ANSI/SDI A250.4

Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors
Description

• This standard overview focuses on the content and intent of this performance standard.

• The focus is on commercial hollow metal doors, frames and their applicable hardware and how ANSI A250.4 can be used by the design professional in both the selection and specification of commercial door openings.
History

- 1980 - First adopted as and SDI Standard
  - First attempt to replicate on-site door usage in operable test environment
    • Door
    • Frame
    • Hardware
  - Provided manufacturers with uniform method of evaluation
    • Life cycle testing of components and assembly
- 1994 – Adopted as ANSI A156.4
- 1999 – Re-published and adopted as ANSI A250.4
Purpose

• Why developed
  – Provided manufacturers with uniform method of evaluation
    • Life cycle testing of components and assembly
• Methods of testing
  – Two (2) part test procedure:
    • Cycle test at designated level of cycles
    • Twist tests at designated cycle points
  – Operable test:
    • Door cycles with commercial hinges, exit device and closer
    • Replicates on site use and abuse
• How it related to proper selection and usage
  – Length of cycles tested relate to use and application
  – Provides design professional with guidance
Performance Test

Purpose of the standard:
- ANSI/SDI A250.4 establishes a performance test method for commercial hollow metal openings
- Replicates field operating conditions
  - Operable hardware
  - Door swings opens 60°± 5°
  - Cycles 15 cycles / minute
  - Twist tests at predefined intervals
Performance Test

Test Apparatus:
- Test fixture with pneumatic cylinder to cycle the door at designated rates
Performance Test

Test Apparatus:
- Test fixture with pneumatic cylinder to cycle the door at designated rates

Two part test:
- Cycle Test
- Twist Test
Performance Test

Operable Opening:
- Exit device
- Door closer
- Hinges

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American National Standard
Test Procedure and Acceptance Criteria for – Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcements

1 Purpose
The primary purpose of this procedure shall be to establish a standard method of testing the performance of a steel door mounted in a pressed steel or channel iron frame, installed with appropriate anchors, under conditions that might reasonably be considered an accelerated field operating condition.

The user of this performance standard must temper its usage with the knowledge that there are many variables that affect door performance, such as different hardware, anchors, glass and louver cutouts, field modification by parties other than the manufacturer, environmental factors, such as heat, cold, moisture, etc.

1.1 Reference documents
ANSI/BHMA A156.1-1997 Butts and Hinges
ANSI/BHMA A156.3-1994 Exit Devices
ANSI/BHMA A156.4-1992 Door Controls – Closers
ANSI/BHMA A155.7-1988 (R1997) Template hinge dimensions

2 Apparatus and equipment
The apparatus and equipment used shall be the same as when testing doors, frames, or frame anchors. The main testing structure shall be constructed as shown in figures 1 and 2. The structure shall conform to the parts shown, except the opening width and height are permitted to vary to allow the testing of various door sizes. The test frame shall be anchored in such a manner as to insure rigidity.

3 Preparation for test
The door shall be hung in the frame on the hinges. The hinges used shall conform to American National Standards ANSI/BHMA A155.7-1985.
Overview – Performance Test

Test specimen:
- Door:
  - 3070 nominal size door
  - Production doors shall be used
  - Detailed description of the construction
Overview – Performance Test

Test specimen:
- Frame:
  - Production frame
  - Detailed construction description
  - KD or Welded
- Anchors:
  - Snap-in or welded
Swing Test

- **Purpose:**
  - Full-sized operable door to simulate actual applications
  - Evaluate door panel degradation
- **Cycles:**
  - Level “A” = 1,000,000 cycles
  - Level “B” = 500,000 cycles
  - Level “C” = 250,000 cycles

Refer to ANSI A250.8 for guidance in selecting the correct cycle levels in relationship to opening use, application and abuse.
Swing Test Report

- Report filled out by technician witnessing test
- Test can be witnessed and certified by test lab

Page #7 – Door Evaluation
Page #8 – Frame Evaluation
Twist Test

• Purpose:
  – Simulate abuse
  – Evaluate door panel degradation

• Conducted at:
  – 25,000 cycle intervals for the first
  – 100,000 cycles and at 50,000 cycle
    intervals for the balance of the test.

• Load pressure:
  – Loads in 30 lb. increments
  – Max 300 lb. load applied
  – Reduce load in 30 lb. increments
Twist Test Report

Plotted curve drawn through the points shall graphically demonstrate the reaction of the door to increasing and decreasing pressures at different cycle intervals.
SDI Member Companies

- Ceco Door
- ASSA ABLOY
- CURRIES
- ASSA ABLOY
- DEANSTEEL
- Hollow Metal On Demand
- HMX
- MESKER
- MPI
- Republic Doors & Frames
- Pioneer
- Security Products
- STEELCAST
- STEEL DOOR INSTITUTE

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