ANSI/DASMA 102-2011

AMERICAN NATIONAL STANDARD

SPECIFICATIONS FOR SECTIONAL DOORS

ANSI/DASMA 102-2011

Door & Access Systems Manufacturers' Association, International

Sponsor:

DASMA
Door & Access Systems Manufacturers Association International

1300 Sumner Ave
Cleveland, Ohio 44115-2851

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American National Standard

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Suggestions for improvement of this standard will be welcome.
They should be sent to the Door & Access Systems Manufacturers' Association, International.

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Foreword

(This foreword is included for information only and is not part of ANSI/DASMA 102-2011, *Specifications for Sectional Doors.*

This standard was originally developed by the Technical Committee of the National Association of Garage Door Manufacturers and was approved as an American National Standard with the designation ANSI/NAGDM 102. The Door & Access Systems Manufacturers' Association, International, (DASMA) was formed through the consolidation of two associations that served the garage door and operator industries for many years, NAGDM and the Door Operator & Remote Control Manufacturers Association (DORCMA).

The Technical Committee of the DASMA Commercial & Residential Garage Door Division revised the standard in 2003, and the ANSI Board of Standards Review granted approval of the edition as an American National Standard on October 22, 2004. The current version of the standard was approved as a DASMA standard, and the Board of Standards Review granted recognition as an American National Standard on May 19, 2011

DASMA recognizes the need to periodically review and update this standard. Suggestions for improvement should be forwarded to the Door & Access Systems Manufacturers' Association, International, 1300 Sumner Avenue, Cleveland, Ohio, 44115-2851.

ANSI/DASMA 102-2011

AMERICAN NATIONAL STANDARD

Specifications for Sectional Doors

1. SCOPE

1.1. Inclusions. This specification for sectional doors, as defined in Section 2, is intended to cover residential and commercial type doors normally used on garages, warehouses, factories, service stations, and other places requiring doors generally used for vehicular traffic.

1.2. Exclusions. It is not intended to cover doors generally used for pedestrian traffic nor other types of overhead doors such as rigid, folding, multi-leaf, rolling doors, or special application doors.

2. DEFINITIONS

2.1 Commercial Door. A sectional door which is intended for vehicular use at entrances of commercial buildings such as loading docks, service stations, parking garages and manufacturing plants, normally expected to be operated but not limited to less than 5,000 cycles per year.

2.2 Cycle. One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

2.3 Door System. Sections and components necessary to produce an operational door per DASMA 102. This may include an operator, if listed as part of the door system.

2.4 Door System Manufacturer. Supplies as a package all sections and components necessary to produce an operational door per DASMA 102. This may include an operator, if listed as part of the door system.

2.5 Folding Door. A door made of two or more horizontal sections that are hinged together but fold one against the other when opened.

2.6 Multi-Leaf Door. A door made of two or more stacking horizontal sections which interlock without the benefit of hinges.

2.7 Power Assisted. Providing a powered device to operate a door system.

2.8 Residential Door. A sectional door which is intended for use in a residential garage, and normally expected to be operated less than 1,500 cycles per year.

2.9 Rigid Doors. A door made in one rigid piece designed to close an entire opening. Opening and closing is accomplished by pivoting the door about an axis, with or without a horizontal track to guide the top of the door.

2.10 Rolling Door. A door made of individual horizontal interlocking slats. The door is opened by rolling the door around a shaft and subsequently upon itself.

2.11 Sectional Type Doors. Doors made of two or more horizontal sections hinged together so as to provide a door large enough to close the entire opening and which is guided into the horizontal tracks, or into the vertical position by means of an extended vertical track system.

(NOTE: A glossary of common industry terms can be found in DASMA Technical Data Sheet #160, Sectional Garage Door Terminology).

3. REFERENCED STANDARDS

The following standards are a part of this standard to the extent that they are referenced in the text. Conformance shall be to the latest edition of each referenced standard listed below.

- ANSI/DASMA 103 *Standard for Counterbalance Systems on Residential Sectional Garage Doors*
- ANSI/DASMA 105 *Test method for thermal transmittance and air infiltration of garage doors*
- ANSI/DASMA 107 *Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation*
- ANSI/DASMA 108 *Standard Method for Testing Sectional Garage Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference*
- ANSI/DASMA 109 *Standard Method for Testing Garage Doors: Determination of Cycle Life*
- ANSI/DASMA 115 *Standard Method for Testing Garage Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind Pressure*

- ANSI/DASMA 116 *Standard for Section Interfaces on Residential Garage Door Systems*
- UL 325 *Door, drapery, gate, louver, window operators and systems*
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4. INSTALLATION/OPERATION

The door system manufacturer shall furnish standard details and instructions for proper installation and operation. Such instructions shall include warnings relative to the installation and operation of the door system.

5. MAINTENANCE

The door system manufacturer shall furnish a listing of those components requiring regular maintenance with instructions and frequencies for such maintenance.

6. DURABILITY

6.1 Residential and commercial door systems shall be designed to operate at a minimum of 10,000 cycles when they are properly selected, installed, operated, and maintained. A door system shall be designed to operate the specified cycle life when more than 10,000 cycles are specified.

6.2 When testing is performed to determine cycle life, testing shall be conducted in accordance with ANSI/DASMA 109.

7. IDENTIFICATION

Each door system shall be labeled to identify the name and address of the door system manufacturer.

8. GENERAL REQUIREMENTS

8.1 Hand Chain Hoist Operation

Hand chain hoists shall not be used on standard lift and low headroom applications unless provisions are made to maintain adequate cable tension as specified by the door system manufacturer.

8.2 Power Assisted Operation

8.2.1 Motorized jackshaft operators shall not be used on standard lift and low headroom applications unless provisions are made to maintain adequate cable tension as specified by the door system manufacturer.

8.2.2 If a drawbar operator is used, additional door reinforcement may be required upon installation. Reinforcement requirements for drawbar attachment shall be specified in the door system manufacturer's installation instructions.

8.2.3 If an operator is listed as part of the door system, such operator shall be designed in compliance with the applicable sections of the version of UL 325 in effect at the time of manufacture.

8.3 Counterbalance Assemblies

8.3.1 Counterbalance assemblies shall meet the requirements of ANSI/DASMA 103.

8.3.2 Torsion spring counterbalance assembly design shall be in accordance with Section 9.3.

8.3.3 Extension spring assembly design shall be in accordance with ANSI/DASMA 103.

8.4 Sectional Door Interfaces and Lift Handles. Residential doors shall meet the requirements of ANSI/DASMA 116.

8.5 Thermal Transmittance/Air Infiltration. Published thermal transmittance and air infiltration values of installed residential and commercial doors shall be in accordance with the test methods specified in ANSI/DASMA 105.

8.6 Published steel gauge numbers shall be in accordance with DASMA Technical Data Sheet #154, DASMA Steel Gauge Chart.

8.7 Foam Plastic Insulation. Foam plastics used in sectional doors shall meet requirements established by the authority having jurisdiction for flame spread and smoke development.

9. LOADS

9.1 Wind Loads

9.1.1 Residential or Commercial Door System. A door system shall be designed to withstand a minimum wind load as required by the authority having jurisdiction over the geographic location where the door is to be installed When required by the authority having jurisdiction, structural tests shall be in accordance with ANSI/DASMA 108 or other accepted means required by the authority having jurisdiction.

9.1.2 Where resistance to windborne debris is required by the authority having jurisdiction over the geographic location where the door is to be installed, a door system shall meet the requirements of ANSI/DASMA 115 or other accepted means as required by the authority having jurisdiction.

9.2 Dead Loads

9.2.1 Residential and Commercial Door Sections. Door sections, including their reinforcement hinges, roller assemblies, and method of attachment to the door, shall be designed to support their own weight when in the horizontal position and not deflect more than 1/120th of the door width. Deflection shall be measured after the door has been in the horizontal position for at least 24 hours.

9.2.2 Horizontal Track Assembly. The horizontal track assembly, including installation hardware, shall be designed to support a dead load equal to the door weight when in the horizontal position and not deflect more than 1/240th of the door height. Deflection shall be measured after the door has been in the horizontal position for at least 24 hours. Twist, deflection, or deformation of the track shall not interfere with the operation of the door. The manufacturer shall specify the point(s) where attachment to the horizontal track shall be made for the purpose of suspending the track from the building.

9.2.3 Bottom Corner Bracket. Each bottom corner assembly, and its method of attachment to the door, shall be designed to support a dead load equal to the weight of the door, and all on-the-door hardware, multiplied by a safety factor of 2.

9.3 Torsion Spring Counterbalance Assembly. The torsion spring counterbalance assembly shall be so designed and constructed to provide for a safe and durable conversion of spring torque to lifting power for balancing the weight of a sectional door as stated in paragraphs 9.3.1-9.3.6. Torsion springs shall not be used to balance sectional doors employing an index ratio of less than 6 to 1 (mean coil diameter six times wire diameter).

$$\mathbf{IR} = \frac{\mathbf{MCD}}{\mathbf{d}}$$

IR	=	Index Ratio
MCD	=	Mean Coil Diameter
d	=	Wire Diameter

9.3.1 Torsion Shafts

9.3.1.1 Tubular steel torsion shafts shall be of a sufficient wall thickness to prevent a torsional (radial) deflection of the shaft in excess of 1.5 degrees per foot (305 mm) of shaft length from the torque source to point of delivery. Linear deflection of a torque shaft shall not exceed one tenth inch (2.5 mm) per foot (305 mm) of shaft length with proper supports in position.

9.3.1.2 Solid steel torsion shafts shall be of a diameter and composition sufficient to prevent torsional (radial) deflection of not more than 2 degrees per foot (305 mm) of shaft length from the torque source to the point of delivery. Linear deflection of the torque shaft shall not exceed one tenth inch (2.5 mm) per foot (305 mm) of shaft length with proper shaft supports in position.

FORMULAS

Formulas are used to determine the angular torsional deflection in degrees for tubular wall and solid torque shafts of any wall thickness or shaft diameter. No allowance made for torsional shear modular loss by set screw deformation of tubular shafts, or keyways milled into solid shafts.

Tubular steel shaft formula:

$$\mathbf{a} = \frac{584 \times MIP \times 12}{(D^4 - d^4) \times 11{,}500{,}000}$$

Solid steel shaft formula:

$$\mathbf{a} = \frac{584 \times MIP \times 12}{D^4 \times 11{,}500{,}000}$$

Formulas used to determine maximum inch/pound torque limits for a specified number of degrees of torsional deflection per foot of shaft length.

Tubular steel shaft formula:

$$\mathbf{MIP} = \frac{a \times (D^4 - d^4) \times 11{,}500{,}000}{584 \times 12}$$

Solid steel shaft formula:

$$\mathbf{MIP} = \frac{a \times D^4 \times 11{,}500{,}000}{584 \times 12}$$

Explanation of factors involved in formulas:

a	=	Angle in degrees deflection per foot of shaft length
MIP	=	Maximum inch/pounds torque
D^4	=	Outside shaft diameter to the 4th power
d^4	=	Inside shaft diameter to the 4th power

9.3.2 Cable drums shall be so designed to allow cable to be accumulated or dispensed in an orderly manner and to prevent lapping or cable chafing. Cable drums shall be selected with a minimum safety factor of 4, based on the maximum torque for the applied load requirements.

9.3.3 Spring Fittings

9.3.3.1 Winding device shall have a torsional safety factor of 4. The portion of the winding device interconnecting with the spring shall be of a design that properly retains a torsion spring when fully wound or unwound, and withstands the radial and lateral forces exerted by the torsion springs.

9.3.3.2 Spring retainers and stationary sleeves shall have a torsional safety factor of 4. Spring retainers, or stationary sleeves, shall be so designed to withstand the radial and lateral forces exerted by the torsion spring to properly retain the spring when fully wound or unwound and allow the application of torque.

9.3.4 Each side bearing plate shall be designed to support the weight of the counterbalance assembly, plus the total door weight, multiplied by a safety factor of 2. They shall be adequately reinforced to resist any lateral force exerted by the torsion shaft and properly retain the shaft bearing in alignment with the torsion shaft.

9.3.5 Spring anchor plates shall be so designed as to adequately transmit torque from the stationary end of a torsion spring to the building structure and, at the same time, support the weight of the torsion shaft, multiplied by a safety factor of 2, in a level attitude. The anchor plate shall be able to withstand the lateral forces exerted by torsion spring.

9.3.6 Shaft bearings shall be of a type and design that adequately support the radial forces dictated by the weight of the counterbalance assembly and door weight, lateral forces exerted by the torsion shaft, and shall be able to tolerate minor shaft misalignment conditions.

9.4 Cable Assembly. The cable assembly that transmits door load shall be selected using a safety factor of 5. Cable shall be securely anchored at each end. Cable diameters shall not be greater than 5% of the diameter of the cable drum or cable sheave with which it will be used.

10. RESPONSIBILITIES OF OTHERS

10.1 Transmitted Loads

10.1.1 The track system shall be attached to the building at the points specified by the manufacturer (Section 9.2.2) using a method capable of supporting the door loads at each point. In addition, the supports shall resist twisting and swaying loads imposed on them by the track system.

10.1.2 The installation instructions shall advise that it is important that forces transmitted from an installed door system to the building structure be considered in the design of building openings for doors. These forces are evident at the building jambs when a door is subjected to wind pressure, at each spring anchor pad and its connection to the building header, and at all points where the horizontal track is attached to the building. Since these forces will vary, installation instructions shall specify that load information may be obtained by contacting the door system manufacturer.

10.1.3 The spring system shall be installed with fasteners supplied by the manufacturer, in accordance with the manufacturer's installation instructions.

11. DISCLAIMERS

11.1 Certification that a door system meets this standard does not constitute a warranty that the system will perform in accordance with the standards set forth in this standard, including but not limited to durability, thermal transmittance/air infiltration, or loads. Certification implies only that the design of the listed door system, when tested in accordance with these standards (which may be random testing, if so specified), meets the applicable tests.

11.2 Many tests required by this standard are inherently hazardous and adequate safeguards for personnel and property must be employed in conducting such tests.

DASMA – the Door & Access Systems Manufacturers Association, International – is North America's leading trade association of manufacturers of garage doors, rolling doors, garage door operators, vehicular gate operators, and access control products. With association headquarters based in Cleveland, Ohio, our 90 member companies manufacture products sold in virtually every county in America, in every U.S. state, every Canadian province, and in more than 50 countries worldwide. DASMA members' products represent more than 95% of the U.S. market for our industry.

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