TAYLOR WEAKS
HOUMA, LA
WIND LOAD CALCULATION
February 20, 2019

DOOR WIND LOAD CALCULATIONS

This structure has been designed in accordance with the requirements of the American Society of Civil Engineers MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES ASCE 7. The following wind load requirements were employed in the design of the structure:

- Wind Load Requirements employed in the Design of the Structure
  - Ultimate Wind Speed: V_{ULT} = 152 MPH
  - Wind Bourne Debris: YES
  - Basic Wind Speed: V_{ASD} = 118 MPH
  - Building Category II, Enclosed
  - Wind Exposure B

Door wind load calculations based on individual structural panels secured at top and bottom with rollers and pins with the door in the closed position whenever high winds are expected. Door wind load calculations meet ASCE 7 "Minimum Design Loads for Buildings and Other Structures" for building mean roof height under 20 ft.

Calculations are limited to FOLDTITE SYSTEMS, INC., FOLD-TITE STACKER System Door Series CSA-5.0 Plus designed for:

Taylor Weaks: 48 ft 0 in X 13 ft 0 in
Fold-Tite Drawing # WEA_FT4713Q
See Attached

To be installed:
200 Aviation Rd.
Houma, LA 70363

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State of Florida PE # 22150

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WIND LOAD PRESSURE

Ultimate Wind Speed V_{ULT} = 152 MPH

Velocity pressure exposure coefficient exposure B (ASCE 7 Table 6-5)

K_Z = 0.70

Topographic factor (ASCE 7 Eq. 6-1, Figure 6-2, no hill or escarpment)

K_{ZT} = 1.0

Importance Factor I = .77

Velocity pressure (ASCE 7 Eq. 6-13)

$$Q_Z = 0.00256 \bullet K_Z \bullet K_{ZT} \bullet V^2 \bullet I$$

$$Q_Z = 32.9 \text{ lb} \bullet \text{ft/ft}^2$$

External pressure coefficient (ASCE 7 Figure 6-5A)

Positive: 0.7, Negative: -0.8 G_{CP} = -0.8

Internal pressure coefficient enclosed (ASCE 7 Table 6-7)

Positive: 0.18, Negative: -0.18 GC_{PI} = 0.18

DESIGN WIND PRESSURE (MAX.)

Components and cladding, mean building height under 60 ft

$$P = -Q_Z \bullet (GC_P - GC_{PI})$$

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$P = 32.2\ lb \bullet ft/ft^2$

ASD WIND LOAD FACTOR

$P_{ASD} = 0.6 \bullet P$

$P_{ASD} = 19.32\ lb \bullet ft/ft^2$

CRITICAL STRUCTURAL CONDITION

The critical structural condition for the door is the bending of the vertical members on the sides of the individual door panels. The critical panels are the center panels.

Panel Clear Span Height

$H = 12\ ft\ 10.5\ in$

$H = 154.5\ in$

Panel Width

$W = 4\ ft\ 9.16\ in$

$W = 57.16\ in$

Load on Vertical Edge Members

$L = P_{ASD} \bullet W/2$

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$L = 76.69\ lb \bullet ft/ft$

$L = 6.39\ lb \bullet ft/in$

Moment on Vertical Edge Member

$M_{MAX} = L \bullet H \bullet H/8$

$M_{MAX} = 11{,}440\ lb \bullet in$

Edge Member Properties

The edge member is an aluminum extrusion from KEYMARK CORPORATION, die number T-27743, Aluminum Alloy 6063 T-5 for FOLDTITE SYSTEMS #CSA-5.0 VERTICAL. The member has the following properties according to the KEYMARK CORPORATION. (See Attached)

$I_X = 3.460\ in^4$

$I_Y = 0.318\ in^4$

$S_X = 1.375\ in^3$

$S_Y = 0.213\ in^3$

Aluminum Properties Alloy 6063 T-5

$F_{YALLOWABLE} = 12{,}000\ lb / in^2$

Moment Allowable

$M_{ALLOWABLE} = S_X \bullet F_Y$

$M_{ALLOWABLE} = 16{,}500\ lb \bullet in$

THEREFORE, THE MEMBER IS ADEQUATE

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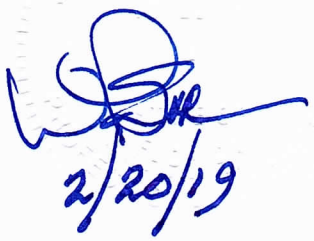

HANGER BOLTS AND LOCK PINS

Loading on Hangers

Door Width (DW)

DW = 48 ft 3.09 in

Door Height (DH)

DH = 13 ft 0.51 in

Hanger Spacing (HS)

HS = 9 ft 6.32 in

Lock Pin Spacing (LPS)

LPS = 9 ft 6.32 in

Drop Pin Spacing (DPS)

DPS = 4 ft 9.16 in

Number of Pins = 10

Door Weight (DW)

DW = 1.99 lb/in

Wind Loading (P)

$P = 32.2\ lb \cdot ft/ft^2$

Dead Load / Hanger (DLH)

DLH = 246.5 lb • ft

Wind Load at Verticals (WLV)

WLV = 1994 lb • ft

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HANGER BOLTS, LOCK PINS LOADING & SIZE

Load capacity of threaded hanger rods/bolts, based on an allowable bolt stress (ABS) of 60,000 lb • ft/in^2 Grade 5

Bolt Length = 7.00 in, Bolt Diameter = ½ in

Bolt Area = 0.13 in^2, Max Allowable Load = 7800 lb • ft

Bolt Stresses for Applied Loads

Axial Tension Stress (ATS) = DLH/BA

ATS = 1896 lb/in^2

Shear Stress (SS) = WLV/BA

SS = 15,338 lb/in^2

Combined Stress

CS = ATS/ABS + SS/ABS ≤1.0

CS = .286

THEREFORE, THE HANGER BOLTS ARE ADEQUATE

LOCK PINS

Load capacity of drop lock pins, based on an allowable pin stress (APS) of 60,000 lb • ft/in^2

Pin Diameter = ½ in

Pin = 0.196 in^2

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