

CS231A 700

COMMERCIAL STANDARDS ~~CS231-A-E~~ A-60
ON AIRCRAFT HANGAR DOORS

Fact Sheet

In March 1958, the Hangar and Industrial Door Technical Council requested the cooperation of the Commodity Standards Division, National Bureau of Standards in establishing a series of commercial standards for hangar and industrial doors. **These standards, listed below, are no longer valid and were withdrawn October 2, 1973.**

CS231A-60, Aircraft Hangar Doors of the Manually-Operated Horizontal Sliding Type (Steel Frame),

CS231B-61, Aircraft Hangar Doors of the Individually Power-Operated Horizontal Sliding Type (Steel Frame),

CS231C-63, Aircraft Hangar Doors of the Partial-Group Power-Operated Horizontal Sliding Type (Steel Frame),

CS231D-63, Aircraft Hangar Doors of the Full Group Power-Operated Horizontal Sliding Type (Steel Frame), and

CS231E-63, Aircraft Hangar Doors of the Power-Operated Horizontal Unbraced-Canopy Type (Steel Frame).

The Hangar and Industrial Door Technical Council is no longer in existence.

The Federal Aviation Administration (FAA) may be able to provide assistance and information concerning current standards and requirements. Contact: Engineering and Specifications Division (622A), Office of Airport Safety and Standards, Federal Aviation Administration (FAA), 800 Independence Avenue, SW, Washington, DC 20591; Telephone: (202) 267-3826/-3053; Fax: (202) 267-3505/-3507.

National Bureau of Standards

COMMERCIAL STANDARDS AND SIMPLIFIED PRACTICE RECOMMENDATIONS

Notice of Intent to Withdraw Certain Standards

In accordance with § 10.12 of the Department of Commerce procedures for the development of Voluntary Product Standards (15 CFR Part 10, as revised; 35 F.R. 8349 dated May 28, 1970), notice is hereby given of the Department's intent to withdraw the 81 standards identified below. It has been tentatively determined that each of these Commercial Standards (CS) and Simplified Practice Recommendations (SPR) are no longer technically adequate or used by the industry, or are otherwise not in the public interest.

- CS 16-29 Wall Paper.
- CS 26-30 Aromatic Red Cedar Closet Lining.
- CS 27-36 Mirrors.
- CS 28-46 Cotton Fabric Tents, Tarpaulins and Covers.
- CS 43-32 Grading of Sulphonated (Sulphated) Oils - Saponifiable Types.
- CS 61-51 Venetian Blinds (Grade A Custom-Made).
- CS 73-61 Old Growth Douglas Fir, Sitka Spruce, and Western Hemlock Doors.
- CS 76-39 Hardwood Interior Trim and Molding.
- CS 78-40 Ground-and-Polished Lenses for Sun Glasses.
- CS 79-40 Blown, Drawn, and Dropped Lenses for Sun Glasses.
- CS 89-40 Hardwood Stair Treads and Risers.
- CS 92-41 Cedar, Cypress and Redwood Tank Stock Lumber.
- CS 119-45 Dial Indicators (For Linear Measurements).
- CS 133-46 Woven Wire Netting.
- CS 134-46 Cast Aluminum Cooking Utensils (Metal Composition).
- CS 140-47 Testing and Rating Convectors.
- CS 141-47 Sine Bars, Blocks, Plates and Fixtures.
- CS 159-49 Sun Glass Lenses Made of Ground and Polished Plate Glass Thereafter Thermally Curved.
- CS 160-49 Wood Fiber Blanket Insulation (For Building Construction).
- CS 161-59 "Standard Grade" Hot Dipped Galvanized Ware (Coated After Fabrication).
- CS 162-49 Tufted Bedspreads.
- CS 167-50 Automotive and General Service Copper Tube.
- CS 168-50 Polystyrene Plastic Wall Tiles, and Adhesives for Their Application.
- CS 169-50 Galvanized Ware Fabricated from Pregalvanized Steel Sheets (For Standard Grade Items Only).
- CS 206-57 Solvent Welded (SWP Size) (Cellulose-Acetate Butyrate Pipe)

- CS 225-59 Method of Rating Commercial and Industrial Type Vacuum Cleaners, Portable and Mobile Types.
- CS 231A-60 Aircraft Hangar Doors Manually Operated Horizontal Sliding Type (Steel Frame).
- CS 231B-61 Aircraft Hangar Doors of the Individually Power-Operated Horizontal Sliding Type (Steel Frame).
- CS 231C-63 Aircraft Hangar Doors of the Partial Group Power-Operated Horizontal Sliding Type (Steel Frame).
- CS 231D-63 Aircraft Hangar Doors of the Full-Group Power-Operated Horizontal Sliding Type (Steel Frame).
- CS 231E-63 Aircraft Hangar Doors of the Power-Operated Unbraced-Canopy Type (Steel Frame).
- CS 232-60 Industrial Wire Cloth.
- CS 244-62 Roof Drainage Products.
- CS 252-63 TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Electrical Insulating Tubing.
- CS 263-64 Aluminium Nails.
- CS 267-65 Steel Medicine Cabinets.
- SPR 6-63 Standard Stock Sizes of American Pattern and Curved Milled Tooth Files and Rasps.
- SPR 11-36 Bed Blanket Sizes.
- SPR 22-40 Paper (Basic Sheet Sizes).
- SPR 31-63 Loaded Shot Shell.
- SPR 37-38 Commercial Forms (Invoice, Purchase Order and Inquiry).
- SPR 42-61 Grocers' Paper Bags.
- SPR 47-54 Cut Tacks and Small Cut Nails.
- SPR 51-29 Chasers for Self-Opening and Adjustable Die Heads.
- SPR 53-63 Steel Spirals for Reinforced Concrete Columns.
- SPR 62-63 Metallic Cartridges.
- SPR 76-40 Ash Handles.
- SPR 81-28 Binders' Board.
- SPR 90-62 Hack-Saw Blades.
- SPR 91-32 Glass Containers for Preserves, Jellies and Apple Butter.
- SPR 129-59 Merchandise Paper Bags.
- SPR 132-36 Ice Cream Cups and Cup Caps.
- SPR 146-52 Corrugated and Solid-Fiber Boxes for Canned Fruits and Vegetables.
- SPR 150-34 Copper Wire Nails.
- SPR 155-49 Cans for Fruits and Vegetables (Names, Dimensions, Capacities and Designated Use).
- SPR 162-35 Packaging of Air Brake (Electric Railway) Parts.
- SPR 173-54 Stock Folding Boxes for Millinery.
- SPR 175-40 Heavy-Duty, Round Nesting Paper, Food and Beverage Containers and Lids.
- SPR 187-42 Food Trays or Dishes (Waxed Paper, Molded Wood Pulp, and Wood Types).
- SPR 197-51 Glass Containers for Maraschino Cherries.
- SPR 206-63 Standard Stock Sizes of Swiss Pattern Files.
- SPR 208-55 Fluid-Milk Cans.
- SPR 213-45 Asphalt Roll Roofing and Asphalt and Tar-Saturated Felt Products.
- SPR 217-49 Copper Water Tube, and Copper and Brass Pipe.
- SPR 218-46 Paper Tubes for Packaging Milk Bottle Caps.
- SPR 223-47 Wire Nails and Staples.
- SPR 228-47 Pallets for Handling Groceries and Packaged Merchandise.
- SPR 235-48 Copper and Copper-Alloy Round Seamless Tube.
- SPR 241-50 Copper and Copper-Alloy Rod.
- SPR 246-51 Wooden Kegs for Nails.
- SPR 248-52 Packaging of Standard Malleable Iron Screwed Pipe Fittings, Black or Galvanized.
- SPR 250-53 Standard Drug Catalogs.
- SPR 251-54 Packaging of Gas Stop Cocks.
- SPR 252-60 Standard Sizes of Pint, Quart, and Half-Gallon Rectangular Ice Cream Cartons and Molds.
- SPR 254-54 Packaging of Steel Pipe Couplings.
- SPR 256-55 Steel Outlet Boxes, Zinc or Cadmium Coated.
- SPR 257-55 Thermal Conductance Factors for Preformed Above-Deck Roof Insulation.
- SPR 258-56 One-Pound Eastern Flat Margarine Carton.
- SPR 261-58 One-Pound Elgin-Style Butter Cartons Sizes.
- SPR 262-60 Acoustical Materials.
- SPR 263-60 Standard Shapes, Sizes, Grades and Designations of Cemented Carbide Products.

Any comments or objections concerning the intended withdrawal of any of these standards should be made in writing and directed to the Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234, within 45 days of the publication of this notice. The effective date of withdrawal, where appropriate, will be not less than 60 days after the final notice of withdrawal. Withdrawal action terminates the authority to refer to a published standard as a voluntary standard developed under the Department of Commerce procedures, from the effective date of the withdrawal.

Dated: February 28, 1972.

LEWIS M. BRANSCOMB,
Director.

[FR Doc.72-3253 Filed 3-2-72; 8:49 am]

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DO NOT REMOVE

COMMERCIAL STANDARD **CS231A-60**

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LAST COPY**

**Aircraft Hangar Doors
of the Manually Operated Horizontal
Sliding Type (Steel Frame)**

A recorded
voluntary standard of the
trade published by
the U.S. Department
of Commerce



WITHDRAWN

U.S. DEPARTMENT OF COMMERCE
Frederick H. Mueller, Secretary

BUSINESS AND DEFENSE SERVICES ADMINISTRATION
OFFICE OF TECHNICAL SERVICES
Commodity Standards Division

With the cooperation of the
National Bureau of Standards

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, Business and Defense Services Administration, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of 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.

Commercial Standards originate 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 Commercial Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

June 16, 1961

E R R A T A

Commercial Standard CS231A-60

- (1) Paragraph 5.6.2.1 was inadvertently misplaced when this standard was printed. Please correct your copy by inserting it after paragraph 5.6.2 on page 6.

5.6.2.1 Cast Steel Rollers. - The cast steel used in bottom rollers shall be a special alloy with the chemical properties in accordance with Table 2.

Table 2. Chemical properties of cast steel

Element	Minimum percentage	Maximum percentage
Carbon	0.25	0.35
Manganese	1.20	1.40
Silicon	0.35	0.50
Molybdenum	0.20	0.30
Phosphorus	0.00	0.05
Sulphur	0.00	0.05

- (2) Delete paragraph 5.6.2.1 from page 8 in the standard.

Aircraft Hangar Doors of the Manually Operated Horizontal Sliding Type (Steel Frame)

[Effective August 15, 1960]

1. PURPOSE

1.1 The purpose of this Commercial Standard is to establish nationally recognized minimum requirements for structural design and construction of aircraft hangar doors of the manually operated horizontal sliding type for the guidance of producers, architects, contractors and others interested in the product.

2. SCOPE

2.1 This standard covers minimum requirements for structural design, materials, method of construction, and recommends installation features. It defines this style door and states what the manufacturer contracts to provide as the completed door.

2.1.1 This standard covers specifically the fabrication of hangar doors; however, it should be understood that the doors cannot be expected to operate satisfactorily unless properly installed according to the manufacturer's recommendations. Therefore, certain requirements related to hangar door openings are given in the appendix and it will be necessary to adhere to them in order to obtain the hangar door manufacturer's guarantee (see sec. 4.2 and Appendix A).

3. DEFINITION

3.1 A manually operated horizontal sliding aircraft hangar door consists of a series of sliding type leaves, supported on bottom rails and having no integral power system to move the sections into either the open or closed position.¹

4. GENERAL REQUIREMENTS

4.1 *Approval Drawings.*—The door manufacturer shall furnish for approval three sets of suitable drawings showing general arrangement of leaves, hardware, and all equipment, as they relate to the completed structure. Structural steel details which may affect the door or its installation shall be submitted to the door manufacturer for his review and approval.

¹The Hangar and Industrial Door Technical Council has proposed the establishment of Commercial Standards for the following other types of doors:

- Hangar Doors, Horizontal Sliding, Individually Power Operated.
- Hangar Doors, Horizontal Sliding, Partial Group Power Operated.
- Hangar Doors, Horizontal Sliding, Full Group Power Operated.
- Hangar Doors, Unbraced Canopy Type, Power Operated.
- Industrial Doors, Mechanically and Power Operated Vertical Lift Type.
- Industrial Doors, Two-Leaf Turnover Type.

Information on these proposed standards may be obtained by writing to the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

4.2 *Responsibilities.*—The door manufacturer shall furnish all labor, materials, tools, equipment and services required for the fabrication of manually operated horizontal sliding hangar doors and, when required, their assembly and installation at the site. The door manufacturer shall not be responsible for top guides and supports; bottom rails and their ties; the preparation of building jambs for the attachment of weathering material; glazing; field paint; or master-keyed cylinders.

4.3 *Shop Paint.*—All steel, miscellaneous parts, and hardware, shall be shop primed.² This primer paint shall be a high quality commercial grade steel primer. All steel shall be cleaned prior to painting to remove all oil, rust, and other foreign material.

4.4 *Weather Stripping Material.*—Material, which is adjustable and readily replaceable, shall be provided on necessary vertical edges, sills, and heads to afford a substantially weather tight installation.

4.4.1 *Non-Metallic Weather Stripping Material.*—Material on vertical edges and sills shall be wipe-type, two-ply cloth-inserted 100% neoprene. The material shall have a minimum thickness of 1/8-inch and shall be retained continuously for its full length and secured with rust-resistant fasteners on 9-inch centers. Clearance between vertical edges of leaves and between leaves and jambs, which are to be weathered, shall not be less than 3 inches.

4.4.2 *Metallic Weather Stripping Material.*—Head weather stripping material between each leaf and the top guide system shall be formed of not less than 22 gage³ galvanized sheet steel.

4.5 *Insulation.*—When required, insulation shall be furnished by the door manufacturer, and shall be suitable for the geographic location of the structure and its design as established at the time the order is placed. It shall be installed in accordance with the insulation manufacturer's recommendations, and the insulation shall be protected by liner sheets to a minimum height of 6 feet above the floor.

4.6 *Workmanship.*—All components furnished by the manufacturer (see par. 4.2) shall be free from defects that affect the appearance or the serviceability of the completed unit.

4.7 *Maintenance Information.*—Recommendations or instructions for proper maintenance of the door shall be furnished by the door manufacturer for the guidance of the purchaser.

5. DETAIL REQUIREMENTS

5.1 *Design Criteria.*—Leaves shall be designed and constructed of standard structural sections or formed plates in accordance with the latest American Institute of Steel Construction Specifications,⁴ and be of ample size and strength for loads and stresses imposed under specified conditions. Rolled shapes and/or hot rolled open hearth flat plates shall be in accordance with ASTM Designation A7-58T, Tentative Specification for Steel for Bridges and Buildings.⁵ Doors shall be designed to withstand the minimum external or internal wind

² The shop coat of paint is a priming coat intended to protect the steel for a temporary period of weathering only and to provide a base for further painting. The door manufacturer does not assume responsibility for the deterioration that may result from extended exposure to the elements.

³ Galvanized sheet steel gage, thickness 0.0336 inches within commercial tolerances.

⁴ Available from American Institute of Steel Construction, 101 Park Ave., New York 17, N.Y.

⁵ Available from American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

loads specified in ASA A58.1-1955,⁶ but at no time shall the minimum be less than 20 pounds per square foot, with a wind load deflection not to exceed the door height in inches divided by 120, and fiber stresses due to combined dead and wind loads shall not exceed 27,000 pounds per square inch.

5.2 *Materials*.—All framing members shall be either standard structural sections or formed plates. Structural sections shall comply with American Institute of Steel Construction Specifications, and formed plates shall comply with the latest American Iron and Steel Institute Specifications.⁷ Where flat external door covering is used, it shall be a prime quality steel sheet, not less than No. 13 gage.⁸ Other types of covering material are acceptable when dictated by architectural treatment; however, due consideration must be given to framing design and clearance. When aluminum covering is used, the contact face of the door shall have a protective coating to eliminate any possibility of electrolysis. All materials shall be of grades which equal or exceed requirements established by the American Society for Testing Materials.

5.3 *Door Leaf Construction*.

5.3.1 *General*.—Leaf sections in sizes suitable for convenient shipping shall be of welded construction and all joints shall develop 100% of the strength of the framing members. An alternate and equally acceptable construction is one in which members are prefabricated for field assembly. Under this alternate method of construction, framing members can be either welded or bolted.

5.3.2 *Fabrication*.—Vertical members shall be continuous throughout the height of the door and those adjoining each other at splices shall be accurately prepared to facilitate field assembly in accordance with standard practice. All frames and framing members shall be true to dimension and square in all directions and no leaf shall be bowed, warped or out of line in the vertical or horizontal plane of the door opening by more than $\frac{1}{8}$ inch in 20 feet, so as to allow proper clearance between leaves. Diagonal bracing shall be provided so that the completed leaf assembly will be adequately braced to withstand shipping, assembly, and operational loads. Exposed welds and welds which interfere with the installation of various parts, such as cover sheets and sash, shall be ground smooth. Flat cover sheets shall be sealed with a good grade of mastic or caulking compound and fastened to the frame either by welding, spot welding, or threaded fasteners or drive fasteners on 9-inch centers. Where flat sheets are attached as either covering or liner sheets, the clear unsupported area shall not exceed 25 square feet. All outside edges of cover sheets shall be made weather tight before shop painting.

5.4 *Sash Inserts*.—When required, all sash shall be of standard commercial fixed type construction suitable for glazing in accordance with standard practice. All outside edges of sash shall be made weather tight before shop painting. Sash shall be either welded or through bolted to the door leaf frame on 9-inch centers.

5.5 *Personnel Doors*.—The manufacturer shall provide at least one personnel door for each 80 linear feet of hangar door opening as a safety requirement. Doors shall be either a swing or slide type

⁶ Available from American Standards Association, 70 E. 45th St., New York 17, N.Y.

⁷ Available from American Iron & Steel Institute, 150 E. 42d St., New York 17, N.Y.

⁸ U.S. Gage, thickness 0.0897 inch within commercial tolerances.

standard $1\frac{3}{4}$ inches thick industrial steel door and be a minimum of 3 feet in width by 7 feet in height. The upper portion of the door shall have provision for glazing.

5.5.1 *Swing Doors*.—The doors shall have suitable sized closers, standard hinges and have a lock set designed to lock the door securely by key from the outside and be operable from the inside by a thumb-turn, lever, or other suitable device not requiring a key.

5.5.2 *Slide Doors*.—The doors shall be top hung gravity closing type with anti-friction bearing trolleys and have a similar lock set as described in par. 5.5.1. Bottom supported doors are equally acceptable.

5.6 *Hardware*.—Hardware shall be of a suitable design for use on hangar doors. The door manufacturer shall provide top guide rollers, bottom rollers, top guide bumpers, bottom rail bumpers, hand and/or tractor pulls, and either manual brakes or cane bolts.

5.6.1 *Top Guide Rollers*.—Top guide rollers shall be of the horizontal type with either a single or double wheel. Rollers shall be made of either steel, malleable iron or cast iron and shall be of a size that is adequate for satisfactory performance under the designated load conditions. Rollers shall be provided with adequate bearings. (See fig. 1.)

5.6.2 *Bottom Rollers*.—Bottom rollers shall be made of either cast steel or welded pressed steel having a minimum tread diameter in accordance with Table 1. Vertically adjustable rollers shall be provided where the height to width ratio of the door leaf exceeds 3. Rollers shall be designed to permit removal without taking the door leaf from its position on the rail.

TABLE 1. *Minimum Roller Sizes*

Tread diameter of roller ¹	A.S.C.E. or A.R.E.A. Rail size ²	Area of door leaf
<i>Inches</i>	<i>Weight in pounds per yard</i>	<i>Square feet</i>
9	16	Up to 275
12	20	275 to 400

¹ This table applies to hangar doors of standard construction. On special doors having unusually heavy wheel loads, wheel size shall be determined by the actual wheel loading.

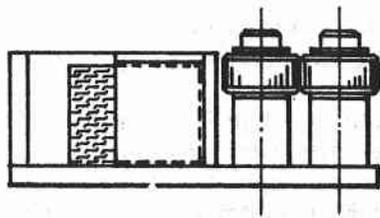
² American Society of Civil Engineers or American Railway Engineering Association rail size.

5.6.2.2 *Welded Pressed Steel Rollers*.—Welded pressed steel rollers shall be constructed by using pressure formed discs, heavy-walled tubing for hubs, and rolled rims, all of which shall be continuously arc welded. The material used shall, in all cases, meet or exceed the minimum requirements given in ASTM-A7 Specification.⁹

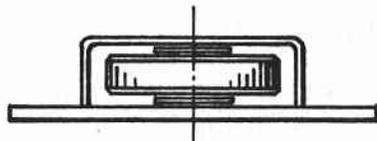
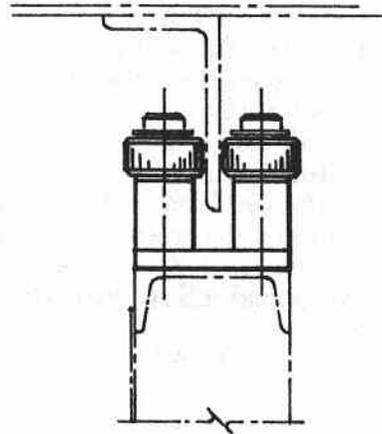
5.6.2.3 *Treads*.—Treads shall be machined concentric with bearing seats. The horizontal clearance between wheel and rail shall be not more than $\frac{1}{8}$ inch at the bottom nor more than $\frac{1}{4}$ inch at the edge of the flange. Bearing seats shall be accurately machined for a press fit to meet bearing manufacturer's requirements.

5.6.2.4 *Bearings*.—Bearings shall be either ball or roller type, arranged so that both the vertical loads and the horizontal wind loads can only be transmitted from the leaf to the wheels through the bear-

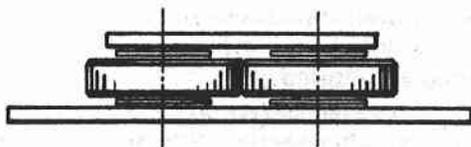
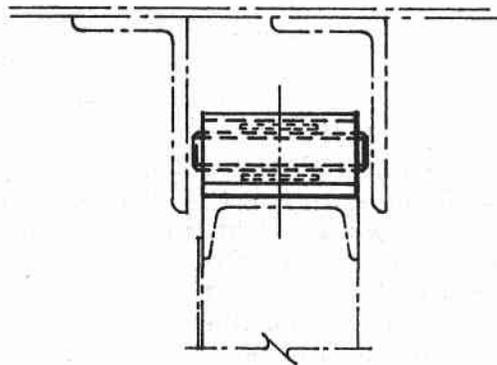
⁹ See footnote 7, page 4.



TYPE - A



TYPE - B



TYPE - C

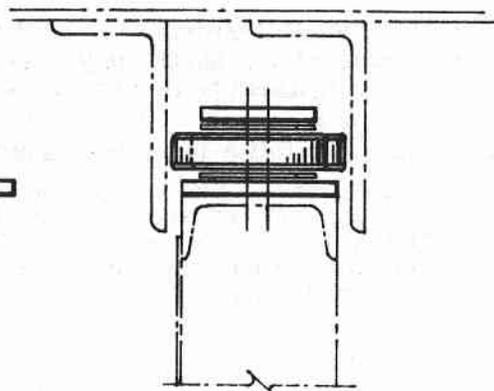


FIGURE 1.—ACCEPTABLE TOP ROLLER ARRANGEMENTS (Refer to Door Manufacturers for Specific Recommendations for Individual Installations)

ings. Bearings shall be provided with seals to retain the grease and prevent the entrance of dirt and shall be equipped with approved types of high pressure grease fittings.

5.6.2.5 *Alternate Design.*—Other designs of bottom rollers may be used providing all the requirements in paragraphs 5.6.2.3 and 5.6.2.4 are met.

5.6.3 *Bumpers*.—Top guide bumpers shall be provided for each door leaf for the fully closed position. Bottom rail bumpers shall be provided for each door leaf for the fully open position.

5.6.4 *Hand Pulls and/or Tractor Pulls*.—Hand pulls and/or tractor pulls shall be provided on the leading and trailing edges of each leaf to facilitate positioning the door.

5.6.5 *Brake or Lock*.—A manual brake or cane bolt of manufacturer's standard design shall be furnished for each leaf.

5.6.2.1 *Cast Steel Rollers*.—The cast steel used in bottom rollers shall be a special alloy with the chemical properties in accordance with Table 2.

TABLE 2. *Chemical properties of cast steel*

Element	Minimum percentage	Maximum percentage
Carbon.....	0.25	0.35
Manganese.....	1.20	1.40
Silicon.....	0.35	0.60
Molybdenum..	0.20	0.30
Phosphorus....	0.00	0.05
Sulphur.....	0.00	0.05

6. INSPECTION

6.1 All manually operated sliding type aircraft hangar doors sold as conforming to this Commercial Standard are subject to inspection by the purchaser or his agent for conformance of design, materials and workmanship. Complaints regarding any door, leaf or part thereof shall be made within ten days after assembly at the site and/or before they are installed. Any rejected door, leaf or part shall be held properly protected for a period of 30 days after notice of rejection pending adjustment.

7. CERTIFICATION

7.1 In order to assure the purchaser that the design, quality, and workmanship are as specified herein, producers may individually or in concert with their trade association, issue guarantees or mark each door, leaf, or part thereof by a stamp or label as conforming to this standard. The following wording is recommended:

This manually operated, sliding type aircraft hangar door complies with all of the requirements of Commercial Standard CS231A-60, as developed by the trade under the procedure of Commodity Standards and issued by the U.S. Department of Commerce.

(Name of Manufacturer)

APPENDIX A

The following numbered items describe work and responsibilities not required to be performed by the door manufacturer.

1. *Top Guide and Bottom Rail Tolerances.*—In order to assure proper operation of the sliding door leaves, it is recommended that the installation of the bottom rails be done only after the top guide system is in place. Top guides and bottom rails should be furnished and installed to the following tolerances:

(a) *Top Guides and Supports:*

Vertical: Nominal architectural elevation to be held within plus or minus $\frac{1}{4}$ -inch.

Lateral: Nominal center to center dimension to be held within plus or minus $\frac{1}{8}$ -inch with variation from nominal at no greater rate than $\frac{1}{8}$ -inch in 20 feet. Joints of head guides are not required to be welded, but guides must be shimmed or ground so that adjoining guide surfaces are not out of line more than $\frac{1}{16}$ -inch. All head guide tolerances are to be met after dead load is imposed upon the building frame.

(b) *Bottom Rails and Rail Ties:*

Vertical: Rails to be set to elevation within plus or minus $\frac{1}{4}$ -inch with variations from elevation at no greater rate than $\frac{1}{8}$ -inch in 20 feet.

Lateral: The nominal design relationship between top guides and bottom rails must be maintained. Center to center dimension of bottom rails must be held within plus or minus $\frac{1}{8}$ -inch, with variation from nominal at no greater rate than $\frac{1}{8}$ -inch in 20 feet. All rail joints shall either be welded and ground smooth or splice plates installed in accordance with American Society of Civil Engineers Standards.¹⁰

2. *Glazing.*—All glass to be furnished and installed in accordance with standard practice.

3. *Field Paint.*—All field paint and painting to be in accordance with specified requirements and should also include painting of bolt heads and nuts, field welds, and touch-up of abrasions in the shop coat.

4. *Locks.*—If master keyed lock cylinders are desired in personnel doors they should be included in the building hardware specifications.

5. *Preparation for Weathering Material.*—Where weathering material attaches to building jambs, soffits, etc., the preparation and installation of mountings, holes in building members, and other pro-

¹⁰ Available from American Society of Civil Engineers, 33 W. 39th St., New York 18, N.Y.

visions for attachment are to be in strict accordance with the door manufacturer's drawings.

HISTORY OF PROJECT

1st Edition:—On March 20, 1958, the Hangar and Industrial Door Technical Council requested the cooperation of the Commodity Standards Division in establishing a Commercial Standard for Manually Operated Horizontal Sliding Type Aircraft Hanger Doors. The Council, through its Technical Committee, prepared a draft of the proposed standard, which was circulated to representative groups of manufacturers, architects, airports and municipalities for preliminary comment and approval. From the suggestions offered, the draft was modified to coincide with the consensus of opinion expressed and was reviewed and edited by the National Bureau of Standards. Copies were then circulated to the entire trade for written acceptance and on July 15, 1960 it was announced as an adopted voluntary trade standard of the industry and an official publication of the Department of Commerce, to be known as Commercial Standard CS231A-60.

STANDING COMMITTEE

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 Technical Services, U.S. Department of Commerce, which acts as secretary for the committee.

Representing Manufacturers:

A. E. WETTER, Byrne Doors, Inc., 1603 E. Nine Mile Rd., Ferndale 20, Mich. (Chairman)
W. R. YOKEL, International Steel Co., 1321 Edgar St., Evansville 7, Ind.

Representing Users:

EDWARD E. INGRAHAM, Manager, LaGuardia Airport, Box 577, Flushing 71, N.Y., Representative from the American Association of Airport Executives.
V. NEISCH, American Airlines, 100 Park Ave., New York, N.Y.

Representing Architects:

D. P. DENITTO, Roberts and Schaefer Co., 254 W. 54th St., New York, N.Y.
ROBERT E. LINTON, Albert Kahn Associated Architects and Engineers, Inc., New Center Bldg., Detroit 2, Mich.

Project Manager: Edward J. McCamley, Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce.

Technical Adviser: James P. Thompson, Codes and Safety Standards, Building Technology Division, National Bureau of Standards.

ACCEPTORS

The manufacturers, distributors, users and others listed below have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the standard as far as practicable, but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the standard, and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the standard may be identified as such by a certificate, grade mark, or label. Purchasers are encouraged to require such specific evidence of compliance, which may be given by the manufacturer whether or not he is an acceptor.

ASSOCIATIONS

(General Support)

Hangar & Industrial Door Technical Council, Cleveland, Ohio.
Montana Chapter, American Institute of Architects, Committee on Standards, Billings, Mont.

FIRMS AND OTHER INTERESTS

Anderson Flying Service, Garden City, Mo.
Buswell Flying Service, Lakeview, Oreg. (General support)
Byrne Doors, Inc., Ferndale, Detroit, Mich.
Camlet, J. Thomas, Architect & Engineer, Garfield, N.J.
Capitol Steel & Iron Co., Oklahoma City, (General support).
Cincinnati, City of, Department of Public Works, Division of Engineering, Cincinnati, Ohio.
Clarke County Airport, Athens, Ga.
Conrad & Cummings, Associated Architects, Binghamton, N.Y.
Douglas, City of, Douglas, Ga.
Dresser-Ideco Co., a Division of Dresser Industries, Inc., Columbus, Ohio.
Evansville-Vanderburgh Airport Authority District, Evansville, Ind.
Fleming Steel Co., New Castle, Pa.
Hangar and Industrial Door Division-International Steel Co., Evansville, Ind.
Hutchinson, City of, Hutchinson, Kans.
Independent Iron Works, Inc., Oakland, Calif.

Luria Engineering Co., Bethlehem, Pa.
McPherson Co., The, Engineers-Architects, Greenville, S.C. (General support.)
Mesker, Geo. L., Steel Corp., Evansville, Ind.
Miller, Vrydagh & Miller, Architects, Terre Haute, Ind.
North Jackson Air Service, Madison, Miss. (General support.)
Parish, Archie G., Architectural Office of, St. Petersburg, Fla.
Peelle Co., The, Brooklyn, N.Y.
PI Steel Corp., Ogden, Utah.
Richards-Wilcox Manufacturing Co., Aurora, Ill.
Roberts and Schaefer Co., Inc., New York, N.Y.
Salt Lake City Municipal Airport No. 1, Salt Lake City, Utah.
Stravs, Carl B., Architect, Twin Falls, Idaho.
Thorne, Henry Calder, Architect, Ithaca, N.Y.
Virginia, University of, Charlottesville, Va. (General support.)
Webber & Erickson, Architects, Rutland, Vt. (General support.)
Witmer, Maurice E., A.I.A., Portsmouth, N.H.

U.S. GOVERNMENT

Atomic Energy Commission, Property & Supply Management Branch, Division of Construction & Supply, Washington, D.C.
Veterans Administration, Technical Representative on Standards, Washington, D.C.

OTHER COMMERCIAL STANDARDS

A list of Commercial Standards may be obtained from the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. The list includes the purchase price of each publication and gives directions for ordering copies.

ACCEPTANCE OF COMMERCIAL STANDARD
Aircraft Hangar Doors of the Manually Operated Horizontal Sliding Type (Steel Frame)

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 Technical Services
 Business and Defense Services Administration
 U. S. Department of Commerce
 Washington 25, D. C.

Gentlemen:

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

production¹ distribution¹ purchase¹ testing¹
 of this commodity.

We reserve the right to depart from the standard 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 _____

¹ Underscore the applicable words. 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 interest, 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 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 nationwide 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.