



Specialized Structural Engineering
 Equipment Seismic Design
 Project Management
 Risk Assessments
 Building Evaluation

CCS Group, Inc. • Creative Construction Solutions

OSHPD PRE-APPROVAL PACKAGE

OPA-0628-10

FOR

SEISMIC ANCHORAGE OF LOWELL MANUFACTURING CABINETS & RACKS

Client:

Lowell Manufacturing Company
 100 Integram Drive
 Pacific, Missouri 63069
 (636) 257-3400
 (636) 257-6606 FAX
 www.lowellmfg.com

By:

CCS Group, Inc.
 1415 Elbridge Payne Rd., Suite 265
 Chesterfield, MO 63017
 (636) 532-2100

November 2012

CCS Project #: CCS11-040

A P P R O V E D

Fixed Equipment Anchorage
 Office of Statewide Health Planning and Development



OPA-0628-10
 Pre-approval Program Manager
 Anthony R. Pike
 (916) 440-8470

Reviewed By: *Jeffrey Y. Kikumoto*

Date: *10 Dec 2012*



GENERAL NOTES

1. Lowell Manufacturing model applicability:
 - a. LSGR-XX22, LSGR-XX27, LSGR-XX32, LSGR-XX36 & associated +EQQ-XRU series 19" seismic ganging racks. Ref. specific model loads in Table 1 & 2 below.
 - b. LSGR-XX22, LSGR-XX27, & LSGR-XX32, & associated +EQQ-XRU series 19" stand alone seismic cabinets. Ref. specific model loads in Table 1 & 2 below.
2. Design Criteria: The 2010 California Building Code (CBC) & ASCE /SEI 7-05
 - a. Spectral Response Acceleration, S_s , from 2010 California Building Code (2010 CBC Figure 1613.5(1))
 - b. Site Class A, B, C or D. Site Class D assumed. Qualification Instructions not applicable to site class E & F sites.
 - c. Importance Factor, $I_p = 1.5$ (OSHPD 1 & 4)
 $I_p = 1.0$ (OSHPD 2)
 - d. Equation 13.3-1 (ASCE 7-05) Equation 13.3-3 Equation 13.3-2

$$F_p = \frac{0.4 a_p S_{DS} W_p}{R_p / I_p} \left[1 + 2 \frac{Z}{h} \right]$$

$$F_{pmin} = 0.3 S_{DS} I_p W_p$$

$$F_{pmax} = 1.6 S_{DS} I_p W_p$$

$a_p = 1.0$ $R_p = 25$ $S_{DS} =$ See Tables 3A, 3B, 3C, & 3D
 - f. Cabinet supported on Normal or Light Weight Concrete with $f'_c = 3,000$ psi min.
 - g. Maximum weight, cabinet and contents. Approval is limited to racks /cabinets loaded with contents weighing less than the maximum content weight listed. Restrictions are placed on maximum S_s and location in the building based on this maximum content weight. Maximum content weight approved by Structural Engineer of Record shall be posted at the unit while in service.

Table 1 - OSHPD 1 & 4 Buildings - $I_p = 1.5$

Model Series (-XRU covers -IRU, -2RU & -4RU models)	W_p (CABINET & CONTENT)	MAX CONTENT WEIGHT
LSGR-4421, LSGR-4432, LSGR-4436, LSGR-4421, LSGR-4432	1,200 lb	980 lb
LSGR-4021, LSGR-3521, LSGR-4032, LSGR-3532, LSGR-4036, LSGR-3536, LSGR-4021, LSGR-3521, LSGR-4032, LSGR-3532	1,100 lb	900 lb
LSGR-4422, LSGR-4022, LSGR-3522, LSGR-4422, LSGR-4022, LSGR-3522,	900 lb	725 lb
LSGR-2122, LSGR-2121, LSGR-2421, LSGR-2422, LSGR-2421	637 lb	500 lb

Maximum attachment loads to building structure (per anchor):
 Max. tension = 904 lb Max. shear = 285 lb

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GENERAL NOTES CONT'D

Table 2 - OSHPD 2 Buildings - Ip = 1.0

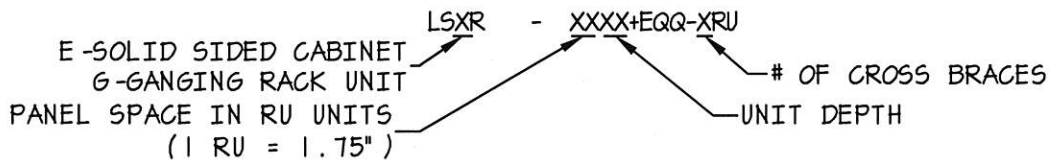
Models	Ip (CABINET & CONTENTS)	MAX. CONTENT WEIGHT
LSGR-4427, LSGR-4432, LSGR-4436, LSER-4427, LSER-4432 LSGR-4027, LSGR-3527, LSGR-4032, LSGR-3532, LSGR-4036, LSGR-3536, LSER-4027, LSER-3527, LSER-4032, LSER-3532 LSGR-4422, LSGR-4022, LSGR-3522, LSER-4422, LSER-4022, LSER-3522 LSER-2122, LSER-2127, LSGR-2427, LSER-2422, LSER-2427 LSER-F1422, LSER-1422, LSGR-2122, LSGR-2422 LSER-F2122, LSER-F2422, LSER-F3522, LSER-F4022, LSER-F4422 LSER-F2127, LSER-F2427, LSER-F3527, LSER-F4027, LSER-F4427	1,500 lb	1,200 lb

Maximum attachment loads at anchorage to building structure (per anchor):
 Max. tension = 1,713 lb
 Max. shear = 476 lb

3. Installation Instructions:

- a. Select desired cabinet or rack model. Verify content weight is not exceeded per Table 1 for Ip = 1.5 (OSHPD 1 & 4) or Table 2 for Ip = 1.0 (OSHPD 2)

MODEL NUMBER LEGEND



- b. Determine The Spectral Response Acceleration, S_s at short periods -0.2 sec. from:
 - 2010 CBC Figure 1613.5(1)
 - USGS website based on specific location
 - Contact Lowell for assistance
- c. Determine Soil Site Class and verify if A, B, C or D. Qualification Instructions not applicable to site class E & F sites. Site Class for the building site may be obtained from:
 - Building Structural Design Drawings
 - Geotechnical Report or Engineer
- d. Verify component Importance Factor
 - $I_p = 1.5$ (OSHPD 1 & 4)
 - $= 1.0$ (OSHPD 2)

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GENERAL NOTES CONT'D

- e. Determine Location in Bldg for Cabinet /Rack :
 - < 1/3 h of Building Height
 - < 2/3 h of Building Height
 - > 2/3 h of Building Height
 - f. Verify the ground motion level for the project site (Ss) is less than or equal to the maximum ground motion listed the Tables 3a, 3b, 3c, or 3d as applicable
 - g. Determine cabinet anchorage detail sheet from Tables 3a, 3b, & 3c dependent on the location in building for Ip = 1.5 (OSHPD 1&4) and from Table 3d for Ip = 1.0 (OSHPD 2).
 - h. Determine supporting concrete type (Normal or Light Weight, f'c = 3000 psi min.)
 - i. Determine anchor bolt installation parameters on Sheet S3.1.
4. Structural Engineer of Record for the building structure shall verify that governing loads indicated can be supported by the existing structure and that construction methods (i.e. embed, spacing, and edge distance) is in conformance with details.
5. Cabinet /Rack Anchors:
- a. Anchors shall be:
 - 1) Hilti Kwik Bolt TZ (ICC-ES ESR-1917), carbon steel
 - 2) Simpson Strong Bolt 2 (ICC-ES ESR-3037)
 - 3) Powers Power Stud SD2 (ICC-ES ESR-2502)
 - b. See Tables on Sheet S3.1 for anchorage design parameters. Anchor to be installed in accordance with these & applicable ICC-ESR Report requirements.
 - c. Do not drill thru existing reinforcing when installing anchors. If reinforcing is hit, notify Structural Engineer of Record for direction.
 - d. Anchor testing for Ip=1.5 cabinets /racks (OSHPD 1&4) shall be per 2010 CBC Section 1916A.7:
 - 1) Torque test 50% of the installed anchors as follows:

	SIMPSON	HILTI	POWERS
1/2" Dia. - 60 ft-lbs		40 ft-lbs	40 ft-lbs
 - 2) Perform test by torque wrench method. Applicable test torque must be achieved within one-half (1/2) turn of the nut.
 - 3) Testing shall occur a minimum of 24 hours after anchor installation.
 - 4) If any anchor fails, all anchors shall be tested which are installed by the same trade and not previously tested until 20 consecutive anchors or all remaining anchors pass, then resume initial test frequency. Notify Structural Engineer of Record for corrective measures
 - 5) Test equipment shall be calibrated by an approved testing laboratory in accordance with standard recognized procedures.

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GENERAL NOTES CONT'D

e. Anchor testing for Ip=1.0 cabinets/racks (OSHPD 2) shall be per 2010 CBC Section 1912.2.2

- 1) Torque test 50% of the installed anchors as follows:

SIMPSON	HILTI	POWERS
1/2" Dia. - 60 ft-lbs	40 ft-lbs	40 ft-lbs
- 2) Perform test by torque wrench method. Applicable test torque must be achieved within one-half (1/2) turn of the nut.
- 3) Testing shall occur a minimum of 24 hours after anchor installation.
- 4) If any anchor fails, all anchors shall be tested which are installed by the same trade and not previously tested until 20 consecutive anchors or all remaining anchors pass, then resume initial testing frequency. Notify Structural Engineer of Record for corrective measures.
- 5) Test equipment shall be calibrated by an approved testing laboratory in accordance with standard recognized procedures.

6. This pre-approval covers only the seismic anchorage of the cabinet/rack to the building's structure. Structural Engineer of Record responsible for verifying structure is capable of resisting all other loading.

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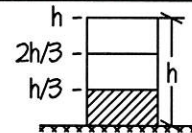
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S1.3

TABLE 3A - ANCHORAGE REQUIREMENTS FOR LOWER THIRD OF BUILDING
 $I_p = 1.5 / OSHPD 1 \& 4$

MODEL NUMBER	MAX S_s FOR ANCHORAGE	MAX S_{DS} FOR ANCHORAGE (4)	ANCHORAGE DETAIL
LSGR-4436	0.50	0.47	S2.0
LSGR-4436+EQQ-1RU	1.00	0.73	S2.1
LSGR-4436+EQQ-2RU	1.25	0.83	S2.2
LSGR-4436+EQQ-4RU	2.00	1.33	S2.3
LSER-4432 & LSGR-4432	0.50	0.47	S2.0
LSER-4432+EQQ-1RU & LSGR-4432+EQQ-1RU	1.00	0.73	S2.1
LSER-4432+EQQ-2RU & LSGR-4432+EQQ-2RU	1.25	0.83	S2.2
LSER-4432+EQQ-4RU & LSGR-4432+EQQ-4RU	2.00	1.33	S2.3
LSER-4427 & LSGR-4427	0.50	0.47	S2.0
LSER-4427+EQQ-1RU & LSGR-4427+EQQ-1RU	1.00	0.73	S2.1
LSER-4427+EQQ-2RU & LSGR-4427+EQQ-2RU	1.25	0.83	S2.2
LSER-4427+EQQ-4RU & LSGR-4427+EQQ-4RU	2.00	1.33	S2.3
LSER-4422 & LSGR-4422	1.25	0.83	S2.0
LSER-4422+EQQ-1RU & LSGR-4422+EQQ-1RU	1.75	1.17	S2.1
LSER-4422+EQQ-2RU & LSGR-4422+EQQ-2RU	2.25	1.50	S2.2
LSER-4422+EQQ-4RU & LSGR-4422+EQQ-4RU	2.75	1.83	S2.3
LSGR-4036	1.00	0.73	S2.0
LSGR-4036+EQQ-1RU	1.50	1.00	S2.1
LSGR-4036+EQQ-2RU	2.00	1.33	S2.2
LSGR-4036+EQQ-4RU	2.25	1.50	S2.3
LSER-4032 & LSGR-4032	1.00	0.73	S2.0
LSER-4032+EQQ-1RU & LSGR-4032+EQQ-1RU	1.50	1.00	S2.1
LSER-4032+EQQ-2RU & LSGR-4032+EQQ-2RU	2.00	1.33	S2.2
LSER-4032+EQQ-4RU & LSGR-4032+EQQ-4RU	2.25	1.50	S2.3
LSER-4027 & LSGR-4027	1.00	0.73	S2.0
LSER-4027+EQQ-1RU & LSGR-4027+EQQ-1RU	1.50	1.00	S2.1
LSER-4027+EQQ-2RU & LSGR-4027+EQQ-2RU	2.00	1.33	S2.2
LSER-4027+EQQ-4RU & LSGR-4027+EQQ-4RU	2.25	1.50	S2.3

- 1) Table is applicable to Cabinet/Racks located at one third of the height of the building and below. **AREA OF INSTALLATION**
 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
 3) Indicated anchorage detail sheet specifies the required anchorage.
 4) Site Class D assumed.



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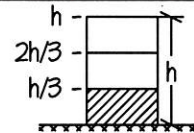
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TABLE 3A - ANCHORAGE REQUIREMENTS FOR LOWER THIRD OF BUILDING
 $I_p=1.5/OSHPD 1\&4$ (CONT.)


MODEL NUMBER	MAX S_s FOR ANCHORAGE	MAX S_{Ds} FOR ANCHORAGE ⁽⁴⁾	ANCHORAGE DETAIL
LSER-4022 & LSGR-4022	1.25	0.83	S2.0
LSER-4022+EQQ-1RU & LSGR-4022+EQQ-1RU	2.00	1.33	S2.1
LSER-4022+EQQ-2RU & LSGR-4022+EQQ-2RU	2.25	1.50	S2.2
LSER-4022+EQQ-4RU & LSGR-4022+EQQ-4RU	2.75	1.83	S2.3
LSGR-3536	1.25	0.83	S2.0
LSGR-3536+EQQ-1RU	1.75	1.17	S2.1
LSGR-3536+EQQ-2RU	2.25	1.50	S2.2
LSGR-3536+EQQ-4RU	2.50	1.67	S2.3
LSER-3532 & LSGR-3532	1.25	0.83	S2.0
LSER-3532+EQQ-1RU & LSGR-3532+EQQ-1RU	1.75	1.17	S2.1
LSER-3532+EQQ-2RU & LSGR-3532+EQQ-2RU	2.25	1.50	S2.2
LSER-3532+EQQ-4RU & LSGR-3532+EQQ-4RU	2.50	1.67	S2.3
LSER-3527 & LSGR-3527	1.25	0.83	S2.0
LSER-3527+EQQ-1RU & LSGR-3527+EQQ-1RU	1.75	1.17	S2.1
LSER-3527+EQQ-2RU & LSGR-3527+EQQ-2RU	2.25	1.50	S2.2
LSER-3527+EQQ-4RU & LSGR-3527+EQQ-4RU	2.50	1.67	S2.3
LSER-3522 & LSGR-3522	1.75	1.17	S2.0
LSER-3522+EQQ-1RU & LSGR-3522+EQQ-1RU	2.00	1.33	S2.1
LSER-3522+EQQ-2RU & LSGR-3522+EQQ-2RU	2.75	1.83	S2.2
LSER-3522+EQQ-4RU & LSGR-3522+EQQ-4RU	3.00	2.00	S2.3
LSER-2427 & LSGR-2427	3.00	2.00	S2.0
LSER-2427+EQQ-1RU & LSGR-2427+EQQ-1RU	3.00	2.00	S2.1
LSER-2422	3.00	2.00	S2.0
LSER-2422+EQQ-1RU	3.00	2.00	S2.1
LSER-2127	3.00	2.00	S2.0
LSER-2127+EQQ-1RU	3.00	2.00	S2.1
LSER-2122	3.00	2.00	S2.0
LSER-2122+EQQ-1RU	3.00	2.00	S2.1

- 1) Table is applicable to Cabinet/Racks located at one third of the height of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

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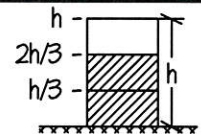
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TABLE 3B - ANCHORAGE REQUIREMENTS FOR MIDDLE THIRD OF BUILDING
 $I_p = 1.5 / \text{OSHPD } 1 \& 4$

MODEL NUMBER	MAX S_s FOR ANCHORAGE	MAX S_{Ds} FOR ANCHORAGE (4)	ANCHORAGE DETAIL
LSGR-4436	0.25	0.27	S2.0
LSGR-4436+EQQ-1RU	0.75	0.60	S2.1
LSGR-4436+EQQ-2RU	1.00	0.73	S2.2
LSGR-4436+EQQ-4RU	1.50	1.00	S2.3
LSER-4432 & LSGR-4432	0.25	0.27	S2.0
LSER-4432+EQQ-1RU & LSGR-4432+EQQ-1RU	0.75	0.60	S2.1
LSER-4432+EQQ-2RU & LSGR-4432+EQQ-2RU	1.00	0.73	S2.2
LSER-4432+EQQ-4RU & LSGR-4432+EQQ-4RU	1.50	1.00	S2.3
LSER-4427 & LSGR-4427	0.25	0.27	S2.0
LSER-4427+EQQ-1RU & LSGR-4427+EQQ-1RU	0.75	0.60	S2.1
LSER-4427+EQQ-2RU & LSGR-4427+EQQ-2RU	1.00	0.73	S2.2
LSER-4427+EQQ-4RU & LSGR-4427+EQQ-4RU	1.50	1.00	S2.3
LSER-4422 & LSGR-4422	1.00	0.73	S2.0
LSER-4422+EQQ-1RU & LSGR-4422+EQQ-1RU	1.25	0.83	S2.1
LSER-4422+EQQ-2RU & LSGR-4422+EQQ-2RU	1.75	1.17	S2.2
LSER-4422+EQQ-4RU & LSGR-4422+EQQ-4RU	2.25	1.50	S2.3
LSGR-4036	0.75	0.60	S2.0
LSGR-4036+EQQ-1RU	1.25	0.83	S2.1
LSGR-4036+EQQ-2RU	1.50	1.00	S2.2
LSGR-4036+EQQ-4RU	1.75	1.17	S2.3
LSER-4032 & LSGR-4032	0.75	0.60	S2.0
LSER-4032+EQQ-1RU & LSGR-4032+EQQ-1RU	1.25	0.83	S2.1
LSER-4032+EQQ-2RU & LSGR-4032+EQQ-2RU	1.50	1.00	S2.2
LSER-4032+EQQ-4RU & LSGR-4032+EQQ-4RU	1.75	1.17	S2.3
LSER-4027 & LSGR-4027	0.75	0.60	S2.0
LSER-4027+EQQ-1RU & LSGR-4027+EQQ-1RU	1.25	0.83	S2.1
LSER-4027+EQQ-2RU & LSGR-4027+EQQ-2RU	1.50	1.00	S2.2
LSER-4027+EQQ-4RU & LSGR-4027+EQQ-4RU	1.75	1.17	S2.3

- 1) Table is applicable to Cabinet/Racks located at two thirds of the height of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

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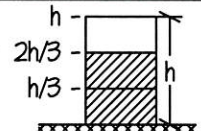
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TABLE 3B - ANCHORAGE REQUIREMENTS FOR MIDDLE THIRD OF BUILDING
 $I_p=1.5/OSHPD 1\&4$ (CONT.)

MODEL NUMBER	MAX S_s FOR ANCHORAGE	MAX S_{DS} FOR ANCHORAGE ⁽⁴⁾	ANCHORAGE DETAIL
LSER-4022 & LSGR-4022	1.00	0.73	S2.0
LSER-4022+EQQ-1RU & LSGR-4022+EQQ-1RU	1.50	1.00	S2.1
LSER-4022+EQQ-2RU & LSGR-4022+EQQ-2RU	1.75	1.17	S2.2
LSER-4022+EQQ-4RU & LSGR-4022+EQQ-4RU	2.25	1.50	S2.3
LSGR-3536	1.00	0.73	S2.0
LSGR-3536+EQQ-1RU	1.25	0.83	S2.1
LSGR-3536+EQQ-2RU	1.75	1.17	S2.2
LSGR-3536+EQQ-4RU	2.00	1.33	S2.3
LSER-3532 & LSGR-3532	1.00	0.73	S2.0
LSER-3532+EQQ-1RU & LSGR-3532+EQQ-1RU	1.25	0.83	S2.1
LSER-3532+EQQ-2RU & LSGR-3532+EQQ-2RU	1.75	1.17	S2.2
LSER-3532+EQQ-4RU & LSGR-3532+EQQ-4RU	2.00	1.33	S2.3
LSER-3527 & LSGR-3527	1.00	0.73	S2.0
LSER-3527+EQQ-1RU & LSGR-3527+EQQ-1RU	1.25	0.83	S2.1
LSER-3527+EQQ-2RU & LSGR-3527+EQQ-2RU	1.75	1.17	S2.2
LSER-3527+EQQ-4RU & LSGR-3527+EQQ-4RU	2.00	1.33	S2.3
LSER-3522 & LSGR-3522	1.25	0.83	S2.0
LSER-3522+EQQ-1RU & LSGR-3522+EQQ-1RU	1.50	1.00	S2.1
LSER-3522+EQQ-2RU & LSGR-3522+EQQ-2RU	2.25	1.50	S2.2
LSER-3522+EQQ-4RU & LSGR-3522+EQQ-4RU	2.50	1.67	S2.3
LSER-2427 & LSGR-2427	2.50	1.67	S2.0
LSER-2427+EQQ-1RU & LSGR-2427+EQQ-1RU	3.00	2.00	S2.1
LSER-2422	2.50	1.67	S2.0
LSER-2422+EQQ-1RU	3.00	2.00	S2.1
LSER-2127	2.50	1.67	S2.0
LSER-2127+EQQ-1RU	3.00	2.00	S2.1
LSER-2122	2.50	1.67	S2.0
LSER-2122+EQQ-1RU	3.00	2.00	S2.1

- 1) Table is applicable to Cabinet/Racks located at two thirds of the height of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

AREA OF INSTALLATION



A P P R O V E D
 Fixed Equipment Anchorage
 Office of Statewide Health Planning and Development



OPA-0628-10
 Pre-approval Program Manager
 Anthony R. Pike
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Reviewed By: Jeffrey Y. Kikumoto
 Date: 6/28/2012

REGISTERED PROFESSIONAL ENGINEER
 Michael James
 No. 38184
 Exp. 3-31-13
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11-21-12

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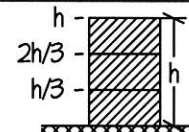
S1.7

TABLE 3A - ANCHORAGE REQUIREMENTS FOR LOWER THIRD OF BUILDING
 $I_p = 1.5 / \text{OSHPD } 1 \& 4$

MODEL NUMBER	MAX S_s FOR ANCHORAGE	MAX S_{Ds} FOR ANCHORAGE (4)	ANCHORAGE DETAIL
LSGR-4436	0.50	0.47	S2.0
LSGR-4436+EQQ-1RU	1.00	0.73	S2.1
LSGR-4436+EQQ-2RU	1.25	0.83	S2.2
LSGR-4436+EQQ-4RU	2.00	1.33	S2.3
LSER-4432 & LSGR-4432	0.50	0.47	S2.0
LSER-4432+EQQ-1RU & LSGR-4432+EQQ-1RU	1.00	0.73	S2.1
LSER-4432+EQQ-2RU & LSGR-4432+EQQ-2RU	1.25	0.83	S2.2
LSER-4432+EQQ-4RU & LSGR-4432+EQQ-4RU	2.00	1.33	S2.3
LSER-4427 & LSGR-4427	0.50	0.47	S2.0
LSER-4427+EQQ-1RU & LSGR-4427+EQQ-1RU	1.00	0.73	S2.1
LSER-4427+EQQ-2RU & LSGR-4427+EQQ-2RU	1.25	0.83	S2.2
LSER-4427+EQQ-4RU & LSGR-4427+EQQ-4RU	2.00	1.33	S2.3
LSER-4422 & LSGR-4422	1.25	0.83	S2.0
LSER-4422+EQQ-1RU & LSGR-4422+EQQ-1RU	1.75	1.17	S2.1
LSER-4422+EQQ-2RU & LSGR-4422+EQQ-2RU	2.25	1.50	S2.2
LSER-4422+EQQ-4RU & LSGR-4422+EQQ-4RU	2.75	1.83	S2.3
LSGR-4036	1.00	0.73	S2.0
LSGR-4036+EQQ-1RU	1.50	1.00	S2.1
LSGR-4036+EQQ-2RU	2.00	1.33	S2.2
LSGR-4036+EQQ-4RU	2.25	1.50	S2.3
LSER-4032 & LSGR-4032	1.00	0.73	S2.0
LSER-4032+EQQ-1RU & LSGR-4032+EQQ-1RU	1.50	1.00	S2.1
LSER-4032+EQQ-2RU & LSGR-4032+EQQ-2RU	2.00	1.33	S2.2
LSER-4032+EQQ-4RU & LSGR-4032+EQQ-4RU	2.25	1.50	S2.3
LSER-4027 & LSGR-4027	1.00	0.73	S2.0
LSER-4027+EQQ-1RU & LSGR-4027+EQQ-1RU	1.50	1.00	S2.1
LSER-4027+EQQ-2RU & LSGR-4027+EQQ-2RU	2.00	1.33	S2.2
LSER-4027+EQQ-4RU & LSGR-4027+EQQ-4RU	2.25	1.50	S2.3

- 1) Table is applicable to Cabinet/Racks located at the roof level of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

AREA OF INSTALLATION



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 Office of Statewide Health Planning and Development



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 Date



11-21-12



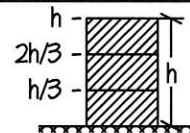
<p>LOWELL MANUFACTURING</p> <p>LOWELL CABINET & RACKS</p> <p>SEISMIC ANCHORAGE DETAILS - CBC</p>	 <p>100 Ingram Drive Pacific, MO 63069 Phone (636) 257-3400</p>	 <p>CCS Group, Inc 1415 Elbridge Payne Rd Suite 265 Chesterfield, MO 63017 www.ccsgruppstl.com</p>	<p>JOB NO. CCS11-040</p> <p>DATE NOVEMBER 2012</p> <p style="font-size: 2em;">S1.8</p>
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TABLE 3B - ANCHORAGE REQUIREMENTS FOR MIDDLE THIRD OF BUILDING
 $I_p=1.5/OSHPD 1\&4$ (CONT.)

MODEL NUMBER	MAXIMUM S_s FOR ANCHORAGE	MAX S_{DS} FOR ANCHORAGE (4)	ANCHORAGE DETAIL
LSER-4022 & LSGR-4022	1.00	0.73	S2.0
LSER-4022+EQQ-1RU & LSGR-4022+EQQ-1RU	1.50	1.00	S2.1
LSER-4022+EQQ-2RU & LSGR-4022+EQQ-2RU	1.75	1.17	S2.2
LSER-4022+EQQ-4RU & LSGR-4022+EQQ-4RU	2.25	1.50	S2.3
LSGR-3536	1.00	0.73	S2.0
LSGR-3536+EQQ-1RU	1.25	0.83	S2.1
LSGR-3536+EQQ-2RU	1.75	1.17	S2.2
LSGR-3536+EQQ-4RU	2.00	1.33	S2.3
LSER-3532 & LSGR-3532	1.00	0.73	S2.0
LSER-3532+EQQ-1RU & LSGR-3532+EQQ-1RU	1.25	0.83	S2.1
LSER-3532+EQQ-2RU & LSGR-3532+EQQ-2RU	1.75	1.17	S2.2
LSER-3532+EQQ-4RU & LSGR-3532+EQQ-4RU	2.00	1.33	S2.3
LSER-3527 & LSGR-3527	1.00	0.73	S2.0
LSER-3527+EQQ-1RU & LSGR-3527+EQQ-1RU	1.25	0.83	S2.1
LSER-3527+EQQ-2RU & LSGR-3527+EQQ-2RU	1.75	1.17	S2.2
LSER-3527+EQQ-4RU & LSGR-3527+EQQ-4RU	2.00	1.33	S2.3
LSER-3522 & LSGR-3522	1.25	0.83	S2.0
LSER-3522+EQQ-1RU & LSGR-3522+EQQ-1RU	1.50	1.00	S2.1
LSER-3522+EQQ-2RU & LSGR-3522+EQQ-2RU	2.25	1.50	S2.2
LSER-3522+EQQ-4RU & LSGR-3522+EQQ-4RU	2.50	1.67	S2.3
LSER-2427 & LSGR-2427	2.50	1.67	S2.0
LSER-2427+EQQ-1RU & LSGR-2427+EQQ-1RU	3.00	2.00	S2.1
LSER-2422	2.50	1.67	S2.0
LSER-2422+EQQ-1RU	3.00	2.00	S2.1
LSER-2127	2.50	1.67	S2.0
LSER-2127+EQQ-1RU	3.00	2.00	S2.1
LSER-2122	2.50	1.67	S2.0
LSER-2122+EQQ-1RU	3.00	2.00	S2.1

- 1) Table is applicable to Cabinet/Racks located at the roof level of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

AREA OF INSTALLATION



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 Office of Statewide Health Planning and Development



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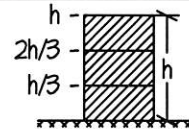
S1.9

TABLE 3D - ANCHORAGE REQUIREMENTS $I_p = 1.0/OSHPD 2$

MODEL NUMBER	MAXIMUM S_s & S_{Ds} FOR ANCHORAGE	ANCHORAGE DETAIL
LSGR-4436	$S_s = 3.00$ - NORMAL WEIGHT CONCRETE $S_{Ds} = 2.00$ - NORMAL WEIGHT CONCRETE SEE TABLE 5 ON S3.1 FOR LIGHT WEIGHT CONCRETE	S2.0
LSER-4432 & LSGR-4432		
LSER-4427 & LSGR-4427		
LSER-4422 & LSGR-4422		
LSGR-4036		
LSER-4032 & LSGR-4032		
LSER-4027 & LSGR-4027		
LSER-4022 & LSGR-4022		
LSGR-3536		
LSER-3532 & LSGR-3532		
LSER-3527 & LSGR-3527		
LSER-3522 & LSGR-3522		
LSER-2427 & LSGR-2427		
LSER-2422 & LSGR-2422		
LSER-2127		
LSER-2122 & LSGR-2122		
LSER-1422		
LSER-F4427		
LSER-F4422		
LSER-F4027		
LSER-F4022		
LSER-F3527		
LSER-F3522		
LSER-F2427		
LSER-F2422		
LSER-F2127		
LSER-F2122		
LSER-F1422		

- 1) Table is applicable to Cabinet/Racks located at the roof level of the building and below.
- 2) For S_s see 2010 CBC, Figure 1613.5 (1) through 1613.5 (14).
- 3) Indicated anchorage detail sheet specifies the required anchorage.
- 4) Site Class D assumed.

AREA OF INSTALLATION



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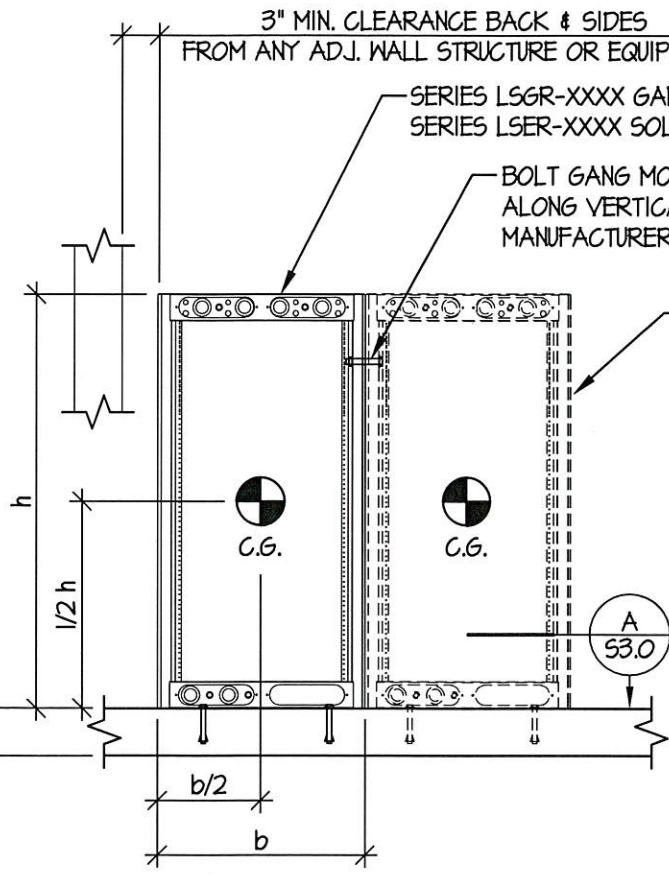
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SEE TABLE 4 OR 5 ON S3.1 FOR MIN. STRUCTURAL CONCRETE SLAB THICKNESS (NORMAL OR LIGHT WT. F' ≥ 3000 psi.)



3" MIN. CLEARANCE BACK & SIDES FROM ANY ADJ. WALL STRUCTURE OR EQUIPMENT

SERIES LSGR-XXXX GANGING RACK OR SERIES LSER-XXXX SOLID SIDE CABINET

BOLT GANG MOUNTED RACKS TOGETHER FRONT AND BACK ALONG VERTICAL HEIGHT W/ 1/4"-20 BOLT AND NUT PER MANUFACTURER'S INSTRUCTIONS. TORQUE TO 60 IN-LBS.

LOWELL MANUFACTURING OPEN FRAME GANGABLE RACKS, AS APPLICABLE.

CABINET OR RACK HEIGHT	
MODEL NUMBER	HEIGHT "h"
LSXR-44XX, LSER-F44XX	83-1/8"
LSXR-40XX, LSER-F40XX	76-1/8"
LSXR-35XX, LSER-F35XX	67-3/8"
LSXR-24XX, LSER-F24XX	48-1/8"
LSXR-21XX, LSER-F21XX	42-7/8"
LSER-1422, LSER-F1422	30-5/8"

ELEVATION

NOTES:

- 1) REFER TO TABLES 3A, 3B, 3C, & 3D FOR COMPLETE MODEL NO. APPLICABILITY.
- 2) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS.
- 3) LOADS APPLIED TO STRUCTURE:

$Ip = 1.5$ (OSHPD 1&4)
 TOTAL WT. : 1,200 lb MAX.
 MAX. TENSION : 904 lb PER ANCHOR
 MAX. SHEAR : 285 lb PER ANCHOR

$Ip = 1.0$ (OSHPD 2)
 TOTAL WT. : 1,500 lb MAX.
 MAX. TENSION : 1,713 lb PER ANCHOR
 MAX. SHEAR : 476 lb PER ANCHOR

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Reviewed By: Jeffrey Y. Kikumoto Date

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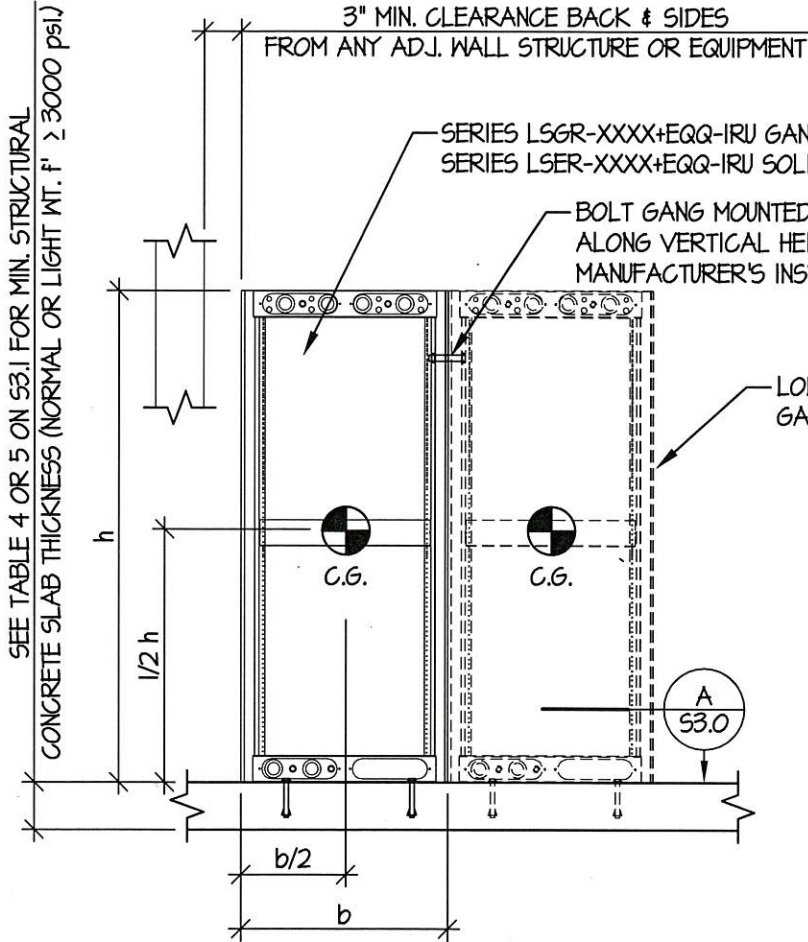
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S2.0



CABINET OR RACK HEIGHT	
MODEL NUMBER	HEIGHT "h"
LSXR-44XX	83-1/8"
LSXR-40XX	76-1/8"
LSXR-35XX	67-3/8"
LSXR-24XX	48-1/8"
LSXR-21XX	42-7/8"

ELEVATION

NOTES:

- 1) REFER TO TABLES 3A, 3B, & 3C FOR COMPLETE MODEL NO. APPLICABILITY (I_p=1.5 ONLY - OSHPD 1&4).
- 2) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS.
- 3) LOADS APPLIED TO STRUCTURE:

I_p = 1.5 (OSHPD 1&4)
 TOTAL WT. : 1,200 lb MAX.
 MAX. TENSION : 904 lb PER ANCHOR
 MAX. SHEAR : 285 lb PER ANCHOR

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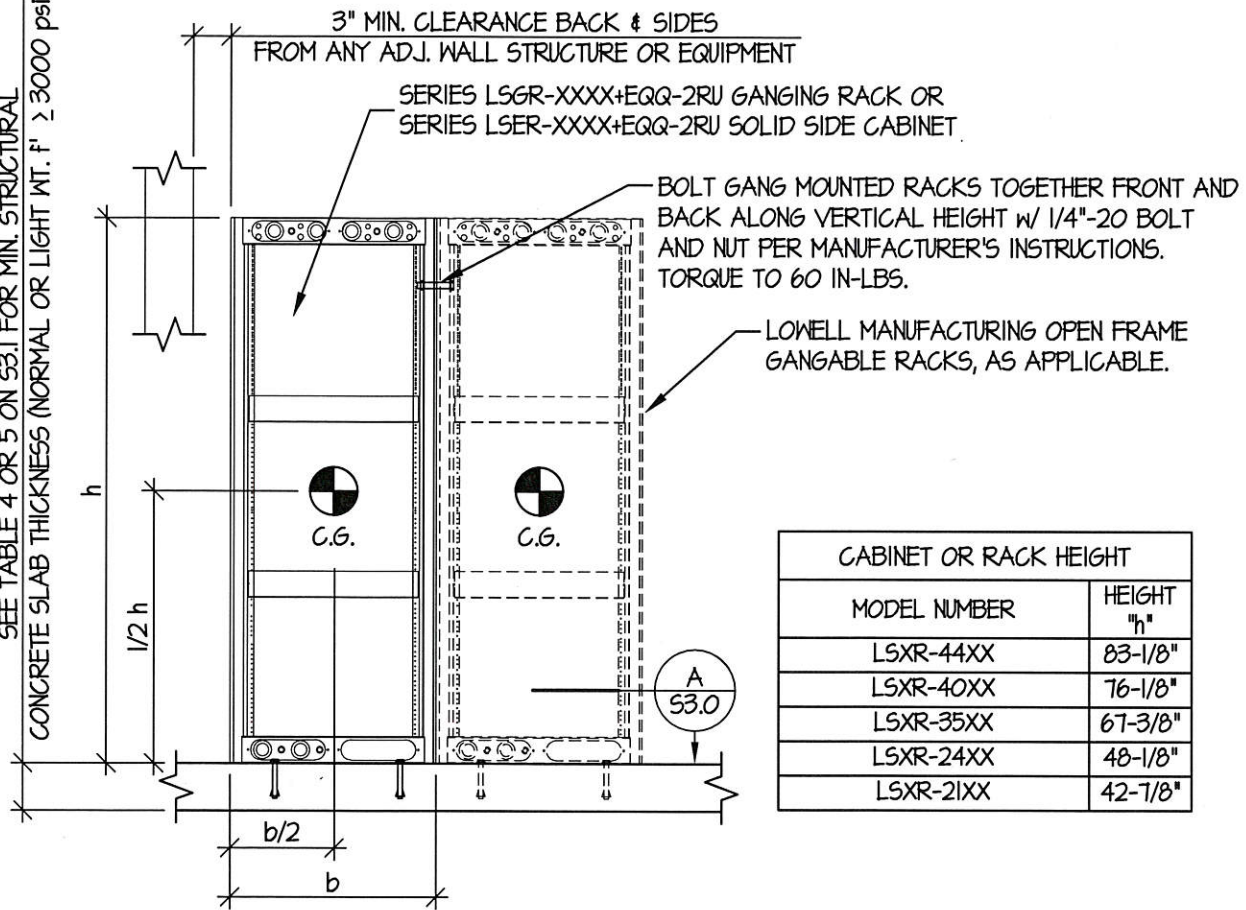
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S2.1

SEE TABLE 4 OR 5 ON S3.1 FOR MIN. STRUCTURAL CONCRETE SLAB THICKNESS (NORMAL OR LIGHT WT. F' \geq 3000 psi)



CABINET OR RACK HEIGHT	
MODEL NUMBER	HEIGHT "h"
LSXR-44XX	83-1/8"
LSXR-40XX	76-1/8"
LSXR-35XX	67-3/8"
LSXR-24XX	48-1/8"
LSXR-21XX	42-7/8"


ELEVATION

NOTES:

- 1) REFER TO TABLE 3A, 3B, & 3C FOR COMPLETE MODEL NO. APPLICABILITY (Ip=1.5 ONLY - OSHPD 1&4).
- 2) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS.
- 3) LOADS APPLIED TO STRUCTURE:

Ip = 1.5 (OSHPD 1&4)
 TOTAL WT. : 1,200 lb MAX.
 MAX. TENSION : 904 lb PER ANCHOR
 MAX. SHEAR : 285 lb PER ANCHOR

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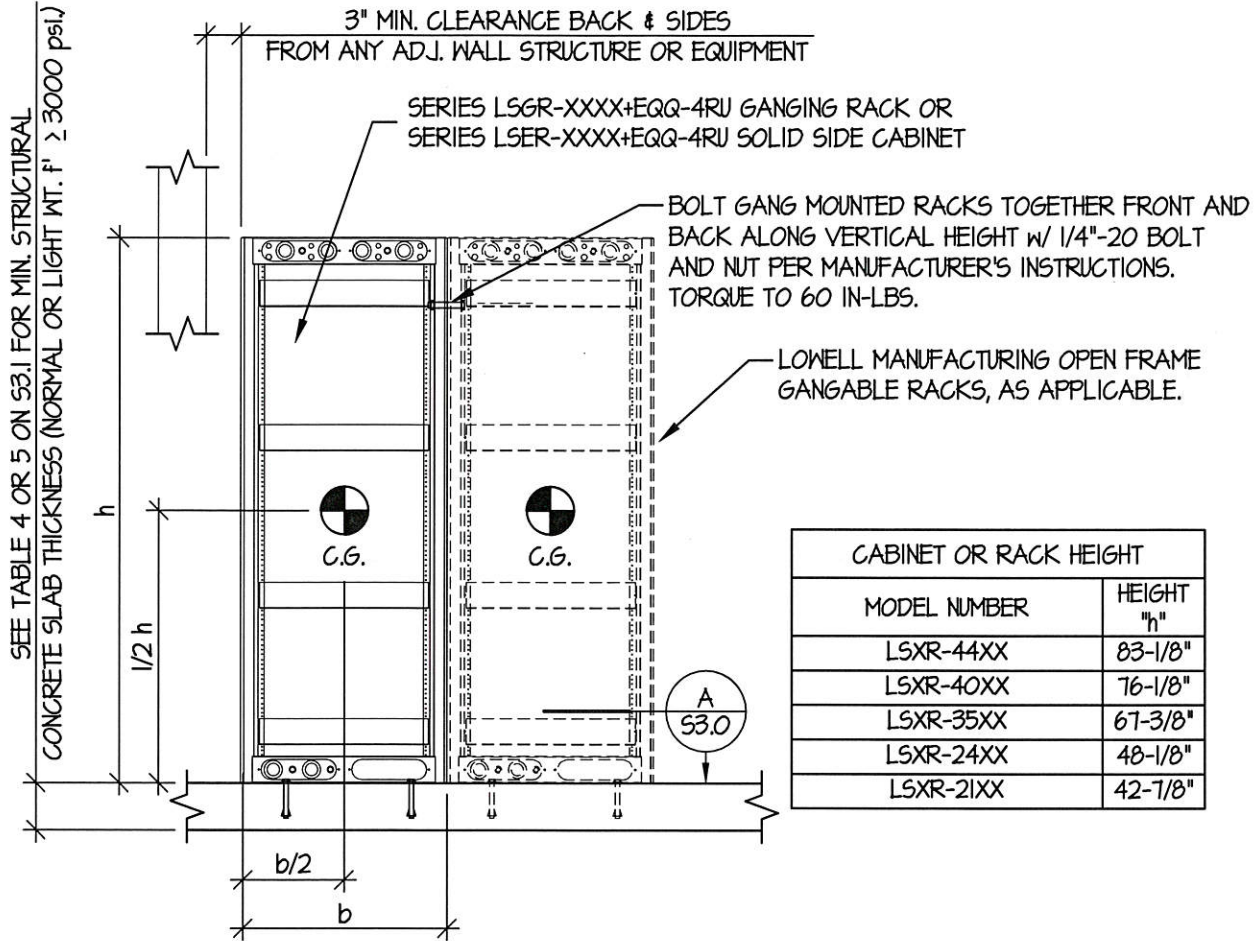
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<p>LOWELL MANUFACTURING</p> <p>LOWELL CABINET & RACKS</p> <p>SEISMIC ANCHORAGE DETAILS - CBC</p>	<p>Lowell</p> <p>100 Ingram Drive Pacific, MO 63069 Phone (636) 257-3400</p>	<p>CCS</p> <p>CCS Group, Inc 1415 Elbridge Payne Rd Suite 265 Chesterfield, MO 63017 www.ccsgroutstl.com</p>	JOB NO.
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			DATE
			NOVEMBER 2012
			S2.2



CABINET OR RACK HEIGHT	
MODEL NUMBER	HEIGHT "h"
LSXR-44XX	83-1/8"
LSXR-40XX	76-1/8"
LSXR-35XX	67-3/8"
LSXR-24XX	48-1/8"
LSXR-21XX	42-7/8"

ELEVATION

NOTES:

- 1) REFER TO TABLES 3A, 3B, & 3C FOR COMPLETE MODEL NO. APPLICABILITY (Ip=1.5 ONLY - OSHPD 1&4).
- 2) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS.
- 3) LOADS APPLIED TO STRUCTURE:

Ip = 1.5 (OSHPD 1&4)
 TOTAL WT. : 1,200 lb MAX.
 MAX. TENSION : 904 lb PER ANCHOR
 MAX. SHEAR : 285 lb PER ANCHOR

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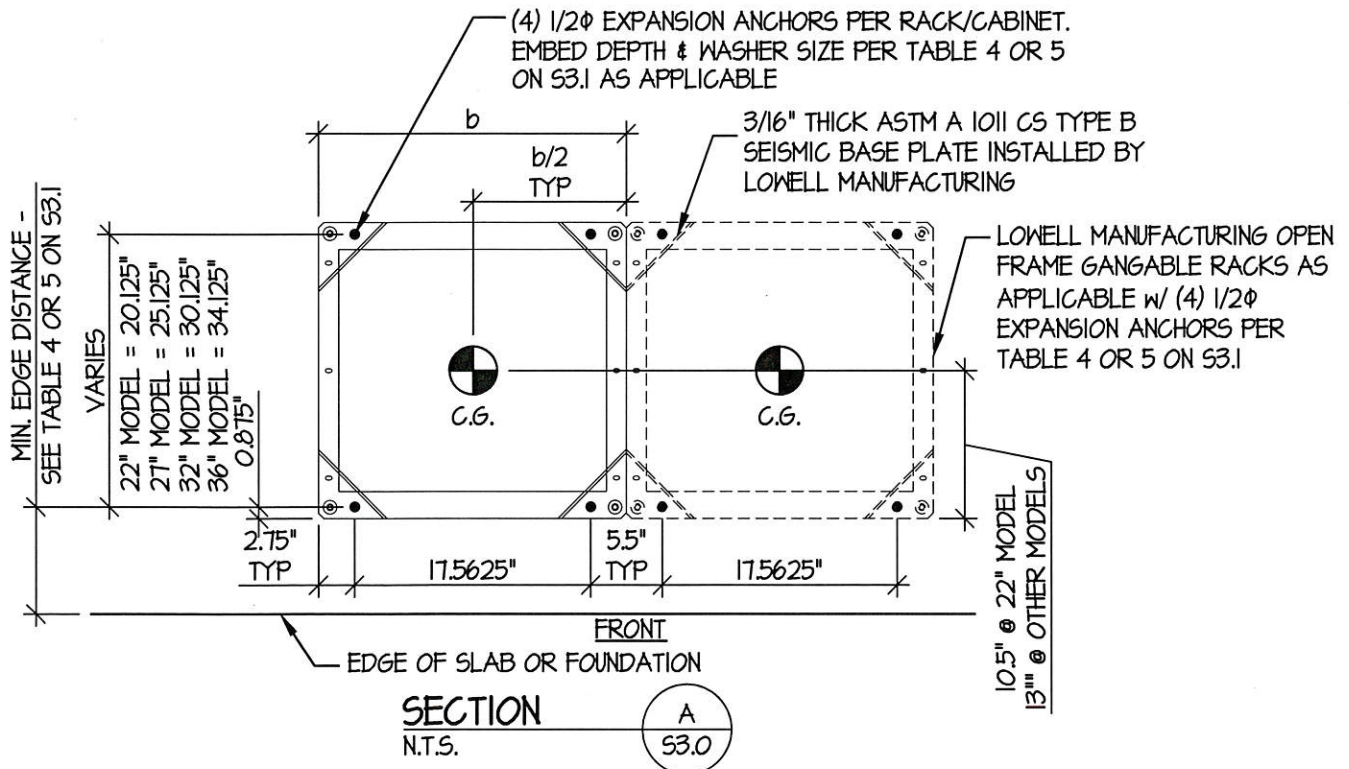
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			DATE NOVEMBER 2012
			S2.3



NOTES:

1.) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS.

2.) LOADS APPLIED TO STRUCTURE:

$I_p = 1.5$ (OSHPD 1#4)
TOTAL WT. : 1,200 lb MAX.
MAX. TENSION : 904 lb PER ANCHOR
MAX. SHEAR : 285 lb PER ANCHOR

$I_p = 1.0$ (OSHPD 2)
TOTAL WT. : 1,500 lb MAX.
MAX. TENSION : 1,713 lb PER ANCHOR
MAX. SHEAR : 476 lb PER ANCHOR

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S3.0

TABLE 4 - OSHPD 1 & 4 BUILDINGS - ANCHORAGE REQUIREMENTS ($l_p = 1.5$)

ANCHOR TYPE	NOMINAL EMBEDMENT	WASHER	MIN SLAB DEPTH	MIN EDGE DISTANCE
1/2" HILTI KWIK BOLT TZ	3 5/8"	1 1/2" x 1/8"	6"	4"
1/2" SIMPSON STRONG BOLT 2	3 7/8"	1 1/2" x 1/8"	6"	4"
1/2" POWERS POWER STUD SD2	3 3/4"	1 1/2" x 1/8"	6"	4"

- 1) APPLIES TO NORMAL AND LIGHTWEIGHT CONCRETE
- 2) W_p AND CONTENT WEIGHT PER TABLE 1 ON SHEET S1.0
- 3) $l_p = 1.5$ ONLY

TABLE 5 - OSHPD 2 BUILDINGS - ANCHORAGE REQUIREMENTS ($l_p = 1.0$)

CONCRETE TYPE	ANCHOR TYPE	MAX S_s/S_d s	NOMINAL EMBEDMENT	WASHER	MIN SLAB DEPTH	MIN EDGE DISTANCE
NORMAL WEIGHT CONCRETE	1/2" HILTI KWIK BOLT TZ	3.00/2.00	3 5/8"	1 1/2" x 1/8"	6"	4"
	1/2" SIMPSON STRONG BOLT 2		3 7/8"	1 1/2" x 1/8"	6"	4"
	1/2" POWERS POWER STUD SD2		3 3/4"	1 1/2" x 1/8"	6"	4"
LIGHT WEIGHT CONCRETE	1/2" HILTI KWIK BOLT TZ	2.50/1.67	3 5/8"	1 1/2" x 1/8"	6"	5"
	1/2" SIMPSON STRONG BOLT 2	2.00/1.33	3 7/8"	1 1/2" x 1/8"	6"	5"
	1/2" POWERS POWER STUD SD2	2.50/1.67	3 3/4"	1 1/2" x 1/8"	6"	5"

- 1) APPLIES TO NORMAL AND LIGHTWEIGHT CONCRETE AS INDICATED.
- 2) W_p AND CONTENT PER TABLE 2 ON S1.1
- 3) $l_p = 1.0$ ONLY (OSHPD 2)
- 4) SITE CLASS D ASSUMED FOR S_d s CALCULATION.

NOTES:

1.) SEISMIC ANCHORAGE DETAIL APPLIES TO LOWELL MANUFACTURING SEISMIC RACKS & CABINETS

2.) LOADS APPLIED TO STRUCTURE:

$l_p = 1.5$ (OSHPD 1&4)

TOTAL WT. : 1,200 lb MAX.
 MAX. TENSION : 904 lb PER ANCHOR
 MAX. SHEAR : 285 lb PER ANCHOR

$l_p = 1.0$ (OSHPD 2)

TOTAL WT. : 1,500 lb MAX.
 MAX. TENSION : 1,713 lb PER ANCHOR
 MAX. SHEAR : 476 lb PER ANCHOR

APPROVED

Fixed Equipment Anchorage
Office of Statewide Health Planning and Development



OPA-0628-10
 Pre-approval Program Manager
 Anthony R. Pike
 (916) 440-8470

Reviewed By: *Jeffrey Y. Kikumoto* Date: *10 DEC 2012*

REGISTERED PROFESSIONAL ENGINEER



Michael James [Signature]

No. 38184
Exp. 3-31-13

CIVIL

STATE OF CALIFORNIA

11-21-12

<p>LOWELL MANUFACTURING</p> <p>LOWELL CABINET & RACKS</p> <p>SEISMIC ANCHORAGE DETAILS - CBC</p>	 <p>100 Ingram Drive Pacific, MO 63069 Phone (636) 257-3400</p>	 <p>CCS Group, Inc 1415 Elbridge Payne Rd Suite 265 Chesterfield, MO 63017 www.ccsgroupstl.com</p>	<p>JOB NO. CCS11-040</p> <p>DATE NOVEMBER 2012</p> <p style="font-size: 2em;">S3.1</p>
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