 sonia, Conn.
 Fay Foundry Co., St. Joseph, Mich.
 Federal Foundry Co., Indianapolis,
 Ind.
 Federal Malleable Co., West Allis, Wis.
 Fenton Foundry Supply Co., The,
 Dayton, Ohio.
 Ferguson & Lange Foundry Co., Chi-
 cago, Ill.
 Fillmore Avenue Foundry & Iron
 Works (Inc.), Buffalo, N. Y.
 Flint & Walling Manufacturing Co.,
 Kendallville, Ind.
 Fort Pitt Malleable Iron Co., Pitts-
 burg, Pa.
 Foundry Equipment Co., The, Cleve-
 land, Ohio.
 Francis & Nygren Foundry Co., The,
 Chicago, Ill.
 Frank Foundries Corporation, Daven-
 port, Iowa.
 Frank Foundries Corporation, Moline,
 Ill.
 Frederick Iron & Steel Co., The, Fred-
 erick, Md.
 Fremont Foundry Co., The, Fremont,
 Ohio.
 Fulton Foundry & Machine Co., The,
 Cleveland, Ohio.
 Fulton Sylphon Co., The, Knoxville,
 Tenn.
 G. & C. Foundry Co., The, Sandusky,
 Ohio.
 Gardner-Denver Co., Quincy, Ill.
 Gardner-Denver Co., Denver Colo.
 Gartland Haswell Rentschler Foundry
 Co., Dayton, Ohio.
 Goldens Foundry & Machine Co., Co-
 lumbus, Ga.
 Goodnow Foundry Co., L. H., Fitch-
 burg, Mass.
 Goslin Birmingham Manufacturing Co.,
 Birmingham, Ala.
 Gould Coupler Co., The, Depew,
 N. Y.
 Grabler Manufacturing Co., The,
 Cleveland, Ohio.
 Gray Co., The G. A., Cincinnati, Ohio.
 Great Lakes Malleable Co., Mil-
 waukee, Wis.
 Green Foundry Co., St. Louis, Mo.
 Greenlee Bros. & Co., Rockford, Ill.
 Greenlee Foundry Co., Chicago, Ill.
 Griffin Wheel Co., Chicago, Ill.
 Hagan Foundry Corporation, Orrville,
 Ohio.
 Hajoca Corporation (iron works), Lans-
 dale, Pa.
 Hamilton Foundry & Machine Co.,
 The, Hamilton, Ohio.
 Hanford Iron Works (Inc.), San Ber-
 nardino, Calif.

Hanna Engineering Works, Chicago, Ill.
 Hardy & Sons Co., William A., Fitchburg, Mass.
 Harnischfeger Corporation, Milwaukee, Wis.
 Harrison Steel Castings Co., The, Attica, Ind.
 Hatboro Foundry Co., Hatboro, Pa.
 Hayes Pump & Planter Co., Galva, Ill.
 Hendy Iron Works, Joshua, San Francisco, Calif.
 Hercules Foundries (Inc.), Huntington Park, Calif.
 Herman Pneumatic Machine Co., Zelienople, Pa.
 Hershey Machine & Foundry Co., Manheim, Pa.
 Hill Clutch Machine & Foundry Co., The, Cleveland, Ohio.
 Hockensmith Wheel & Mine Car Co., Penn, Westmoreland County, Pa.
 Hodge Manufacturing Co., The, Greenville, Pa.
 Hoffmann & Billings Manufacturing Co., Milwaukee, Wis.
 Hoover Co., The, North Canton, Ohio.
 Hubbard Steel Foundry Co., East Chicago, Ind.
 Hub City Iron Works, Aberdeen, S. Dak.
 Humphries Manufacturing Co., The, Mansfield, Ohio.
 Hunter Machine Co., James, North Adams, Mass.
 Ideal Foundry Co., Grand Rapids, Mich.
 Illinois Foundry Co., Springfield, Ill.
 Illinois Iron & Bolt Co., Carpentersville, Ill.
 Illinois Malleable Iron Co., Chicago, Ill.
 Illinois State Reformatory, Pontiac, Ill. (in principle).
 Indiana Foundry Co. (Inc.), Indiana, Pa.
 Industrial Brownhoist Corporation, Bay City, Mich.
 Ingersoll-Rand, Phillipsburg, N. J.
 Inland Steel Co., East Chicago, Ind.
 International Derrick & Equipment Co., The, Columbus, Ohio.
 International Harvester Co., Milwaukee, Wis.
 International Heater Co., Utica, N. Y.
 Iron City Sanitary Manufacturing Co., Pittsburgh, Pa.
 Iron Foundry Division of Viking Pump Co., Cedar Falls, Iowa.
 Jefferson Brass Foundry, Brooklyn, N. Y.
 Jefferson Union Co. (Inc.), Lockport, N. Y.
 Johnson Co. (Inc.), J. D., New York, N. Y.
 Kay Brunner Steel Casting Co., Los Angeles, Calif.

Kedzie Foundry Co., Chicago, Ill.
 Kendallville Foundry Co., Kendallville, Ind.
 Kingwell Bros., San Francisco, Calif.
 Kinney Iron Works, Los Angeles, Calif.
 Kokomo Malleable Iron Works (Inc.), Kokomo, Ind.
 Kramer & Co., H., Chicago, Ill.
 Kutztown Foundry & Machine Co., Kutztown, Pa.
 Laclede-Christy Clay Products Co., St. Louis, Mo.
 Laconia Car Co., Laconia, N. H.
 Lamb-Grays Harbor Co., Hoquiam, Wash.
 Landers, Frary & Clark, New Britain, Conn.
 Lavelle Foundry Co., Anderson, Ind.
 Lebanon Steel Foundry, Lebanon, Pa.
 Leeds & Northrup Co., Philadelphia, Pa.
 Liberty Foundry Co., St. Louis, Mo.
 Liberty Foundry (Inc.), Wauwatosa, Wis.
 Lindemann & Hoverson Co., A. J., Milwaukee, Wis.
 Los Angeles Foundry Co., Los Angeles, Calif.
 Los Angeles Valve & Fittings Co., Los Angeles, Calif.
 Lumen Bearing Co., Buffalo, N. Y.
 Lunkenheimer Co., The, Cincinnati, Ohio.
 Lyne Foundry & Machine Co., C. H., Miami, Fla.
 Macaulay Foundry Co. (Inc.), H. C., Berkeley, Calif.
 Machined Steel Casting Co., The, Alliance, Ohio.
 Madison Foundry Co., The, Cleveland, Ohio.
 Madsen Iron Works, Huntington Park, Calif.
 Machler Co., The Paul, Chicago, Ill.
 Majestic Co., The, Huntington, Ind.
 Malcolm Foundry Co. (Inc.), Newark, N. J.
 Malleable Iron Fittings Co., Branford, Conn.
 Marcy Foundry Co., Perth Amboy, N. J.
 Marine Manufacturing & Supply Co., The, Pittsburgh, Pa.
 Marion Malleable Iron Works, Marion, Ind.
 Marion Steam Shovel Co., The, Marion, Ohio.
 Marshall Furnace Co., Marshall, Mich.
 Martin Iron Works, Los Angeles, Calif.
 Massachusetts Institute of Technology, Cambridge, Mass.
 Massillon Steel Casting Co., The, Massillon, Ohio.
 May-Feebeger Co., The, Newark, Ohio.
 Maynard Electric Steel Casting Co., Milwaukee, Wis.

McConway & Torley Co., The, Pittsburgh, Pa.

McCormick Co. J. S., Pittsburgh, Pa. (in principle).

McKeefrey & Co., Leetonia, Ohio (in principle).

McQuay-Norris Manufacturing Co. of Indiana, Connerville, Ind.

Meadville Malleable Iron Co., Meadville, Pa.

Meeker Foundry Co., Newark, N. J.

Mereen-Johnson Machine Co., Minneapolis, Minn.

Mersfelder Pattern Works, Cincinnati, Ohio.

Metal Industry, The, New York, N. Y. (in principle).

Metallurgical Laboratories, San Francisco, Calif.

Metric Metal Works of the American Meter Co. (Inc.), Erie, Pa.

Milwaukee Foundry Equipment Co., Milwaukee, Wis.

Milwaukee Grey Iron Foundry Co., Milwaukee, Wis.

Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

Minneapolis Electric Steel Castings Co., Minneapolis, Minn.

Mobile Pulley & Machine Works, Mobile, Ala.

Moline Malleable Iron Co., St. Charles, Ill.

Monessen Foundry & Machine Co., Monessen, Pa.

Monroe Steel Castings Co., Monroe, Mich.

Moore Bros. Co., Joliet, Ill.

Morris Machine Works, Baldwinsville, N. Y.

Mueller Co., Decatur, Ill.

Muncie Foundry & Machine Co., Muncie, Ind.

Muncie Malleable Foundry Co., Muncie, Ind.

Nash Engineering Co., The, South Norwalk, Conn.

National Bearing Metals Corporation, Meadville, Pa.

National Bearing Metals Corporation, N. S. Pittsburgh, Pa.

National Engineering Co., Chicago, Ill.

National Malleable & Steel Castings Co., Cleveland, Ohio.

National Radiator Corporation, Johnstown, Pa.

National Rubber Machinery Co., Columbiana, Ohio.

National Supply Co. of California, The, Torrance, Calif.

National Transit Pump & Machine Co., Oil City, Pa.

Newbury & Son (Inc.), Jay H., Goshen, N. Y.

Newbury Manufacturing Co., Monroe, N. Y.

New England Butt Co., Providence, R. I.

New Haven Sand Blast Co., New Haven, Conn.

Nickel Plate Foundry Co., The, Cleveland, Ohio.

Nolte Brass Foundry Co., The, Springfield, Ohio.

North Chicago Pattern & Machine Co., North Chicago, Ill.

Northern Malleable Iron Co., St. Paul, Minn.

Northwestern Steel & Iron Corporation, Minneapolis, Minn., Division of Foote Bros. Gear & Machine Co., Chicago, Ill.

Nugent Steel Castings Co., The, Chicago, Ill.

Ogden Iron Works Co., Ogden, Utah.

Ohio Ferro Alloys Corporation, Canton Ohio.

Ohio Foundry Co., The, Cleveland, Ohio.

Ohio Injector Co., The, Wadsworth, Ohio.

Ohio Malleable Iron Co., Columbus, Ohio.

Ohio Pattern Works & Foundry Co., The, Cincinnati, Ohio.

Oklahoma Steel Castings Co., Tulsa, Okla.

Olney Foundry Co., Philadelphia, Pa.

Olympic Steel Works, Seattle, Wash.

Oregon Brass Works, Portland, Oreg.

Oregon Short Line Railroad Co., Salt Lake City, Utah.

Oriskany Malleable Iron Co. (Inc.), Oriskany, N. Y.

Osage Foundry & Machine Co., Bartlesville, Okla.

Pacific Brass Foundry, San Francisco, Calif.

Pacific Car & Foundry Co., Seattle, Wash.

Page Boiler Co., The William H., Meadville, Pa.

Paulson & Son (Inc.), Thomas, Brooklyn, N. Y.

Pekin Foundry & Manufacturing Co., Pekin, Ill.

Pelton Steel Casting Co., Milwaukee, Wis.

Penn Foundry & Manufacturing Co., Reading, Pa.

Pennsylvania Electric Steel Casting Co., Hamburg, Pa.

Peoria Malleable Castings Co., Peoria, Ill.

Philadelphia Hardware & Malleable Iron Works (Inc.), Philadelphia, Pa.

Philbrick-Booth & Spencer (Inc.), Hartford, Conn.

Phillips Bronze Bushing Works, Los Angeles, Calif.

Phoenix Iron Works, Oakland, Calif.

Pittsburgh Engineering Works, Pittsburgh, Pa.

Pittsburgh Malleable Iron Co., Pittsburgh, Pa.

Pitz Foundry (Inc.), Brooklyn, N. Y.

Plainville Casting Co., The, Plainville, Conn.

Pohlmann Foundry Co., J. W., Buffalo, N. Y.

Portland Iron Works, Portland, Oreg.

Port of Albany Foundries (Inc.), Coxsackie, N. Y.

Powhatan Brass & Iron Works, Ranson, W. Va.

Pratt Institute, Brooklyn, N. Y. (in principle).

Precision Engineering Co., Philadelphia, Pa.

Proctor & Schwartz (Inc.), Philadelphia, Pa.

Production Pattern & Equipment Co., Milwaukee, Wis.

Pulaski Foundry & Manufacturing Corporation, Pulaski, Va.

Pulverized Fuel Equipment Co., Chicago, Ill.

Racine Steel Castings Co., Racine, Wis.

Ransom Grinding Machine Co., Oshkosh, Wis.

Red Jacket Manufacturing Co., Davenport, Iowa.

Reliance Iron Works, Alhambra, Calif.

Republic Carbon Co., Niagara Falls, N. Y. (in principle).

Research Corporation, Bound Brook, N. J.

Reynolds Aluminum Co., The, New Washington, Ohio.

Rhode Island Malleable Iron Works, Hillsgrove, R. I.

Rice, Barton & Fales (Inc.), Worcester, Mass.

Rich Manufacturing Co., Los Angeles, Calif.

Riverside Steel Casting Co., South Kearny, N. J.

Robins Conveying Belt Co., Passaic, N. J.

Rockford Brass Works, Rockford, Ill.

Rockwood Sprinkler Co. of Massachusetts, Worcester, Mass.

Rogers Companies, C. E., Boston, Mass.

Ross-Meehan Foundries, Chattanooga, Tenn.

Rotor Air Tool Co., Cleveland, Ohio (in principle).

Rothe Foundry Co., The Jos. F., Green Bay, Wis.

Roxbury Steel Casting Co., Boston, Mass.

Saco-Lowell Shops, Biddeford, Me., Boston, Mass., Newton Upper Falls, Mass. (in principle).

St. Louis Steel Casting Co., St. Louis, Mo.

St. Paul Foundry Co., St. Paul, Minn.

Salem Brass & Iron Manufacturing Co., Bridgeton, N. J.

Sargent & Co., New Haven, Conn.

Sawbrook Steel Castings Co., The, Lockland, Ohio.

Schofield's Sons Co., J. S., Macon, Ga.

Sego Milk Products Co., Salt Lake City, Utah.

Shallcross Control Systems Co., Milwaukee, Wis. (in principle).

Shaw Laboratory, San Francisco, Calif.

Shenango-Penn Mold Co., Dover, Ohio.

Shepard Niles Crane & Hoist Corporation, Montour Falls, N. Y.

Shoop Bronze Co., The, Tarentum, Pa.

Sibley Machine Co., South Bend, Ind.

Simmons Co., Kenosha, Wis.

Sivyer Steel Casting Co., Milwaukee, Wis.

Skagit Steel & Iron Works, Sedro Woolley, Wash.

Sly Manufacturing Co., The W. W., Cleveland, Ohio.

Smith & Co. (Inc.), F. L., New York, N. Y.

Smith Co., The Werner G., Cleveland, Ohio (in principle).

Smith Manufacturing Co., The A. P., East Orange, N. J.

Smith Steel Casting Co., George H., Milwaukee, Wis.

Smith System Heating Co., Minneapolis, Minn.

South Bend Foundry Co., South Bend, Ind.

Southern Pacific Co., San Francisco, Calif.

Southside Malleable Casting Co., Milwaukee, Wis.

Sowers Manufacturing Co., Buffalo, N. Y.

Spalding Foundry Co., Atlanta, Ga.

Speakman Co., Wilmington, Del.

Sperry & Co., D. R., Batavia, Ill.

Spring City Foundry Co., Waukesha, Wis.

Springfield Bronze & Aluminum Co., Springfield, Mass.

Standard Foundry Co., The, Dayton, Ohio.

Standard Malleable Iron Co., Muskegon Heights, Mich.

Standard Oil Co., of New Jersey, New York, N. Y.

Stacey Schmidt Manufacturing Co., York, Pa.

Steel Sales Corporation, Chicago, Ill. (in principle).

Steffens-Amberg Co., The, Newark, N. J.

Sterland Range & Furnace Corporation, Rochester, N. Y.

Sterling Wheelbarrow Co., Milwaukee, Wis.

Sterrit-Thomas Foundry Co., Pittsburgh, Pa.

Stewart Die Casting Corporation, Chicago, Ill.
 Stockham Pipe & Fittings Co., Birmingham, Ala.
 Straight Line Engine Co., (Inc.), The, Syracuse, N. Y.
 Sullivan Machinery Co., Claremont, N. H.
 Superior Pattern & Manufacturing Co., Detroit, Mich.
 Superior Steel & Malleable Castings Co., Benton Harbor, Mich.
 Swayne Robinson & Co., Richmond, Ind.
 Swindell Dressler Corporation, Pittsburgh, Pa.
 Tabor Manufacturing Co., The, Philadelphia, Pa.
 Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
 Terre Haute Malleable & Manufacturing Co., Terre Haute, Ind.
 Texas Steel Co., Fort Worth, Tex.
 Titgen-Eastwood Co., Philadelphia, Pa.
 Treadwell Engineering Co., Easton, Pa.
 Trenton Malleable Iron Co., Trenton, N. J.
 Tropenas Co., New York, N. Y.
 Troy Engine & Machine Co., Troy, Pa.
 Union Iron Works, Decatur, Ill.
 Union Machine Co., Bartlesville, Okla.
 Union Manufacturing Co., New Britain, Conn.
 Union Steam Pump Co., Battle Creek, Mich.
 United Casting Co., Los Angeles, Calif.
 United Dry Docks (Inc.), New York, N. Y.
 United Iron Works, Oakland, Calif.
 United States Aluminum Match Plate Co., Cleveland, Ohio.
 United States Chain & Forging Co., Pittsburgh, Pa.
 United States Metallic Packing Co., The, Philadelphia, Pa.
 Universal Foundry Co., Oshkosh, Wis.
 University of Nebraska, Lincoln, Nebr. (in principle).
 Utah Copper Co., Salt Lake City, Utah.
 Utah Power & Light Co., Salt Lake City, Utah.
 Utah Light & Traction Co., Salt Lake City, Utah.
 Valley Castings & Pattern Co., Bay City, Mich.
 Valley Iron Works, St. Paul, Minn.
 Valley Mould & Iron Corporation, Hubbard, Ohio.
 Vibro Manufacturing Co., Chicago, Ill.
 Vogt Machine Co., Henry, Louisville, Ky.

Vulcan Mold & Iron Co., Latrobe, Pa.
 Wagner Malleable Iron Co., Decatur, Ill.
 Walker Manufacturing Co., Racine, Wis.
 Warman Steel Casting Co. (Ltd.), Huntington Park, Calif.
 Warren Webster & Co., Camden, N. J.
 Washburn Shops, The, Worcester, Mass.
 Weaver Manufacturing Co., Springfield, Ill.
 Western Foundry Co., Chicago, Ill.
 Western Malleable Casting Co., Los Angeles, Calif.
 Western Steel & Foundry Co., Salt Lake City, Utah.
 Westinghouse Electric & Manufacturing Co., Philadelphia, Pa.
 Wharton, jr., & Co. (Inc.), William, Easton, Pa.
 Wheeling Mold & Foundry Division of Continental Roll & Steel Foundry Co., Warwood plant, Wheeling, W. Va.
 Whitehead & Kales Co., River Rouge, Mich.
 Whitin Machine Works, Whitinsville, Mass.
 Whiting Corporation, Harvey, Ill.
 Wilmington Casting Co., The, Wilmington, Ohio.
 Wilmot Engineering Co., White Haven, Pa.
 Wisconsin Gray Iron Foundry Co., Milwaukee, Wis.
 Wood Bros. Thresher Co., Des Moines, Iowa.
 Wood Newspaper Machinery Corporation, Plainfield, N. J.
 Woodward Iron Co., Woodward, Ala.
 Yates American Machinery Co., Rochester, N. Y.
 York Foundry & Machine Co., York, Pa.
 Youngstown Foundry & Machine Co., The, Youngstown, Ohio.
 Youngstown Pressed Steel Co., The, Warren, Ohio.

GOVERNMENT

Department of Commerce, Bureau of Standards, chief of construction, Washington, D. C.
 Department of Interior, chief clerk, Washington, D. C.
 Federal Specifications Board, Washington, D. C. (in principle).
 United States Veterans' Administration, Washington, D. C.
 United States Treasury Department, Washington, D. C.



FOUNDRY PATTERNS OF WOOD

COMMERCIAL STANDARD CS19-32

Pursuant to a request from the Fifth Annual Conference of the California Development Association held at Del Monte, Calif., January 24, 1929, and with the approval of the American Foundrymen's Association, the Department of Commerce submitted to the industry for acceptance a recommended commercial standard for foundry patterns of wood. The industry has since accepted and approved for promulgation by the Department of Commerce the color markings shown herein.

This standard became effective for new production February 10, 1930.

Promulgation recommended.

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

Promulgated.

GEORGE K. BURGESS,
Director, Bureau of Standards.

APPROVED.

R. P. LAMONT,
Secretary of Commerce.

NOTE.—The pamphlet is a reprint of CS19-30 to include additional acceptors received subsequent to the first printing and other minor corrections not affecting the standard itself.

GENERAL

The color markings given herein are recommended as standard by the producers and users for foundry patterns and core boxes of wood construction.

STANDARD PATTERN COLORS

All foundry patterns and core boxes of wood construction shall be painted in accordance with the following practice (see color chart fig. 1¹):

- (1) Surfaces to be left *unfinished* are to be painted *black*.
- (2) Surfaces to be *machined* are to be painted *red*.
- (3) *Seats of and for loose pieces* are to be marked by *red stripes on a yellow background*.
- (4) *Core prints and seats for loose core prints* are to be painted *yellow*.
- (5) *Stop-offs* are to be indicated by *diagonal black stripes on a yellow base*.

Some variations in shades of above colors are permissible within reasonable limitations. The colors may be obtained by mixing suitable inexpensive pigments with varnish or shellac to produce the type of coating desired.

HISTORY OF PROJECT

In 1920 the American Society for Testing Materials requested the American Foundrymen's Association to sponsor an effort to standardize patterns, core boxes, and other items of pattern equipment. The association, acting upon the request, organized under its sponsorship a general committee consisting of two members each of the following organizations:

American Foundrymen's Association.

American Society for Testing Materials.

Institute of Metals Division of the American Institute of Metallurgical Engineers.

Steel Founders' Society of America.

National Association of Pattern Manufacturers.

After several meetings of this joint committee, a definite standardization program was adopted, and three subcommittees were formed, each taking charge of one of the three major divisions of the program, namely, (1) pattern making, (2) mounting the pattern, and (3) flask sizes. It was considered that the most important subject for standardization was color markings for patterns. The subcommittee in charge became immediately active and tentative standards for color markings were submitted to the several organizations in 1926 for approval. At a meeting of the joint committee in Cleveland on March 2, 1926, the tentative standard was finally approved and publication authorized. Several thousand copies of this standard have since been issued by the American Foundrymen's Association.

The organizations actively engaged in the standardization of pattern colors at the time of issuing the standard were:

American Foundrymen's Association.

Malleable Iron Research Institute.

American Society for Testing Materials.

¹ Separate copies of the color chart in a large size, suitable for posting in the pattern shop or foundry, are available from the American Foundrymen's Association, 222 West Adams Street, Chicago, Ill.

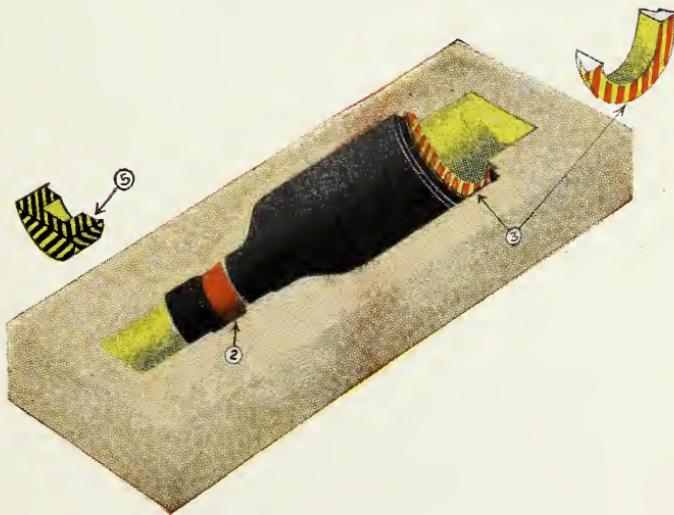
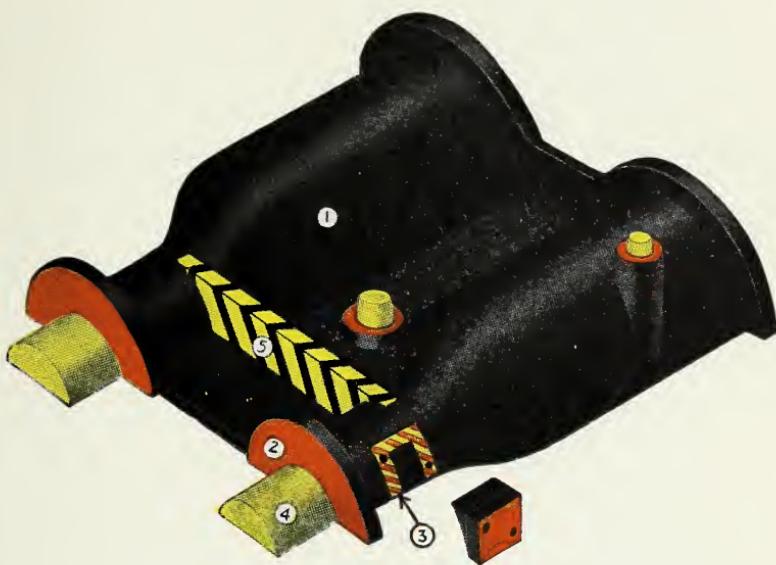


FIGURE 1.—STANDARD PATTERN COLORS

by

Electric Steel Founders' Research Group.
Foundry Equipment Manufacturers Association.
National Association of Purchasing Agents.
Steel Founders' Society of America.

Since the above publication, other organizations have approved the standard, such as the Ohio Foundries Association, the United Metal Trades Association, of Portland, Oreg., and others. The last-named association has approved the standard as applied to patterns for iron and steel and suggests reversing the yellow and black colors on patterns for aluminum and brass.

The future scope of this commercial standard will not be restricted to the standard pattern colors and will allow the subsequent inclusion of specifications and other practices of the industry.

The main purpose in establishing the standard pattern colors as a commercial standard is to obtain a more widely effective indorsement of the practice. Standard color markings provide the molder with correct information regarding location of cores, the surfaces to be machined, what portions are filled where stop-off construction is used and insure preparation of the mold in the proper manner.

Since the work of the joint committee and subsequent adoption by several associations has paralleled the commercial standards procedure to a certain extent, no general conference was deemed necessary.

STANDING COMMITTEE

The following standing committee was appointed to consider annually any comments or suggestions as to changes in the standard in order that it may be kept in accord with the desires of the industry and the advance in the art:

D. M. AVEY, chairman, The Foundry, Penton Building, Cleveland, Ohio.
J. P. O'NEIL, American Foundrymen's Association, Western Foundry Co., 3634 South Kedzie Avenue, Chicago, Ill.
JOHN F. HAY, Malleable Iron Research Institute, Erie Malleable Iron Co., Erie, Pa.
CHARLES JOHNSON, Malleable Iron Research Institute, Rockford Malleable Iron Co., Rockford, Ill.
K. V. WHEELER, Electric Steel Founders' Research Group, Lebanon Steel Foundry, Lebanon, Pa.
FRED GRAF, Foundry Equipment Manufacturers Association, American Foundry Equipment Co., Mishawaka, Ind.
J. E. STAFFORD, National Association of Purchasing Agents, Inland Steel Co., Indiana Harbor, Ind.
L. M. STAFFIN, National Association of Purchasing Agents, Bohn Aluminum & Brass Corporation, Detroit, Mich.
W. J. CORBETT, Steel Founders' Society of America, Fort Pitt Steel Casting Co., McKeesport, Pa.

EFFECTIVE DATE

The selection of an effective date for the adoption of the standard was determined when, as a result of circularization of the industry, the necessary support was secured. Adequate support was received and the standard made effective as of February 10, 1930.

CERTIFICATION PLAN

Although no general conference of the producers and users of foundry patterns was held, and hence no opportunity has, as yet, been presented for the indorsement by the foundry-pattern industry of

the so-called certification plan, it is believed a brief description of this plan may be helpful in the event detail requirements affecting construction or quality of foundry patterns are incorporated in the standard at a later date.

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 STANDARD 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 nation-wide 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 committee 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 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 7.

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 $\left\{ \begin{array}{l} \text{Production}^1 \\ \text{Distribution}^1 \\ \text{Use}^1 \end{array} \right\}$ of Foundry Patterns of Wood, beginning - - - - - (Date), and will use our best effort in 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.

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

(Cut on this line)

(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 Foundry Patterns of Wood:

- - - - -
- - - - -
- - - - -

¹ Please 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:

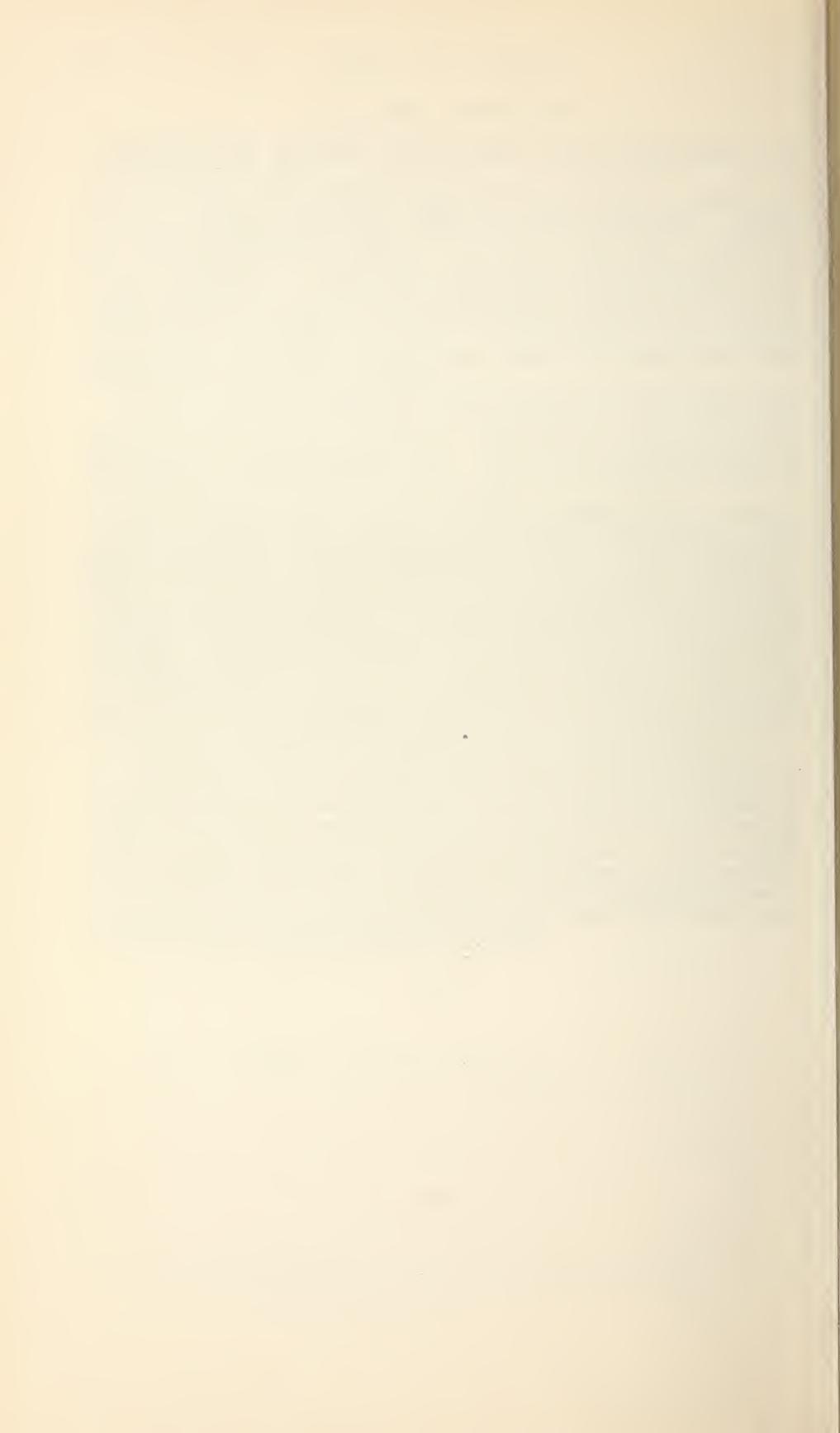
1. *Adherence.*—The Department of Commerce has no regulatory powers to enforce adherence to the commercial standards. Instead this waste-elimination program is based on voluntary cooperation and self-government in industry. To make this specific standardization operate as a satisfactory example of self-government 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.	18-20.	Hickory golf shafts.
1-28.	Clinical thermometers.	19-32.	Foundry patterns of wood (reprinted).
2-30.	Mopsticks.	20-30.	Staple vitreous china plumbing fixtures.
3-28.	Stoddard solvent.	21-30.	Interchangeable ground glass joints.
4-29.	Staple porcelain (all-clay) plumbing fixtures.	22-30.	Builders' hardware (nontemplate.)
5-29.	Steel pipe nipples.	23-30.	Feldspar.
6-31.	Wrought-iron pipe nipples. (First revision.)	24-30.	Standard screw threads.
7-29.	Standard weight malleable iron or steel screwed unions.	25-30.	Special screw threads.
8-30.	Plain and thread plug and ring gage blanks.	26-30.	Aromatic red cedar closet lining.
9-29.	Builders' template hardware.	27-30.	Plate glass mirrors.
10-29.	Brass pipe nipples.	28-32.	Cotton fabric tents, tarpaulins, and covers.
11-29.	Regain of mercerized cotton yarns.	29-31.	Staple seats for water-closet bowls.
12-29.	Domestic and industrial fuel oils.	30-31.	Colors for sanitary ware.
13-30.	Dress patterns.	31-31.	Red cedar shingles.
14-31.	Boy's blouses, button-on waists, shirts, and junior shirts.	32-31.	Cotton cloth for rubber and pyroxylin coating.
15-29.	Men's pajamas.	33-32.	Knit underwear (exclusive of rayon).
16-29.	Wall paper.	34-31.	Bag, case, and strap leather.
17-30.	Diamond core drill fittings.	35-31.	Plywood.
		36-31.	Fourdrinier wire cloth.
		37-31.	Steel bone plates and screws.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice in the 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.

