

# Portable Electric Drills

(Exclusive of High Frequency)

U. S. DEPARTMENT OF COMMERCE



U. S. DEPARTMENT OF COMMERCE  
Charles Sawyer, Secretary

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

Office of Industry and Commerce

H. B. McCoy, Director

In cooperation with

NATIONAL BUREAU OF STANDARDS

E. U. Condon, Director



## Portable Electric Drills

(Exclusive of High Frequency)

A Recorded Voluntary Standard of the Trade

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### COMMODITY STANDARDS

Simplified Practice Recommendations and Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Industry and Commerce and the National Bureau of Standards.

The purpose of Simplified Practice Recommendations is to eliminate avoidable waste through the establishment of standards of practice for stock sizes and varieties of specific commodities that currently are in general production and demand. The purpose of Commercial Standards is to establish standard methods of test, rating, certification, and labeling of commodities, and to provide uniform bases for fair competition.

The adoption and use of a Simplified Practice Recommendation, or a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforceable through usual legal channels as a part of the sales contract.

A Simplified Practice Recommendation, or a Commercial Standard originates with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The Division, by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the Division assures continuous servicing of each effective Simplified Practice Recommendation and Commercial Standard, through review and revision, whenever, in the opinion of the industry, changing conditions warrant such action. Simplified Practice Recommendations and Commercial Standards are printed and made available by the Department of Commerce through the Government Printing Office and the Department of Commerce field offices.

# COMMERCIAL STANDARD 93-50

for

## PORTABLE ELECTRIC DRILLS

(Exclusive of High Frequency)

(Second Edition)

[Effective December 1, 1950]

### 1. PURPOSE

1.1 The purpose of this commercial standard is to provide a nationally recognized specification for portable electric drills. By its general adoption and use, it is expected to promote a better understanding between buyers and sellers and establish a basis for certification of capacity and performance.

### 2. SCOPE

This standard provides minimum specifications for class A, duty, and class B, standard, rotary electric drills manufactured in standard sizes ranging from  $\frac{3}{16}$  inch to  $1\frac{1}{2}$  inches. It covers construction, and minimum full-load ampere rating for each size of drill; tests; nameplates; and a uniform method of compliance with the standard.

### 3. GENERAL REQUIREMENTS

All portable electric drills sold as conforming to this commercial standard shall meet the following general requirements.

**Construction.**—All parts of the drills shall be rugged in construction and properly supported, mounted, and secured. The drills shall be simple in construction, reliable in operation, and readily accessible for inspection, adjustment, and replacement. Parts shall be interchangeable and of a good fit with other parts made by the same manufacturer.

3.3 **Safety.**—All portable electric drills shall be designed for facility in operation and safety in use. All rotating parts which are a danger to the operator in use shall be suitably guarded against accidental contact where such guards do not interfere with the correct operation of the tool. The frame, except for the ventilating openings of the tool, shall totally enclose all stationary and rotating electrical parts. The openings for ventilation shall be as small as practicable, not exceeding  $\frac{1}{2}$  inch in width, and such that the motor will be protected from injury from outside sources.

3.4 **Housings.**—Housings shall surround and enclose the mechanism of the drill to guard it effectively from external injury. The

practice of using aluminum or other light-weight alloys on portable electric drills is satisfactory.

### 3.5 *Switch.*

3.5.1 Each electric drill shall be provided with a conveniently located switch (see par. 4.5) for turning the current of the motor "off" and "on." All switches shall be double-pole, except that single-pole switches may be used on  $\frac{3}{16}$ -inch class A and class B, and  $\frac{1}{4}$ -inch class B drills. The switch mechanism shall be in an enclosure of strong insulating material of high-dielectric strength. Switches, except those which release automatically, shall be marked plainly to show the "off" and "on" position. Switches operating on 250 volts or less shall have a minimum  $\frac{1}{4}$ -inch clearance between terminals of opposite polarity, measured over the surfaces of the insulating material between terminals. The clearance to ground on adjacent frame shall be at least  $\frac{1}{8}$  inch, measured over the surfaces of the insulating material.

3.5.2 Switches shall be capable of interrupting the stalled motor current at full rated voltage for 50 consecutive contacts at intervals of 10 seconds without flashing to the case and sticking or burning of contacts. To determine whether or not a switch meets these requirements, it should be installed on the electric drill and arranged for *testing only*, connected to an ungrounded circuit in accordance with the following conditions: When the switch is single-pole, the line opposite to that passing through the switch shall be connected to the switch case. When a double-pole switch is used, the side of the line farthest from any adjacent metal within the switch case shall be connected to the switch case. On drills supplied with motors of 250 volts and less, alternating current or direct current, the test shall be applied at rated voltage, direct current.

3.5.3 The switch shall have a current rating not less than the full-load current rating on nameplate of the drill with which it is to be used. In the case of drills supplied with motors of 250 volts or less, where the same switches are used on all lower potential ratings, the switch shall have a 110-volt current rating not less than that of the 110-volt motor.

3.6 *Motors.*—Motors shall be of rugged construction and shall operate satisfactorily at 6 percent above or below the standard rated voltage. Commutators shall be rugged and shall be of such design as will withstand the maximum idle speed of the motor without relative radial displacements of individual commutator segments. Rotors or armatures shall be accurately balanced statically and dynamically. Where the pinion gear is cut on the shaft, motor shafts shall be made of high-grade alloy steel and be suitably heat-treated. The voltage of portable electric drills shall not exceed 250 volts. The armature and field wiring shall have insulation at least equivalent to class A insulation as defined by American Institute of Electrical Engineers, with suitable impregnation to resist moisture.

3.7 *Brushes.*—Drill motors shall be provided with rectangular or square carbon brushes fitted in suitable insulated brush holders, provided with spiral or helical springs. Flexible copper shunts shall be provided on all brushes, except on  $\frac{3}{16}$ -inch class A and class B, and  $\frac{1}{4}$ -inch class B drills. There shall be a  $\frac{1}{4}$ -inch minimum internal creepage distance as measured from the edge of the live brush holder



over the insulation to the adjacent grounded frame. No live parts of brush mechanism shall be exposed to contact by the operator. Where insulated screw caps are used, they shall be protected by the housing from mechanical injury.

3.8 *Bearings*.—The armature of the motor shall be mounted on ball bearings at least equivalent to Annular Bearing Engineers' Committee No. 1 standard, or comparable roller-type bearings. Intermediate shaft bearings shall be of either the ball, roller, or sleeve type, properly proportioned. Spindle or arbor bearings of tools may be of the ball, roller, or sleeve type. Ball bearings, so mounted as to preclude the possibility of contamination with dust and dirt, shall be of the dust-proof type or enclosed in a dust-proof housing. All spindles or arbors and other shafts subjected to thrust loads shall have bearings with adequate thrust capacity or a separate ball thrust bearing.

3.9 *Gears and shafts*.—All gears, except worm gears, shall be made of suitably heat-treated steel and be adequately supported to prevent deflection. Shafts shall be made of suitably heat-treated high-grade alloy steel. Each shaft shall be adequately supported by at least two bearings of the type required by paragraph 3.8. Gears and shafts shall be fully enclosed.

3.10 *Lubrication*.—Bearings shall be arranged for suitable lubrication. Gears shall operate in lubricant which shall be prevented from entering the motor frame or leaking from the gear housing.

3.11 *Wiring*.—All wiring, except the rubber-covered cord, shall be enclosed in the metal frame of the drill, and conductors shall be securely held in position away from rotating parts. All leads shall be arranged to avoid contamination from possible oil or grease within frames of drills.

3.12 *Cord and attachment plug*.—Each drill shall be equipped with a flexible rubber-covered, three-wire approved cord of type S or SJ, having a minimum length of 10 feet as measured from the tool to a suitable two-prong, or two-prong with grounding pin, attachment plug of an approved type. The green-colored insulated wire of this cord shall be connected inside the frame and be well protected against mechanical injury. The ground connection shall be entirely separate. Its fastening means shall not be used for any other purpose and shall securely lock the connection. The green-colored insulated wire of the cord shall be used as the ground-wire connection from the tool to the attachment plug grounding prong, or lead. This wire should be suitably tagged with instructions for making proper ground connection. The cords of portable drills shall be provided with a strain relief and an antikink device attached to the tool. The size of the conductors shall be determined from the full-load ampere rating of the tool, and shall be in conformance with the table for the allowable carrying capacity of flexible rubber-covered cord as given in the National Electrical Code.

#### 4. DETAIL REQUIREMENTS

4.1 Electric drills shall be divided into two classes, "class A," heavy duty, and "class B," standard.

4.2 *Class A.*—Heavy-duty drills shall have the minimum full-load ampere ratings for each size as shown in table 1, and shall be suitable for heavy production use.

4.3 *Class B.*—Standard drills shall have the minimum full-load ampere ratings for each size as shown in table 1, and shall be suitable for occasional drilling to rated capacity, but not for the more or less continuous service required of tools in heavy production use.

4.4 *Size.*—Electric drills shall be sized according to the maximum chuck capacity (see paragraph 4.6). Standard sizes shall be  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $\frac{7}{8}$ , 1,  $1\frac{1}{4}$ , and  $1\frac{1}{2}$  inches.

4.5 *Handles.*—All drills up to and including  $\frac{5}{16}$ -inch class A and  $\frac{3}{8}$ -inch class B capacity shall have a suitable end or offside handle and a conveniently located switch. Heavy-duty class A drills of  $\frac{3}{8}$ -inch capacity shall be equipped with (1) a combination breastplate and spade handle with a side handle in which a grip-controlled switch is located, or (2) a suitable end handle with switch and an auxiliary side handle. Drills of  $\frac{1}{2}$ -inch capacity and greater shall have a combination spade and breastplate handle located on the end of the drill, with two side handles located approximately on an axis through the center of gravity of the drill to insure good balance when in use. One of the side handles shall be removable, and the other shall contain a grip-controlled switch.

TABLE 1.—Minimum full-load ampere ratings <sup>1</sup>

[Applies to both nameplates and tests]

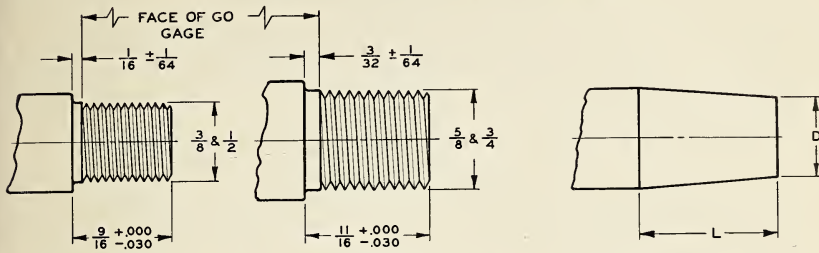
Size or capacity of drill	Class A, heavy-duty drills	Class B, standard drills
<i>Inches</i>	<i>Amperes</i>	<i>Amperes</i>
$\frac{3}{16}$ -----	1.8	1.3
$\frac{1}{4}$ -----	2.5	1.8
$\frac{5}{16}$ -----	2.8	2.2
$\frac{3}{8}$ -----	3.5	2.5
$\frac{1}{2}$ -----	5.0	3.5
$\frac{5}{8}$ -----	6.0	4.5
$\frac{3}{4}$ -----	7.5	5.5
$\frac{7}{8}$ -----	8.0	6.0
1-----	8.5	-----
$1\frac{1}{4}$ -----	11.0	-----
$1\frac{1}{2}$ -----	15.0	-----

<sup>1</sup> Above ampere ratings are based on a 115-volt, 60-cycle, single-phase supply at rated current. (See par. 5.1.) Ampere ratings at other voltage ratings are in inverse proportion to the voltage rating.

4.6 *Chuck.*—Chuck equipment for drills up to and including  $\frac{3}{4}$ -inch rating shall be of standard high grade, three-jawed type, so constructed as to hold firmly and centrally, straight shank drills up to the maximum rated capacity of the electrical drill. Chucks shall be of the geared type, with three hardened and ground tool steel jaws. A suitable chuck key shall be furnished with each chuck. Seven-eighths-inch and 1-inch electric drills shall have No. 2 or No. 3 Morse taper socket, and  $1\frac{1}{4}$ -inch and  $1\frac{1}{2}$ -inch drills shall have No. 3 or No. 4 Morse taper socket.

4.7 *Spindles*.—Spindles for geared chucks may be either threaded or tapered and shall conform to the requirements shown in table 2.

TABLE 2.—*Spindles for geared chucks*



Chuck capacity	Threaded spindle			Tapered spindle				
	Thread	Pitch diameter		No.	D (max.)	D (min.)	L	Taper
		Max.	Min.					
<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In.</i>		<i>In.</i>	<i>In.</i>	<i>In.</i>	<i>In./ft</i>
$\frac{3}{16}$ and $\frac{1}{4}$ light.....	$\frac{3}{8}$ -24	0.3479	0.3455	1	0.3370	0.3365	0.656	0.92508
$\frac{1}{4}$ and $\frac{5}{16}$ medium.....	$\frac{1}{2}$ -20	.3479	.3455	2S	.4910	.4905	.750	.97161
	$\frac{1}{2}$ -20	.4675	.4649					
$\frac{3}{8}$ light.....	$\frac{3}{8}$ -24	.3479	.3455	2	.4910	.4905	.875	.97861
	$\frac{1}{2}$ -20	.4675	.4649	2	.4910	.4905	.875	.97861
$\frac{3}{8}$ medium.....	$\frac{1}{2}$ -20	.4675	.4649		.4910	.4905	.875	.97861
	$\frac{5}{8}$ -16	.5844	.5812	33	.5635	.5630	1.000	.76194
$\frac{1}{2}$ light.....	$\frac{1}{2}$ -20	.4675	.4649					
	$\frac{5}{8}$ -16	.5844	.5812	6	.6260	.6255	1.000	.62292
$\frac{1}{2}$ medium.....	$\frac{3}{4}$ -16	.7094	.7062					
	$\frac{5}{8}$ -16	.5844	.5812	3	.7480	.7475	1.212	.63898
$\frac{5}{8}$ and $\frac{3}{4}$ medium.....	$\frac{3}{4}$ -16	.7094	.7062					

<sup>1</sup> Short taper.

## 5. TESTS

5.1 *Ampere rating*.—Full-load ampere rating on nameplate shall be the amperage corresponding to a load which reduces the speed to not less than 55 percent and not more than 70 percent of the no-load speed. Temperature rise at rated nameplate amperes under continuous operation shall not exceed 25° C. on the outside of the case or motor frame and 50° C. at any point on the motor windings, and 65° C. on the commutator, as indicated by the thermometer method of temperature determination, or 65° C. at any point on the motor windings, as indicated by the resistance method of temperature determination. All tests shall be conducted with a maintained rated line voltage of 115 volts and 60-cycle, single phase, alternating current.

5.2 *Dielectric test*.—At the completion of manufacture, each electric drill shall pass the following withstand voltage test: An alternating voltage of 900 volts effective for 1 minute, or 900 volts, plus 20 percent, for 1 second, shall be applied from the current-carrying parts to the noncurrent-carrying parts for motors intended to operate on voltages not exceeding 250.

## 6. NAMEPLATE

6.1 Each drill shall be provided with a suitable metal nameplate securely fastened in a conspicuous location to an integral part of the frame or the housings, and be permanently marked. The stamping shall give the maker's serial number, type (or other designation) of the tool, the maker's name, size or capacity of the drill, type of current (a-c or d-c), voltage, full-load current in amperes, and no-load rpm. Full-load rpm may also be shown, and, if shown, shall be the rpm at the rated full-load amperes.

## 7. IDENTIFICATION

7.1 In order that buyers may be assured that portable electric drills purchased comply with all requirements of this standard, manufacturers may identify products by means of a statement of compliance on labels, invoices, sales literature, etc. Where the manufacturer's name, trademark, or trade name appears, the following statement is recommended:

This portable electric drill complies with Commercial Standard CS93-50, as developed by the trade under the procedure of the Commodity Standards Division, and issued by the U. S. Department of Commerce.

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Name of manufacturer

7.2 When available space on labels is insufficient for the full statement in legible type, an abbreviated statement, as follows, is recommended:

Complies with CS93-50, as developed by the trade, and issued by the U. S. Department of Commerce.

## 8. EFFECTIVE DATE

8.1 Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors herein-after listed, this commercial standard was issued by the United States Department of Commerce, effective from December 1, 1950.

Edwin W. Ely,

*Chief, Commodity Standards Division.*

## 9. HISTORY OF PROJECT

9.1 *First edition.*—Pursuant to a request on February 16, 1940, from the Electric Tool Institute for the cooperation of the National Bureau of Standards in the establishment of a commercial standard for portable electric drills, a proposed standard as drafted by the ETI was submitted to manufacturers for comment. The resulting comment was reviewed by a committee of engineers, and a draft incorporating suitable changes was used as a basis for discussion at a general conference in Chicago on June 26, 1940, to which those concerned were invited.

9.1.1 The report of the general conference and the recommended commercial standard as adopted by the conference were circulated on



July 17, 1940, to producers, distributors, and users for written acceptance.

9.1.2 Some subsequent modifications to clarify ambiguities were approved by the standing committee and forwarded on March 7 and 8, 1941, to all concerned.

9.1.3 Upon receipt of written acceptances from a preponderant majority, an announcement was issued on April 18, 1941, that the standard would become effective for new production from October 18, 1941.

9.2 *Second edition.*—On January 24, 1950, a draft of a revision proposed by the Electric Tool Institute, pursuant to suggestions made by the General Motors Corp., was referred to the standing committee. In accordance with action by this committee, the recommended revision was submitted on March 20, 1950, to the trade with opportunity for acceptance.

9.2.1 Following acceptance by a satisfactory majority, in the absence of active opposition, an announcement was issued on November 1, 1950, that the revised standard had been accepted as the recorded voluntary standard of the trade, effective from December 1, 1950.

*Project Managers:* F. E. Powell and E. C. Barrett, Commodity Standards Division, Office of Industry and Commerce.

*Technical Advisers:* Dr. F. M. Defandorf, Electricity Division, and I. H. Fullmer, Optics and Metrology Division, National Bureau of Standards.

## 10. STANDING COMMITTEE

10.1 The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Industry and Commerce, United States Department of Commerce, which acts as secretary for the committee.

BLAINE B. RAMEY, Chairman

E. L. CONNELL, Universal Tools, Chicago Pneumatic Tool Co., 1241 East 49th Street, Cleveland, Ohio.

H. C. PECK, The Stanley Electric Tool Division, The Stanley Works, Elm Street, New Britain, Conn.

WHITFIELD MORETTI, Millers Falls Co., Greenfield, Mass.

BLAINE B. RAMEY, Black & Decker Manufacturing Co., Towson, Md.

R. KENNEDY HANSON, Electric Tool Institute, 1109 Clark Building, Pittsburgh, Pa.

P. L. HOUSER, Industrial Engineering & Construction Department, International Harvester Co., 180 North Michigan Avenue, Chicago, Ill.

MONT GORDON, Douglas Aircraft Co., Inc., Santa Monica, Calif.

F. K. HANLIN, Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Ill.

National Supply & Machinery Distributors Assn. invited to appoint a representative.



## ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date \_\_\_\_\_

Commodity Standards Division,  
Office of Industry and Commerce,  
United States Department of Commerce,  
Washington 25, D. C.

Sirs:

We believe that the Commercial Standard CS93-50 constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable as a

☐ Manufacturer <sup>1</sup>  
☐ Testing Laboratory <sup>1</sup>

☐ Distributor <sup>1</sup>  
☐ User <sup>1</sup>

of portable electric drills. We reserve the right to depart from it as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer \_\_\_\_\_  
(In ink)

\_\_\_\_\_  
(Kindly typewrite or print the following lines)

Name and title of above officer \_\_\_\_\_

Organization \_\_\_\_\_  
(Fill in exactly as it should be listed)

Street address \_\_\_\_\_

City, zone, and State \_\_\_\_\_

<sup>1</sup> Underscore which one. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General Support" should be added after the signature.

## TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard, where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.



## ACCEPTORS

The organizations and individuals listed below have individually accepted this standard for use as far as practicable in the production, distribution, purchase or testing of portable electric drills. In accepting the standard they reserved the right to depart from it as they individually deem advisable. It is expected that articles which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

### ASSOCIATIONS

American Trucking Associations, Inc., Washington D. C.  
Mountain States Hardware & Implement Association, Boulder, Colo.  
National Association of Master Plumbers, New York, N. Y.  
National Electrical Contractors Association, Washington, D. C.

### FIRMS

Aeronca Aircraft Corp., Middletown, Ohio.  
Air Transport Manufacturing Co., Hollywood, Calif.  
Albertson & Co., Inc., Sioux City, Iowa.  
Almond, T. R., Manufacturing Co., Ashburnham, Mass.  
American Can Co., Philadelphia, Pa.  
Autocor Co., The, Ardmore, Pa.  
Baker Specialty & Supply Co., Logansport, Ind.  
Baldwin Locomotive Works, The, Eddystone, Pa.  
Barrett Hardware Co., Joliet, Ill.  
Bethlehem Plumbing Supply Co., Bethlehem, Pa.  
Black & Decker Manufacturing Co., The, Towson, Md.  
Boyer-Campbell Co., The, Detroit, Mich.  
Bradford Machine Tool Co., The, Cincinnati, Ohio  
Brightbill, M. A., Body Works, Inc., Lebanon, Pa.  
Cadillac Motor Car Division, General Motors Corp., Detroit, Mich.  
Central of Georgia Railway Co., Savannah, Ga.  
Cessna Aircraft Co., Wichita, Kans.  
Chicago Pneumatic Tool Co., New York, N. Y.  
Cincinnati Electrical Tool Co., The, Cincinnati, Ohio.  
Cleveland Diesel Engine Division, General Motors Corp., Cleveland, Ohio.  
Cleveland Transit System, Cleveland, Ohio.  
Consolidated Vultee Aircraft Corp., San Diego, Calif.  
Construction Equipment Co., Spokane, Wash.  
Dayton Rubber Co., Dayton, Ohio.  
Detroit Testing Laboratory, Inc., The, Detroit, Mich.  
Douglas Aircraft Co., Inc., Santa Monica, Calif.  
Emerson Electric Manufacturing Co., The, St. Louis, Mo.  
Fairbanks, Morse & Co., Beloit Works, Beloit, Wis.  
General Motors Corp., Detroit, Mich.  
Grumman Aircraft Engineering Corp., Bethpage, L. I., N. Y.  
Hardware & Supply Co., The, Akron, Ohio.  
Hicks Rubber Co., Waco, Tex.  
Hudson Motor Car Co., Detroit, Mich.

Independent Pneumatic Tool Co., Aurora, Ill.  
Lockheed Aircraft Corp., Burbank, Calif.  
Louisville Electric Manufacturing Co., Inc., Louisville, Ky.  
Madsen & Howell, Inc., Perth Amboy, N. J.  
Mall Tool Co., Chicago, Ill.  
Malone Plumbing Supply Co., Pittsburgh, Pa.  
Martin, Glenn L., Co., Baltimore, Md.  
Master Pneumatic Tool Co., Inc., Orwell, Ohio.  
Mechanical Construction Corp., Hibbing, Minn.  
Mercury Aircraft Inc., Hammondsport, N. Y.  
Mill & Industrial Supply, Inc., Louisville, Ky.  
Millers Falls Co., Greenfield, Mass.  
Milwaukee Electric Tool Corp., Milwaukee, Wis.  
Misener Manufacturing Co., Inc., Syracuse, N. Y.  
Oshkosh Motor Truck, Inc., Oshkosh, Wis.  
Patzig Testing Laboratories, Des Moines, Iowa.  
Plumbers' Supply Co., New Bedford, Mass.  
Ryan Aeronautical Co., San Diego, Calif.  
Sears, Roebuck & Co., Chicago, Ill.  
Shilstone Testing Laboratory, Inc., New Orleans, La.  
Skilsaw, Inc., Chicago, Ill.  
Speedway Manufacturing Co., Cicero, Ill.  
Stanley Electric Tools, Division of The Stanley Works, New Britain, Conn.  
Superior-Sterling Co., Bluefield, W. Va.  
Syntron Co., Homer City, Pa.  
Turner Supply Co., Mobile, Ala.  
Underwriters' Laboratories, Inc., Chicago, Ill.  
United States Electrical Tool Co., The, Cincinnati, Ohio.  
United States Testing Co., Inc., Hoboken, N. J.  
Valley Supply Corp., Neenah, Wis.  
Van Horn, Oliver H., Co., Inc., New Orleans, La.  
Vinyard Ship Building Co., Milford, Del.  
Weakley-Watson-Miller Hardware Co., Brownwood, Tex.  
Westchester Square Plumbing Supply Co., Inc., New York, N. Y.  
Western Electric Co., Inc., New York, N. Y.  
Westinghouse Electric Corp., Pittsburgh, Pa.  
Wodack Electric Tool Corp., Chicago, Ill.  
Woolcock Plumbing & Heating Co., Niagara Falls, N. Y.

### UNITED STATES GOVERNMENT

Agriculture, Department of, Division of Purchase, Sales and Traffic, Washington, D. C.  
Army, Department of the, Office of Asst. Chief of Staff, Standards Branch, Washington, D. C.  
Veterans Administration, Washington, D. C.  
Wright-Patterson Air Force Base, Air Matériel Command, Dayton, Ohio.

## COMMERCIAL STANDARDS

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2-30. Mopsticks.  
3-40. Stoddard solvent (third edition).  
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- 20-49. Vitreous china plumbing fixtures (fifth edition).
- 21-39. Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition).
- 22-40. Builders' hardware (nontemplate) (second edition).
- 23-30. Feldspar.
- 24-43. Screw threads and tap-drill sizes.
- 25-30. Special screw threads. Superseded by CS 24-43.
- 26-30. Aromatic red cedar closet lining.
- 27-36. Mirrors (second edition).
- 28-46. Cotton fabric tents, tarpaulins and covers (second edition).
- 29-31. Staple seats for water-closet bowls.
- 30-31. (Withdrawn).
- 31-38. Wood shingles (fourth edition).
- 32-31. Cotton cloth for rubber and pyroxylin coating.
- 33-43. Knit underwear (exclusive of rayon) (second edition).
- 34-31. Bag, case, and strap leather.
- 35-49. Hardwood plywood (fourth edition).
- 36-33. Fourdrinier wire cloth (second edition).
- 37-31. Steel bone plates and screws.
- 38-32. Hospital rubber sheeting.
- 39-37. (Withdrawn).
- 40-32. Surgeons' rubber gloves.
- 41-32. Surgeons' latex gloves.
- 42-49. Structural fiber insulating board (fourth edition).
- 43-32. Grading of sulphonated oils.
- 44-32. Apple wraps.
- 45-48. Douglas fir plywood (eighth edition).
- 46-49. Hose lengths and sizes (fourth edition).
- 47-34. Marking of gold-filled and rolled-gold-plate articles other than watchcases.
- 48-40. Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).
- 49-34. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
- 50-34. Binders board for bookbinding and other purposes.
- 51-35. Marking articles made of silver in combination with gold.
- 52-35. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
- 53-35. Colors and finishes for cast stone.
- 54-35. Mattresses for hospitals.
- 55-35. Mattresses for institutions.
- 56-49. Oak flooring (third edition).
- 57-40. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).
- 58-36. Woven elastic fabrics for use in overalls (overall elastic webbing).
- 59-44. Textiles—testing and reporting (fourth edition).
- 60-48. Hardwood dimension lumber (second edition).
- 61-37. Wood-slat venetian blinds.
- 62-38. Colors for kitchen accessories.
- 63-38. Colors for bathroom accessories.
- 64-37. Walnut veneers.
- 65-43. Methods of analysis and of reporting fiber composition of textile products (second edition).
- 66-38. Marking of articles made wholly or in part of platinum.
- 67-38. Marking articles made of karat gold.
- 68-38. Liquid hypochlorite disinfectant, deodorant, and germicide.
- 69-38. Pine oil disinfectant.
- 70-41. Phenolic disinfectant (emulsifying type) (second edition) (published with CS71-41).
- 71-41. Phenolic disinfectant (soluble type) (second edition) (published with CS70-41).
- 72-38. Household insecticide (liquid spray type).
- 73-48. Old growth Douglas fir, Sitka spruce, and Western hemlock standard stock doors (fourth edition).
- 74-39. Solid hardwood wall paneling.
- 75-42. Automatic mechanical draft oil burners designed for domestic installations (second edition).
- 76-39. Hardwood interior trim and molding.
- 77-48. Enameled cast-iron plumbing fixtures (second edition).
- 78-40. Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).
- 79-40. Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78-40).
- 80-41. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
- 81-41. Adverse-weather lamps for vehicles (after market).
- 82-41. Inner-controlled spotlamps for vehicles (after market).
- 83-41. Clearance, marker, and identification lamps for vehicles (after market).
- 84-41. Electric tail lamps for vehicles (after market).
- 85-41. Electric license-plate lamps for vehicles (after market).
- 86-41. Electric stop lamps for vehicles (after market).
- 87-41. Red electric warning lanterns.
- 88-41. Liquid burning flares.
- 89-40. Hardwood stair treads and risers.
- 90-49. Power cranes and shovels.
- 91-41. Factory-fitted Douglas fir entrance doors.
- 92-41. Cedar, cypress, and redwood tank stock lumber.
- 93-50. Portable electric drills (exclusive of high frequency) (second edition).
- 94-41. Calking lead.
- 95-41. Lead pipe.
- 96-41. Lead traps and bends.
- 97-42. Electric supplementary driving and passing lamps for vehicles (after market).
- 98-42. Artists' oil paints.
- 99-42. Gas floor furnaces—gravity circulating type.
- 100-47. Porcelain-enameled steel utensils (third edition).
- 101-43. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
- 102- (Reserved for Diesel and fuel-oil engines).
- 103-48. Rayon jacquard velour (with or without other decorative yarn) (second edition).
- 104-49. Warm-air furnaces equipped with vaporizing-type oil burners (third edition).
- 105-48. Mineral wool insulation for low temperatures (second edition).
- 106-44. Boys' pajama sizes (woven fabrics) (second edition).
- 107-45. (Withdrawn).
- 108-43. Treading automobile and truck tires.
- 109-44. Solid-fuel-burning forced-air furnaces.
- 110-43. Tire repairs—vulcanized (passenger, truck, and bus tires).
- 111-43. Earthenware (vitreous-glazed) plumbing fixtures.
- 112-43. Homogeneous fiber wallboard.
- 113-44. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
- 114-13. Hospital sheeting for mattress protection.
- 115-44. Porcelain-enameled tanks for domestic use.
- 116-44. Bituminized-fibre drain and sewer pipe.
- 117-49. Mineral wool insulation for heated industrial equipment (second edition).
- 118-44. Marking of jewelry and novelties of silver. (E)119-45.<sup>1</sup> Dial indicators (for linear measurements).
- 120-48. Standard stock ponderosa pine doors (third edition).
- 121-45. Women's slip sizes (woven fabrics).
- 122-49. Western softwood plywood (second edition).
- 123-49. Grading of diamond powder (second edition).
- (E)124-45.<sup>1</sup> Master disks.

<sup>1</sup> Where "(E)" precedes the CS number, it indicates an emergency commercial standard, drafted under war conditions with a view toward early revision.

- 125-47. Prefabricated homes (second edition).
- 126-45. Tank mounted air compressors.
- 127-45. Self-contained mechanically refrigerated drinking water coolers.
- 128-49. Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes) (second edition).
- 129-47. Materials for safety wearing apparel (second edition).
- 130-46. Color materials for art education in schools.
- 131-46. Industrial mineral wool products, all types—testing and reporting.
- 132-46. Hardware cloth.
- 133-46. Woven wire netting.
- 134-46. Cast aluminum cooking utensils (metal composition).
- 135-46. Men's shirt sizes (exclusive of work shirts).
- 136-46. Blankets for hospitals (wool, and wool and cotton).
- 137-46. Size measurements for men's and boys' shorts (woven fabrics).
- 138-49. Insect wire screening (second edition).
- 139-47. Work gloves.
- 140-47. Testing and rating convectors.
- 141-47. Sine bars, blocks, plates, and fixtures.
- 142-47. Automotive lifts.
- 143-47. Standard strength and extra strength perforated clay pipe.
- 144-47. Formed metal porcelain enameled sanitary ware.
- 145-47. Testing and rating hand-fired hot-water-supply boilers.
- 146-47. Gowns for hospital patients.
- 147-47. Colors for molded urea plastics.
- 148-48. Men's circular flat and rib knit rayon underwear.
- 149-48. Utility type house dress sizes.
- 150-48. Hot-rolled rail steel bars (produced from Tee-section rails).
- 151-48. Body measurements for the sizing of apparel for infants, babies, toddlers, and children (for the knit underwear industry).
- 152-48. Copper naphthenate wood-preservative (spray, brush, dip application).
- 153-48. Body measurements for the sizing of apparel for girls (for the knit underwear industry).
- 154- . (Reserved for wire rope.)
- 155-50. Body measurements for the sizing of boys' apparel (knit underwear, shirts, trousers).
- 156-49. Colors for polystyrene plastics.
- 157-49. Ponderosa pine and sugar pine plywood.
- 158-49. Model forms for girls' apparel.
- 159-49. Sun-glass lenses made of ground and polished plate glass, thereafter thermally curved.
- 160-49. Wood-fiber blanket insulation (for building construction).
- 161-49. "Standard grade" hot-dipped galvanized ware (coated after fabrication).
- 162-49. Tufted bedspreads.
- 163-49. Standard stock ponderosa pine windows, sash, and screens.
- 164- (Reserved for concrete mixers).
- 165-50. Zinc naphthenate wood-preservative (spray, brush, dip application).
- 166-50. Size measurements for men's work trousers.
- 167-50. Automotive and general service copper tube.
- 168-50. Polystyrene plastic wall tiles, and adhesives for their application.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Commodity Standards Division, Office of Industry and Commerce, United States Department of Commerce, Washington 25, D. C.



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