Gemini

WIND LOAD CALCULATIONS - FAB SSTL LETTERS

Fabricated Stainless Steel 60" Letter - Stud Mounted

The following calculations were conducted in October 2014.

Calculations are for construction of a Fabricated Stainless Steel letter, 60" high, using a continuous solder joint with Harris Stay-Brite 325 (lead-free silver solder), 95%Sn, 5%Ag, with a shear strength of 10,600 psi.

Wind Force $F = A \times c \times V \times V \times N$ where:

A = Area Square Feet

C = constant (.00256)

V = Velocity in MPH

N = 2.0 for a flat plate

Therefore, for a typical 60 inch letter, the projected area will be 12.2 square feet.

$F = 12.2 \times .00256 \times 90 \times 90 \times 2.0 = 505$ lbf.

The point of failure is known to be the silver solder joint, between the back braces and sides of the letters. Normally, there are a minimum of 4 to 6 of these braces with a weld length of 2 inches per side, and a filet of .032 inches.

Therefore, the solder area is calculated as:

$A = 2 \times 4 \times 2 \times .032 = .512$ square inches, at worst case.

With a shear strength of 10,600 psi, the calculated solder strength will be:

$P = 10,600 \times .512 = 5,427$ lbf.

The safety factor in this case will be $SF = 5,427 / 505 = 10.75$

With a desired safety factor of 3 to 5, and an actual factor of 10.75, the structure should be satisfactory, as constructed.

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