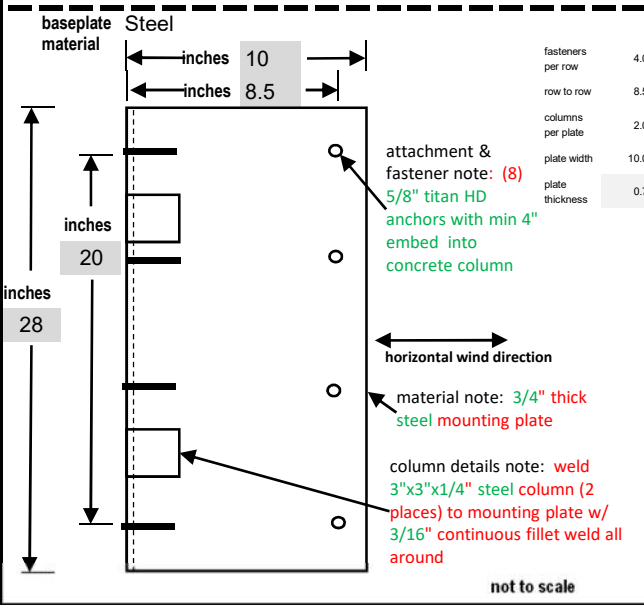
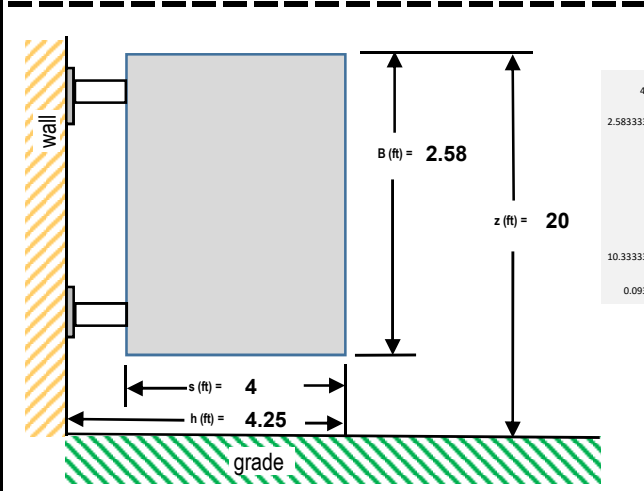


2 column, rectangular, standard



INTERNATIONAL BUILDING CODE 2015

ASCE 7-10

Environmental Conditions

115 Vult (mph), 3 second gust at 33 ft elevation per ASCE , Figure 26.5

II Risk Category; II= Normal; III= Substantial Hazard; IV= Essential/Critical

C Wind Exposure; C, House size obstructions for > 600 ft; D, no obstructions > 5000 ft

at corner Sign proximity to corner or on awning $K_{zt} = 4.0$

Sign Particulars

A	sign segment	OAH
4.25	outermost extension h (ft) from attachment	4.3
2.58	segment height B (ft) (or width if ceiling or horizontal mounted)	2.6
4.00	segment width s (ft) (or height if ceiling or horizontal mounted)	4
20.00	elevation z of sign (ft)	
2	number of attachment columns (usually 1 column per mounting plate)	

Calculated values

10.33 = sign area as ft^2 plus 0.094 = column area as ft^2 giving totals = 10.43 ft^2

0.90 = K_z , velocity pressure exposure coefficient

1.60 = C_f , force coefficient, orientation Case A & B, clearance ratio per ASCE Figure 29.3-1

103.8 = q_z (psf), velocity pressure at elevation z, using V_{ult}

141.2 = P_{ult} (psf), factored wind pressure, using V_{ult}

883 = F (lb force), wind shear force (ASD) on sign and column area

1,987 = M (lb ft), moment at wall (ASD), total

994 = M (lb ft) moment at wall (ASD), per column

2,806 = tension load at fasteners (lb force) per fastener row, each mounting plate

701.5 = tension load (lbf) per fastener (per mounting plate detail of fasteners per row)

0.43 = section modulus (in^3) required per column per calculated moment at wall

1.85 = section modulus (in^3) provided by tube dimensions **ACCEPTABLE**

0.259 = required minimum mounting plate thickness (in) **ACCEPTABLE**

Constants & Formulas: $K_d = 0.85$, wind directionality factor (attached sign) per ASCE Table 26.6-1; $G = 0.85$, gust factor (rigid structure), per ASCE, Section 26.11.1; $C_{pi} = n/a$, internal pressure coefficient; K_z velocity pressure exposure coefficient = $2.01 \cdot (z(15 \text{ ft minimum})/Z_g)^{2/\alpha}$, Z_g and α from ASCE Table 26.11-1; K_{zt} topographic factor based on proximity to corner; within $h/2$ of corner = corner = 4; within $h/5$ of corner = near corner = 2.5; otherwise midwall = 1.5, or on canopy = 2.0; $q_z, ult = 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^3_{ult}$; $P_{ult} = q_z, ult \cdot G \cdot C_f$; $P_{asd} = P_{ult} \cdot 0.6$; $F_{seg} = P_{asd} \cdot s \cdot B$; $M = \sum(F_{seg})$ * distance from wall to centroid location; Risk Category II windspeeds from ASCE Figure 26.5-1B, MRI = 700 years; Risk Category III windspeeds from ASCE Figure 26.5-1C, MRI = 1700 years; Section modulus required = moment per column / ((material ksi) / 0.6 safety factor).

Aspect ratio = $B/s = 0.646$ Clearance ratio = $s/h = 0.941$ $Z_g = 900$ α factor = 9.5

Material ksi (welded) = 46 (unwelded) = 46

Column tube (pipe) size = 3" x 3" x 1/4" column width // to wind (in) = 3

column width \perp to wind (in) = 3 column thickness (in) = 0.25

UNO valid for one sign at this location.

- Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
- Wall material specifications for attachment only (building design and structure is by others):
 - CMU shall be 8" ASTM C90 with fasteners in 1.25" face shell
 - Wood framing shall be 2x4 SPF, 0.42 s. g. w/ fasteners in mid 1/2" of 1.5" edge.
 - Cold Formed steel framing shall be 0.033", 36 ksi with fasteners in flange.
 - Wood Structural Sheathing shall be 7/16" OSB or plywood.
 - Concrete shall be 3000 psi min compressive strength.
- Contractor shall verify all wall materials and construction, dimensions, and conditions in the field before erection, and notify the engineer of any discrepancies.
- Fasteners (all allowable loads are per allowable stress design):
 - $\geq 3/8"$ A307 STEEL THROUGH BOLTS (CMU, concrete, frame) (as specified in detail)
 - For solid walls, install w/ nut and 3x3x1/4" washer on back of wall
 - For frame walls, install with 2x6 syp #2, 2x2 angle, or 1.5" unistrut continuous blocking on back of wall (continuous blocking must extend past the end of the sign to the next framing member)
 - Allowable tension load = 500 lb.

By using this engineering the owner, manufacturer, and installer accept responsibility to: •Design, build, and install sign faces, cabinets, raceways, attachment brackets, and electrical, etc. according to sign code, building code, zoning, and UL, •Verify that site conditions match stated wind speed, risk, exposure, and topo factors, and •Select approved attachment detail, conforming to this generic attachment engineering, by verifying existing wall, which is not the responsibility of this engineer. In fact, materials and construction of existing walls is not known at the time of this seal; for this reason various attachment options for various wall construction types are specified.

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MIPE-6201060322



26 November 2024

This seal for structural engineering
(Attachment ONLY)

SCOPE OF WORK: Establishes minimum structural requirements for attachment of generic signs to wall based on stated (not verified) wind & gravity loads and size & shape, based on sign installer's drawing, attached.

NOTE: THIS SIGN IS ADDING LOAD TO THE EXISTING BUILDING. IT IS THE RESPONSIBILITY OF THE SIGN INSTALLER TO HAVE THE BUILDING DESIGNER VERIFY THAT THE BUILDING CAN SUPPORT THE ADDITIONAL SIGN LOADS, BOTH WEIGHT AND WIND.

Piquette Flats

411 Piquette
Detroit, MI

METRO SIGNS &
LIGHTING

JOB # 24168

BLADE SIGN
2 Columns, attached to wall