Structural Engineers

RMJ

Robinson Meier Juilly & Associates Principals Peter Robinson, S.E. Jayson E. Haines, S.E.



Structural Calculations Seismic Anchorage

Prepared for:

Eaton January 16, 2014 RMJ Job No. 14107



241 Joaquin Ave. San Leandro, CA 94577 (510) 991-0977

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Paramount/ S Series Unit

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Eaton Paramount/ S Series Unit Anchorage Nationwide RMJ Job# 14107

Project Description:

This project involves providing server anchorage support for units located throughout the United States. Calculations have been assembled according to two distinct seismic regions low & moderate, and high. A map has been created based on Figures 3.3-1 & 3.3-2 of ASCE 7-10 to define the two different seismic regions. Please note our seismic map shows three distinct regions low, moderate, and high, but for simplicity of our calculations low and moderate were combined into one region. The map also shows a solid line near the New Madrid Fault where the value of S_s exceeds 2.75. In this area of extreme seismic potential, all anchorage is site specific. The other seismic regions have been determined according to the table included below;

| | Seism | ic Design Data | |
|--------------------------|---|---|---|
| Seismic design region | Short period spectral response acceleration S_s | Short-period site coefficient F _a | Design spectral response acceleration at short periods S_{DS} |
| Low | 0.4 | 1.5 | 0.4 |
| Moderate | 1.5 | 1.0 | 1.0 |
| High | 2.75 | 1.0 | 2.0 |

4.5" Concrete Slab

For allowable load refer to flow charts. Simpson Strong Bolt 2 expansion anchor bolts shall be used to anchor the Eaton equipment. Specific equipment model numbers are listed on next page. The design approach is conservative by considering that half of the bolts resist shear forces and the other half resist tension forces due to uplift. Calculations are based on the assumptions that anchors are not located within any boundary edges, 4.5" thick concrete minimum thickness, 2.75" minimum embedment, and 3000 psi concrete strength.

Concrete fill over Metal Deck

Units not located on ground level but below 50% of the buildings height has an assumed weight varies of Low and Moderate Seismic Regions and varies in High Seismic Regions. (see flow charts). Units to be raised a maximum height of 24" according to ICC report ESR-3037 the $\frac{1}{2}$ " dia. Strong Bolt 2 with an embedded 2.75" requires a minimum concrete thickness of 4.5". We have included a hand calculation for the reported value.

Results

Please see the table below for a quick review of our results.

| Bolt Alignment | Max Tension (lbf.) | Max Shear (lbf.) | % Capacity | |
|----------------|--------------------|--------------------|------------|--|
| Ground Level | 1,150 (937 actual) | 1,250 (585 Actual) | 99 | |
| 50% Bld. Ht. | 1,051 | 949 | 99 | |

Our results show that units on the ground level the Simpson Strong Bolt 2 ($\frac{1}{2}$ " Dia. with a 2.75" embedment) resists a max tension force of 1,150#, and max shear force of 1,250#. Anchorage for units located on the upper floor using the Simpson Strong Bolt 2 ($\frac{1}{2}$ " Dia. with a 1³/₄" embedment) resists a max tension force of 1,051#, and max shear force of 949#. I have included the Simpson output files along with my hand calculations in the appendix section of this calculation packet. Site specific engineering is required where S_S is greater than 2.75. Design is in accordance with the 2012 International Building Code.

Principals Peter Robinson, S.E.

Jayson E. Haines, S.E.

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Eaton –Paramount/ S Series Units Scope, Assumptions, and Limitations RMJ Job #14107 January 17, 2014

- > Special Inspection shall be provided for expansion bolt installation.
- Existing concrete shall have a minimum compressive strength of 3,000 psi.
- ▶ Importance factor is assumed to be 1.5.
- Raised Units not to exceed 24".
- ➢ Soil class is assumed to be D.
- > Calculations and anchorage are done in accordance with the 2012 IBC, 2013 CBC and ASCE7-10.
- Maximum S_s value is 2.75. Where value of S_s exceeds 2.75, site specific calculations are required for all anchorages. S_s values can exceed 2.75 near the New Madrid faults.
- > The minimum slab on grade thickness is assumed to be 4".
- > The minimum concrete fill over metal deck thickness is $2\frac{1}{2}$ " (with $1\frac{1}{2}$ " metal deck).
- Maximum weight of enclosure and contents has been listed in the below:

| | High | h Seismic | Low and Moderate Seismic | | |
|---|-------------------|-------------------------|--------------------------|-------------------------|--|
| | Ground Level | \geq 50% of Bldg. Ht. | Ground Level | \geq 50% of Bldg. Ht. | |
| Max Wt. of Enclosure and Contents (lb) | SEE FLOW CHART | SEE FLOW CHART | SEE FLOW CHART | SEE FLOW CHART | |

- > Enclosure is assumed to stay rigid during seismic loading (design by others).
- > Computer access floor shall have strength to support compression and lateral loads.
- Floor slab and concrete filled metal deck shall have strength to resist uplift caused by overturning moment of cabinets.
- Any installation located in a high seismic region above the upper half of the building is not considered the upper half of the building.
- Ganged Units based on a <u>Minimum of 3 Units</u>.
- > Calculations are for Eaton Paramount/ S Series units.

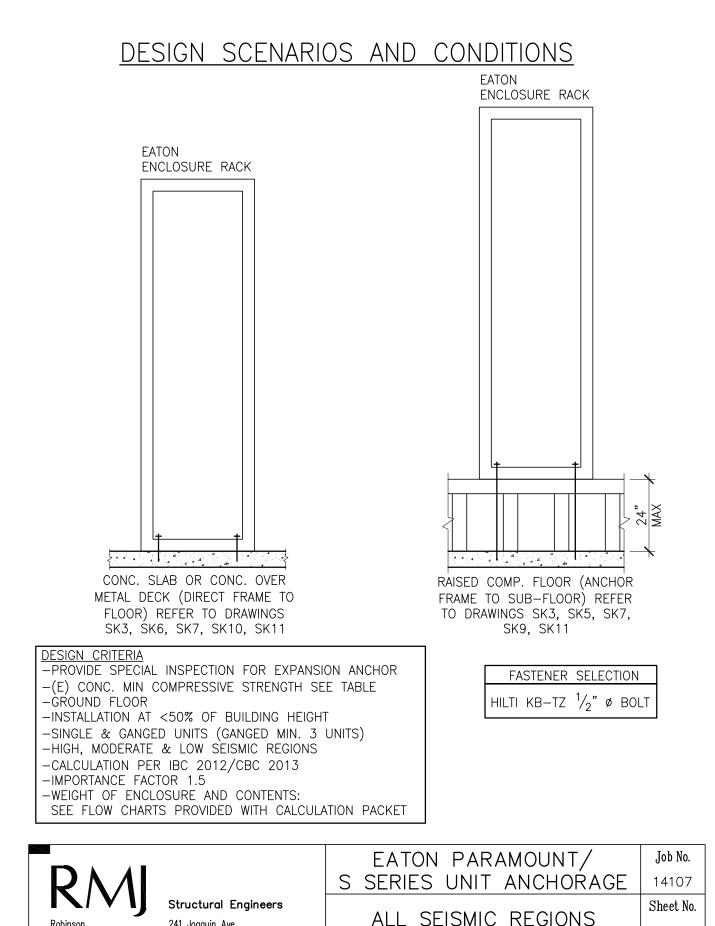
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| | Paramount | Paramo | unt H-Frame |
|-------------|-------------------|--------------|----------------|
| Item Number | Product Name | Item Number | Product Name |
| JW772434 | •40Ux24"Wx34.5" | PMTFRM422440 | •42Ux24"Wx40"D |
| JW772440 | •40Ux24"Wx40"D | PMTFRM422445 | •42Ux24"Wx45"D |
| JW772445 | •40U, 24W, 45D | PMTFRM423040 | •42Ux30"Wx40"D |
| JW773034 | •40Ux30"Wx34.5"D | PMTFRM423045 | •42Ux30"Wx45"D |
| JW773040 | •40Ux30"Wx40"D | PMTFRM442434 | •44Ux24"Wx34"D |
| JW773045 | •40U, 30W, 45D | PMTFRM442440 | •44Ux24"Wx40"D |
| JW842434 | •84"Hx24"Wx34.5"D | PMTFRM442445 | •44Ux24"Wx45"D |
| JW842440 | •84"Hx24"Wx40"D | PMTFRM442834 | •44U28"Wx34"D |
| JW842445 | •44U, 24W, 45D | PMTFRM442840 | •44Ux28"Wx40"D |
| JW843032 | •84"Hx30"Wx31.5"D | PMTFRM443040 | •44Ux30"Wx40"D |
| JW843034 | •84"Hx30"Wx34.5"D | PMTFRM443045 | •44Ux30"Wx45"D |
| JW843040 | •84"Hx30"Wx40"D | PMTFRM443645 | •44Ux36"Wx45"D |
| JW843045 | •44U, 30W, 45D | PMTFRM482440 | •48Ux24"Wx40"D |
| JW962434 | •96"Hx24"Wx34.5"D | PMTFRM482445 | •48Ux24"Wx45"D |
| JW962440 | •96"Hx24"Wx40"D | PMTFRM483040 | •48Ux30"Wx40"D |
| JW962445 | •51U, 24W, 45D | PMTFRM483045 | •48Ux30"Wx45"D |
| JW963034 | •96"Hx30"Wx34.5"D | PMTFRM512440 | •51Ux24"Wx40"D |
| JW963040 | •96"Hx30"Wx40"D | PMTFRM512445 | •51Ux24"W45"D |
| JW963045 | •51U, 30W, 45D | PMTFRM513040 | •51Ux30"Wx40"D |
| | | PMTFRM513045 | •51Ux30"Wx45"D |

> Calculations are for Eaton Paramount units.

Responsibility of the Structural Engineer of Record

- > Verify that the concrete meets the requirements of the applicable ICC ESR.
- > Verify that the anchors are at an adequate distance from any slab opening or edges.
- Verify the adequacy of the structure to support the weight and forces shown in this pre-approval in addition to all other weights and forces that are imposed on it.
- > Provide any supplementary structure required for strength and stability.
- Verify that the installation is in conformance with the 2010 CBC and with the notes and details shown in this pre-approval. Verify that the equipment's actual weight, cg location, anchor locations, anchor details and the material and gage of the unit where attachments are made conform with the information shown in this pre-approval.



Signed by MAS

241 Joaquin Ave.

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San Leandro, CA 94577

Robinson Meier

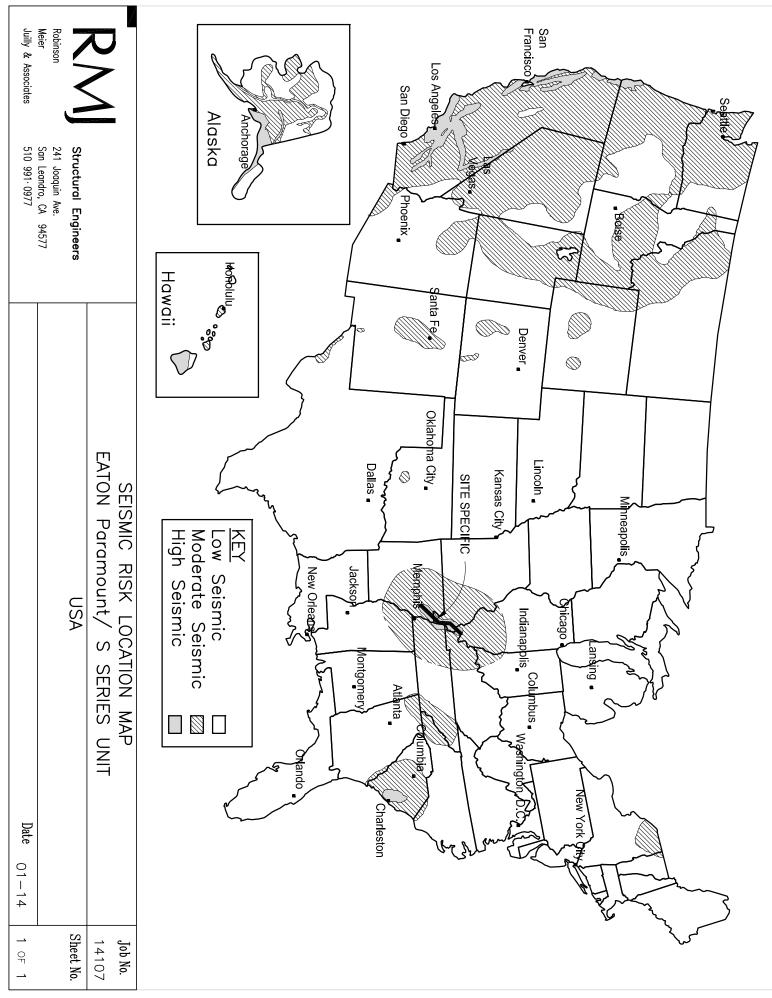
Juilly & Associates

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(SK2)

01/2014

Date



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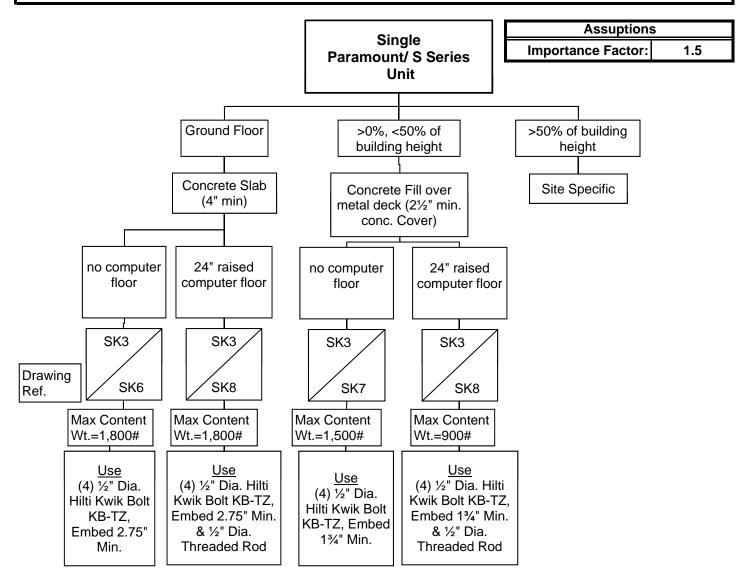
Low & Moderate Seismic

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By: MAS

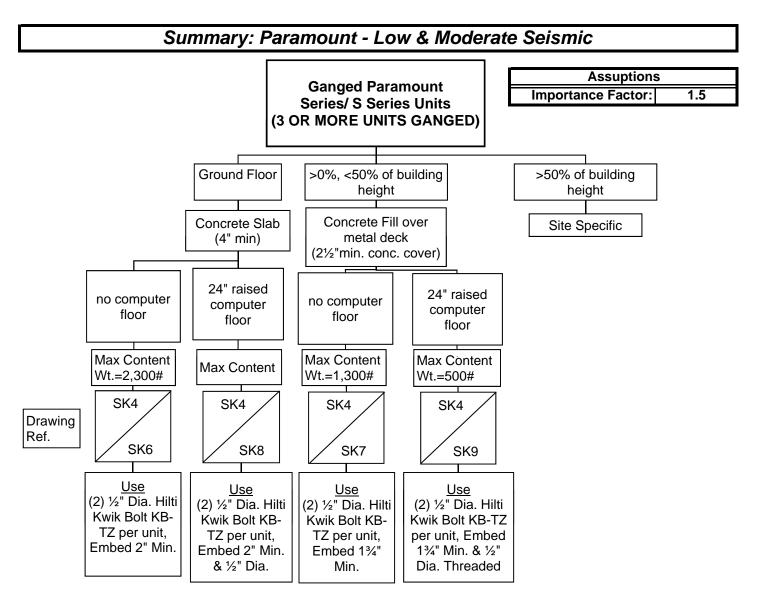
Date: 01/16/14 Page: 8

Summary: Paramount - Low & Moderate Seismic



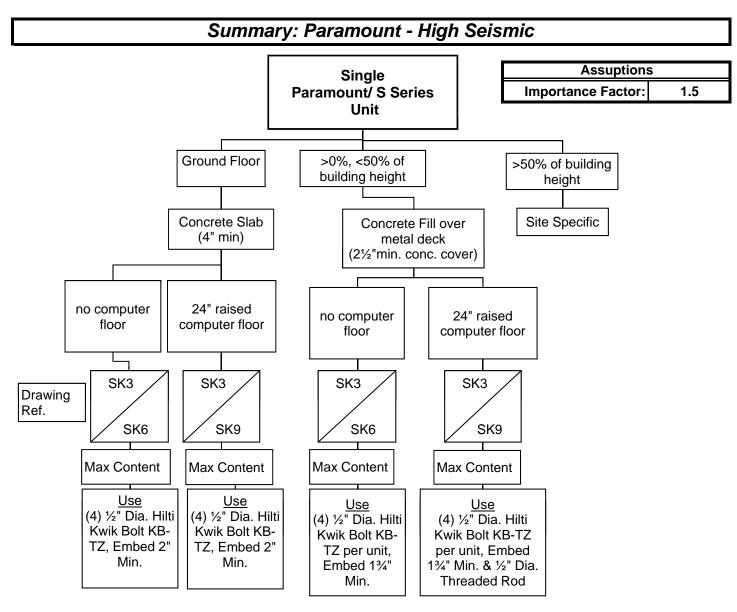
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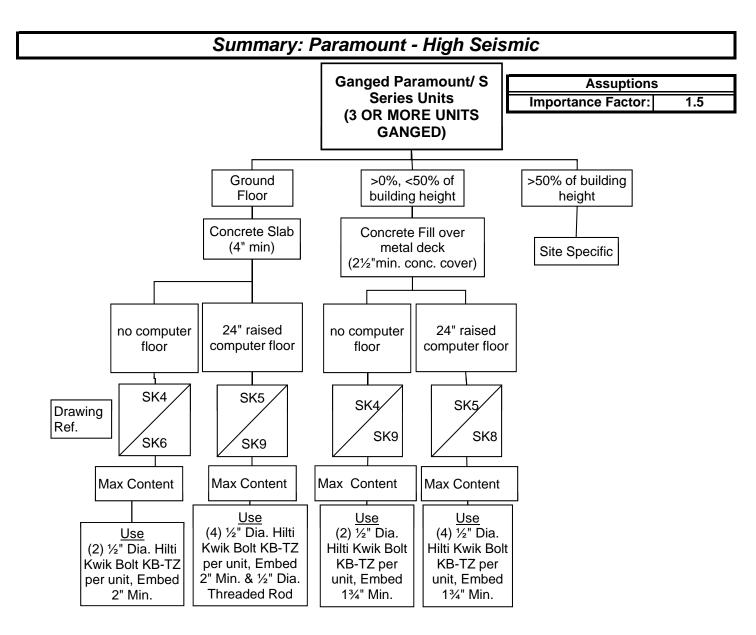
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Low & Moderate Seismic Calculations

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Find the Seismic Design Category (SDC)

Unit : Paramount/S Series

Project Location: Latitude: Va

Varies

Low & Moderate Seismic Longitude: Varies

Soil Classification: D Occupancy Category: II Table 1613.5.2 & Section 1613.5.2 Table 1604.5

Information from U.S. Geological Survey Website http://earthquake.usgs.gov/research/hazmaps/

| S _S = | 1.500 | g | |
|-------------------|-------|---|-------------------|
| S ₁ = | 1.070 | g | |
| $F_a =$ | 1.000 | | Table 1613.5.3(1) |
| $F_v =$ | 1.500 | | Table 1613.5.3(2) |
| S _{MS} = | 1.50 | g | (Equation 16-37) |
| S _{M1} = | 1.61 | g | (Equation 16-38) |
| S _{DS} = | 1.000 | g | (Equation 16-39) |
| S _{D1} = | 1.070 | g | (Equation 16-40) |

Seismic Design Category (SDC):

Varies

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Low & Moderate Seismic

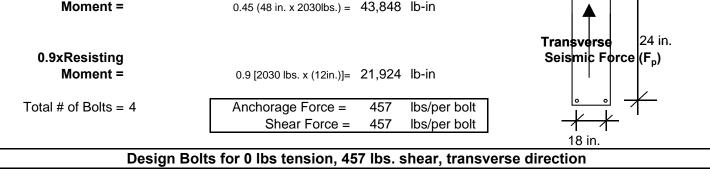
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Load Case: Single Unit (Ground Flr.)

| 24 Edge Length .5 .6 .80 Weight (Ibs) .15 .15 .15 .2,030 = 24 = 18 0.45 (48 in. x | Center X (in) 12 | in of Gravi Y (in) 12 | ty Location Z (in) 48 | Set $S_{DS} =$ $I_{p} =$ $a_{p} =$ $R_{p} =$ $Z/h =$ $F_{p} =$ $F_{p,min} =$ $F_{p,max} =$ Use F_{p} = | 1.0 1.5 1.0 2.5 0.0 0.240 0.45 2.40 0.45 | Low & Moderate Seismic (Importance) (Cabinets) (Cabinets) (Ground Floor) W W W W |
|--|---------------------------------|------------------------------------|-----------------------------|--|---|---|
| Weight (lbs) ats 2,030 = 24 = 18 | X (in) 12 | Y (in) | Z (in) | $I_{p} = a_{p} = B_{p} = C_{p} = C_{p,min} = C_{p,min} = C_{p,max} = C_{p,max} = C_{p} = C_{p$ | 1.5 1.0 2.5 0.0 0.240 0.45 2.40 0.45 | Seismic (Importance) (Cabinets) (Cabinets) (Ground Floor) W W W W |
| Weight (lbs) tts 2,030 = 24 = 18 | X (in) 12 | Y (in) | Z (in) | $I_{p} = a_{p} = B_{p} = C_{p} = C_{p,min} = C_{p,min} = C_{p,max} = C_{p,max} = C_{p} = C_{p$ | 1.5 1.0 2.5 0.0 0.240 0.45 2.40 0.45 | Seismic (Importance) (Cabinets) (Cabinets) (Ground Floor) W W W W |
| Weight (lbs) tts 2,030 = 24 = 18 | X (in) 12 | Y (in) | Z (in) | $a_p =$ $R_p =$ z/h = $F_p =$ $F_{p,min} =$ $F_{p,max} =$ Use $F_p =$ | 1.0 2.5 0.0 0.240 0.45 2.40 0.45 | (Cabinets) (Cabinets) (Ground Floor) W W W |
| ts 2,030 = 24 = 18 | 12 | | | $R_{p} =$ $z/h =$ $F_{p} =$ $F_{p,min} =$ $F_{p,max} =$ Use F_{p} = | 2.5 0.0 0.240 0.45 2.40 0.45 | (Cabinets) (Ground Floor) W W W W |
| = 24 = 18 | | 12 | 48 | z/h = F _p = F _{p,min} = F _{p,max} = Use F_p = | 0.0 0.240 0.45 2.40 0.45 | (Ground Floor) W W W W |
| = 18 | | | | F _p = F _{p,min} = F _{p,max} = Use F_p = | 0.240 0.45 2.40 0.45 | W W W W |
| = 18 | | | | F _{p,min} = F _{p,max} = Use F_p = | 0.45 2.40 0.45 | W W W |
| | | | | F _{p,max} = Use F _p = | 2.40 0.45 | W W |
| 0.45 (48 in. x | | | | F _{p,max} = Use F _p = | 0.45 | W |
| 0.45 (48 in. x | | | | i | | |
| 0.45 (48 in. x | | | | · · · | | |
| · | : 2030lbs.) = bs. x (9in)]= | | | | jitudinal e (F _p) | Seismic – 24 in. |
| | | 704 | | 1 | | |
| U U | | | • | | | |
| | | | ibs/per bolt | I 1 | <u>●</u> / / 18 in. | + |
| s for 761 lbs te | ension, 4 | 57 lbs. : | shear, longit | tudinal direc | tion | |
| | | | | Paramour | nt/S Serie | es unit Plan |
| | Shea | Anchorage Force = Shear Force = | Shear Force = 457 | Shear Force = 457 lbs/per bolt | Shear Force = 457 lbs/per bolt | , , , , , , , , , , , , , , , , , , , |



Drawing Reference See: SK-3 & SK-6

74**T•N**

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Low & Moderate Seismic

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Load Case: Single Unit on 24" Raised Computer Floor (Ground Flr.)

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San Leandro, CA 94577

| Unit Dimens | ions | | | | | Sei | ismic Fo | orce |
|-----------------------|-------------------|----------------|---------------|------------|--------------|----------------------|------------------------|----------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | | | Low & Moderate |
| Depth(D) (in) = | 34.5 | Raised Floor H | leight = | 24 | in | S _{DS} = | 1.0 | Seismic |
| Frame Height (in) = | 96 | | | | | $I_p =$ | 1.5 | (Importance) |
| Unit Weight (lb) = | 230 | | Center | of Gravi | ty Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | R _p = | 2.5 | (Cabinets) |
| Paramount/S Series | Frame +Contents | 2,030 | 12 | 12 | 72 | z/h = | 0.0 | (Ground Floor) |
| | | | | | | $F_p =$ | 0.240 | W |
| Longitudinal Anchorag | ge Spacing (in) = | 24 | | | | F _{p,min} = | 0.45 | W |
| Transverse Anchorag | ge Spacing (in) = | 18 | | | | F _{p,max} = | 2.40 | W |
| | | | | | | Use F _p = | 0.45 | W |
| Longitudinal Ove | erturning | | | | | | | |
| Overturning | | | | | | <u>Paramoun</u> | t/S Serie | es unit Plan |
| Moment = | | 0.45 (72 in. x | 2030lbs.) = | 65,772 | lb-in | | o o | |
| | | | | | | Long | itudinal | Seismic |
| 0.9xResisting | | | | | | Force | | |
| Moment = | | 0.9 [2030 lbs | . x (12in.)]= | 21.924 | lb-in | | | – 24 in. |
| | | | | <i>y</i> - | - | | | |
| Total # of Bolts = | 4 | Anchorage | | 914 | lbs/per bolt | | | |
| | | Shea | r Force = | 457 | lbs/per bolt | | • • | + |
| | | | | | | _ | + | ¹ |
| | | | | | | 1 | 8 in. | |
| D | esign Bolts f | for 914 lbs te | ension, 4 | 57 lbs. : | shear, longi | tudinal direc | tion | |
| | | | | | | . | 40.0 ···· | |
| Transverse Over | turning | | | | | Paramoun | | es unit Plan |
| Overturning | | / | | 05 770 | u. •. | | ° ° · | 1 |
| Moment = | | 0.45 (72 in. x | 2030lbs.) = | 65,772 | Ib-in | | | |
| | | | | | | Transvers | | 24 in. |
| 0.9xResisting | | | | | | Seismic F | or¢e (F _p) | |
| Moment = | | 0.9 [2030 lb: | s. x (12in)]= | 21,924 | lb-in | | | |
| | | | | | | | | |
| Total # of Bolts = | 4 | Anchorage | | 914 | lbs/per bolt | | | 1 - |
| | | Shea | r Force = | 457 | lbs/per bolt | | 1 1 | |
| - | <u> </u> | | | | | | 8 in. | |
| D | esign Bolts | for 914 lbs t | ension, 4 | 57 lbs. | shear, trans | sverse direct | ion | |

Drawing Reference See: <u>SK-3 & SK-8</u>

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Low & Moderate Seismic

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Load Case: Ganged Unit (Ground Flr.)

of Units ganged (min.)= 3

| Single Unit Din | nension | | | | | Sei | smic Fo | orce |
|------------------------|-------------------|--------------|--------|-----------|------------|----------------------|---------|----------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | | | Low & Moderate |
| Depth(D) (in) = | 34.5 | | | | | S _{DS} = | 1.0 | Seismic |
| Frame Height (in) = | 96 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Weight (lb.) = | 230 | | Center | of Gravit | y Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | $R_p =$ | 2.5 | (Cabinets) |
| 3 - Paramount/S Series | Frame +Contents | 7,590 | 21 | 12 | 48 | z/h = | 0.0 | (Ground Floor) |
| | | | | | | $F_p =$ | 0.240 | W |
| Longitudinal Anchora | ge Spacing (in) = | 24 | | | | $F_{p,min} =$ | 0.45 | W |
| Transverse Anchora | ge Spacing (in) = | 42 | | | | F _{p,max} = | 2.40 | W |
| | | | | | | Use F _p = | 0.45 | W |

Longitudinal Overturning

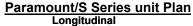
Overturning Moment =

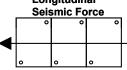
0.45 (96/2 in. x 7590lbs.) = 163,944 lb-in

0.9xResisting Moment =

0.9 (7590 lbs. x21 in.)= 143,451 lb-in

Anchorage Force = 488 lbs Shear Force = 1,139 lbs/per bolt





3 ganged units # of bolts per unit = 2

Design Bolts for 0 lbs tension, 1,139 lbs. shear, longitudinal direction

Transverse Overturning

Overturning Moment =

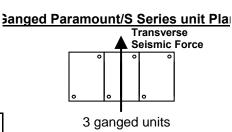
0.45 (96/2 in. x 7590lbs.) = 163,944 lb-in

0.9xResisting Moment =

0.9 (7590 lbs x12 in.) = 81,972 lb-in

Anchorage Force =

Shear Force =



of bolts per unit = 2

Design Bolts for 1 lbs tension, 1,139 lbs. shear, transverse direction

1,139

1,139

lbs/per bolt

lbs/per bolt

Drawing Reference See: SK-4 & SK-6



Raised Floor =

Low & Moderate Seismic

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24

By: MAS

in

Date: 01/16/14 Page: 17

Load Case: Ganged Unit on 24" Raised Comp. Flr. (Ground Flr.)

of Units ganged (min.)= 3

(510) 991-0977

| Single Unit Dim | nension | | | | |
|--------------------------------|-------------------------|-----------------------|---------------------|---------------------|---------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | |
| Depth(D) (in) = | 34.5 | | | | |
| Frame Height (in) = | 96 | | | | |
| Frame Weight (lb.) = | 230 | | Center | of Gravit | y Location |
| _ | | | | | |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) |
| Unit 3 - Paramount/S Series | Part Frame +Contents | Weight (lbs) 7,590 | X (in) 66 | Y (in) 12 | Z (in) 72 |
| | Frame +Contents | | . , | . , | . , |

| Seismic Force | | | | | | |
|----------------------|-------|---------------------------|--|--|--|--|
| S _{DS} = | 1.0 | Low & Moderate Seismic | | | | |
| $I_p =$ | 1.5 | (Importance) | | | | |
| a _p = | 1.0 | (Cabinets) | | | | |
| $R_p =$ | 2.5 | (Cabinets) | | | | |
| z/h = | 0.0 | (Ground Floor) | | | | |
| $F_p =$ | 0.240 | W | | | | |
| $F_{p,min} =$ | 0.45 | W | | | | |
| F _{p,max} = | 2.40 | W | | | | |
| Use F _p = | 0.45 | W | | | | |

Longitudinal Overturning

Overturning Moment =

0.5 (72 in. x 7590lbs.) = 245,916 lb-in

0.9xResisting Moment =

0.9 (7590 lbs. x66 in.)= 450,846 lb-in

Longitudinal Seismic Force

Ganged Paramount/S Series unit Plan

Anchorage Force = 0 lbs/per bolt Shear Force = 1,139 lbs/per bolt 3 ganged units # of bolts per unit = 2

Design Bolts for 0 lbs tension, 1,139 lbs. shear, longitudinal direction

Transverse Overturning

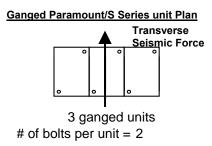
Overturning Moment =

0.5 (72in. x 7590lbs.) = 245,916 lb-in

0.9xResisting Moment =

0.9 (7590 lbs x17.25 in.) = 117,835 lb-in

Anchorage Force = 1,238 lbs/per bolt Shear Force = 1,139 lbs/per bolt



Design Bolts for 1,238 lbs tension, 1,139 lbs. shear, transverse direction

Drawing Reference See: SK-4 & SK-9

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Load Case: <u>Single Unit (≤ 50% of Bldg. Ht.)</u>

(i.e. 2nd floor of a 4 story building or 4th floor of an 8 story building)

| Unit Dimens | sions | | | | | Sei | ismic Fo | orce |
|--|------------------------|--|--|------------------------------------|----------------|----------------------------------|---------------------|--------------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | | | Low 8 Moderat |
| Depth(D) (in) = | 34.5 | | | | | S _{DS} = | 1.0 | Low & Moderat Seismic |
| Frame Height (in) = | 96 | | | | | $I_p =$ | 1.5 | (Importance) |
| Unit Weight (lb) = | 230 | | Center | of Gravi | ty Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | $R_p =$ | 2.5 | (Cabinets) |
| Paramount/S Series | Frame +Contents | 1,430 | 12 | 12 | 48 | z/h = | 0.5 | (50% of bldg ht |
| | | | | | | $F_p =$ | 0.480 | W |
| Longitudinal Anchorag | ge Spacing (in) = | 18 | | | | F _{p,min} = | 0.45 | W |
| Transverse Anchorag | ge Spacing (in) = | 24 | | | | F _{p,max} = | 2.40 | W |
| | | | | | | Use F _p = | 0.48 | W |
| ongitudinal Ove | erturning | | | | | · | | |
| Overturning | | | | | | <u>Paramoun</u> | t/S Serie | es unit Plan |
| Moment = | | 0.48 (48 in. x | 1430lbs.) = | 32,947 | lb-in | | <u>ه</u> ٥ | |
| | | | | | | | itudinal | Śeismic |
| 0.9xResisting | | | | | | Force | • (F _p) | |
| Moment = | | 0.9 [1430 lbs | . x (12in.)]= | 15,444 | ID-IN | | | – 24 in. |
| | Add 30% inc | rease due to 1 | 3.4.2. AS | CE-7-10 | | | | 24 111. |
| Total # of Bolts = | | Anchorage | | 365 | lbs/per bolt | | | |
| | | Shea | r Force = | 446 | lbs/per bolt | | o o | + |
| | | | | | | _ | $\frac{1}{1}$ | I |
| | | | | | | 1 | 8 in. | |
| D | anian Balta (| for 265 lbo to | noion 1 | AG Iba | sheer lengi | udinal diraa | tian | |
| D | esign Bolts : | for 365 lbs te | nsion, 4 | 46 lbs. s | shear, longi | tudinal direc | tion | |
| | • | for 365 lbs te | nsion, 4 | 46 lbs. s | shear, longi | | | es unit Plan |
| ransverse Over | • | for 365 lbs te | ension, 4 | 46 lbs. s | shear, longi | | | es unit Plan |
| ransverse Over Overturning | • | | | | | | | es unit Plan |
| ransverse Over | • | for 365 lbs te 0.48 (48 in. x | | | | | | es unit Plan |
| ransverse Over Overturning | • | | | | | <u>Paramoun</u> Trans | t/S Serie | 24 in. |
| ransverse Over Overturning Moment = 0.9xResisting | • | 0.48 (48 in. x | 1430lbs.) = | 32,947 | lb-in | <u>Paramoun</u> Trans | t/S Serie | 24 in. |
| ransverse Over Overturning Moment = | • | 0.48 (48 in. x | | 32,947 | lb-in | <u>Paramoun</u> Trans | t/S Serie | 24 in. |
| ransverse Over Overturning Moment = 0.9xResisting Moment = | turning | 0.48 (48 in. x 0.9 [1430 lt | 1430lbs.) = bs. x (9in)]= | 32,947 11,583 | lb-in | <u>Paramoun</u> Trans | t/S Serie | 24 in. |
| ransverse Over Overturning Moment = 0.9xResisting Moment = | turning Add 30% inc | 0.48 (48 in. x 0.9 [1430 lt rease due to 1 | 1430lbs.) = bs. x (9in)]= 1 3.4.2. AS | 32,947 11,583 CE-7-10 | lb-in lb-in | <u>Paramoun</u> Trans | t/S Serie | 24 in. |
| ransverse Over Overturning Moment = 0.9xResisting Moment = | turning Add 30% inc | 0.48 (48 in. x 0.9 [1430 lt rease due to 1 Anchorage | 1430lbs.) = bs. x (9in)]= 1 3.4.2. AS | 32,947 11,583 | lb-in | <u>Paramoun</u> Tran: Seis | t/S Serie | 24 in. |

Drawing Reference See: <u>SK-3 & SK-7</u>

Powering Business Worldwide"

Low & Moderate Seismic

Job No. : 14107

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18 in.

Load Case: <u>Single Unit on 24" Raised Comp. Flr. (≤ 50% of Bldg. Ht.)</u>

(i.e. 2nd floor of a 4 story building or 4th floor of an 8 story building)

| | (I.e. 2110 11001 | of a 4 story bu | liaing of 4 | th hoor o | an 8 story bu | iliaing) | | |
|----------------------|-------------------|-------------------|----------------|------------|------------------------------|----------------------|---------------------------------|----------------------|
| Unit Dimens | sions | Raise | d Floor = | 24 | in | Se | ismic Fo | orce |
| Width(w) (in) = | | Edge Length | 3 | in | | | | Low & Moderate |
| Depth(D) (in) = | 34.5 | | | | | S _{DS} = | 1.0 | Seismic |
| Frame Height (in) = | 96 | | | | | $I_p =$ | 1.5 | (Importance) |
| Unit Weight (Ib) = | 230 | | Center | of Gravi | ty Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | $R_p =$ | 2.5 | (Cabinets) |
| Paramount/S Series | Frame +Contents | 1,130 | 12 | 12 | 72 | z/h = | 0.5 | (50% of bldg ht.) |
| | | | | | | $F_p =$ | 0.480 | W |
| Longitudinal Anchora | ge Spacing (in) = | 24 | | | | F _{p,min} = | 0.45 | W |
| Transverse Anchora | ge Spacing (in) = | 18 | | | | F _{p,max} = | 2.40 | W |
| | | | | | | Use F _p = | 0.48 | W |
| Longitudinal Ove | erturnina | | | | | | | |
| Overturning | | | | | | Paramoun | t/S Serie | es unit Plan |
| Moment = | | 0.48 (72 in. x | 1130lbs.) = | 39,053 | lb-in | | | |
| | | | | | | | | |
| 0.9xResisting | | | <i></i> | 40.004 | u | | itudinai ŧ (F _p) | Seismic |
| Moment = | | 0.9 [1130 lbs | s. x (12in)]= | 12,204 | ID-IN | | • (• p/ | – 24 in. |
| | Add 30% inc | rease due to 1 | 13.4.2. AS | CE-7-10 | | | | 24 111. |
| Total # of Bolts = | | Anchorage | | 970 | lbs/per bolt | | | |
| | | | r Force = | 353 | lbs/per bolt | | | |
| | | | | | | | | 1 |
| | | | | | | _ | <u>ব</u> িব জিল | |
| | aaiaa Dalta | fa = 070 lb = 4a | | | | | 8 in. | |
| D | esign boils | for 970 lbs te | ension, s | 53 IDS. 3 | snear, iongi | | lion | |
| Transverse Over | turnina | | | | | Paramoun | t/S Serie | es unit Plan |
| Overturning | | | | | | <u>r urunoun</u> | <u>o o</u> | |
| Moment = | | 0.48 (72 in. x | 1130lbs) - | 39 053 | lh-in | | | 1 |
| moment | | 0.40 (72 m. x | 1100103.) – | 00,000 | | | | |
| 0.9xResisting | | | | | | Trans | sverse | 24 in. |
| Moment = | | 0.9 [1130 lbs | s. x (12in.)]= | 12,204 | lb-in | | mic Føre | ce (F _p) |
| | | _ | | | | | | |
| | | rease due to 1 | | | | | o 0 | + |
| Total # of Bolts = | 4 | Anchorage Shea | Force = | 727 353 | lbs/per bolt lbs/per bolt | | | Ϋ́Ι |
| | | Silea | | 303 | ing/her nour | | 1 1 | |

Design Bolts for 727 lbs tension, 353 lbs. shear, transverse direction

Drawing Reference See: <u>SK-3 & SK-9</u>

Powering Business Worldwide*

Low & Moderate Seismic

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Load Case: <u>Ganged Unit (≤ 50% of Bldg. Ht.)</u>

of Units ganged (max)= 3

| Single Unit Din | nension | | | | | Se | ismic Fo | orce |
|---|-------------------|--------------|--------|-----------|------------|---------------------------------------|------------|---|
| Width(w) (in) = Depth(D) (in) = Frame Height (in) = | 34.5 | Edge Length | 3 | in | | S _{DS} = I _p = | 1.0 1.5 | Low & Moderate Seismic (Importance) |
| Frame Weight (lb.) = | 230 | | Center | of Gravit | y Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | R _p = | 2.5 | (Cabinets) |
| 3 - Paramount/S Series | Frame +Contents | 4,590 | 21 | 12 | 48 | z/h = | 0.5 | (50% of bldg ht.) |
| | | | | | | $F_p =$ | 0.480 | W |
| Longitudinal Anchora | ge Spacing (in) = | 24 | | | | $F_{p,min} =$ | 0.45 | W |
| Transverse Anchora | ge Spacing (in) = | 42 | | | | $F_{p,max} =$ | 2.40 | W |

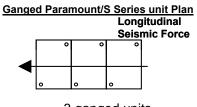
Longitudinal Overturning

Overturning Moment =

0.48 (96/2 in. x 4590lbs.) = 105,754 lb-in

0.9xResisting Moment =

0.9 (4590 lbs. x21 in.)= 86,751 lb-in



0.48

W

Use $F_{p} =$

Add 30% increase due to 13.4.2. ASCE-7-10

Anchorage Force = 294 lbs Shear Force = 955 lbs/per bolt

3 ganged units # of bolts per unit = 2

Design Bolts for 294 lbs tension, 955 lbs. shear, longitudinal direction

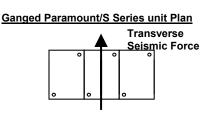
Transverse Overturning

Overturning Moment =

0.48 (96/2 in. x 4590lbs.) = 105,754 lb-in

0.9xResisting Moment =

0.9 (4590 lbs x12 in.) = 49,572 lb-in



3 ganged units

1,014 lbs/per bolt 955 lbs/per bolt

of bolts per unit = 2

Design Bolts for 1 lbs tension, 955 lbs. shear, transverse direction

Drawing Reference See: SK-4 & SK-7

Add 30% increase due to 13.4.2. ASCE-7-10

Anchorage Force =

Shear Force =

Powering Business Worldwide"

Low & Moderate Seismic

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Load Case: <u>Ganged Unit on 24" Raised Comp. Flr. (≤ 50% of Bldg. Ht.)</u>

of Units ganged (max)= 3

Raised Floor = 24

in

| Single Unit Dim | nension | | | | | Sei | ismic Fo | orce |
|---------------------------|-------------------|----------------|-------------------|----------|---------------|----------------------|------------|-----------------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | Edge length | | | |
| Depth(D) (in) = | 34.5 | | | | | S _{DS} = | 1.0 | Low & Moderate Seismic |
| Frame Height (in) = | 96 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Weight (lb.) = | 230 | | Center | of Gravi | ty Location | a _p = | 1.0 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | $R_p =$ | 2.5 | (Cabinets) |
| 3 - Paramount/S Series | Frame +Contents | 2,190 | 66 | 12 | 72 | z/h = | 0.5 | (50% of bldg ht.) |
| | | | | | | $F_p =$ | 0.480 | W |
| Longitudinal Anchorag | ge Spacing (in) = | 24 | | | | $F_{p,min} =$ | 0.45 | W |
| Transverse Anchorag | ge Spacing (in) = | 42 | | | | $F_{p,max} =$ | 2.40 | W |
| | | | | | | Use F _p = | 0.48 | W |
| ongitudinal Ove | erturning | | | | • | | | |
| Overturning | | | | | | | | |
| Moment = | | 0.48 (72 in. x | 2190lbs.) = | 75,686 | lb-in | Ganged Para | | eries unit Plan |
| | | | | | | | ļ | -ongitudinal Seismic Force |
| 0.9xResisting | | | | | | 0 | 0 | 0 |
| Moment = | | 0 9 (2190 lb | os. x66 in.)= | 130 086 | lb-in | • | | |
| | | 0.0 (2100 h | | 100,000 | | 0 | o 0 | |
| | Add 30% inc | rease due to 1 | | | | 3 | 3 ganged | units |
| | | Anchorage | | 0 | lbs/per bolt | | | 0 |
| | | Snea | r Force = | 456 | lbs/per bolt | # of bolts | per unit | = 2 |
| [| Design Bolts | for 0 lbs ten | sion, 45 | 6 lbs. s | hear, longitu | dinal directi | on | |
| | - | | | | | | | |
| <u>Fransverse Over</u> | <u>turning</u> | | | | | | | |
| Overturning | | | | | | <u>Ganged Para</u> | mount/S S | <u>eries unit Plan</u> |
| Moment = | | 0.5 (72in. x | 2190lbs.) = | 75,686 | lb-in | | | Transverse Seismic Force |
| | | | | | | | ° ° | <u> </u> |
| 0.9xResisting Moment = | | 0.0 (0100 lb | os x12 in.) = | 22 652 | lh in | | | |
| Woment - | | 0.9 (2190 k | $s x 12 \ln .) =$ | 23,052 | | ٥ | • | 0 |
| | Add 30% inc | rease due to 1 | 3.4.2. AS | CE-7-10 | | | | |
| | | Anchorage | Force = | 940 | lbs/per bolt | 3 | 3 ganged | units |
| | | Shea | r Force = | 456 | lbs/per bolt | # of bolts | per unit : | = 2 |
| | a alam Dalf | for 040 lbs (| | | ahaan turi | | | |
| D | esign Bolts | for 940 lbs to | ension, 4 | 156 IDS. | snear, trans | verse direct | ion | |
| | | | | | | | | |





Robinson Meier Juilly & Associates Principals Peter Robinson, S.E. Jayson E. Haines, S.E.

High Seismic Calculations



High Seismic

Job No. : 14107 Date: 01/16/14 By: MAS Page: 23

Find the Seismic Design Category (SDC)

Unit : Paramount/S Series

Project Location: Latitude: Varies

High Seismic

Longitude: Varies

Soil Classification: D Occupancy Category: II Table 1613.5.2 & Section 1613.5.2 Table 1604.5

Information from U.S. Geological Survey Website http://earthquake.usgs.gov/research/hazmaps/

| S _S = | 2.750 | g | |
|-------------------|-------|---|-------------------|
| S ₁ = | 1.070 | g | |
| $F_a =$ | 1.000 | | Table 1613.5.3(1) |
| $F_v =$ | 1.500 | | Table 1613.5.3(2) |
| S _{MS} = | 2.75 | g | (Equation 16-37) |
| S _{M1} = | 1.61 | g | (Equation 16-38) |
| S _{DS} = | 1.833 | g | (Equation 16-39) |
| S _{D1} = | 1.070 | g | (Equation 16-40) |

Seismic Design Category (SDC):

Varies

Powering Business Worldwide"

High Seismic

Job No. : 14107 By: MAS

Date: 01/17/14 Page: 24

Load Case: Single Unit (Ground Flr.)

| Unit Dimens | sions | | | | | Sei | smic Fo | orce |
|----------------------|-------------------|--------------|--------|-----------|------------|----------------------|---------|----------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Depth(D) (in) = | 34.5 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| Unit Weight (lb.) = | 230 | | Center | of Gravit | y Location | $R_p =$ | 2.5 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.0 | (Ground Floor) |
| Paramount/S Series | Frame +Contents | 1,030 | 12 | 12 | 48 | $F_p =$ | 0.440 | W |
| | | | | | | $F_{p,min} =$ | 0.83 | W |
| Longitudinal Anchora | ge Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W |
| Transverse Anchora | ge Spacing (in) = | 18 | | | | Use F _p = | 0.83 | W |
| | | | | | | | | |

Longitudinal Overturning Overturning

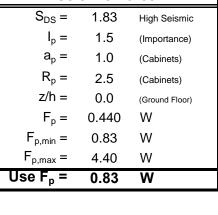
Moment =

Total # of Bolts = 4

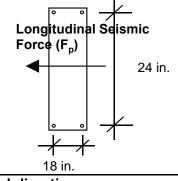
0.83 (48 in. x 1030lbs.) = 40,788 lb-in

0.9xResisting Moment = 7,045 0.9 [(1030 lbs. - Vert. Comp.) x 12in.]= lb-in Vertical Component (0.2*SDS*Wp) = 378 lbs

> Anchorage Force = 937 lbs/per bolt Shear Force = 425 lbs/per bolt



Paramount/S Series unit Plan



Design Bolts for 937 lbs tension, 425 lbs. shear, longitudinal direction

| Transverse Overtur | ning | | | Paramount/S Series unit Plan | | | | | | |
|-------------------------|--|--------|--------------|---------------------------------|--|--|--|--|--|--|
| Overturning Moment = | 0.02 (40 in 4020/hr) | 10 700 | lh in | | | | | | | |
| woment – | 0.83 (48 in. x 1030lbs.) = | 40,700 | ID-IN | | | | | | | |
| 0.9xResisting | | | | Transverse24 in. | | | | | | |
| Moment = | 0.9 [(1030 lbs Vert. Comp.) x (12in.)]= | 7,045 | lb-in | Seismic Force (F _p) | | | | | | |
| | Vertical Component (0.2*SDS*Wp) = | 378 | lbs | | | | | | | |
| Total # of Bolts = 4 | Anchorage Force = | 703 | lbs/per bolt | | | | | | | |
| | Shear Force = | 425 | lbs/per bolt | | | | | | | |
| | | | | 18 in. | | | | | | |
| Desig | Design Bolts for 703 lbs tension, 425 lbs. shear, longitudinal direction | | | | | | | | | |

Drawing Reference See: SK-3 & SK-6



Job No. : 14107 By: MAS

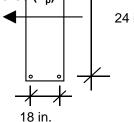
Date: 01/17/14 Page: 25

Load Case: Single Unit on 24" Raised Computer Floor (Ground Flr.)

| Unit Dimens | sions | Raise | d Floor = | 24 | in | Sei | smic Fo | orce |
|--|-------------------|------------------------------------|----------------|-----------|--------------|----------------------|----------------|-------------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Depth(D) (in) = | 34.5 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| Unit Weight (lb.) = | 230 | | Center | of Gravit | y Location | $R_p =$ | 2.5 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.0 | (Ground Floor) |
| Paramount/S Series | Frame +Contents | 630 | 12 | 12 | 72 | $F_p =$ | 0.440 | W |
| | | | | | | $F_{p,min} =$ | 0.83 | W |
| Longitudinal Anchorag | ge Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W |
| Transverse Anchorag | ge Spacing (in) = | 18 | | | | Use F _p = | 0.83 | W |
| Longitudinal Overturning Overturning Moment = 0.9xResisting | <u>erturning</u> | 0.83 (72 in. ; | x 630lbs.) = | 37,422 | lb-in | | °° itudinal | es unit Plan Seismic |
| Moment = | - (| lbs Vert. Comp. Component (0.2* | , , , . | , | lb-in Ibs | • | | – 24 in. |

Total # of Bolts = 4

Anchorage Force = 920 lbs/per bolt Shear Force = 260 lbs./per bolt



Design Bolts for 920 lbs tension, 260 lbs. shear, longitudinal direction

| Transverse Overturn | ling | | | Paramount/S Series unit Plan |
|----------------------|---------------------------------------|--------|--------------|---------------------------------|
| Overturning | | | | |
| Moment = | 0.83 (72 in. x 630lbs.) = | 37,422 | lb-in | |
| 0.9xResisting | | | | Transverse 24 in. |
| Moment = | 0.9 [(630 lbs Vert. Comp.) x (12in)]= | 4,309 | lb-in | Seismic Force (F _p) |
| | Vertical Component (0.2*SDS*Wp) = | 231 | lbs | |
| | | | | |
| Total # of Bolts = 4 | Anchorage Force = | 690 | lbs/per bolt | ++ |
| | Shear Force = | 425 | lbs/per bolt | 18 in. |
| Decisy | Rolts for 600 lbs tonsion 4 | 05 lba | ahaan langit | |

Design Bolts for 690 lbs tension, 425 lbs. shear, longitudinal direction

Drawing Reference See: SK-3 & SK-9

Powering Business Worldwide" High Seismic

Job No. : 14107 Date: 01/17/14 By: MAS Page: 26

Load Case: Ganged Unit (Ground Flr.)

of Units ganged (min)= 3

| Observation Line (CD) | | | | | | 0.5 | omio Er | |
|---------------------------|-------------------|--|----------------------------|-----------------|--|----------------------|-------------|---|
| Single Unit Dim | | l | | | | | smic Fo | orce |
| Width(w)(in) = | | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Depth(D) (in) = | 34.5 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| Unit Weight (lb.) = | 230 | | Center | of Gravit | ty Location | R _p = | 2.5 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.0 | (Ground Floor) |
| - Paramount/S Series | Frame +Contents | 3,990 | 21 | 12 | 48 | F _p = | 0.440 | W |
| | | | | | | $F_{p,min} =$ | 0.83 | W |
| | | | | | | F _{p,max} = | 4.40 | W |
| Longitudinal Anchorag | e Spacing (in) = | 24 | | | | Use F _p = | 0.83 | W |
| Transverse Anchorag | je Spacing (in) = | 42 | | | | | | |
| 0.9xResisting Moment = | - • | 0.83 (96/2 in. x 0 lbs Vert. Comp Component (0.2* Anchorage Shea | p.) x21 in.]= SDS*Wp) = | | lb-in lbs lbs/per bolt lbs/per bolt |] 3 | L | Longitudinal Seismic Force |
| De Fransverse Over | • | or 656 lbs te | ension, 5 | 49 lbs. s | shear, longi | tudinal direc | tion | |
| Overturning Moment = | | 0.83 (96/2 in. x | 3990lbs.) = | 158,004 | lb-in | Ganged Paramo | unt/S Seri | es unit Plan Transverse Seismic For |
| 0.9xResisting Moment = | | 0 lbs - Vert. Comp | · - | 27,292 1,463 | | ٥ | 000 | 0 0 |
| | Vertical | Component (0.2* | SDS^Wp) = | 1,403 | lbs | 3 | l ganged | units |

Design Bolts for 908 lbs tension, 549 lbs. shear, transverse direction

Drawing Reference See: <u>SK-4 & SK-6</u>



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Load Case: Ganged Unit on 24" Raised Comp. Flr. (Ground Flr.)

of Units ganged (min)= 3

| Single Unit DimensionRaised Floor = 24 inWidth(w) (in) = 24Edge Length 3 inDepth(D) (in) = 34.5Frame Height (in) = 96Unit Weight (in) = 230Center of Gravity LocationUnit Weight (in) = 230Center of Gravity LocationJ. Paramounuts SeriesFrame +ContentsUnit Veight (in) = 230Center of Gravity LocationJ. Paramounuts SeriesFrame +ContentsUnit Veight (in) = 24X (in) Y (in) Z (in)J. Ongitudinal Anchorage Spacing (in) = 24Transverse Anchorage Spacing (in) = 57Longitudinal Overturning Moment = 0.8 (72 in x 2490bs.) = 147,906 lb-in Vertical Component (0.2*SDs*Wp) = 913Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.8 (72in x 2490bs.) = 147,906 lb-in Vertical Component (0.2*SDs*Wp) = 913Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.9 (2490 lbs - Vert. Comp.) x12 in] = 17,032Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.9 (2490 lbs - Vert. Comp.) x12 in] = 17,032Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.9 (2490 lbs - Vert. Comp.) x12 in] = 17,032Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.9 (2490 lbs - Vert. Comp.) x12 in] = 17,032Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionTransverse Overturning Moment = 0.9 (2490 lbs - Vert. Comp.) x12 in] = 17,032 <th>Ū</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> | Ū | | | | | | | | |
|--|------------------------|-------------------|-----------------|---------------|----------|--------------|----------------------|------------|-----------------|
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | Single Unit Din | nension | Raise | d Floor = | 24 | in | Sei | smic Fo | orce |
| Frame Height (in) = 96Unit Weight (b) = 230Center of Gravity Location $\underline{Unit Weight (b) = 230}$ Center of Gravity Location $\underline{Unit Weight (b) = 230}$ Center of Gravity Location $\underline{Unit Weight (b) = 230}$ Center of Gravity Location $\underline{Unit Weight (b) = 230}$ Center of Gravity Location $Ungitudinal Anchorage Spacing (in) = 24$ Transverse Anchorage Spacing (in) = 57Longitudinal Overturning Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Longitudinal Selemic Force 342 lbs/per bolt0.9 [(2490 lbs Vert. Comp.) x21 in.]=29,805 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Longitudinal Selemic ForceDesign Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionCanged Paramount/S Series unit Plan Longitudinal Selemic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Transverse Selemic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Transverse Selemic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs3 ganged units3 ganged units3 ganged units | Width(w) (in) = | 24 | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Unit Weight (lb.) =230Center of Gravity LocationUnitPartWeight (lbs)X (in)Y (in)Z (in)3 · Paramount/S Seriesframe + Contents2,490211272Longitudinal Anchorage Spacing (in) =2472 $F_p = 0.440$ WTransverse Anchorage Spacing (in) =57 $Berge P_p = 0.83$ WLongitudinal Overturning Moment =0.8 (72 in. x 2490lbs.) =147,906 lb-in $Ganged Paramount/S Series unit PlanLongitudinal Component (0.2*SDS*Wp) =0.9 (2490 lbs Vert. Comp.) x21 in.] =29,805 lb-inVertical Component (0.2*SDS*Wp) =913 lbs3 ganged unitsAnchorage Force =518 lbs tension, 342 lbs. shear, longitudinal direction3 ganged unitsTransverse OverturningMoment =0.8 (72in. x 2490lbs.) =147,906 lb-inCanged Paramount/S Series unit PlanSeries unit PlanLongitudinal directionTransverse OverturningMoment =0.8 (72in. x 2490lbs.) =147,906 lb-inCanged Paramount/S Series unit PlanSeries unit PlanTransverseSelemic Force0.9 (2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-inVertical Component (0.2*SDS*Wp) =913 lbsSa0.9 (2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-inVertical Component (0.2*SDS*Wp) =913 lbsSa3 ganged units3 ganged units3 ganged units$ | Depth(D) (in) = | 34.5 | | | | | I _p = | 1.5 | (Importance) |
| UnitPartWeight (lbs)X (in)Y (in)Z (in)3 · Paramount/S SeriesFrame +Contents2,490211272J. Orgitudinal Anchorage Spacing (in) =247272 $F_p = 0.440$ WLongitudinal Anchorage Spacing (in) =57 $User F_p = 0.83$ WLongitudinal Overturning Moment =0.8 (72 in. x 2490lbs.) =147,906 lb-in $Ganged Paramount/S Series unit PlanLongitudinalSatismic Force0.9xResistingMoment =0.9 [(2490 lbs. · Vert. Comp.) x21 in.] =29,805 lb-inyertical Component (0.2*SDS*Wp) =913 lbsAnchorage Force =518 lbs tension, 342 lbs. shear, longitudinal directionTransverse OverturningMoment =0.8 (72in. x 2490lbs.) =147,906 lb-in0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-inVertical Component (0.2*SDS*Wp) =913 lbs0.9 (2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-inVertical Component (0.2*SDS*Wp) =913 lbs0.9 (2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-inVertical Component (0.2*SDS*Wp) =913 lbs3 ganged units3 ganged units$ | Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| 3 · Paramount/S SeriesFrame + Contentis2,490211272Longitudinal Anchorage Spacing (in) =24Transverse Anchorage Spacing (in) =57Longitudinal Overturning Overturning Moment =0.8 (72 in. x 2490lbs.) =147,906 lb-inCongitudinal Overturning Overturning Moment =0.8 (72 in. x 2490lbs.) =147,906 lb-in0.9 ((2490 lbs Vert. Comp.) x21 in.] =29,805 lb-in 9 13 lbsCanged Paramount/S Series unit Plan Longitudinal Seismic Force0.9 strange Force =518lbs/per bolt# of bolts per unit = 4Canged Paramount/S Series unit Plan Longitudinal Seismic Force0.9 ((2490 lbs Vert. Comp.) x21 in.] =29,805 lb-in 9 13 lbs# of bolts per unit = 4Canged Paramount/S Series unit Plan Seismic ForceTransverse Overturning Moment =0.8 (72in. x 2490lbs.) =147,906 lb-in 9 13 lbsTransverse Overturning Moment =0.9 ((2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 9 13 lbsGanged Paramount/S Series unit Plan Transverse Seismic ForceOverturning Moment =0.9 ((2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 9 13 lbs3 ganged units3 ganged unitsAnchorage Force =909 lbs/per bolt | Unit Weight (lb.) = | 230 | | Center | of Gravi | ty Location | $R_p =$ | 2.5 | (Cabinets) |
| Longitudinal Anchorage Spacing (in) = 24 Transverse Anchorage Spacing (in) = 57 Longitudinal Overturning Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.9 ((2490 lbs Vert. Comp.) x21 in.]= 29,805 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 518 lbs/per bolt Shear Force = 342 lbs/per bolt Transverse Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9 x Resisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt Anchorage Force = 909 lbs/per bolt | Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.0 | (Ground Floor) |
| Longitudinal Anchorage Spacing (in) = 24 Transverse Anchorage Spacing (in) = 57 Longitudinal Overturning Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs Vert. Comp.) x21 in.]= 29,805 lb-in Vertical Component (0.2*SDS'Wp) = 913 lbs Anchorage Force = 518 lbs/per bolt Shear Force = 342 lbs/per bolt Transverse Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in Vertical Component (0.2*SDS'Wp) = 913 lbs 3 ganged units # of bolts per unit = 4 Coverturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in Vertical Component (0.2*SDS'Wp) = 913 lbs 3 ganged units 3 ganged units 3 ganged units 3 ganged units 3 ganged units 3 ganged units | 3 - Paramount/S Series | Frame +Contents | 2,490 | 21 | 12 | 72 | $F_p =$ | 0.440 | W |
| Transverse Anchorage Spacing (in) = 57 Longitudinal Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs Vert. Comp.) x21 in.] = 29,805 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 518 lbs/per bolt Shear Force = 342 lbs/per bolt Transverse Overturning Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.8 (72 in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt 3 ganged units | - | - | | | | - | $F_{p,min} =$ | 0.83 | W |
| $\frac{\text{Longitudinal Overturning}}{\text{Moment}} = 0.8 (72 \text{ in. } x 2490 \text{ lbs.}) = 147,906 \text{ lb-in}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x21 \text{ in.}] = 29,805 \text{ lb-in}}{\text{Vertical Component (0.2"SDS'Wp)}} = 913 \text{ lbs}} $ $\frac{\text{Anchorage Force}}{342 \text{ lbs/per bolt}} = 342 \text{ lbs/per bolt}} = 3 \text{ ganged units}}{\text{ follots per unit}} = 4$ $\frac{\text{Design Bolts for 518 \text{ lbs tension, } 342 \text{ lbs. shear, longitudinal direction}}{\text{Moment}} = 0.8 (72 \text{ in. } x 2490 \text{ lbs.}) = 147,906 \text{ lb-in}} $ $\frac{\text{Ganged Paramount/S Series unit Plan}}{\text{Woment}} = 0.8 (72 \text{ in. } x 2490 \text{ lbs.}) = 147,906 \text{ lb-in}} $ $\frac{\text{Ganged Paramount/S Series unit Plan}}{\text{Woment}} = 0.8 (72 \text{ in. } x 2490 \text{ lbs.}) = 147,906 \text{ lb-in}} $ $\frac{\text{Ganged Paramount/S Series unit Plan}}{\text{Woment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}} $ $\frac{\text{Vertical Component (0.2"SDS'Wp)} = 913 \text{ lbs}}{\text{Moment}} = 0.9 \text{ ganged units}} $ | Longitudinal Anchorag | ge Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W |
| Overturning Moment = $0.8 (72 \text{ in. x } 2490 \text{lbs.}) = 147,906 \text{ lb-in}$ Ganged Paramount/S Series unit Plan Longitudinal Series unit Plan Series unit Plan to bolts per unit = 4Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionGanged Paramount/S Series unit Plan # of bolts per unit = 4Transverse Overturning Moment =0.8 (72 in. x 2490 lbs.) = 147,906 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 909 lbs/per boltGanged Paramount/S Series unit Plan Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 909 lbs/per boltGanged Paramount/S Series unit Plan Seismic Force | Transverse Anchorag | ge Spacing (in) = | 57 | | | | Use F _p = | 0.83 | W |
| Overturning Moment = $0.8 (72 \text{ in. x } 2490 \text{lbs.}) = 147,906 \text{ lb-in}$ Ganged Paramount/S Series unit Plan Longitudinal Series unit Plan Series unit Plan to bolts per unit = 4Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal directionGanged Paramount/S Series unit Plan # of bolts per unit = 4Transverse Overturning Moment =0.8 (72 in. x 2490 lbs.) = 147,906 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 913 lbsGanged Paramount/S Series unit Plan Transverse Seismic Force Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 909 lbs/per boltGanged Paramount/S Series unit Plan Seismic Force Seismic Force0.9 [(2490 lbs - Vert. Comp.) x12 in.] =17,032 lb-in 909 lbs/per boltGanged Paramount/S Series unit Plan Seismic Force | Longitudinal Ov | erturnina | | | | | | | |
| $\begin{array}{c} \textbf{0.9xResisting}\\ \textbf{Moment =} & \textbf{0.9} \left[(2490 \ \text{lbs Vert. Comp.}) x21 \ \text{in.} \right] = & 29,805 \ \text{lb-in}\\ \text{Vertical Component} (\textbf{0.2*SDS*Wp}) = & 913 \ \text{lbs} \end{array}$ $\begin{array}{c} \textbf{Anchorage Force = & 518 \ \text{lbs/per bolt}}\\ \textbf{Moment =} & 342 \ \text{lbs/per bolt} \end{array}$ $\begin{array}{c} \textbf{3 ganged units}\\ \textbf{# of bolts per unit = 4} \end{array}$ $\begin{array}{c} \textbf{Design Bolts for 518 \ \text{lbs tension, 342 \ lbs. shear, longitudinal direction}}\\ \textbf{Transverse Overturning}\\ \textbf{Moment =} & \textbf{0.8} (72\text{in. x 2490lbs.}) = 147,906 \ \text{lb-in} \end{array}$ $\begin{array}{c} \textbf{Ganged Paramount/S Series unit Plan}\\ \textbf{Transverse}\\ \textbf{Overturning}\\ \textbf{Moment =} & \textbf{0.8} (72\text{in. x 2490lbs.}) = 147,906 \ \text{lb-in} \end{array}$ $\begin{array}{c} \textbf{Ganged Paramount/S Series unit Plan}\\ \textbf{Transverse}\\ \textbf{Overturning}\\ \textbf{Moment =} & \textbf{0.8} (72\text{in. x 2490lbs.}) = 147,906 \ \text{lb-in} \end{array}$ $\begin{array}{c} \textbf{Sanged Paramount/S Series unit Plan}\\ \textbf{Transverse}\\ \textbf{Overturning}\\ \textbf{Moment =} & \textbf{0.8} (72\text{in. x 2490lbs.}) = 147,906 \ \text{lb-in} \end{array}$ $\begin{array}{c} \textbf{Sanged Paramount/S Series unit Plan}\\ \textbf{Transverse}\\ \textbf{Overturning}\\ \textbf{Moment =} & \textbf{0.9} [(2490 \ \text{lbs - Vert. Comp.}) x12 \ \text{in.}] = 17,032 \ \text{lb-in} \\ \textbf{Vertical Component (0.2*SDS*Wp) = } 913 \ \text{lbs} \end{array}$ $\begin{array}{c} \textbf{3 ganged units}\\ \textbf{3 ganged units} \end{array}$ | | | | | | | | | |
| $\begin{array}{c} \textbf{0.9xResisting}\\ \textbf{Moment =}\\ \textbf{0.9} [(2490 \ \text{lbs Vert. Comp.)} x21 \ \text{in.}] = 29,805 \ \text{lb-in}\\ \text{Vertical Component} (0.2^{*}\text{SDS*Wp}) = 913 \ \text{lbs} \end{array}$ $\begin{array}{c} \textbf{Anchorage Force = 518 \ \text{lbs/per bolt}}\\ \textbf{Moment =}\\ \textbf{0.9} [(2490 \ \text{lbs Vert. Comp.)} x21 \ \text{in.}] = 29,805 \ \text{lb-in}\\ \textbf{Moment =}\\ \textbf{0.9} [\textbf{1} \\ \textbf{0.9} [\textbf{1} \\ \textbf{0.9} [\textbf{Resisting}\\ \textbf{Moment =}\\ \textbf{0.9} [(2490 \ \text{lbs Vert. Comp.)} x12 \ \text{in.}] = 17,032 \ \text{lb-in}\\ \textbf{Vertical Component} (0.2^{*}\text{SDS*Wp}) = 913 \ \text{lbs} \end{array}$ $\begin{array}{c} \textbf{Sanged Paramount/S Series unit Plan}\\ \textbf{Moment =}\\ \textbf{0.9} [(2490 \ \text{lbs Vert. Comp.)} x12 \ \text{in.}] = 17,032 \ \text{lb-in}\\ \textbf{Vertical Component} (0.2^{*}\text{SDS*Wp}) = 913 \ \text{lbs} \end{array}$ | Moment = | | 0.8 (72 in. x | 2490lbs.) = | 147,906 | lb-in | Ganged Para | | |
| 0.9xResisting Moment = $0.9 [(2490 \text{ lbs.} - \text{Vert. Comp.}) x21 \text{ in.}] = 29,805 \text{ lb-in}$ Vertical Component $(0.2^{\circ}\text{SDS}^{\circ}\text{Wp}) = 913 \text{ lbs}$ Anchorage Force = 518 lbs/per bolt Shear Force = 342 lbs/per bolt # of bolts per unit = 4 Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Overturning Moment = $0.8 (72\text{in.} x 2490 \text{lbs.}) = 147,906 \text{ lb-in}$ 0.9xResisting Moment = $0.9 [(2490 \text{ lbs.} \cdot \text{Vert. Comp.}) x12 \text{ in.}] = 17,032 \text{ lb-in}$ Vertical Component $(0.2^{\circ}\text{SDS}^{\circ}\text{Wp}) = 913 \text{ lbs}$ Anchorage Force = 909 lbs/per bolt | | | | | | | | | |
| Moment = 0.9 [(2490 lbs Vert. Comp.) x21 in.]= 29,805 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units Anchorage Force = 518 lbs/per bolt # of bolts per unit = 4 Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units | 0 9xPosisting | | | | | | ° ° | 0 00 | ° |
| Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 518 lbs/per bolt Shear Force = 342 lbs/per bolt # of bolts per unit = 4 Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Overturning Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt 3 ganged units 3 ganged units 3 ganged units | - | 0.9 [(249 | 0 lbs Vert. Com | o.) x21 in.1= | 29.805 | lb-in | | | |
| Anchorage Force = 518 lbs/per bolt # of bolts per unit = 4 Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt 3 ganged units | | | | | | | 0 0 | 0 00 | • |
| Shear Force = 342 Ibs/per bolt # of bolts per unit = 4 Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Overturning Ganged Paramount/S Series unit Plan Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in O.9xResisting O.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units | | | | | | | 3 | 3 ganged | units |
| Design Bolts for 518 lbs tension, 342 lbs. shear, longitudinal direction Transverse Overturning Overturning Ganged Paramount/S Series unit Plan Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Transverse Seismic Force Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units | | | - | | | • | <i>u</i> . C | | 4 |
| Transverse Overturning Overturning Ganged Paramount/S Series unit Plan Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Transverse Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt | | | Snea | r Force = | 342 | lbs/per bolt | # of dolts | per unit : | = 4 |
| Overturning Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in Ganged Paramount/S Series unit Plan 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Ib-in Vertical Component (0.2*SDS*Wp) = 913 lbs Ibs 3 ganged units | De | esign Bolts f | for 518 lbs te | ension, 3 | 42 lbs. | shear, longi | tudinal direc | tion | |
| Overturning Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in Ganged Paramount/S Series unit Plan 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Ib-in Vertical Component (0.2*SDS*Wp) = 913 lbs Ibs 3 ganged units | Transie Orie | | | | | | | | |
| Moment = 0.8 (72in. x 2490lbs.) = 147,906 lb-in 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt | | turning | | | | | | | aniaa umit Dlan |
| 0.9xResisting Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs Anchorage Force = 909 lbs/per bolt 3 ganged units | - | | 0.8 (72in v | 2400lbc) - | 1/7 006 | lh-in | Ganged Para | | |
| Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units Anchorage Force = 909 lbs/per bolt 3 ganged units | Woment - | | 0.6 (7211. X | 2490105.) = | 147,300 | | 0 | | Seismic Force |
| Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units Anchorage Force = 909 lbs/per bolt 3 ganged units | | | | | | | | | |
| Moment = 0.9 [(2490 lbs - Vert. Comp.) x12 in.] = 17,032 lb-in Vertical Component (0.2*SDS*Wp) = 913 lbs 3 ganged units Anchorage Force = 909 lbs/per bolt 3 ganged units | 0.9xResisting | | | | | | | | 。。 |
| 3 ganged units Anchorage Force = 909 lbs/per bolt | Moment = | - • | • | - | | | <u> </u> | | <u> </u> |
| Anchorage Force = 909 lbs/per bolt | | Vertical | Component (0.2* | SDS*Wp) = | 913 | lbs | ~ | aonaca | unito |
| e i i | | | Anchorage | e Force – | 909 | lbs/per bolt | | ganged | นาแร |
| | | | • | | | • | # of bolts | per unit : | = 4 |
| | | | | | | • | | - | |

Design Bolts for 909 lbs tension, 342 lbs. shear, longitudinal direction

Drawing Reference See: SK-5 & SK-9



High Seismic

Job No. : 14107 Date: 01/17/14 By: MAS Page: 28

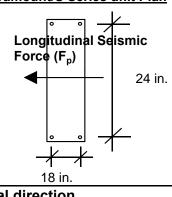
Load Case: <u>Single Unit (≤ 50% of Bldg. Ht.)</u>

(i.e. 2nd floor of a 4 story building or 4th floor of an 8 story building)

| Unit Dimens | sions | _ | | | | Sei | smic Fo | orce |
|--|-------------------|-------------------------------------|--------------|--------------|--------------|----------------------|----------------------------|---------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Depth(D) (in) = | 34.5 | | | | | $I_p =$ | 1.5 | (Importance) |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| Unit Weight (lb.) = | 230 | | Center | of Gravit | ty Location | R _p = | 2.5 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.5 | (50% of bldg ht.) |
| Paramount/S Series | Frame +Contents | 730 | 12 | 12 | 48 | $F_p =$ | 0.880 | W |
| | | | | | | $F_{p,min} =$ | 0.83 | W |
| Longitudinal Anchora | ge Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W |
| Transverse Anchora | ge Spacing (in) = | 18 | | | | Use F _p = | 0.88 | W |
| Longitudinal Ov Overturning Moment = | <u>erturning</u> | 0.88 (48 in. ; | x 730lbs.) = | 30,835 | lb-in | <u>Paramoun</u> | <u>it/S Serie</u> ।৹ ৹ | es unit Plan |
| 0.9xResisting Moment = | | 0 lbs Vert. Comp Component (0.2* | , , ,. | 4,993 268 | lb-in lbs | Long Force | | Seismic - 24 in. |

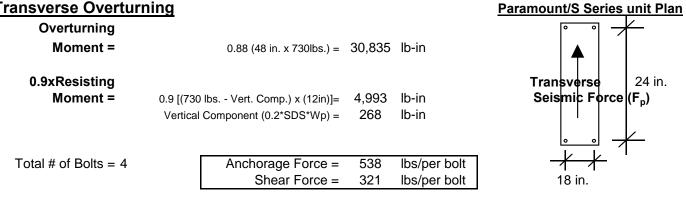
Total # of Bolts = 4

Anchorage Force = 718 lbs/per bolt Shear Force = 321 lbs/per bolt



Design Bolts for 718 lbs tension, 321 lbs. shear, longitudinal direction

Transverse Overturning



Design Bolts for 538 lbs tension, 321 lbs. shear, longitudinal direction

Drawing Reference See: <u>SK-3 & SK-7</u>



High

Job No. : 14107 Date: 01/17/14 By: MAS Page: 29

Load Case: <u>Single Unit on 24" Raised Comp. Flr. (≤ 50% of Bldg. Ht.)</u>

(i.e. 2nd floor of a 4 story building or 4th floor of an 8 story building)

| Unit Dimens | sions | | | | | Sei | smic Fo | orce | |
|---|-------------------|---------------------------------------|-----------|----------|--------------|----------------------|---------|-----------------------|--|
| Width(w) (in) = | 24 | Raise | d Floor = | 24 | in | S _{DS} = | 1.83 | High Seismic | |
| Depth(D) (in) = | 34.5 | Edge Length | 3 | in | | $I_p =$ | 1.5 | (Importance) | |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) | |
| Frame Weight (lb) = | 230 | | Center | of Gravi | ty Location | $R_p =$ | 2.5 | (Cabinets) | |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.5 | (50% of bldg ht.) | |
| Paramount/S Series | Frame +Contents | 530 | 12 | 12 | 72 | $F_p =$ | 0.880 | W | |
| | | | | | | $F_{p,min} =$ | 0.83 | W | |
| Longitudinal Anchorag | ge Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W | |
| Transverse Anchorag | ge Spacing (in) = | 18 | | | | Use F _p = | 0.88 | W | |
| Longitudinal Overturning Paramount/S Series unit Plan Overturning 0.88 (72 in. x 530lbs.) = 33,581 lb-in Paramount/S Series unit Plan | | | | | | | | | |
| 0.9xResisting Moment = | • (|) lbs Vert. Comp Component (0.2*\$ | , , ,. | | lb-in Ibs | Longitud Force (F | | smic 24 in. | |

Total # of Bolts = 4

Anchorage Force = 832 lbs/per bolt Shear Force = 425 lbs/per bolt

Design Bolts for 832 lbs tension, 425 lbs. shear, longitudinal direction

| Transverse Overtu | rning | | | Paramount/S Series unit Plan |
|-------------------------|--|--------|--------------|---------------------------------|
| Overturning Moment = | 0.88 (72 in. x 530lbs.) = | 33,581 | lb-in | |
| 0.9xResisting | 0.9 [(530 lbs Vert. Comp.) x (12in.)]= | 3,625 | lb-in | Transverse 24 in. |
| Moment = | Vertical Component (0.2*SDS*Wp*12in) = | 194 | Ib-in | Seismic Force (F _p) |
| Total # of Bolts = 4 | Anchorage Force = | 624 | lbs/per bolt | ・ |
| | Shear Force = | 425 | lbs/per bolt | 18 in. |

Design Bolts for 624 lbs tension, 425 lbs. shear, longitudinal direction

Drawing Reference See: SK-3 & SK-8

Powering Business Worldwide" High Seismic

Job No. : 14107 Date: 01/17/14 By: MAS Page: 30

Load Case: <u>Ganged Unit (≤ 50% of Bldg. Ht.)</u>

of Units ganged (min)= 3

| | | | | | | Seismic Force | | |
|---|------------------|---|-------------|----------|--------------|-------------------------|-----------|------------------|
| Single Unit Dim | nension | | | | | S _{DS} = | 1.83 | High Seismic |
| Width(w) (in) = | 24 | Edge Length | 3 | in | | $I_p =$ | 1.5 | (Importance) |
| Depth(D) (in) = | 34.5 | | | | | a _p = | 1.0 | (Cabinets) |
| Frame Height (in) = | 96 | | | | | $R_p =$ | 2.5 | (Cabinets) |
| Unit Weight (lb.) = | 230 | | Center | of Gravi | ty Location | z/h = | 0.5 | (50% of bldg ht. |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | F _p = | 0.880 | W |
| 3 - Paramount/S Series | Frame +Contents | 2,790 | 21 | 12 | 48 | $F_{p,min} =$ | 0.83 | W |
| | | | | | | F _{p,max} = | 4.40 | W |
| Longitudinal Anchorag | e Spacing (in) = | 24 | | | | Use F _p = | 0.88 | W |
| <u>ongitudinal Ove</u> Overturning Moment = | <u>erturning</u> | 0.88 (96/2 in. x | 2790lbs.) = | 117,850 | lb-in | Ganged Para | mount/S S | eries unit Pla |
| | | 0 lbs Vert. Comp.) x21 in.]= 33,396 lb-in Component (0.2*SDS*Wp) = 1,023 lbs | | | • • • | | | |
| | | Anchorage | - Force - | 370 | lbs | 3 | 3 ganged | units |
| | | 5 | | | lbs/per bolt | # of bolts per unit = 4 | | = 4 |
| De | | | | | | | | |

Transverse Overturning

| Overturning Moment = | 0.88 (96/2 in. x 2790lbs.) = 117,850 lb-in | Ganged Paramount/S Series unit Pl |
|---------------------------|--|-----------------------------------|
| 0.9xResisting Moment = | 0.9 [(2790 lbs - Vert. Comp.) x12 in.] = 19,084 lb-in Vertical Component (0.2*SDS*Wp) = 1,023 lbs | Seismic Force |
| | | 3 ganged units |
| | Anchorage Force = 686 lbs/per bolt Shear Force = 409 lbs/per bolt | # of bolts per unit = 4 |

Drawing Reference See: <u>SK-4 & SK-7</u>



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Load Case: <u>Ganged Unit on 24" Raised Comp. Flr. (≤ 50% of Bldg. Ht.)</u>

of Units ganged (min)= 3

| Single Unit Dimension | | Raised Floor = 24 in | | | Seismic Force | | | |
|------------------------|------------------|----------------------|--------------|----------|---------------|-----------------------------|------------------|-------------------------------|
| Width(w) (in) = | 24 | Edge Length | 3 | in | | S _{DS} = | 1.83 | High Seismic |
| Depth(D) (in) = | 34.5 | | | | | I _p = | 1.5 | (Importance) |
| Frame Height (in) = | 96 | | | | | a _p = | 1.0 | (Cabinets) |
| rame Weight (lb.) = | 230 | | Center | of Gravi | ty Location | $R_p =$ | 2.5 | (Cabinets) |
| Unit | Part | Weight (lbs) | X (in) | Y (in) | Z (in) | z/h = | 0.5 | (50% of bldg ht.) |
| 3 - Paramount/S Series | Frame +Contents | 1,590 | 21 | 12 | 72 | $F_p =$ | 0.880 | W |
| | | | | | | F _{p,min} = | 0.83 | W |
| Longitudinal Anchorag | e Spacing (in) = | 24 | | | | F _{p,max} = | 4.40 | W |
| Transverse Anchorag | e Spacing (in) = | 57 | | | | Use F _p = | 0.88 | W |
| _ | | | | | - | | | |
| ongitudinal Ove | erturning | | | | | | | |
| Overturning | | | | 400 740 | | | | |
| Moment = | | 0.88 (72 in. x | 1590lbs.) = | 100,742 | lb-in | Ganged Para | <u>mount/S S</u> | eries unit Pla Longitudina |
| 0.9xResisting | | | | | | | 0 00 | Seismic For |
| Moment = | | 0.9 (1590 lb | s. x21 in.)= | 30,051 | lb-in | | | |
| Vert. Comp. (0.2* | SDS*Wp) (To be | Resisted my 2 Cer | nter Bolts)= | 583 | lbs | | | 0 |
| | | | | | | | | |
| | | Anchorage | Force - | 310 | lbs/per bolt | c | 3 ganged | units |
| | | | r Force = | 585 | lbs/per bolt | # of bolts | per unit : | = 4 |
| | | | | | | | | |
| De | esign Bolts f | or 310 lbs te | ension, 5 | 585 lbs. | shear, longi | tudinal direc | tion | |
| | | | | | | | | |
| ransverse Over | <u>turning</u> | | | | | | | |
| Overturning | | / | | 400 740 | u | Ganged Para | | |
| Moment = | | 0.9 (72in. x | 1590lbs.) = | 100,742 | Ib-in | Transverse Seismic Force | | |
| 0.9xResisting | | | | 10 | | 0 | ••••• | ° ° |
| Moment = | - • | 0 lbs - Vert. Comp | , - | - | | | | |
| | Vertical | Component (0.2*S | 5DS^Wp) = | 583 | lb-in | 0 | <u> </u> | 0 0 |
| | | | | | | 3 | B ganged | units |
| | | Anchorage | | 624 | lbs/per bolt | | | |



233

lbs/per bolt

of bolts per unit = 4

Shear Force =

Drawing Reference See: <u>SK-5 & SK-8</u>



RMJ

Robinson Meier Juilly & Associates Principals Peter Robinson, S.E. Jayson E. Haines, S.E.

Drawing Details

GENERAL NOTES

<u>design</u>

Design conforms to the International Building Code, 2012 & the California Building Code, 2013 Edition.

Design Criteria: Importance Factor 1.5 Seismic Design Category (SDC).... VARIES Maximum Value of Ss..... 2.75

<u>Dimensions</u>: Refer to rough concrete surfaces, face of studs, face of conc. block, top of sheathing, or top of slab, unless otherwise indicated.

<u>Typical Details</u>: Details and notes on these sheets shall apply unless specifically shown or noted otherwise. Construction details not fully shown or noted shall be similar to details for similar conditions. All work and construction shall comply with all applicable building codes, regulations, and safety requirements.

<u>Discrepancies</u>: The Contractor shall inform the Architect in writing, during the bidding period, of any discrepancies or omissions noted on the drawings or in the specifications, or of any variations needed in order to conform to codes, rules, and regulations. Upon receipt of such information, the Architect will send written instructions to all concerned. Any such discrepancy, omission, or variation not reported shall be the responsibility of the Contractor, and work shall be performed in a manner as directed by the Architect.

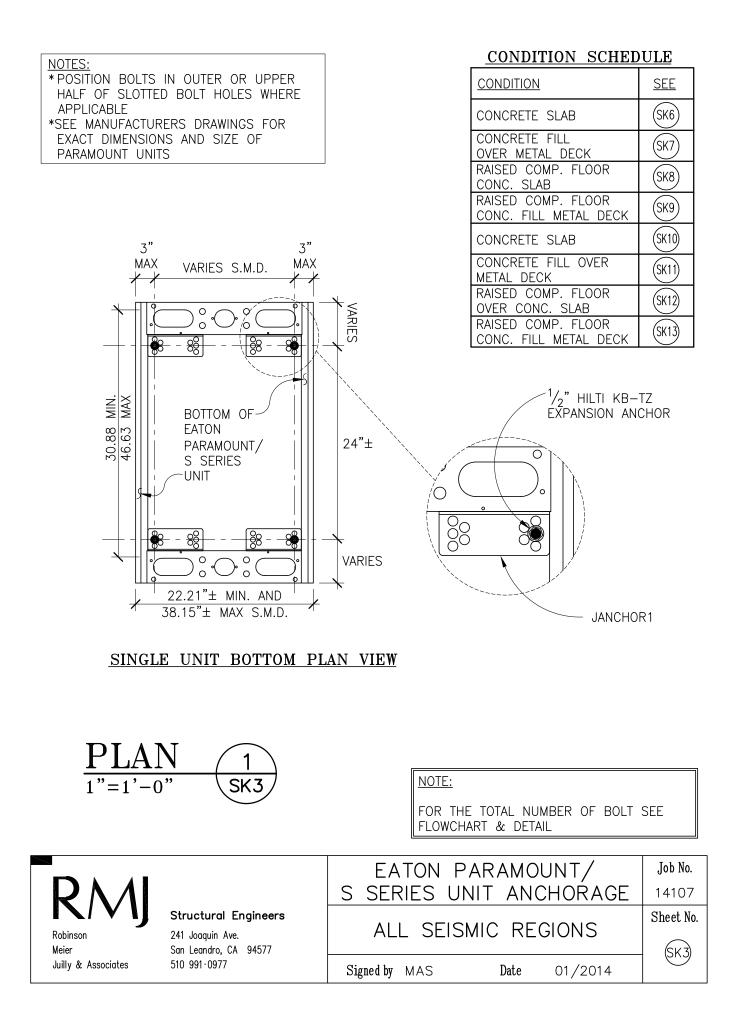
EXISTING CONSTRUCTION

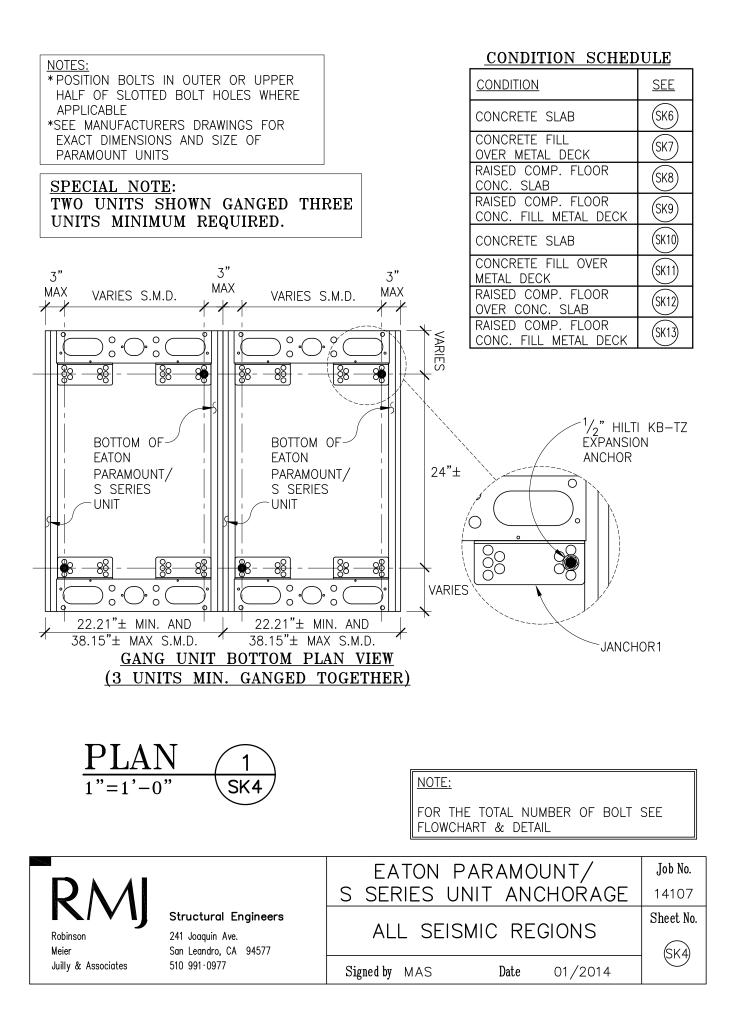
Existing construction shown on the drawings was obtained from existing drawings or field surveys. The Contractor shall verify all existing conditions and shall notify the Architect of all exceptions before proceeding with the work. The removal, cutting, drilling, etc. of existing work shall be performed with great care and small tools in order not to jeopardize the structural integrity of the building. If existing structural members, not indicated for removal, interfere with the new work, the Structural Engineer shall be notified immediately, and approval obtained, before removal of the existing members.

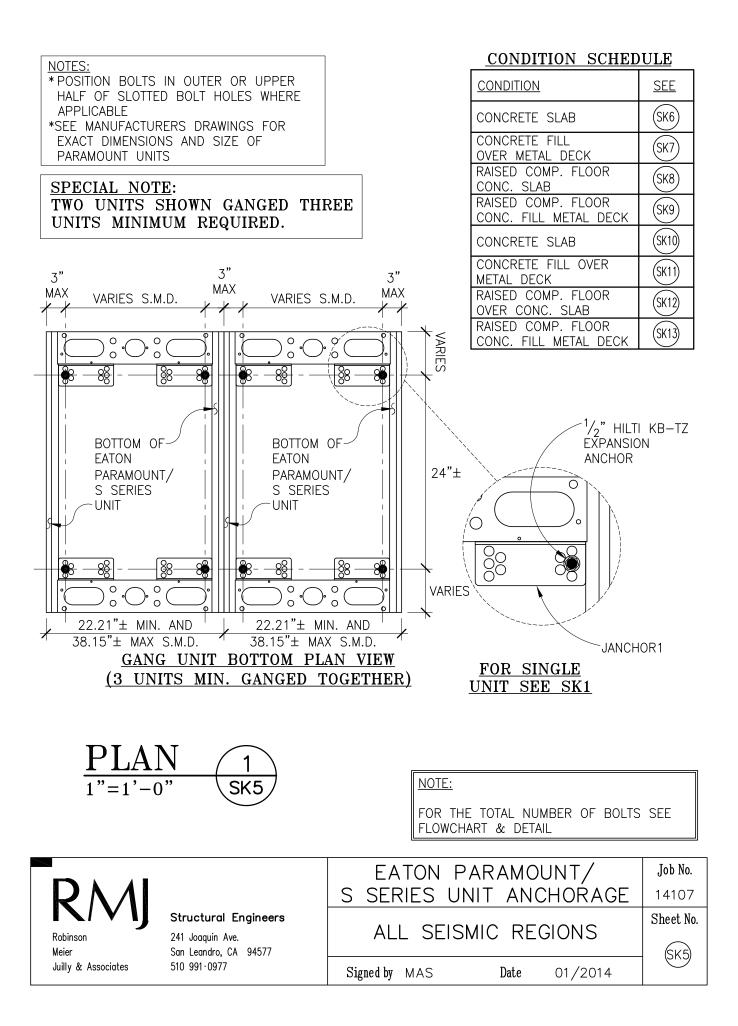
FASTENERS

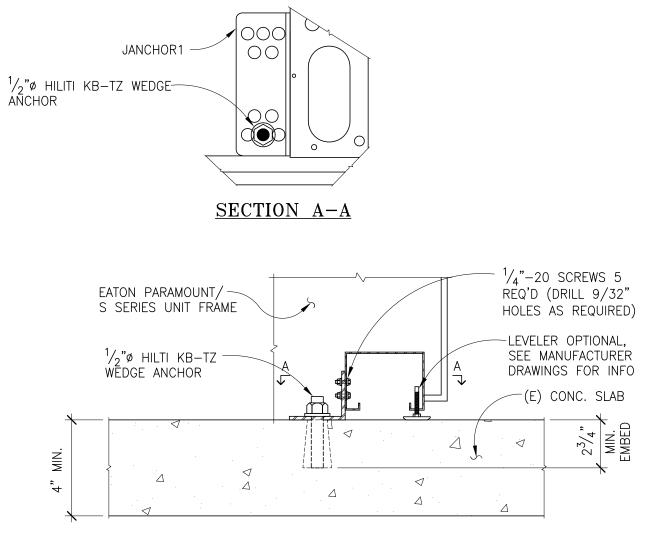
<u>Wedge Anchors</u>: Hilti Kwik Bolt Wedge Anchor, types as indicated per ICBO evaluation report No. 1917 or by manufacture having current ICBO evaluation report with values Iin shear and tension) equal or greater.

| | | EATON P S SERIES UI | | , | Job No. 14107 |
|---------------------|--|------------------------|-----------|---------|-------------------------|
| Robinson Meier | Structural Engineers 241 Joaquin Ave. San Leandro, CA 94577 | ALL SEIS | Sheet No. | | |
| Juilly & Associates | 510 991 0977 | Signed by MAS | Date | 01/2014 | |





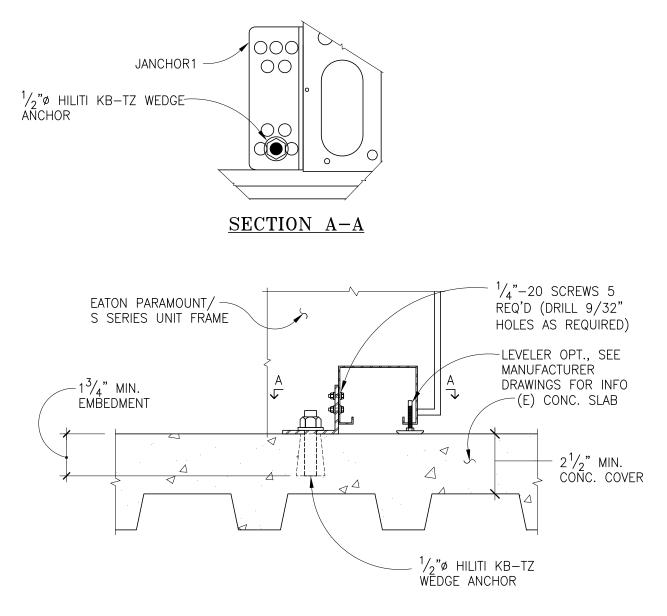




CONCRETE SLAB INSTALLATION



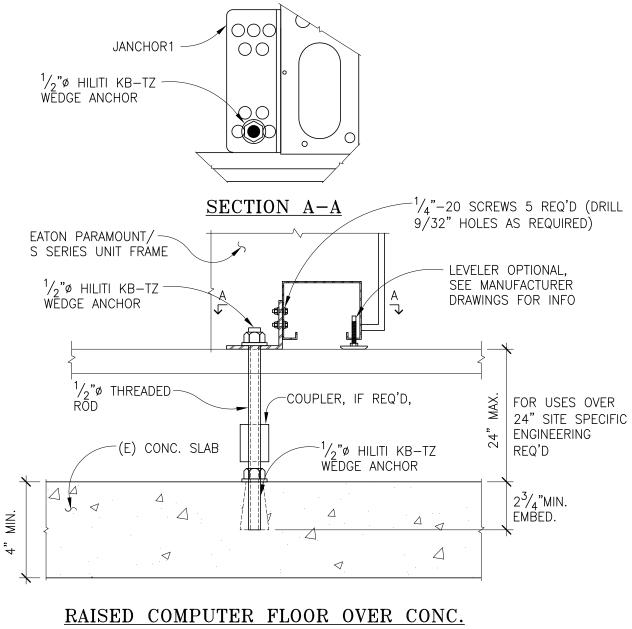
| RM Structural Engineers | EATON PA | | • | Job No. 14107 |
|--|---------------|--------|---------|-------------------------|
| KobinsonStructural EngineersWeierSan Leandro, CA 94577 | ALL SEISM | AIC RE | GIONS | Sheet No. |
| Juilly & Associates 510 991 0977 | Signed by MAS | Date | 01/2014 | |



CONCRETE FILL OVER METAL DECK INSTALLATION



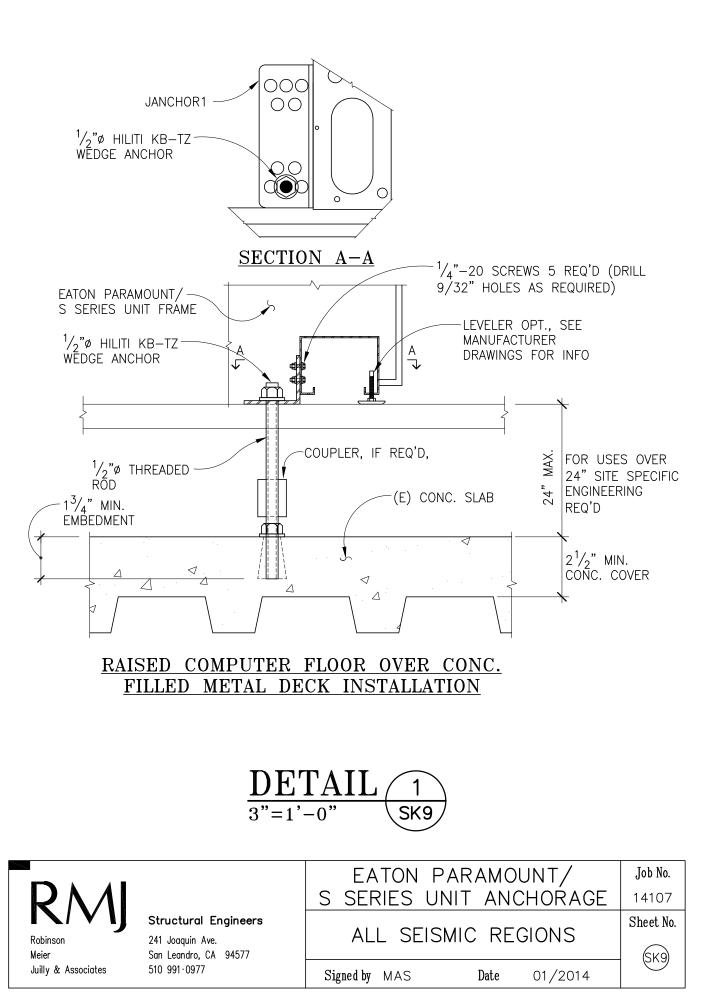
| RMJ Robinson Meier San Leandro, CA 94577 Structural Engineers 241 Joaquin Ave. San Leandro, CA 94577 San Leandro, CA 94777 San Leandro, CA 94777 San Le | neet No. |
|--|----------|
| Juilly & Associates 510 991.0977 Signed by MAS Date 01/2014 | SK |

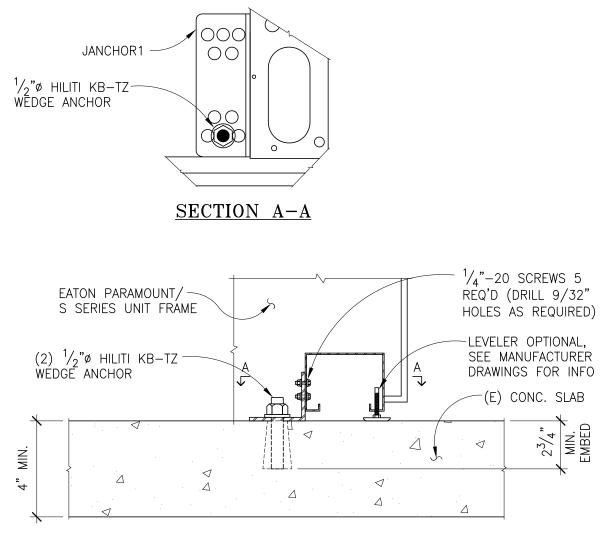


SLAB INSTALLATION



| RM Structural Engineers | | EATON P S SERIES UN | | , | Job No. 14107 |
|---------------------------|--------------|------------------------|--------|---------|-------------------------|
| Robinson 241 Joaquin Ave. | - | ALL SEIS | MIC RE | GIONS | Sheet No. |
| Juilly & Associates | 510 991 0977 | Signed by MAS | Date | 01/2014 | |

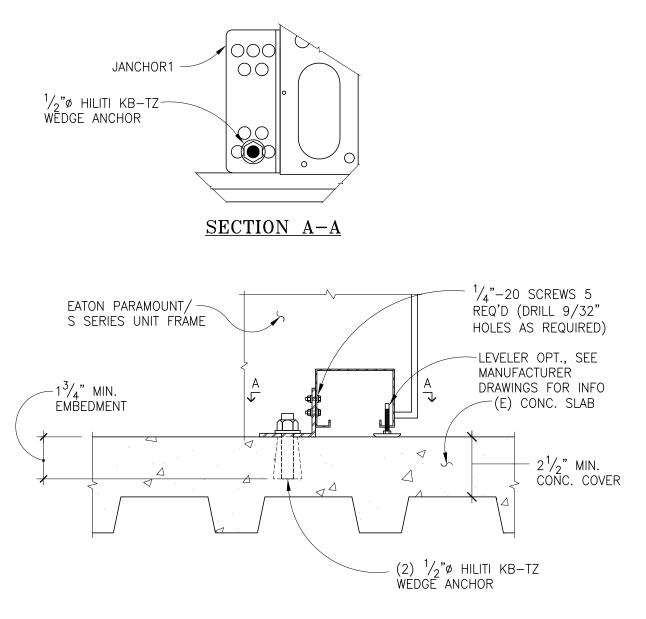




CONCRETE SLAB INSTALLATION



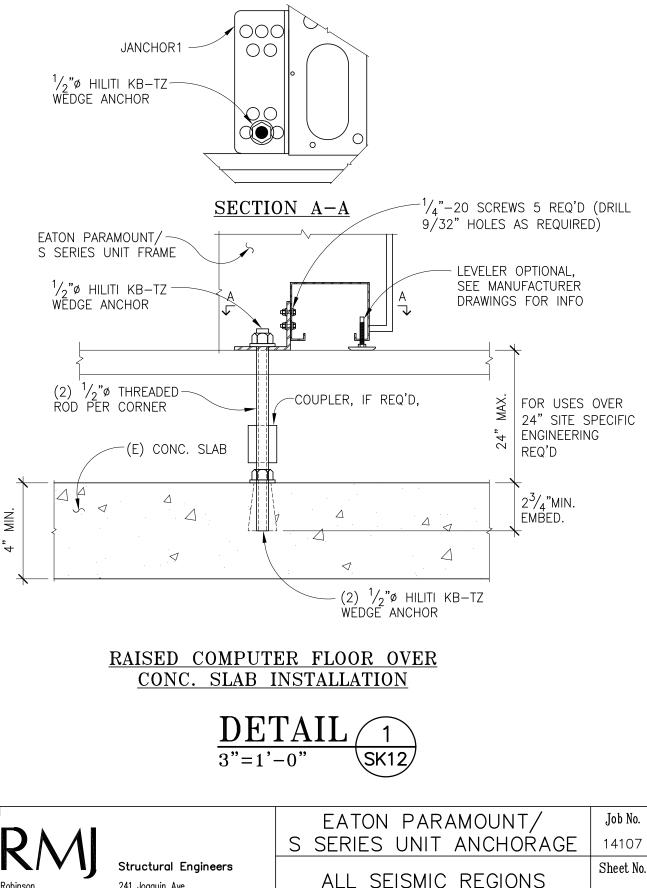
| | RM Structural Engineers | | EATON P S SERIES UI | | , | Job No. 14107 |
|---|---------------------------|------------------|------------------------|--------|---------|-------------------------|
| Meier San Leandro, CA 94577 | Robinson 241 Joaquin Ave. | 241 Joaquin Ave. | ALL SEIS | MIC RE | GIONS | Sheet No. |
| Juilly & Associates 510 991 0977 Signed by MAS Date 01/2014 | Juilly & Associates | | Signed by MAS | Date | 01/2014 | |



CONCRETE FILL OVER METAL DECK INSTALLATION



| Robinson 2 | Robinson 241 Joaquin Ave. | EATON F S SERIES U ALL SEIS | NIT ANG | CHOŔAGE | Job No. 14107 Sheet No. (SK11) |
|------------|---------------------------|-----------------------------------|---------|---------|---|
| | 10 991·0977 | Signed by MAS | Date | 01/2014 | |



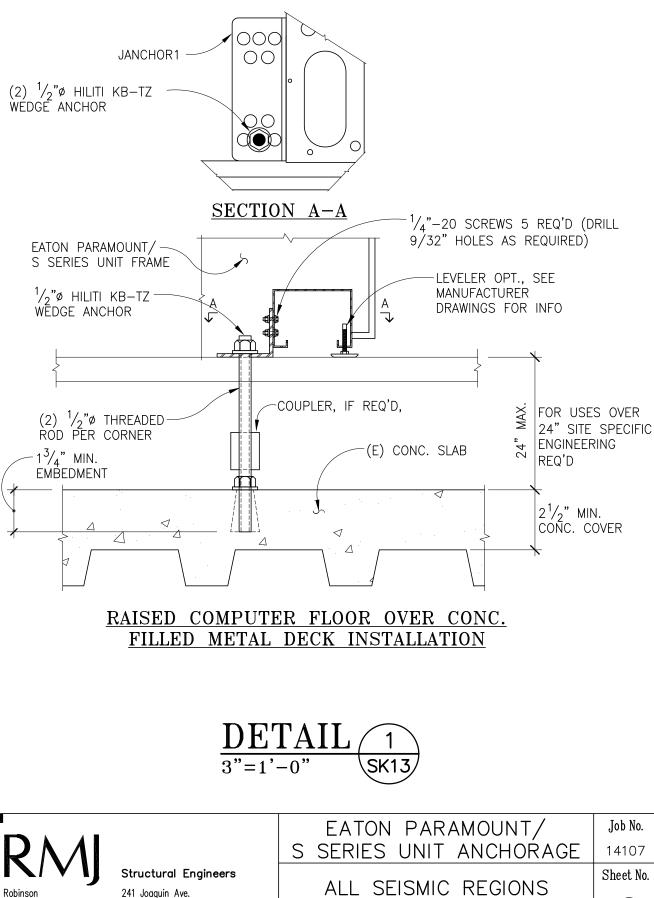
Robinson Meier Juilly & Associates 241 Joaquin Ave. San Leandro, CA 94577 510 991-0977

Signed by MAS

Date C

01/2014

(SK12)



Meier Juilly & Associates 241 Joaquin Ave. San Leandro, CA 94577

510 991.0977

ALL SEISMIC REGIONS (SK13) Signed by MAS 01/2014 Date



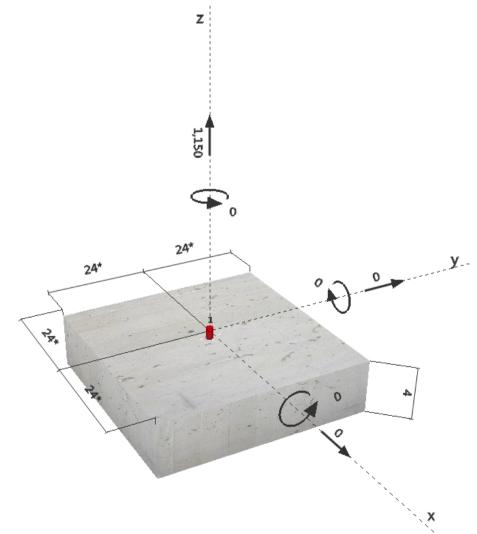
Company: Specifier: Address: Phone I Fax: E-Mail: RMJ mario 241 Joaquin Ave. 510.991.0977 | msigala@rmjse.com Page: Project: Sub-Project I Pos. No.: Date: 1 Eaton 14107 1/16/2014

Specifier's comments: Tension

1 Input data

| Anchor type and diameter: | Kwik Bolt TZ - CS 1/2 (2) | |
|------------------------------------|--|---------------------------------------|
| Effective embedment depth: | $h_{ef,act}$ = 2.000 in., h_{nom} = 2.375 in. | |
| Material: | Carbon Steel | |
| Evaluation Service Report: | ESR-1917 | |
| Issued I Valid: | 5/1/2013 5/1/2015 | |
| Proof: | design method ACI 318-11 / Mech. | |
| Stand-off installation: | - (Recommended plate thickness: not calculated) | |
| Profile: | no profile | |
| Base material: | cracked concrete, 2500, $f_{c}{}^{\prime}$ = 2500 psi; h = 4.000 in. | |
| Installation: | hammer drilled hole, installation condition: dry | |
| Reinforcement: | tension: condition B, shear: condition B; no suppleme | ental splitting reinforcement present |
| | edge reinforcement: none or < No. 4 bar | |
| Seismic loads (cat. C, D, E, or F) | Tension load: yes (D.3.3.4.3 (c)) | |
| | Shear load: yes (D.3.3.5.3 (b)) | |

Geometry [in.] & Loading [lb, in.lb]





| Company: | |
|--------------|--|
| Specifier: | |
| Address: | |
| Phone I Fax: | |
| E-Mail: | |

RMJ mario 241 Joaquin Ave. 510.991.0977 | msigala@rmjse.com Page: Project: Sub-Project I Pos. No.: Date: 2 Eaton 14107 1/16/2014

2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [lb]

| Tension force: (+Tension, -Compression) | | | | | | |
|--|---------------|-------------|---------------|---------------|--|--|
| Anchor | Tension force | Shear force | Shear force x | Shear force y | | |
| 1 | 1150 | 0 | 0 | 0 | | |
| max. concrete compressive strain: - [‰] | | | | | | |
| max. concrete compressive stress: - [psi] | | | | | | |
| resulting tension force in $(x/y)=(0.000/0.000)$: 0 [lb] | | | | | | |
| resulting compression force in (x/y)=(0.000/0.000): 0 [lb] | | | | | | |
| | | | | | | |

3 Tension load

| | | Load N _{ua} [lb] | Capacity _∲ N _n [lb] | Utilization $\beta_N = N_{ua}/\phi N_n$ | Status |
|-----------------------------|---------------------------------------|--|---|---|--------|
| Steel Strength* | | 1150 | 8029 | 15 | OK |
| Pullout Strength* | | N/A | N/A | N/A | N/A |
| Concrete Breakout Stre | ength** | 1150 | 1172 | 99 | OK |
| * anchor having the hig | hest loading | **anchor group (anchors in tension) |) | | |
| 3.1 Steel Strength | | | | | |
| N _{sa} = ESR value | refer to l | CC-ES ESR-1917 | | | |
| $\phi N_{steel} \ge N_{ua}$ | ACI 318- | 11 Table D.4.1.1 | | | |
| Variables | | | | | |
| n | A _{se,N} [in. ²] | f _{uta} [psi] | | | |
| 1 | 0.10 | 106000 | | | |
| Calculations | | | | | |
| N _{sa} [lb] | | | | | |
| 10705 | | | | | |
| Results | | | | | |
| N _{sa} [lb] | Østeel | $_{igoplus}$ N _{sa} [lb] N _{ua} [lb] | | | |
| 10705 | 0.750 | 8029 1150 | | | |



| Company: | RMJ |
|--------------|-------------------|
| Specifier: | mario |
| Address: | 241 Joaquin Ave. |
| Phone I Fax: | 510.991.0977 |
| E-Mail: | msigala@rmjse.com |

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3 Eaton 14107 1/16/2014

| $N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_{b}$ | ACI 318-11 Eq. (D-3) |
|--|--------------------------|
| $\oint_{0} N_{cb} \ge N_{ua}$ | ACI 318-11 Table D.4.1.1 |
| A _{Nc} see ACI 318-11, Part D.5.2.1, Fig. RD.5.2.1(b) | |
| $A_{\rm Nc0} = 9 h_{\rm ef}^2$ | ACI 318-11 Eq. (D-5) |
| $\psi_{ec,N} = \left(\frac{1}{1 + \frac{2}{3} \frac{e_N}{h_{ef}}}\right) \le 1.0$ | ACI 318-11 Eq. (D-8) |
| $\psi_{\text{ed,N}} = 0.7 + 0.3 \left(\frac{c_{a,\min}}{1.5h_{ef}}\right) \le 1.0$ | ACI 318-11 Eq. (D-10) |
| $\begin{split} \psi_{cp,N} &= MAX \left(\frac{C_{a,min}}{C_{ac}}, \frac{1.5h_{ef}}{C_{ac}} \right) \leq 1.0 \\ N_b &= k_c \lambda_a \sqrt{t_c} h_e^{1.5} \end{split}$ | ACI 318-11 Eq. (D-12) |
| $N_{b} = k_{c} \lambda_{a} \sqrt{f_{c}} h_{ef}^{1.5}$ | ACI 318-11 Eq. (D-6) |
| Variables | |
| | |

Variables

| h _{ef} [in.] | e _{c1,N} [in.] | e _{c2,N} [in.] | c _{a,min} [in.] | Ψc,N | | |
|-------------------------------------|--------------------------------------|-------------------------|--------------------------|-------|-------|---------------------|
| 2.000 | 0.000 | 0.000 | 24.000 | 1.000 | | |
| e fiel | Ŀ | | é trait | | | |
| c _{ac} [in.] | k _c | λa | ť _c [psi] | | | |
| 5.500 | 17 | 1.000 | 2500 | | | |
| | | | | | | |
| Calculations | | | | | | |
| A _{Nc} [in. ²] | A _{Nc0} [in. ²] | Wec1,N | Vec2,N | Wed,N | Ψcp,N | N _b [lb] |
| 36.00 | 36.00 | 1.000 | 1.000 | 1.000 | 1.000 | 2404 |
| Results | | | | | | |

| N _{cb} [lb] | ¢concrete | фseismic | ∮ nonductile | $_{igoplus}$ N _{cb} [lb] | N _{ua} [lb] | |
|----------------------|-----------|----------|---------------------|-----------------------------------|----------------------|--|
| 2404 | 0.650 | 0.750 | 1.000 | 1172 | 1150 | |



Profis Anchor 2.4.

| 4 |
|-------------------|
| Eaton |
| I Pos. No.: 14107 |
| 1/16/2014 |
| |

4 Shear load

| | Load V _{ua} [lb] | Capacity _∳ V _n [lb] | Utilization $\beta_V = V_{ua}/\phi V_n$ | Status |
|---------------------------------------|---------------------------|---|---|--------|
| Steel Strength* | N/A | N/A | N/A | N/A |
| Steel failure (with lever arm)* | N/A | N/A | N/A | N/A |
| Pryout Strength* | N/A | N/A | N/A | N/A |
| Concrete edge failure in direction ** | N/A | N/A | N/A | N/A |
| | | | | |

* anchor having the highest loading **anchor group (relevant anchors)

5 Warnings

- To avoid failure of the anchor plate the required thickness can be calculated in PROFIS Anchor. Load re-distributions on the anchors due to elastic deformations of the anchor plate are not considered. The anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the loading!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-11 Appendix D, Part D.3.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Part D.3.3.4.3 (b), Part D.3.3.4.3 (c), or Part D.3.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Part D.3.3.5.3 (a), Part D.3.3.5.3 (b), or Part D.3.3.5.3 (c).
- Part D.3.3.4.3 (b) / part D.3.3.5.3 (a) requires that the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Part D.3.3.4.3 (c) / part D.3.3.5.3 (b) waives the ductility requirements and requires that the anchors shall be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Part D.3.3.4.3 (d) / part D.3.3.5.3 (c) waives the ductility requirements and requires the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by Ω₀.
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-11, Part D.9.1

Fastening meets the design criteria!



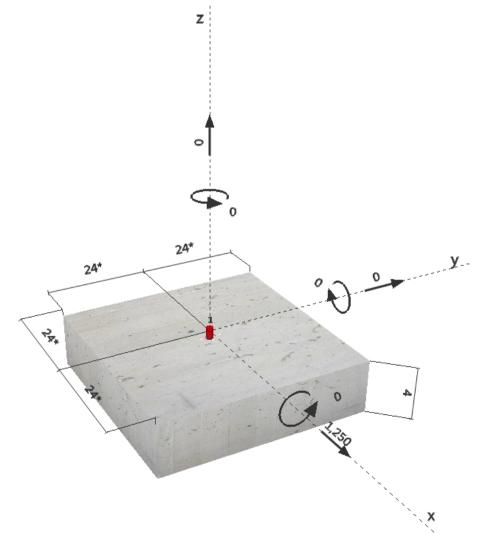
Company: Specifier: Address: Phone I Fax: E-Mail: RMJ mario 241 Joaquin Ave. 510.991.0977 | msigala@rmjse.com Page: Project: Sub-Project I Pos. No.: Date: 1 Eaton 14107 1/16/2014

Specifier's comments: Shear

1 Input data

| Anchor type and diameter: | Kwik Bolt TZ - CS 1/2 (2) | |
|------------------------------------|---|--------------------------------------|
| Effective embedment depth: | $h_{ef,act}$ = 2.000 in., h_{nom} = 2.375 in. | |
| Material: | Carbon Steel | |
| Evaluation Service Report: | ESR-1917 | |
| Issued I Valid: | 5/1/2013 5/1/2015 | |
| Proof: | design method ACI 318-11 / Mech. | |
| Stand-off installation: | - (Recommended plate thickness: not calculated) | |
| Profile: | no profile | |
| Base material: | cracked concrete, 2500, f_c ' = 2500 psi; h = 4.000 in. | |
| Installation: | hammer drilled hole, installation condition: dry | |
| Reinforcement: | tension: condition B, shear: condition B; no suppleme | ntal splitting reinforcement present |
| | edge reinforcement: none or < No. 4 bar | |
| Seismic loads (cat. C, D, E, or F) | Tension load: yes (D.3.3.4.3 (c)) | |
| | Shear load: yes (D.3.3.5.3 (b)) | |

Geometry [in.] & Loading [lb, in.lb]





Profis Anchor 2.4.5

www.hilti.us

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|--------------|--|
| Specifier: | |
| Address: | |
| Phone I Fax: | |
| E-Mail: | |

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2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [lb]

| rension force: (+ rension, -Compression) | | | | | |
|--|---|-------------|--|---------------|--|
| Anchor | Tension force | Shear force | Shear force x | Shear force y | |
| 1 | 0 | 1250 | 1250 | 0 | |
| max. concrete co resulting tension | mpressive strain: mpressive stress: force in (x/y)=(0.0 ssion force in (x/y) | 00/0.000): | - [‰] - [psi] 0 [lb] : 0 [lb] | | |

3 Tension load

| | Load N _{ua} [lb] | Capacity _o N _n [lb] | Utilization $\beta_N = N_{ua}/\phi N_n$ | Status |
|--------------------------------------|-------------------------------------|---|---|--------|
| Steel Strength* | N/A | N/A | N/A | N/A |
| Pullout Strength* | N/A | N/A | N/A | N/A |
| Concrete Breakout Strength** | N/A | N/A | N/A | N/A |
| * another having the highest leading | **anabar group (anabara in tanaian) | | | |

* anchor having the highest loading **anchor group (anchors in tension)



Profis Anchor 2.4.5

| www.hilti.us | | | Profis Anchor 2.4 |
|-------------------------|-------------------------------------|-------------------------|-------------------|
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| Phone I Fax: E-Mail: | 510.991.0977 msigala@rmjse.com | Date: | 1/16/2014 |

4 Shear load

| | Load V _{ua} [lb] | Capacity _∳ V _n [lb] | Utilization $\beta_V = V_{ua}/\phi V_n$ | Status |
|---|---------------------------|---|---|--------|
| Steel Strength* | 1250 | 3572 | 35 | OK |
| Steel failure (with lever arm)* | N/A | N/A | N/A | N/A |
| Pryout Strength** | 1250 | 1683 | 75 | OK |
| Concrete edge failure in direction x+** | 1250 | 5973 | 21 | OK |
| | | | | |

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

| V _{seis} | = ESR value | refer to ICC-ES ESR-1917 |
|-------------------|---------------------|--------------------------|
| ϕV_{stee} | l ≥ V _{ua} | ACI 318-11 Table D.4.1.1 |

Variables

| n | A _{se,V} [in. ²] | f _{uta} [psi] |
|---|---------------------------------------|------------------------|
| 1 | 0.10 | 106000 |

Calculations

V_{sa} [lb] 5495

Results

| V _{sa,eq} [lb] | фsteel | _φ V _{sa} [lb] | V _{ua} [lb] |
|-------------------------|--------|-----------------------------------|----------------------|
| 5495 | 0.650 | 3572 | 1250 |

4.2 Pryout Strength

| $V_{cp} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_{b} \right]$ | ACI 318-11 Eq. (D-40) |
|---|--------------------------|
| $_{\phi}$ V _{cp} ≥ V _{ua} A _{Nc} see ACI 318-11, Part D.5.2.1, Fig. RD.5.2.1(b) | ACI 318-11 Table D.4.1.1 |
| | |
| $A_{Nc0} = 9 h_{ef}^2$ | ACI 318-11 Eq. (D-5) |
| $\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e_N}{3 h_{ef}}}\right) \le 1.0$ | ACI 318-11 Eq. (D-8) |
| $\psi_{\text{ed,N}} = 0.7 + 0.3 \left(\frac{\text{c}_{a,\text{min}}}{1.5\text{h}_{\text{ef}}} \right) \le 1.0$ | ACI 318-11 Eq. (D-10) |
| $\begin{split} \psi_{\text{cp,N}} &= \text{MAX}\left(\frac{c_{a,\min}}{c_{ac}}, \frac{1.5h_{\text{ef}}}{c_{ac}}\right) \leq 1.0\\ N_{\text{b}} &= k_{\text{c}} \lambda_{a} \sqrt{f_{\text{c}}} h_{\text{ef}}^{1.5} \end{split}$ | ACI 318-11 Eq. (D-12) |
| $N_{b} = k_{c} \lambda_{a} \sqrt{f_{c}} h_{ef}^{1.5}$ | ACI 318-11 Eq. (D-6) |
| | |

Variables

| N _b [lb] 2404 |
|-----------------------------|
| |
| |
| |



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| E-Mail: | msigala@rmjse.com |

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4.3 Concrete edge failure in direction x+

| $V_{cb} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_{b}$ | ACI 318-11 Eq. (D-30) |
|--|--------------------------|
| $\phi V_{cb} \ge V_{ua}$ A _{Vc} see ACI 318-11, Part D.6.2.1, Fig. RD.6.2.1(b) | ACI 318-11 Table D.4.1.1 |
| $A_{Vc0} = 4.5 c_{a1}^2$ | ACI 318-11 Eq. (D-32) |
| $\psi_{\text{ec,V}} = \left(\frac{1}{1 + \frac{2e_v}{3c_{a1}}}\right) \le 1.0$ | ACI 318-11 Eq. (D-36) |
| $\psi_{\text{ed},V} = 0.7 + 0.3 \left(\frac{c_{a2}}{1.5c_{a1}} \right) \le 1.0$ | ACI 318-11 Eq. (D-38) |
| $\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \ge 1.0$ | ACI 318-11 Eq. (D-39) |
| $V_{b} = \left(7 \left(\frac{I_{e}}{d_{a}}\right)^{0.2} \sqrt{d_{a}}\right) \lambda_{a} \sqrt{f_{c}} c_{a1}^{1.5}$ | ACI 318-11 Eq. (D-33) |

Variables

| c _{a1} [in.] | c _{a2} [in.] | e _{cV} [in.] | Ψc,∨ | h _a [in.] | |
|-------------------------------------|--------------------------------------|-----------------------|-----------------------|--------------------------------------|----------------------|
| 16.000 | 24.000 | 0.000 | 1.000 | 4.000 | |
| | | | | | |
| l _e [in.] | λa | d _a [in.] | f _c [psi] | Ψparallel,V | |
| 2.000 | 1.000 | 0.500 | 2500 | 1.000 | |
| Calculations | | | | | |
| A _{vc} [in. ²] | A _{Vc0} [in. ²] | Ψec,V | $\psi_{\text{ed}, V}$ | Ψh,V | V _b [lb] |
| 192.00 | 1152.00 | 1.000 | 1.000 | 2.449 | 20900 |
| Results | | | | | |
| V _{cb} [lb] | ∳concrete | фseismic | ∮nonductile | $_{ m \varphi}$ V _{cb} [lb] | V _{ua} [lb] |
| 8532 | 0.700 | 1.000 | 1.000 | 5973 | 1250 |

5 Warnings

- To avoid failure of the anchor plate the required thickness can be calculated in PROFIS Anchor. Load re-distributions on the anchors due to elastic deformations of the anchor plate are not considered. The anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the loading!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-11 Appendix D, Part D.3.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Part D.3.3.4.3 (b), Part D.3.3.4.3 (c), or Part D.3.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Part D.3.3.5.3 (a), Part D.3.3.5.3 (b), or Part D.3.3.5.3 (c).
- Part D.3.3.4.3 (b) / part D.3.3.5.3 (a) requires that the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Part D.3.3.4.3 (c) / part D.3.3.5.3 (b) waives the ductility requirements and requires that the anchors shall be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Part D.3.3.4.3 (d) / part D.3.3.5.3 (c) waives the ductility requirements and requires the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by Ω₀.
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-11, Part D.9.1

Fastening meets the design criteria!

RMJ

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| Meier Juilly & Associates | 650 871-2282 FAX 650 871-2459 | Signed by MAS | Sheet No. 53 of |

SHEAR

*

$$\frac{(anc. B_{REDVOOT} \leq \pi_{RENGTH} OF ANCHOR IN \leq \mu_{EDR} [Sec. D.62]}{N_{CD} = \frac{Anc}{A_{NCO}} \cdot \sqrt{a}_{a}_{a} \cdot \sqrt{c}_{a}_{v} \cdot V_{e} [E_{2} D-21]}$$
NOTE: CONCRETE ANCHORS NOT NEEDR ANY EDGES :.
THIS WILL NOT CONDITION WILL NOT GODERN *

$$\frac{(anc. Peyout S \pi_{REMATH} OF Anchor In Sheer [Sec. D.63]}{V_{CP} = K_{CP} \cdot N_{CD} \cdot [Ean. D-29]}$$

$$k_{CP} = 1$$

$$N_{CD} = 2,156 * (SEE TENSION Cell.)$$

$$V_{CP} = 2,156 *$$

$$\frac{4}{2} = 0.75 \cdot \frac{4}{5} = 0.75$$

$$\frac{4}{5} V_{CP} = 1,152 *$$

$$\frac{STEEL}{STREPOTH OF Anchor In Sheer [Sec. D.6.1]}{V_{SP} = (2,405 * (H_{1,PT}, CPT. PG. 3)9)}$$

$$P = 0.65 [D, 4.4]$$

$$\frac{4V_{SP}}{V_{SP}} = 0.75 \times 0.65 \times (a,405 * = 3,122 * 0.25 * (a,205 * = 3,122 * 0.25 * (a,205 * a,200 * 0.25 * a,200 * 0.25 * (a,205 * a,200 * 0.25 * (a,200 * a,200 * a,200 * a,200 * (a,200 * a,200 *$$

| RM | J |
|----|---|
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TENSION

. . .

$$\frac{5_{TEEL} S_{TALINGTH} OF ANCEON IN TENERON [Sec. D.S.1]}{Nshin n. Ase Sume [EQU. D-3]}
n=1; Ase= 0.101in2 (High Car)
Suea = 115,000 #
 $\phi = 0.75$
 $\phi Nshi = 0.75 \times 0.101 \times 115,000$
 $= 8,711 #$
CONC. BREENEON STREMATH OF ANCHOR IN TENESON [SEC. D.S.2]
 $N_{CH} = \frac{A_{NC}}{A_{NCO}} \cdot \Psi_{ed,H} \cdot \Psi_{CT,H} \cdot N_{H} \cdot [EON. D-7]$
 $here = 1^{3/4}$
 $A_{NCO} = A_{NC} = 9 \cdot here = 9 \times 1.75^{2}$
 $= 27.6 in^{2}$
 $\Psi_{ed,H} = 1.0 \cdot [EQN. D-10 \text{ or } D-11]$
 $\Psi_{CT,H} = 1.0 \cdot [Sec. D.5.2.6]$
 $N_{h} = K_{h} \cdot \sqrt{F_{h}} \cdot here ^{1.5} \cdot [EQN. D-7]$
 $k_{c} = 17$
 $N_{h} = 17 \cdot \sqrt{3,000}^{2} \cdot 1.75^{2}$
 $= 2,156^{4}$
 $\phi = 0.455 \cdot D.4.4]$$$

| | | Eaton | |
|------------------------------|--|--|-----------------|
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| | $n N_{Fn,fc} = Y_{E,P}$ | 67H OF ANCHOR IN TEN Np 5 x 1,460 [±] (Нисти # < GOVERNS | |
| SIDE | FACE BLOW OUT C | SE ANCHOR IN TENSION | [SEC, D, 5. 4] |

ANCHOR NOT LLOSE TO ANY EDGE

<u>STEEL STRENGTH</u> OF ANCHOR IN SHEAR [SEC. D. 61] VSA = n. D.6 ASE, f#2a = 1,0-0.6 × 0.101 × 106,000 = 6,424 #

¢Vsa = 0.75 × 0.65 × 6,424 *

= 3,132 #