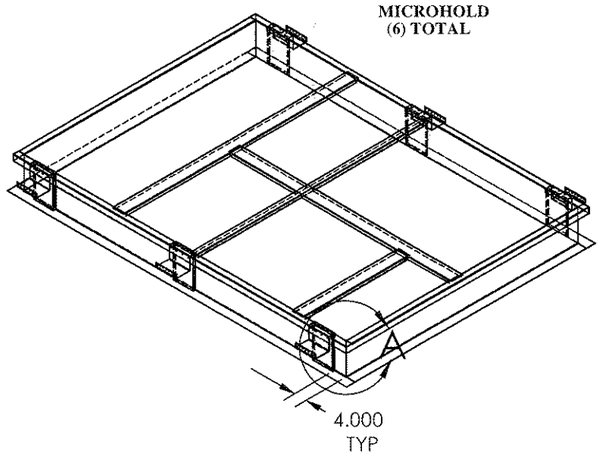
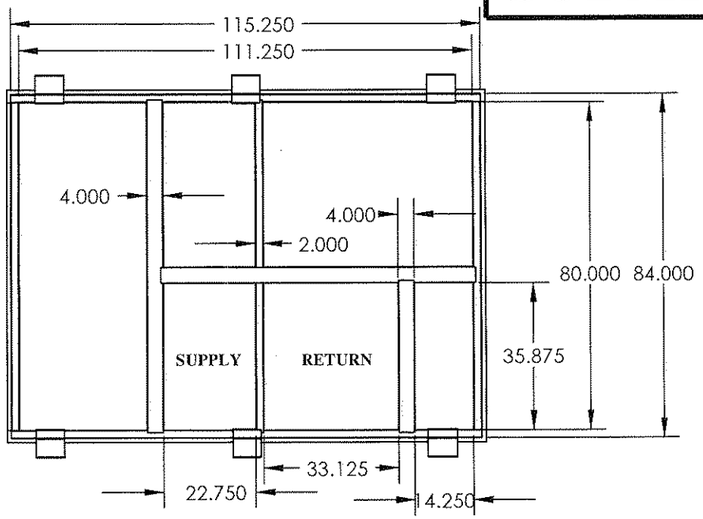
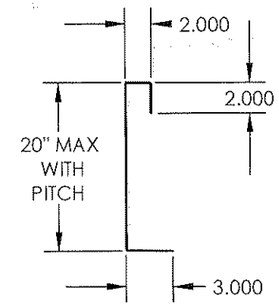
# SUBMITTAL

## W562 SERIES

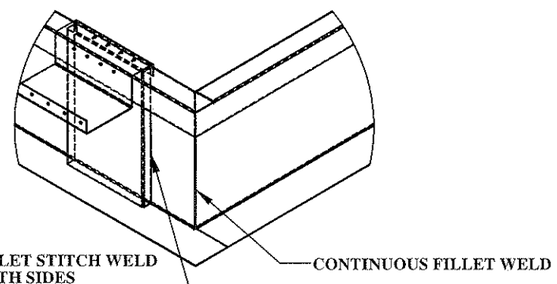


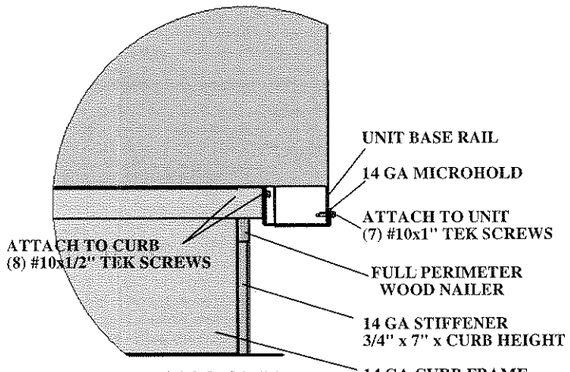

* WELDED CONSTRUCTION
* PERIMETER WOOD NAILER
* GASKET PACKAGE
* FACTORY INSTALLED HOLDDOWNS




CURB
DETAIL




DETAIL A
SCALE 1 : 8




HOLDDOWN
DETAIL

REGISTERED PROFESSIONAL ENGINEER
CLIFFORD H. JOHNSON
No. 2602
Exp. 6-30-09
STRUCTURAL
STATE OF CALIFORNIA
8/23/07

**MicroMetl Corporation**

*Sparks, NV. (800) 884-4662*
*Indianapolis, IN. (800) 662-4822*
*Longview, TX. (903) 248-4800*

*PRODUCT NUMBER:*
*W562 SERIES*
*WELDED CURBS*

*W562-C008-01CBC 8" TALL*
*W562-C011-01CBC 11" TALL*
*W562-C014-01CBC 14" TALL*

**STRUCTURALLY CALCULATED WELDED CURB FOR YORK DCE, DCG, DM, DH, BP, BCH, DEG, DEE 180 UNITS**

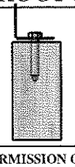
*ANCHORAGE DETAILS TO ROOF:*

*STEEL ATTACHMENT:*

SEE STEEL ATTACHMENT DETAIL SHEETS.

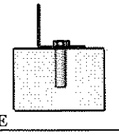
*WOOD ATTACHMENT:*
*(DOUGLAS FIR)*

(88) 1/4 x 3" SIMPSON SDS W/WASHER CENTER ON CURB FLANGE, EVENLY SPACED, (23) EACH LONG SIDE, (21) EACH SHORT SIDE



*CONCRETE ATTACHMENT:*
*(3000 PSI MINIMUM, 4" MIN THICKNESS)*
*(6" MIN EDGE DISTANCE)*

(26) 1/2"SIMPSON TITEN HD EVENLY SPACED,CENTER ON CURB FLANGE
8" MIN SPACING
(7) EACH LONG SIDE, (6) EACH SHORT SIDE



DATE: 07/2007
DRAWN BY: MAC
WEIGHT: 240/276/300
MEETS SEISMIC REQUIREMENTS FOR FOLLOWING CODES:
2001 CBC
2006 IBC



ENG007

BJG ARCHITECTURE + ENGINEERING

# Structural Calculations
# BJG# 20070133

Project:

## W562

Prepared for:

## MicroMetl Corporation
905 Southern Way
Sparks, NV 89431

Date:

August 2007


8/25/07

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| | |
|---|---|
| Job#: | 20070133 |
| By: | TRH |
| Date: | 8/21/2007 |
| Page: | 1 |

**Curb Information** **Product Number 0562**

| | | |
|---|---|---|
| $h_{CURB}$ = | 20 | in - Overall height from support substrate to top of curb |
| $L_{CURB}$ = | 111.25 | in - Longitudinal distance from center-to-center of transverse curb members |
| $W_{CURB}$ = | 80 | in - Transverse distance from center-to-center of longitudinal curb members |

**Unit Information**

| | | |
|---|---|---|
| Wp = | 3085 | lbs - Max. unit weight |
| $Wc_{MAX}$ = | 794 | lbs - Max. corner weight |
| $Wc_{MIN}$ = | 509 | lbs - Min. corner weight |
| $h_{UNIT}$ = | 52.625 | in - Overall unit height above curb |
| $h_{CM}$ = | 35.08 | in - Height above curb to center of mass |
| $L_{UNIT}$ = | 136.25 | in - Overall unit length (longitudinal direction) |
| $W_{UNIT}$ = | 92 | in - Overall unit length (transverse direction) |

**Seismic Loading - 2006 International Building Code (2006 IBC)**

$Fp_{MAX} = 1.6 * S_{DS} * Ip * Wp$

| | | |
|---|---|---|
| Ss = | 2 | (2 is worst case in NV, OR, WA, AZ) |
| Fa = | 1 | (1.0 at worst case Site D, Ss ≥ 1.25) |
| Sms = | 2 | = FaSs |
| $S_{DS}$ = | 1.33 | = 2/3 Sms |
| Ip = | 1.5 | (1.5 at worst case Occupancy) |
| $Fp_{MAX}$ = | 3.20 | Wp |
| $Fp_{MAX}$ = | 2.29 | Wp (ASD) |
| $Fp_{MAX}$ = | 7051 | lb (ASD) - ASD values will be used throughout unless noted otherwise |

**Seismic Loading - 2001 California Building Code (2001 CBC)**

$Fp_{MAX} = 4 * Ca * Ip * Wp$

| | | |
|---|---|---|
| Ca = | 0.44 | (.44 at worst case at Zone 4, Soil Type Sd) |
| Na = | 1.5 | (1.5 at worst case Seismic Source Type A <= 2km) |
| Ip = | 1.5 | (1.5 at worst case Occupancy) |
| $Fp_{MAX}$ = | 3.96 | Wp |
| $Fp_{MAX}$ = | 2.83 | Wp (ASD) |
| $Fp_{MAX}$ = | 8726 | lb (ASD) - ASD values will be used throughout unless noted otherwise |

**Controlling Seismic Loads**

| | | |
|---|---|---|
| $Fp_{MAX}$ = | 2.83 | Wp (ASD) |
| $Fp_{MAX}$ = | 8726 | lb (ASD) - ASD values will be used throughout unless noted otherwise |

**Wind Loading Check**

Max. Projected Area ($A_{MAX}$) = $h_{UNIT}$ * MAX( $L_{UNIT}$ or $W_{UNIT}$)

| | | |
|---|---|---|
| $A_{MAX}$ = | 7170 | $in^2$ |
| = | 49.8 | $ft^2$ |

Equivalent wind pressure required to equal seisimic loading ($P_{EQ}$) = $Fp_{MAX}$ / $A_{MAX}$

$P_{EQ}$ = 142 psf (ASD) OKAY BY INSPECTION: P > 60 PSF

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$V_{each\ side}$ = 2/3 * $Fp_{MAX}$ (ASD)

$V_{MAX}$ = 5817 lb per side

**Transverse Loading**

Max ↓ = 2 $W_{C\ MAX}$ + Fp max * (hcm + hcurb) / Wcurb

Max ↓ = 7596 lb per side

Max ↑ = Fp max * (hcm + hcurb) / Wcurb - 2 * $Wc_{MIN}$

Max ↑ = 4990 lb - Uplift per side

**Longitudinal Loading**

Max ↓ = 2 $W_{C\ MAX}$ + Fp max * (hcm + hcurb) / Lcurb

Max ↓ = 5909 lb per end

Max ↑ = Fp max * (hcm + hcurb) / (Lcurb - 15") - 2 * $Wc_{MIN}$

Max ↑ = 3976 lb - Uplift per end

**Frame Assembly Stiffeners**

**Use 14 gage stiffener material**

Conditions and formulas per AISI Cold-Formed Steel Specification (2001)

| | | | | | |
|---|---|---|---|---|---|
| t = | 0.075 | in | $F_e = \pi^2E/(KL/r)^2$ | | |
| Fy = | 33 | ksi | $F_e$ = | 80.62 ksi | (Eq. C4.1-1) |
| Length = | 7 | in | $\lambda_c = \sqrt{(F_y/F_e)}$ | | |
| Width = | 0.75 | in | $\lambda_c$ = | 0.64 | (Eq. C4-4) |
| Height = | 20 | in | $F_n$ = | 19.32 ksi | (Eq. C4-2,3) |
| $\Omega_C$ = | 1.8 | | $P_n = A_eF_n$ | | |
| A = | 0.62 | $in^2$ | $P_n$ = | 12.05 kips | (Eq. C4-1) |
| $r_1$ = | 0.34 | in | $P_n/\Omega_c$ = | 6.69 kips | |
| $r_2$ = | 2.32 | in | $P_U = R_{MAX} / 2$ | | |
| $kl/r_{min}$ = | 59.6 | | $P_U$ = | 3798.16 lbs | |
| E = | 29000 | ksi | $P_U$ = | 3.80 kips | **STIFFENER OKAY** |

**Connections**

Use Self-drilling, Self Tapping Steel Screws typical & use A307 bolts

Use fastener type #10 in No. 16 gage materials minimum at hold-down to unit and curb.

Allowable Shear = 403 lb per each

Use 1/4" diam. bolts in No. 16 gage materials minimum at corner connectors.

Allowable Shear = 654 lb per each

Allowable Tension = 1176 lb per each

**Hold-down Connectors**

Resultant Force from Vmax and Max ↑ = 7665 = $((Vmax)^2 + (Max\ ↑)^2)^{1/2}$

Total Screws required at connectors = 7 =Resultant/ 3 connectors per side / allowable Shear

## Anchorage to Supporting Structure

Shear to each long side = **5817** lbs
Shear to each short side = **5817** lbs

### Transverse Loading

Max ↑ = Fp max * (hcm + hcurb) / Wcurb - 2 * $Wc_{MIN}$

Max ↑ = 4990 lb - Uplift per side

### Longitudinal Loading

Max ↑ = Fp max * (hcm + hcurb) / (Lcurb - 9") - 2 * $Wc_{MIN}$

Max ↑ = 3683 lb - Uplift per end

### Anchorage to Concrete Pad

*4 in. thick conrete pad - min. embedment of 3 in., min. spacing of 8 in. and min. edge distance of 6 in.*

w/ 1/2" Simpson Titen HD, allow = **1605** lbs in **shear**
w/ 1/2" Simpson Titen HD, allow = **1155** lbs in **tension**

Try **7** Titen HD's per long side at a minimum
Try **6** Titen HD's per short side

(Actual Shear / Allowable Shear)^(5/3) + (Actual Tension / Allowable Tension)^(5/3) ≤1.0

Elliptical Interaction Equation = **0.781** at the long sides **OK, less than 1.0**
Elliptical Interaction Equation = **0.780** at the short sides **OK, less than 1.0**

## Anchorage to Wood sub-Structure

With Simpson 1/4 x 3" SDS screws...

Allow Shear = **470** lb per simpson catalog
Allow Tension = **550** lb assuming 2" penetration per NDS Table 11.2B (#14 wood screw)

**10** screws required for uplift long side
**8** screws required for uplift short side

**13** screws required for shear both sides

**23** **total screws required long side** **5.00** inches maximum spacing
**21** **total screws required short side** **4.0** inches maximum spacing

## Anchorage to Steel sub-Structure

The steel sub-structure will have wood blocking in place between flutes of metal deck, therefore the required number of SDS screws will be the same as for the wood sub-structure.