HGA

Architecture | Engineering | Planning

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Clovis Community Medical Center

RF 1363

Structural Calculations

Commission No: 2088-052-01
Sutter Clovis Community Medical Center
Date: June 23, 2015

CLOVIS – RF 1363

HGA Commission Number 2088-052-01

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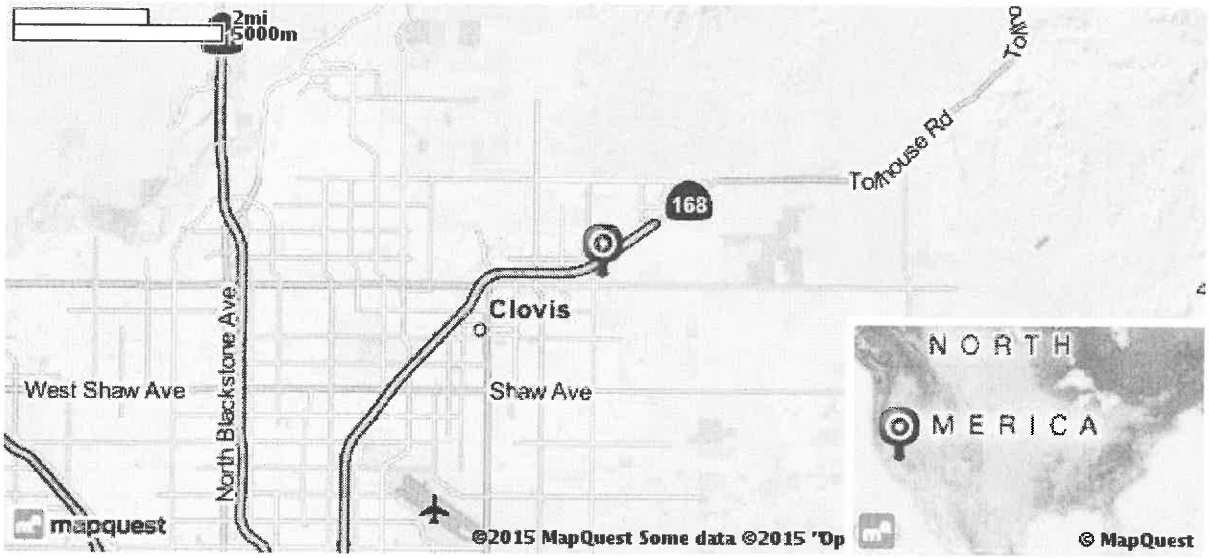
USGS Design Maps Summary Report

User–Specified Input

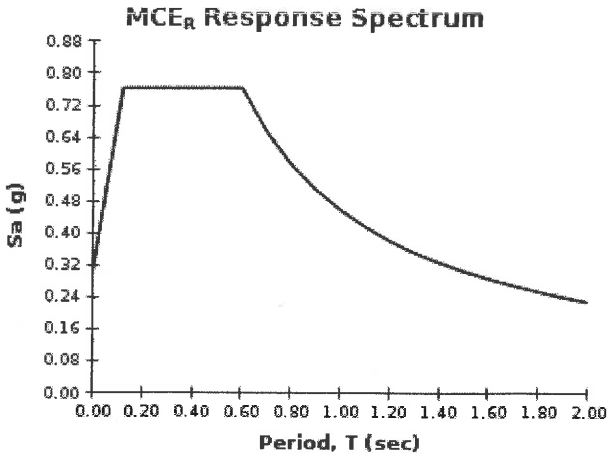
Report Title	Clovis Wed June 17, 2015 16:42:38 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	36.8392°N, 119.66°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	IV (e.g. essential facilities)

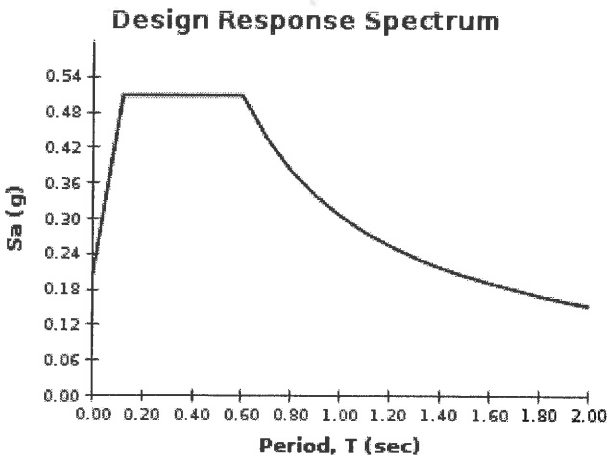


USGS–Provided Output

S_S =	0.567 g	S_{MS} =	0.763 g	S_{DS} =	0.509 g
S_1 =	0.238 g	S_{M1} =	0.459 g	S_{D1} =	0.306 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

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Project : Clovis RF
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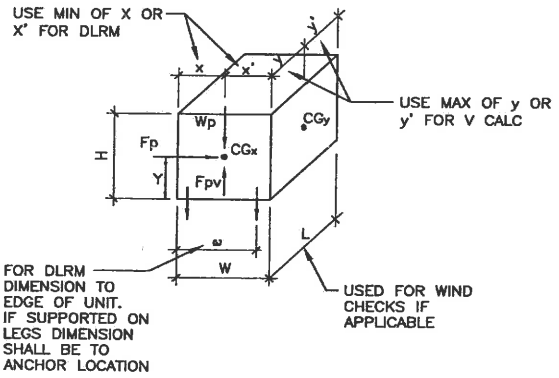
2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - WALL STAND - 3/A070



Height, H = -
Height to center of gravity, Y = 42.0 in
Length, L = 14.0 in
Width, W = 10.0 in
Overturning Dimension, ω = 10.0 in
x = 5.0 in
y = 7.0 in
Weight, W_p = 551 lbs
# of anchors in shear = 4
# of anchors in tension = 2
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 0 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 1.0

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 2.5

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 2.5

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.122 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.160 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

$F_{p,ASD}$ = 88 lbs
OTM = Y * $F_{p,ASD}$ = 3710 lb-in
$F_{p,v}$ = 39 lbs
DLRM = (0.6Wp - Fpv) * x = 0 lb-in

$$T = \frac{(OTM - DLRM) * \Omega \text{ factor}}{\omega * (\#\text{ Anchors})}$$ T = 464 lbs

$$V = \frac{2\,(F_{p,ASD} * (y / L)) * \Omega \text{ factor}}{\#\text{ Anchors}}$$ V = 55 lbs

(V is approximate when number of anchors exceeds 4)

USE (4)-1/2"Ø HILTI KB-TZ's W/ 2" EFFECTIVE EMBEDMENT
T_{ALL} = 1100 lbs
V_{ALL} = 1342 lbs
UNITY CHECK = 0.46

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SIEMENS MEDICAL SOLUTION

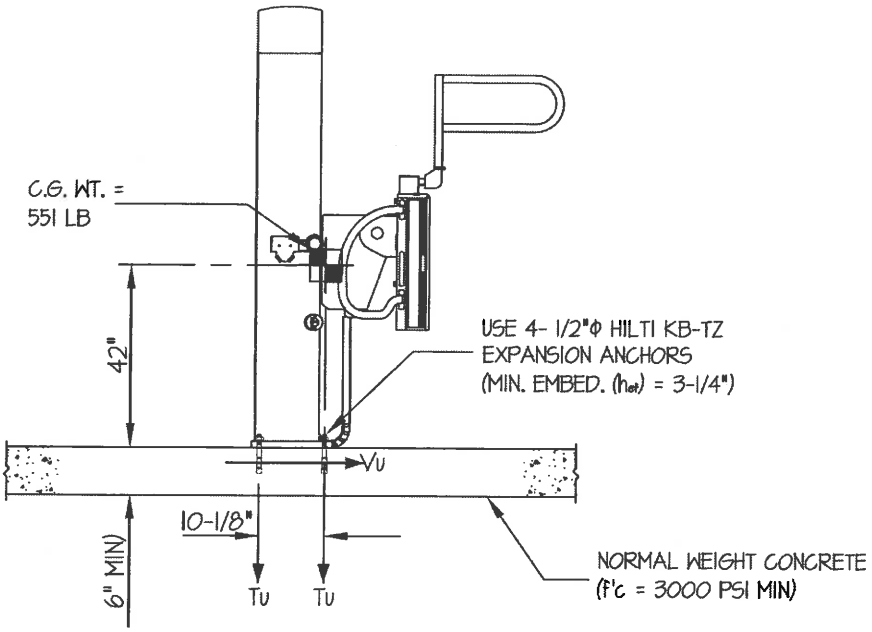
(AXIOM LUMINOS dRF SYSTEM)
LUMINOS dRF WALL STAND WITH MOBILE DETECTOR

DES.	J. ROBERSON
JOB NO.	35-1326
DATE	1/20/14

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB



Tu = 2466 LB/BOLT (MAX)
Vu = 372 LB/BOLT (MAX)

FRONT ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10. STRENGTH DESIGN IS USED.

   HORIZONTAL FORCE (E_h) = 0.90 W_p (S_{DS} = 2.00, a_p = 1.0, I_p = 1.5, R_p = 1.5, Ω_o = 1.5, z/h = 0)
   HORIZONTAL FORCE (E_{hc}) = 1.35 W_p (Ω_o = 1.5 FOR CONCRETE ANCHORAGE)
   VERTICAL FORCE (E_v) = 0.40 W_p

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN, IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2014
1/20/14
STRUCTURAL
STATE OF CALIFORNIA

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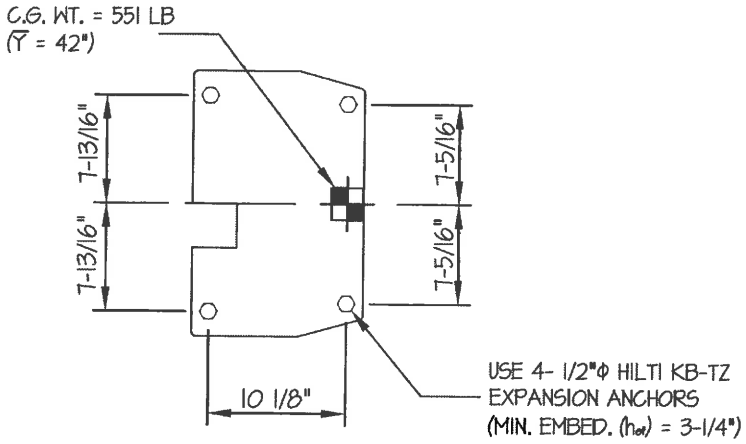
SIEMENS MEDICAL SOLUTION

(AXIOM LUMINOS dRF SYSTEM)
LUMINOS dRF WALL STAND WITH MOBILE DETECTOR

DES.	J. ROBERSON
JOB NO.	35-1326
DATE	1/20/14
SHEET	2
OF	2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB



PLAN AT BASE

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
(STRENGTH DESIGN IS USED) (S_{DS} = 2.00, a_p = 1.0, I_p = 1.5, R_p = 1.5, Ω_0 = 1.5, z/h = 0)

WEIGHT = 551 LB

HORIZONTAL FORCE (E_{hc}) = 1.35 W_p = 744 LB

VERTICAL FORCE (E_v) = 0.40 W_p = 220 LB

BOLT FORCES:

BOLT SPEC: 1/2" ø HILTI KB-TZ:
$\phi T = 0.75\phi N_n$ = 2625 LB/BOLT (TENSION)
$\phi V = \phi V_n$ = 3572 LB/BOLT (SHEAR)

TENSION (T)

$$T_{u\ MAXIMUM} = \left[\frac{744\#(42")}{2\ BOLTS(10.1")} \times (0.3)\right] + \frac{744\#(42")}{1\ BOLT(14.6")} - \frac{(0.9(551\#) - 220\#)}{2\ BOLTS} = 2466\ LB/BOLT\ (MAX)$$

(HORIZ. - SIDE TO SIDE) (HORIZ. - FRONT TO BACK) (0.9(WEIGHT) - E_v)

SHEAR (V)

$$V_{u\ MAXIMUM} = \frac{744\#}{2\ BOLTS} = 372\ LB/BOLT\ (MAX)$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.2 \quad \left(\frac{2466}{2625}\right) + \left(\frac{372}{3572}\right) = 1.04 \leq 1.2 \quad \therefore \text{ O.K.}$$

NOTE:
STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE SLAB OR OTHER SUPPORT STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN.

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Project : Clovis RF
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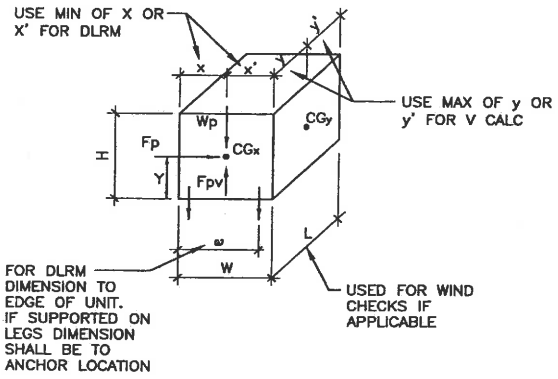
2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - GENERATOR CABINET - 4/A070



Height, H = -
Height to center of gravity, Y = -
Length, L = -
Width, W = -
Overturning Dimension, ω = -
x = -
y = -
Weight, W_p = 838 lbs
# of anchors in shear = -
# of anchors in tension = -
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 4 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 1.0

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 2.5

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 1.0 ← 2.5 for KB-TZ

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.157 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.160 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

$F_{p,ASD}$ = 134 lbs

$F_{p,v}$ = 60 lbs

Parallel / Perp

$T_{SMS} = 0.3\left(\frac{134\#(8")(42.3")}{2\text{screws}(27.5")(86.75")}\right) + \frac{134\#(42.3")}{4\text{screws}(86.75")}$ T = 19 lbs (SMS)

$V_{SMS} = \frac{134\#(42.3")}{4\text{screws}(86.75")}$ $V_{KB} = \frac{134\#(43.5")(2.5)}{2\text{KBs}(81.75")}$ V = 16 lbs (SMS) 84 lbs (KB-TZ)

USE (2)-#10 SMS to 16GA Track Backing at Each Clip
T_{ALL} = 159 lbs
V_{ALL} = 140 lbs
UNITY CHECK = 0.23

USE (2)-3/8"Ø HILTI KB-TZ's W/ 2" EFF. EMBED.
T_{ALL} = 1039 lbs
V_{ALL} = 1098 lbs
UNITY CHECK = 0.08

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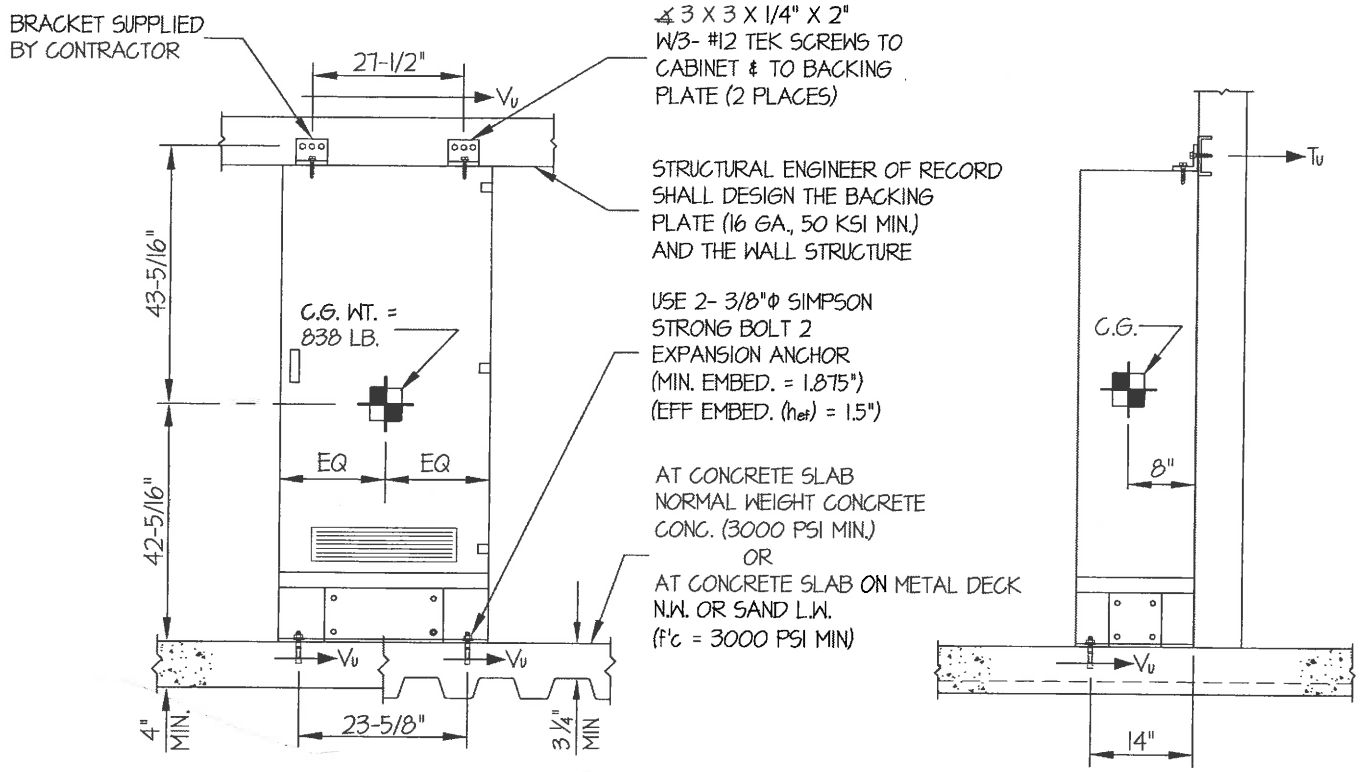
SIEMENS MEDICAL SOLUTIONS

(AXIOM LUMINOS dRF SYSTEM)
POLYDOROS F65 65kw-80kw GENERATOR CABINET

DES. J. ROBERSON		SHEET 1
JOB NO. 35-1326		
DATE 1/16/14		OF 1 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB / CONCRETE SLAB ON METAL DECK



FRONT ELEVATION

SIDE ELEVATION

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
(STRENGTH DESIGN IS USED) (S_{DS} = 2.5, a_p = 1.0, I_p = 1.5, R_p = 2.5, Ω_0 = 2.5, z/h ≤ 1)

WEIGHT = 838 LB
HORIZONTAL FORCE (E_h) = 1.80 W_p = 1508 LB
HORIZONTAL FORCE (E_{hc}) = 4.50 W_p = 3771 LB
VERTICAL FORCE (E_v) = 0.50 W_p = 419 LB

BOLT FORCES:

TENSION (T)

$$T_{u\ PARALLEL} = \frac{1508\#(8'')(42.3'')}{3_{SCREWS}(27.5'')(85.6'')} = 72\ LB$$

$$T_{u\ PERP.} = \frac{1508\#(42.3'')}{6\ SCREWS\ (85.6'')} = 124\ LB$$

$$T_{u\ MAX} = (0.3)(72\#) + 124\# = 146\ LB/SCREW\ (MAX)$$

SHEAR (V)

$$V_{u\ WALL} = \frac{1508\#(42.3'')}{6\ SCREWS\ (85.6'')} = 124\ LB/SCREW\ (MAX)$$

$$V_{u\ FLOOR} = \frac{3771\#(43.3'')}{2\ BOLTS\ (85.6'')} = 954\ LB/BOLT\ (MAX)$$

#12 TEK SCREWS TO 16 GAGE, 50 KSI
ϕT= 328 LB/SCREW
ϕV= 288 LB/SCREW

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.0$$

$$\left(\frac{146}{328}\right) + \left(\frac{124}{288}\right) = 0.88 \leq 1.0 \therefore \text{O.K.}$$

BOLT SPECS: 3/8"ϕ SIMPSON STRONG BOLT 2
ϕV= 1170 LB/BOLT (SHEAR)

REGISTERED PROFESSIONAL ENGINEER
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Project : Clovis RF
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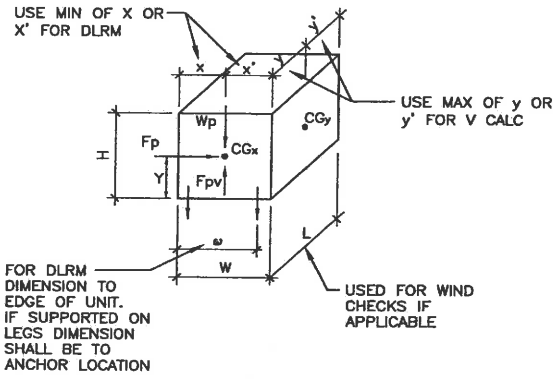
2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - GRID HOLDER - 6/A070



Height, H = -
Height to center of gravity, Y = -
Length, L = -
Width, W = -
Overturning Dimension, ω = -
x = -
y = -
Weight, W_p = 50 lbs
# of anchors in shear = -
# of anchors in tension = -
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 6 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 1.0

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 2.5

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 1.0

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.175 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.160 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

$F_{p,ASD}$ = 8 lbs

$F_{p,v}$ = 4 lbs

$$T = \frac{(50^{\#} + 4^{\#})4''}{2\text{screws}\,(13.1'')} + 0.3\left(\frac{8^{\#}(4'')}{1\text{screw}\,(14'')}\right) + \frac{8^{\#}}{2\text{screws}}$$

(vertical; parallel; perp)

T = 13 lbs

$$V = \frac{50^{\#} + 8^{\#} + 4^{\#}}{2\ \text{screws}}$$

V = 31 lbs

USE (2)-#12 SMS to 16GA Track Backing
T_{ALL} = 205 lbs
V_{ALL} = 180 lbs
UNITY CHECK = 0.24

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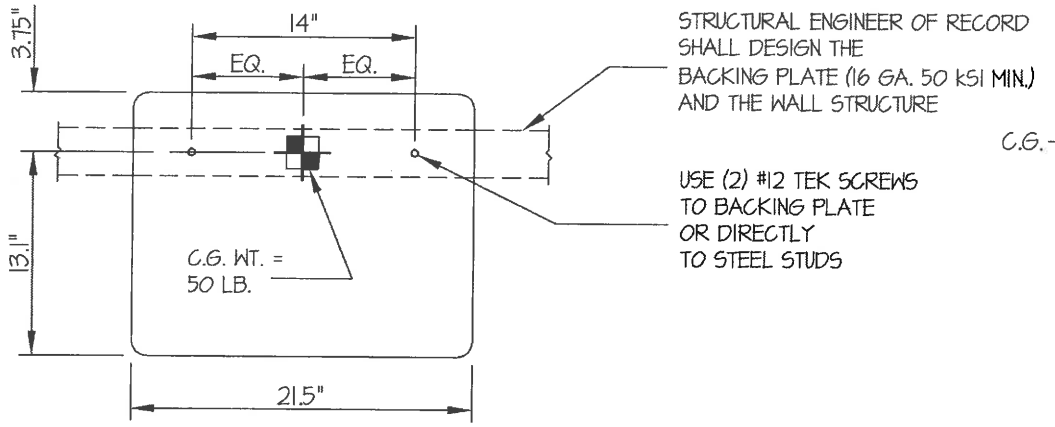
SIEMENS MEDICAL SOLUTION

AXIOM LUMINOS dRF SYSTEM GRID HOLDER

DES.	J. ROBERSON
JOB NO.	35-1326
DATE	1/16/14
SHEET	1
OF	1 SHEETS

SEISMIC ANCHORAGE

WALL MOUNTED



FRONT ELEVATION

T_u = 66 LB/SCREW (MAX)
V_u = 88 LB/SCREW (MAX)

SIDE ELEVATION

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
(STRENGTH DESIGN IS USED) (S_{DS} = 2.5, a_p = 1.0, I_p = 1.5, R_p = 2.5, z/h ≤ 1)
WEIGHT = 50 LB
HORIZONTAL FORCE (E_h) = 1.80 W_p = 90 LB
VERTICAL FORCE (E_v) = 0.50 W_p = 25 LB

BOLT FORCES:

TENSION (T)

$$T_{u\ VERTICAL} = \frac{(50\#(1.2) + 25\#)4"}{2\ SCREWS\ (13.1")} = 13\ LB/SCREW$$

$$T_{u\ PARALLEL} = \frac{90\#(4")}{1\ SCREW\ (14")} = 26\ LB/SCREW$$

$$T_{u\ PERP.} = \frac{90\#}{2\ SCREWS} = 45\ LB/SCREW$$

$$T_{u\ MAX} = 13\# + (0.3)(26\#) + 45\# = 66\ LB/SCREW\ (MAX)$$

SHEAR (V)

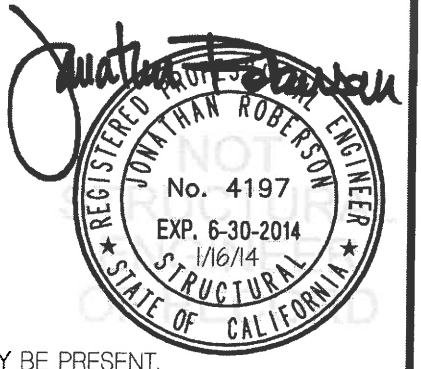
$$V_{u\ MAX} = \frac{50\#(1.2) + 25\# + 90\#}{2\ SCREWS} = 88\ LB/SCREW\ (MAX)$$

#12 TEK SCREWS TO 16 GAGE, 50 KSI
ϕT= 328 LB/SCREW
ϕV= 288 LB/SCREW

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.0$$

$$\left(\frac{66}{328}\right) + \left(\frac{88}{288}\right) = 0.51 \leq 1.0 \therefore \text{O.K.}$$



NOTE:
STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE RIGID (a_p = 1.0) SUPPORT STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

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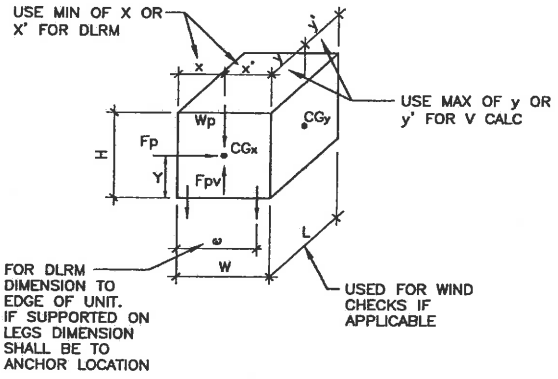
Name: SCE Date: 6/18/15

2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - COMPACT CONTAINER - 7/A070



Height, H = 23.0 in
Height to center of gravity, Y = 11.5 in
Length, L = 30.0 in
Width, W = 15.0 in
Overturning Dimension, ω = 15.0 in
x = 7.5 in
y = 15.0 in
Weight, W_p = 110 lbs
# of anchors in shear = 4
# of anchors in tension = 2
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 0 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 2.5

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 6.0

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 2.5

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.127 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.160 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

$F_{p,ASD}$ = 18 lbs
OTM = Y * $F_{p,ASD}$ = 203 lb-in
$F_{p,v}$ = 8 lbs
DLRM = (0.6Wp - Fpv) * x = 436 lb-in

$$T = \frac{(OTM - DLRM) * \Omega \text{ factor}}{\omega * (\#\text{ Anchors})}$$

T = None

$$V = \frac{2\,(F_{p,ASD} * (y / L)) * \Omega \text{ factor}}{\#\text{ Anchors}}$$

V = 11 lbs

(V is approximate when number of anchors exceeds 4)

USE (4)-3/8"Ø HILTI KB-TZ's W/ 2" EFFECTIVE EMBEDMENT
T_{ALL} = 1039 lbs
V_{ALL} = 1098 lbs
UNITY CHECK = 0.01

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SIEMENS MEDICAL SOLUTIONS

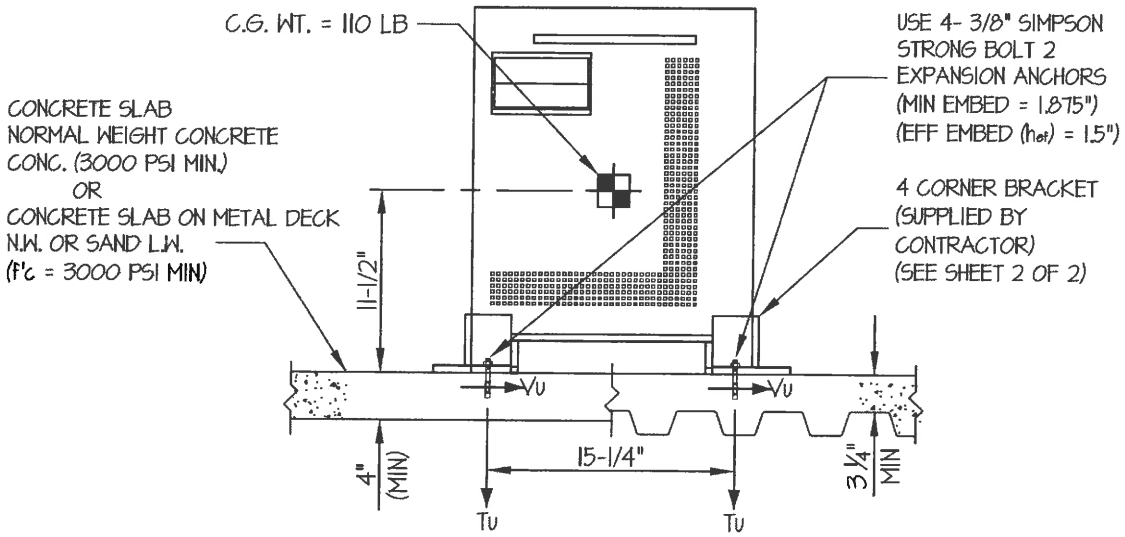
(AXIOM LUMINOS dRF SYSTEM)
FLUOROSPOT COMPACT CONTAINER

DES.	J. ROBERSON
JOB NO.	35-1326
DATE	1/20/14

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB/CONCRETE SLAB ON METAL DECK



FRONT ELEVATION

T_u = 215 LB/BOLT (MAX)
V_u = 259 LB/BOLT (MAX)

NOTES:

1. FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10. STRENGTH DESIGN IS USED.

   HORIZONTAL FORCE (E_h) = 1.88 W_p (S_{DS} = 2.5, a_p = 2.5, I_p = 1.5, R_p = 6.0, Ω_o = 2.5, $z/h \leq 1$)
   HORIZONTAL FORCE (E_{hc}) = 4.70 W_p (Ω_o = 2.5 FOR CONCRETE ANCHORAGE)
   VERTICAL FORCE (E_v) = 0.50 W_p

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN, IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2014
1/20/14
STRUCTURAL
STATE OF CALIFORNIA

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(AXIOM LUMINOS dRF SYSTEM)
FLUOROSPOT COMPACT CONTAINER

DES.	J. ROBERSON
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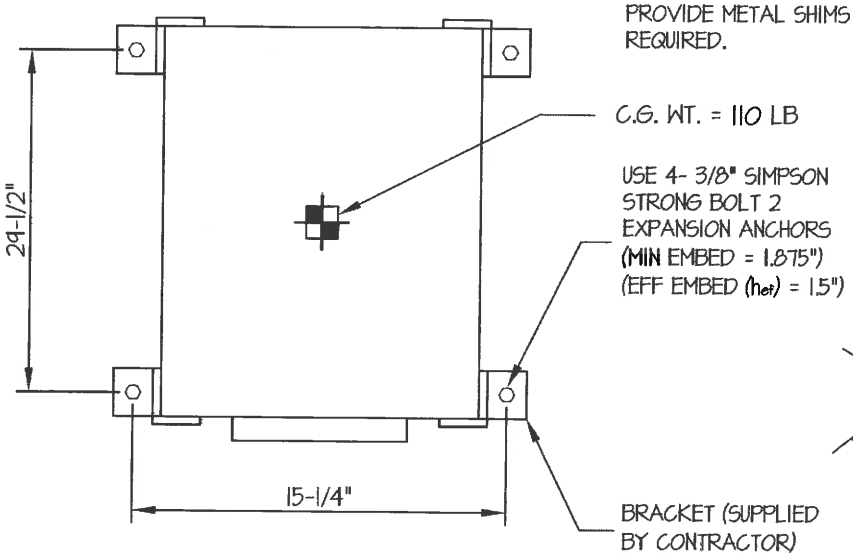
DATE	1/20/14

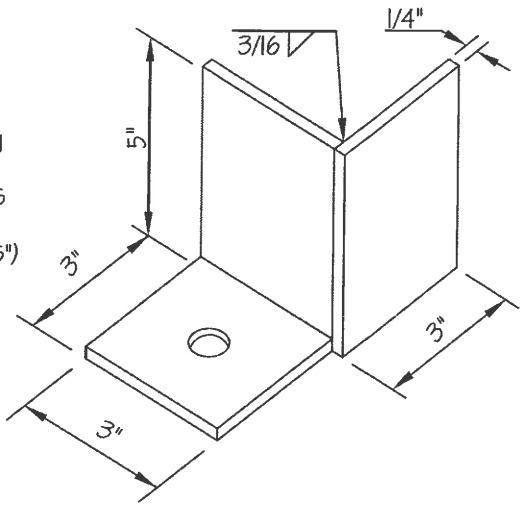
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB/CONCRETE SLAB ON METAL DECK



PLAN AT BASE



CORNER BRACKET

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
(STRENGTH DESIGN IS USED) (S_{DS} = 2.5, a_p = 2.5, I_p = 1.5, R_p = 6.0, Ω_o = 2.5, $z/h \leq 1$)

WEIGHT = 110 LB

HORIZONTAL FORCE (E_{hc}) = 4.70 W_p = 517 LB

VERTICAL FORCE (E_v) = 0.50 W_p = 55 LB

BOLT SPECS: 3/8"ø SIMPSON STRONG BOLT 2
ϕV= 417 LB/BOLT (TENSION)
ϕV= 1170 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{u\ MAXIMUM} = \left[\frac{517\#(11.5'')}{2\ BOLTS(29.5'')} \times (0.3)\right] + \frac{517\#(11.5'')}{2\ BOLTS(15.2'')} - \frac{(0.9(110\#) - 55\#)}{4\ BOLTS} = 215\ LB/BOLT\ (MAX)$$

(HORIZ. - SIDE TO SIDE) (HORIZ. - FRONT TO BACK) (0.9(WEIGHT) - E_v)

SHEAR (V)

$$V_{u\ MAXIMUM} = \frac{517\#}{2\ BOLTS} = 259\ LB/BOLT\ (MAX)$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.2 \quad \left(\frac{215}{417}\right) + \left(\frac{259}{1170}\right) = 0.74 \leq 1.2 \therefore \text{O.K.}$$

NOTE:
STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE SLAB OR OTHER SUPPORT STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

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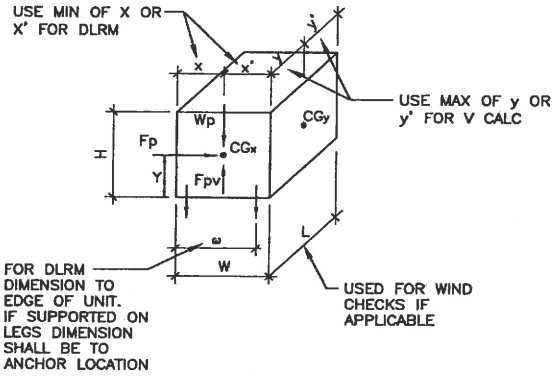
Project : Clovis RF
Subject: Anchorage Forces
Comm No.: 2088-052-01 Page: of
Name: SCE Date: 6/18/15

2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - BRIDGE & TUBE STAND - 8/A070



Height, H = -
Height to center of gravity, Y = -
Length, L = -
Width, W = -
Overturning Dimension, ω = -
x = -
y = -
Weight, W_p = -
# of anchors in shear = -
# of anchors in tension = -
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 10 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 2.5

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 2.5

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 1.0

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.524 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.366 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

① X-Ray
Wt = 772#
$F_p = 0.366(772\#) = 283\#$
$F_{p,v} = 0.071(772\#) = 55\#$

② Longitudinal Rails
Wt = 118#
$F_p = 0.366(118\#) = 43\#$
$F_{p,v} = 0.071(118\#) = 8\#$

$T_① = \frac{283\#(45")(63")}{4\,bolts(37")(58")} + \frac{(772\# + 55\#)(63")(28.7")}{4\,bolts(58")(32")} = 310\#/bolt$

$T_② = \frac{118\# + 8\#}{7(2\,bolts)} = 9\#/bolt$

$T_u = 310\#/bolt + 9\#/bolt = \boxed{319\#/bolt}$

$V_① = \frac{283\#(28.7")}{4\,bolts(32")} = 63\#/bolt$

$V_② = \frac{43\#}{7(2\,bolts)} = 3\#/bolt$

$V_u = 63\#/bolt + 3\#/bolt = \boxed{66\#/bolt}$

∴ Use 3/8"ϕ Bolts (A307)
$T_{all} = 2,485\#$
$V_{all} = 1,325\#$

Unistrut Frame Check

(E) Equip Wt = 825# (including rails)

(N) Equip Wt = 772# (unit) + 118# (rails) = 890#

$$\%\ Diff = 1 - \frac{890^{\#}}{825^{\#}}$$

$$= 8\% \leq 10\%$$

∴ Design of unistrut frame ok

Check Anchorage of frame for Ω_0

* Max Shear

$$V = \left(\frac{283^{\#}\ (\text{unit to 1 side}) + 43^{\#}/2\ (\text{parrail})}{2\ \text{frames}} + \frac{0.21(6psf)(14')(3'+1')\ (\text{Ceiling Seismic load})}{2\ \text{frames}} \right) 2.5\ (\Omega)$$

$$= (152^{\#} + 35^{\#})\, 2.5$$

$$= 468^{\#}$$

* Max Tension

$$T = \left(319^{\#}/6\text{-}it\ (\text{see pg 12})\,(2\ \text{bolts}) + 6psf(2')(3'+1') \right) 2.5\ (\Omega_0) + 468^{\#}\ (\text{Vertical Component from brace due to } V)$$

$$= (638^{\#} + 48^{\#})\, 2.5 + 468^{\#}$$

$$= 2183^{\#}$$

∴ (E) 5/8"ϕ HiHi kB-TZ's w/ 4" Eff Embed

$$\frac{468^{\#}}{2\ \text{bolts}\,(3162^{\#})} + \frac{2183^{\#}}{2\ \text{bolts}\,(1941^{\#})} = 0.64 \leq 1.2\ \text{ok}$$

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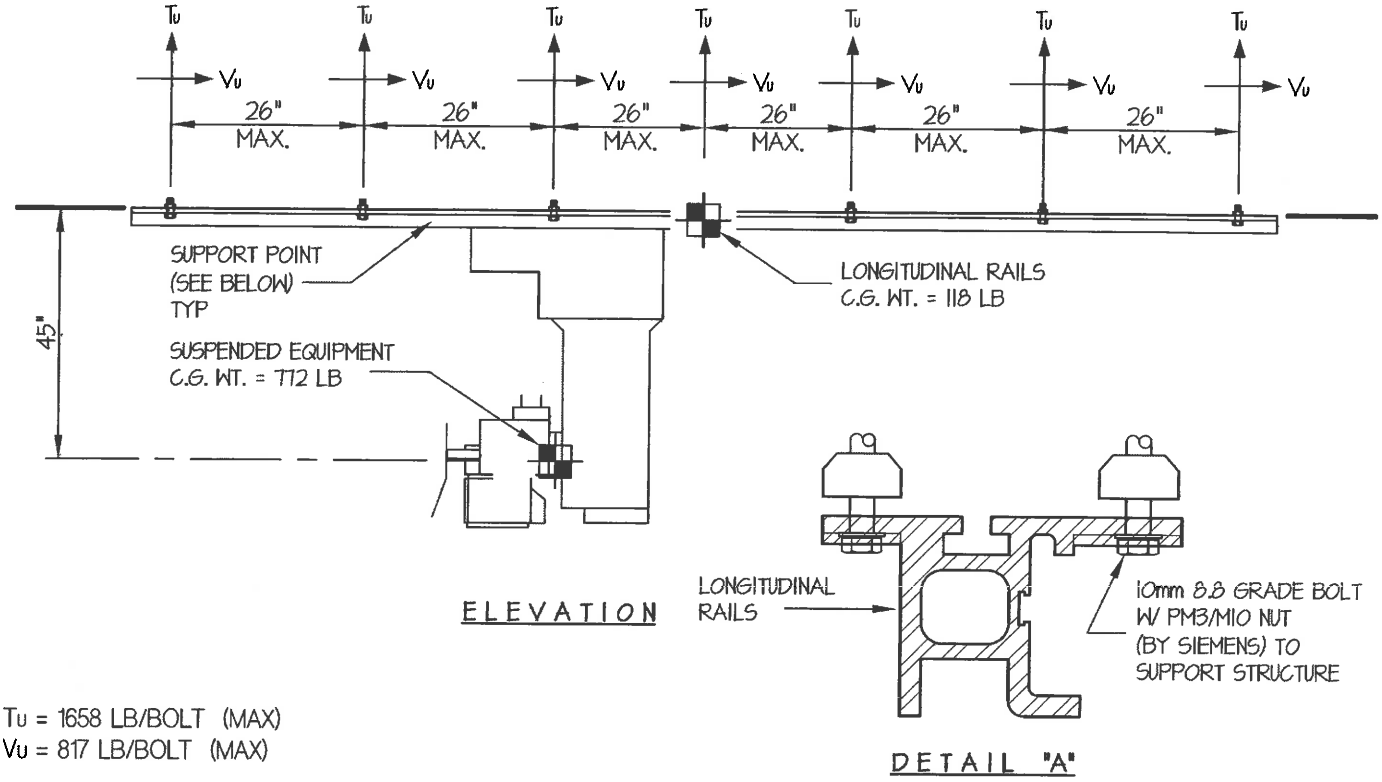
SIEMENS MEDICAL SOLUTIONS

(AXIOM LUMINOS dRF SYSTEM) 3M FULLY SYNCHRONIZED BRIDGE AND X-RAY TUBE STAND

DES. J. ROBERSON
JOB NO. 35-1326
DATE 1/21/14
SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



Tu = 1658 LB/BOLT (MAX)
Vu = 817 LB/BOLT (MAX)

NOTES:

1. FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10 STRENGTH DESIGN IS USED.

   HORIZONTAL FORCE (E_h) = 4.50 W_p (S_{DS} = 2.5, a_p = 2.5, I_p = 1.5, R_p = 2.5, $z/h \leq 1$)
   VERTICAL FORCE (E_v) = 0.50 W_p

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2014
1/21/14
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SIEMENS MEDICAL SOLUTIONS

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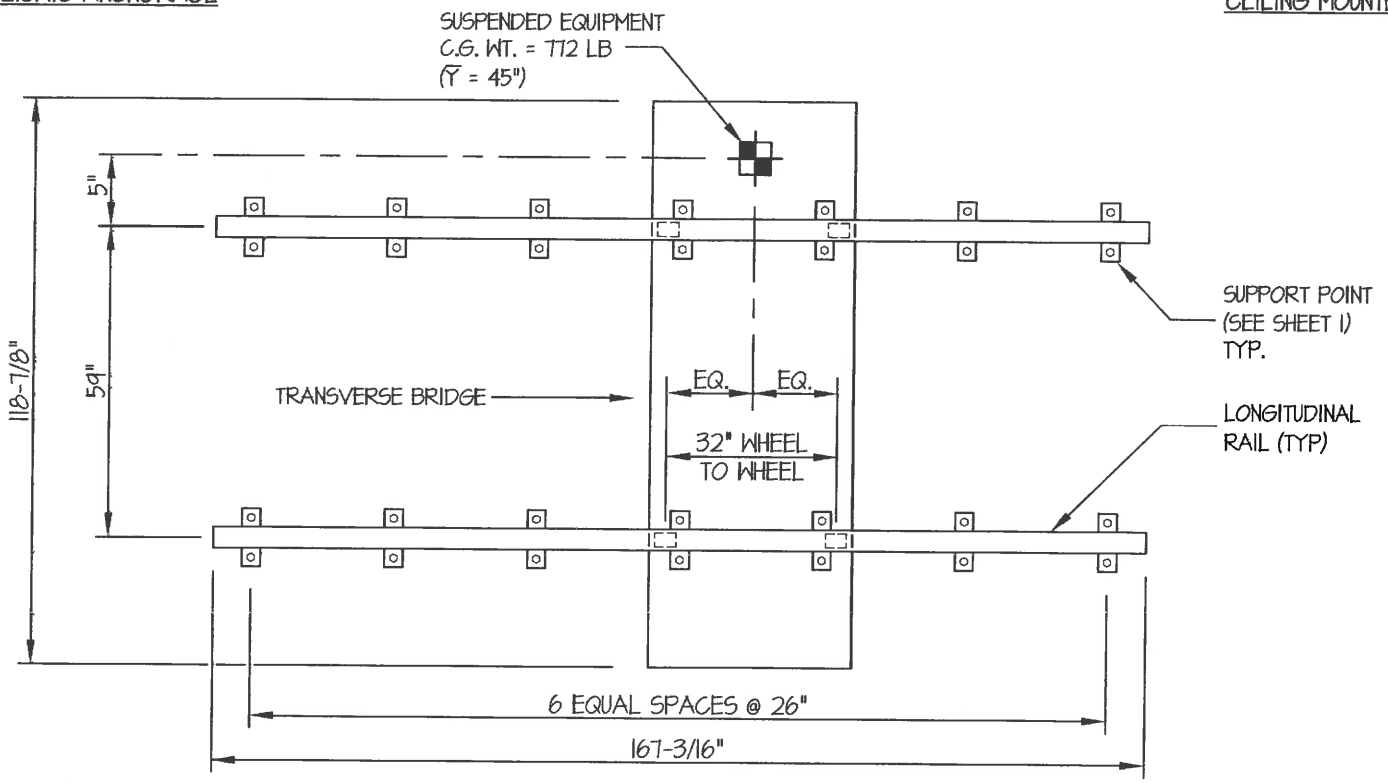
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE — CEILING MOUNTED



PLAN AT CEILING

LOADS:

SUSPENDED EQUIPMENT
WEIGHT = 772 LB
HORIZONTAL FORCE (E_h) = 4.50 W_p = 3474 LB
VERTICAL FORCE (E_v) = 0.50 W_p = 386 LB

LONGITUDINAL RAILS
WEIGHT = 118 LB
HORIZONTAL FORCE (E_h) = 4.50 W_p = 531 LB
VERTICAL FORCE (E_v) = 0.50W_p = 59 LB

BOLT FORCES:

TENSION (T)

$$T_{u1} = \frac{3474\#(45")(64")}{4\ \text{BOLTS}(32")(59")} + \frac{(772\#(1.2) + 386\#)(64")(28.7")}{4\ \text{BOLTS}(59")(32")} = 1644\ \text{LB/BOLT}$$

$$T_{u2} = \frac{118\#(1.2) + 59\#}{7(2\ \text{BOLTS})} = 14\ \text{LB/BOLT}$$

T_u = 1644# + 14# = 1658 LB/BOLT **(MAX)**

SHEAR (V)

$$V_u = \frac{3474\#(28.7")}{4\ \text{BOLTS}(32")} + \frac{531\#}{7(2\ \text{BOLTS})} = 817\ \text{LB/BOLT(MAX)}$$

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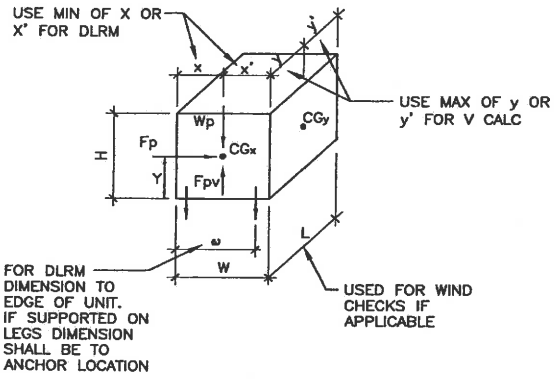
Project : Clovis RF
Subject: Anchorage Forces
Comm No.: 2088-052-01 Page: of
Name: SCE Date: 6/18/15

2013 CBC & ASCE 7-10 EQUIPMENT ANCHORAGE FORCES - REMOTE TABLE - 9/A070



Height, H = -
Height to center of gravity, Y = 29.0 in
Length, L = 47.0 in
Width, W = 22.5 in
Overturning Dimension, ω = 22.5 in
x = 11.3 in
y = 23.5 in
Weight, W_p = 3241 lbs
# of anchors in shear = 6
# of anchors in tension = 2
Average roof height, h = 28 ft
Height of component attachment with respect to grade, z = 0 ft

Seismic

Seismic design requirements for equipment are based on ASCE 7-10, Chapter 13.

COMPONENT AMPLIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — a_p = 1.0

COMPONENT RESPONSE MODIFICATION FACTOR
ASCE Section 13.5, 13.6 & ASCE Table 13.5-1, 13.6-1 — R_p = 2.5

DESIGN SPECTRAL RESPONSE ACCELERATION
CBC Section 1613A.5.4 & CBC Equation 16-39 — S_{DS} = 0.509

COMPONENT IMPORTANCE FACTOR
ASCE Section 13.1.3 — I_p = 1.50

ATTACHMENT FACTOR IN CONCRETE OR MASONRY
ASCE Section 13.4.2.1 and ACI 318-10 sec D3.3.4.3 d — Ω factor = 2.5

SEISMIC DESIGN FORCE

ASCE Section 13.3.1 & ASCE Equation 13.3-1	$F_p = 0.4a_pS_{DS}W_p/(R_p/I_p)(1+2z/h)$	F_p = 0.122 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-2	$F_{p,max} = 1.6S_{DS}I_pW_p$	$F_{p,max}$ = 1.222 Wp
ASCE Section 13.3.1 & ASCE Equation 13.3-3	$F_{p,min} = 0.3S_{DS}I_pW_p$	$F_{p,min}$ = 0.229 Wp

SEISMIC DESIGN FORCES (ASD)

ASCE Section 13.1.7 & 13.3.1	$F_{p,ASD} = 0.7(F_{p,govern})$	$F_{p,ASD}$ = 0.160 Wp
ASCE Section 13.1.7 & 13.3.1	$F_{pv,ASD} = 0.7(0.2S_{DS}W_p)$	$F_{p,v}$ = 0.071 Wp

DESIGN FORCES

$F_{p,ASD}$ = 520 lbs
OTM = Y * $F_{p,ASD}$ = 15070 lb-in
$F_{p,v}$ = 231 lbs
DLRM = (0.6Wp - Fpv) * x = 0 lb-in

$$T = \frac{(OTM - DLRM) * \Omega\ factor}{\omega * (\#\ Anchors)}$$

T = 837 lbs

$$V = \frac{2\ (F_{p,ASD} * (y / L)) * \Omega\ factor}{\#\ Anchors}$$

V = 217 lbs

(V is approximate when number of anchors exceeds 4)

USE (6)-5/8"Ø HILTI KB-TZ's W/ 4" EFFECTIVE EMBEDMENT
T_{ALL} = 3113 lbs
V_{ALL} = 3119 lbs
UNITY CHECK = 0.39

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SIEMENS MEDICAL SOLUTIONS

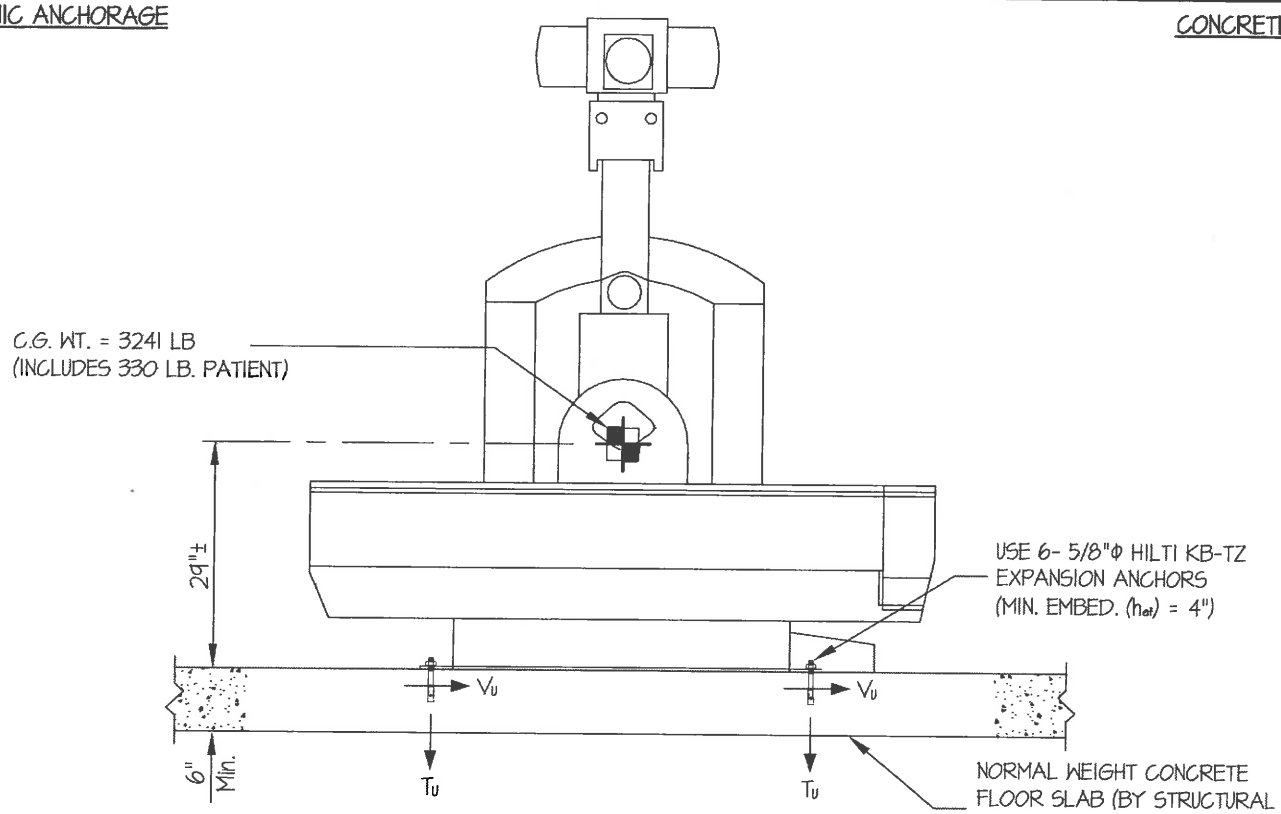
(AXIOM LUMINOS dRF SYSTEM)
LUMINOS dRF REMOTE TABLE

DES.	J. ROBERSON
JOB NO.	35-1326
DATE	1/22/14

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB



Tu = 3049 LB/BOLT (MAX)
Vu = 1122 LB/BOLT (MAX)

ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10 STRENGTH DESIGN IS USED.

   HORIZONTAL FORCE (Eh) = 0.855 Wp (SDS = 1.90, ap = 1.0, Ip = 1.5, Rp = 1.5, Ω_o = 1.5, z/h = 0)
   HORIZONTAL FORCE (Ehc) = 1.28 Wp (Ω_o = 1.5 FOR CONCRETE ANCHORAGE)
   VERTICAL FORCE (Ev) = 0.38 Wp

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

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LUMINOS dRF REMOTE TABLE

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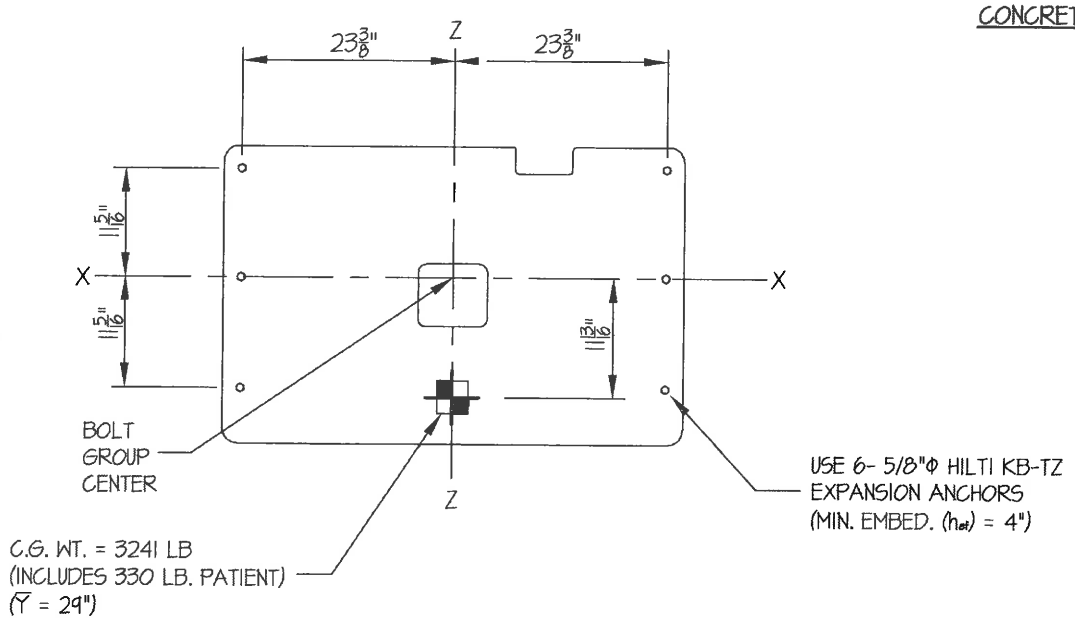
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB



PLAN AT BASE

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
(STRENGTH DESIGN IS USED) (S_{DS} = 1.90, a_p = 1.0, I_p = 1.5, R_p = 1.5, Ω_o = 1.5, z/h = 0)
WEIGHT = 3241 LB
HORIZONTAL FORCE (E_{hc}) = 1.28 W_p = 4148 LB
VERTICAL FORCE (E_v) = 0.38 W_p = 1232 LB

BOLT GROUP PROPERTIES:

I_{X-X} = 768 in.^{4}
I_{Z-Z} = 2186 in.^{4}
I_{Y-Y} = 2954 in.^{4}

MOMENTS:

M_{XX} = 4148#(29") + (1.2(3241#) + 1232#)11.813" = 180,795"#
M_{ZZ} = 4148#(29") = 120,306"#
M_{YY} = 4148#(11.8125") = 49004"#

BOLT SPECS: 5/8"ϕ HILTI KB-TZ
ϕT = 0.75ϕNn = 3329 LB/BOLT (TENSION)
ϕV = ϕVn = 4940 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{U\ MAXIMUM} = \left[\frac{120306"\#(23.375")}{2186} \times (0.3)\right] + \frac{180795"\#(11.3125")}{768} = 3049\ \text{LB/BOLT (MAX)}$$

SHEAR (V)

$$V_{U\ MAXIMUM} = \frac{4148\#}{6\ \text{BOLTS}} + \frac{49004"\#(25.97")}{2954} = 1122\ \text{LB/BOLT (MAX)}$$

oshpd "Equitable Healthcare Accessibility for California"
Office of Statewide Health Planning and Development

APPLICATION FOR PREAPPROVAL

SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0086-10

Check whether application is: NEW [ ] RENEWAL [X]

1.0

SIEMENS MEDICAL SOLUTIONS USA, INC. — *Manufacturer*

Steven B. Wagman — *Manufacturer's Technical Representative*

51 Valley Stream Parkway, Malvern, PA. 19355 — *Mailing Address*

(610) 219-2137 — *Telephone*

Steven.wagman@siemens.com — *E-mail Address*

2.0

Axiom Luminos dRF & Axiom Luminos TF R/F Systems — *Product Name*

Radiography & Fluoroscopy (R/F) imaging systems — *Product Type*

SEE ATTACHMENT 1

Product model No (List all unique product identification numbers and/or serial numbers)

General Description: Multi-component radiography & fluoroscopy systems used for medical imaging.

3.0

EQUIPMENTANCHORAGE.COM — *Applicant Company Name*

JONATHAN ROBERSON, S.E. — *Contact Person*

5877 Pine Ave, Suite 210, Chino Hills, CA. 91709 — *Mailing Address*

(406) 541-EASE (3273) — *Telephone*

jon@easeco.com — *E-mail Address*

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

Signature of Applicant

June 18, 2010 — *Date*

SENIOR ENGINEER — *Title*

EQUIPMENTANCHORAGE.COM — *Company Name*

Registered Design Professional Preparing the Report

4.0 ***EQUIPMENTANCHORAGE.COM***
Company Name

Jonathan Roberson, S.E. | S4197
Contact Name | *California License Number*

5877 Pine Ave, Suite 210, Chino Hills, CA. 91709
Mailing Address

909-606-7622 | jon@easeco.com
Telephone | *E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0 ***EQUIPMENTANCHORAGE.COM***
Company Name

Jonathan Roberson, S.E. | S4197
Contact Name | *California License Number*

5877 Pine Ave, Suite 210, Chino Hills, CA. 91709
Mailing Address

909-606-7622 | jon@easeco.com
Telephone | *E-mail Address*

Anchorage Pre-Approval

6.0

☐ *Anchorage is pre-approved under OPA-*
(Separate application for anchorage pre-approval is required)

☒ Anchorage is not Pre-approved

Certification Method

70. ☒ *Testing in accordance with:* ☒ *ICC-ES AC-156* ☐ *Other (Please Specify):*

☐ *Analysis*
☐ *Experience data*
☐ *Combination of Testing, Analysis, and/or Experience Data (Please Specify):*

Testing Laboratory (if applicable)

8.0 Environmental Testing Laboratory, Inc. | Brady Richard
Company Name | *Contact Name*

11034 Indian Trail, Dallas, TX 75229-3513
Mailing Address

972-247-9657 | brady@etldallas.com
Telephone | E-mail

Approval Parameters

9.0

Design in accordance with ASCE 7-05 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = ***2.4g***

S_{DS} (Spectral response acceleration at short period) = ***2.00***

a_p (In-structure equipment or component amplification factor) = ***1.0***

R_p (Equipment or component response modification factor) = ***1.5***

I_p (Importance factor) = ***1.5***

*z/h (Height factor ratio)=**1.0***

Equipment or Component fundamental frequency(s) = ***SEE ATTACHMENT 1***

Building period limits (if any) = ***NO LIMIT***

Overall dimensions and weight (or range thereof) = ***SEE ATTACHMENT 1***

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

S_{DS} (Spectral response acceleration at short period) =

S_1 (Spectral response acceleration at 1 second period) =

R (Response modification coefficient)=1.0

Ω_0 (System overstrength factor) =1.0

C_d (Deflection amplification factor) =1.0

I_p (Importance factor) =1.5

Height to Center of Gravity above base =

Equipment or Component fundamental period(s) = *Sec*

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: ☐ Yes ☒ No

10.0 ***List of attachments supporting the special seismic certification of equipment or components:***

☐ *Test Report* ☐ *Drawings* ☐ *Manufacturer's Catalog*

☐ *Calculations* ☒ *Others (Please Specify:):* SE Acceptance Letter; Attachment 1

11.0 ***OSHPD Approval*** *(For Office Use Only)*

Signature & Date	**9/20/10**
Chris Tokas, SHFR	**December 31, 2016**
Name & Title	*Approval Expiration Date*
Condition of Approval (if any):	S_{DS} (g) = **2.0** z/h = **1.0**
	Special Seismic Certification Valid Up to

APPLICATION FOR PREAPPROVAL

SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

ATTACHMENT 1: Seismically Certified Components

Description	Width (in.)	Depth (in.)	Height (in.)	Weight (lb.)	Mount [CDEF]	Lowest Resonant Freq. (Hz.)[A] F/B	S/S	Vert.
AXIOM LUMINOS dRF RADIOGRAPHY & FLUOROSCOPY SYSTEM								
X-Ray Tube w/3M Bridge	120	126	106	754	Ceiling Suspension	13.9	4.4	14.6
Wall Stand	28	28	82	617	Floor Mount	8.9	7.6	8.7
Luminos dRF Table	83	75	107	2892	Floor Mount	4.6	4.8	4.6
Flourospot Compact	13.5	27.5	21.75	108	Floor Mount	23.3	11.8	>50
Polydoros F80 63kW-80kW Generator Cabinet	31.5	17.25	86.5	826	Wall/Floor	10.1	11.2	31.0
DCS-1 Display Ceiling Suspension	168	28	102	290	Ceiling Suspension	8.0	6.4	14.8
Luminos dRF Control Console	---	---	---	---	Countertop	---[B]	---[B]	---[B]
19" Monitor Desktop Stand	---	---	---	---	Countertop	---[B]	---[B]	---[B]
Keyboard & Mouse	---	---	---	---	Countertop	---[B]	---[B]	---[B]
Foot Pedal	---	---	---	---	Countertop	---[B]	---[B]	---[B]
AXIOM LUMINOS TF RADIOGRAPHY & FLUOROSCOPY SYSTEM								
3D TOP w/4M Bridge	167	119	38	819	Ceiling Suspension	10.5	6.4	5.0
Luminos TF Table	83	72	77.9	3910	Floor Mount	5.3	4.1	4.3
Cable Drop Box	10.75	8.25	7	161	Wall	13.6	10.3	6.3
DCS 2 Display Ceiling Suspension	167	48	63	440	Ceiling Suspension	10.3	7.7	4.0
Fluorospot Compact Container	17.75	26	23	172	Floor Mount	26.1	9.7	30.4
Polydoros SX 65/80 Generator Cabinet	31.5	17.25	84	641	Wall/Floor	7.9	8.3	20.0
System Cabinet	23.25	17.125	84	518	Wall/Floor	7.9	8.3	19.0
Vertix MT Wall Stand	32	26.75	88.25	416	Floor Mount	9.8	7.9	7.3
Vertix MT Wall Stand	32	26.75	88.25	416	Wall/Floor	---	---	---
Keyboard, Mouse & Monitor	18.3	9.5	17.5	20	Countertop	---[B]	---[B]	---[B]
Control Console	9.25	10.25	2.75	10	Countertop	---[B]	---[B]	---[B]

Notes:

A) F/B = Front-to-Back Axis; S/S = Side-to-Side Axis; Vert. = Vertical Axis
B) Not monitored
C) "Floor Mounted" refers to a free-standing, floor-mounted condition.
D) "Wall/Floor" indicates a condition where the unit bears on, and is anchored directly to the supporting floor. In addition, lateral restraint anchoring the unit to an adjacent wall or other supporting structure is provided at the top of the equipment.
E) "Ceiling Suspended" refers to a condition where the unit is anchored to and suspended from a framing system at or slightly above the ceiling line of the room.
F) "Countertop" refers to a condition where the unit sits atop but is not otherwise anchored to a counter, desk, or other piece of fixed furniture.

Hilti Kwik Bolt TZ - Slab on Grade

f'c = 3000 psi
Conversion Factor = 1.40
ACI 318-08 D3.3.3 Reduction Factor = 0.75

Nominal Anchor Diameter (in)	Effective Embedment h_{ef} (in)	Min. Edge Distance C_{a1} (in)	Critical Edge Distance C_{ac} (in)	Min. Member Thickness (in)	Tension										
					Steel Strength			Pullout Strength			Concrete Breakout Strength				Allowable Seismic Tension (lbs)
					N_{sa} (lbs)	Φ	ΦN_{sa} (lbs)	$N_{p,cr}$ (lbs)	Φ	ΦN_{pn} (lbs)	K_c	N_{cb} (lbs)	Φ	ΦN_{cb} (lbs)	
0.375	2.00	4.38	4.38	4.00	6,500	0.75	4,875	2,270	0.65	1,616	17	2,634	0.65	1,712	1,039
0.500	2.00	5.50	5.50	4.00	10,705	0.75	8,029				17	2,634	0.65	1,712	1,100
0.500	3.25	7.50	7.50	6.00	10,705	0.75	8,029	4,915	0.65	3,500	17	5,456	0.65	3,546	2,250
0.625	3.13	6.50	6.50	5.00	17,170	0.75	12,878				17	5,144	0.65	3,343	2,149
0.625	4.00	8.75	8.75	6.00	17,170	0.75	12,878				17	7,449	0.65	4,842	3,113
0.750	3.75	10.00	10.00	6.00	25,120	0.75	18,840				17	6,762	0.65	4,395	2,825
0.750	4.75	9.00	9.00	8.00	25,120	0.75	18,840				17	9,639	0.65	6,266	4,028

Shear														
Steel Strength			Concrete Breakout Strength						Pryout Strength					Allowable Seismic Shear (lbs)
$V_{sa,eq}$ (lbs)	Φ	ΦV_{sa} (lbs)	A_{vc} (in^2)	A_{VC0} (in^2)	V_b (lbs)	V_{cb} (lbs)	Φ	ΦV_{cb} (lbs)	N_{cb} (lbs)	K_p	V_{cp} (lbs)	Φ	ΦV_{cp} (lbs)	
2,255	0.65	1,466	53	86	3,003	1,830	0.7	1,281	2,634	1	2,634	0.7	1,844	1,098
5,495	0.65	3,572	66	136	4,614	2,237	0.7	1,566	2,634	1	2,634	0.7	1,844	1,342
5,495	0.65	3,572	135	253	8,097	4,318	0.7	3,023	5,456	2	10,911	0.7	7,638	2,591
7,600	0.65	4,940	98	190	6,930	3,554	0.7	2,488	5,144	2	10,288	0.7	7,201	2,132
7,600	0.65	4,940	158	345	11,372	5,199	0.7	3,639	7,449	2	14,898	0.7	10,429	3,119
11,745	0.65	7,634	180	450	14,487	5,795	0.7	4,056	6,762	2	13,523	0.7	9,466	3,477
11,745	0.65	7,634	216	365	12,968	7,685	0.7	5,379	9,639	2	19,279	0.7	13,495	4,611

Hilti Kwik Bolt TZ - Deck Underside

f'c = 3000 psi
Conversion Factor = 1.40
ACI 318-08 D3.3.3 Reduction Factor = 0.75

Nominal Anchor Diameter (in)	Effective Embedment h_{ef} (in)	Tension				Shear			
		Pullout Strength			Allowable Seismic Tension (lbs)	Steel Strength			Allowable Seismic Shear (lbs)
		$N_{p,deck,cr}$ (lbs)	Φ	ΦN_{pn} (lbs)		$V_{sa,deck,eq}$ (lbs)	Φ	ΦV_{sa} (lbs)	
0.375	2.00	1,460	0.65	949	610	1,340	0.65	871	747
0.500	2.00	1,460	0.65	949	610	3,000	0.65	1,950	1,671
0.500	3.25	2,620	0.65	1,703	1,095	4,945	0.65	3,214	2,755
0.625	3.13	2,000	0.65	1,300	836	4,320	0.65	2,808	2,407
0.625	4.00	4,645	0.65	3,019	1,941	5,675	0.65	3,689	3,162