



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

**CCS Group, Inc. • Creative Construction Solutions**

# LOWELL MANUFACTURING CABINET & RACK SEISMIC QUALIFICATION SUMMARY CABINET AND ANCHORAGE INSTALLATION DETAILS

CALIFORNIA BUILDING CODE SEISMIC CERTIFICATION  
FOR USE IN ESSENTIAL FACILITIES & SEISMIC APPLICATIONS

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May 2011

CCS Project #: CCS10-050



5-2-11



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JOB NO.	CCS10-050	JOB	Lowell Manufacturing	BY	CMS	SHEET NO	i	DATE	5/2/2011
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\* Not included in package – see Seismic Qualification Calculations Package  
dated May 2011, CCS Project No. CCS10-050





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## **1.0 PURPOSE:**

The purpose of this calculation is to document the seismic qualification and certification of selected Lowell Manufacturing equipment racks and cabinets used to support electronic components to the seismic criteria of the 2010 California Building Code. Specifically, this package provides seismic qualification and certification requirements for two (2) categories of seismic qualification:

1. Racks and cabinets identified as part of a Life Safety/Essential System. These cabinets and racks are so designated and required in critical or essential facilities where operation and function following a major earthquake event is necessary ( $I_p = 1.5$ ).
2. Racks and cabinets requiring seismic design by code ( $I_p = 1.0$ ), but are NOT identified as a Life Safety/Essential System. These racks and cabinets only require their supports and attachments; i.e., anchorage, to be seismically qualified and certified.

The 2010 California Building Code (CBC), Title 24 regulations references and relies on the 2009 IBC and ASCE/SEI 7-05 for the applicable seismic design provisions for nonstructural components. The 2009 International Building Code (IBC) seismic design requirements were used to seismically qualify the selected Lowell electronic equipment racks and cabinets. The 2009 IBC also references the American Society of Engineers Standard ASCE/SEI 7-05 for the applicable seismic design provisions for nonstructural components; thus the qualification of the Lowell racks and cabinets herein are code compliant with the seismic design provisions of both the 2009 IBC and 2010 CBC.

This seismic qualification package contains the seismic analysis supporting the seismic qualification of the listed Lowell Manufacturing equipment racks and cabinets. In addition, the resulting installation instructions were developed for the equipment racks, cabinets, and their anchorage systems based on the results of seismic calculations and limits established by the IBC seismic provisions. These seismic qualification and installation instructions are organized to establish the maximum spectral accelerations ( $S_s$ ) for the selected racks and cabinets. Specific cabinet and rack details are included for various spectral accelerations associated with differing seismic regions and location within the building structure (basement to roof). Anchorage instructions for the qualified cabinets including anchor size, type, embedment, spacing, and edge distance requirements are also developed and provided.



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## **2.0 SUMMARY:**

The following Lowell Manufacturing rack and cabinet models meet or exceed the seismic design requirements as specified in the 2009 International Building Code, Section 1613 and the 2010 California Building Code, Section 1613.

### **Life Safety/Essential Systems ( $I_p = 1.5$ ) –**

#### **Cabinet Models:**

- LSER-2122, LSER-2422, LSER-3522, LSER-4022, LSER-4422, LSER -2127, LSER-2427, LSER-3527, LSER-4027, LSER-4427, LSER-3532, LSER-4032, LSER-4432.

#### **Ganging Rack Models:**

- LSGR-3522, LSGR-4022, LSGR-4422, LSGR-2427, LSGR-3527, LSGR-4027, LSGR-4427, LSGR-3532, LSGR-4032, LSGR-4432, LSGR-4036, and LSGR-4436.

### **Typical Installations (Anchorage only, $I_p = 1.0$ ) –**

#### **Cabinet Models:**

- LSER-2122, LSER-2422, LSER-3522, LSER-4022, LSER-4422, LSER -2127, LSER-2427, LSER-3527, LSER-4027, LSER-4427, LSER-3532, LSER-4032, LSER-4432.

#### **Ganging Rack Models:**

- LSGR-3522, LSGR-4022, LSGR-4422, LSGR-2427, LSGR-3527, LSGR-4027, LSGR-4427, LSGR-3532, LSGR-4032, LSGR-4432, LSGR-4036, and LSGR-4436.

#### **Fixed Rail Cabinet Models:**

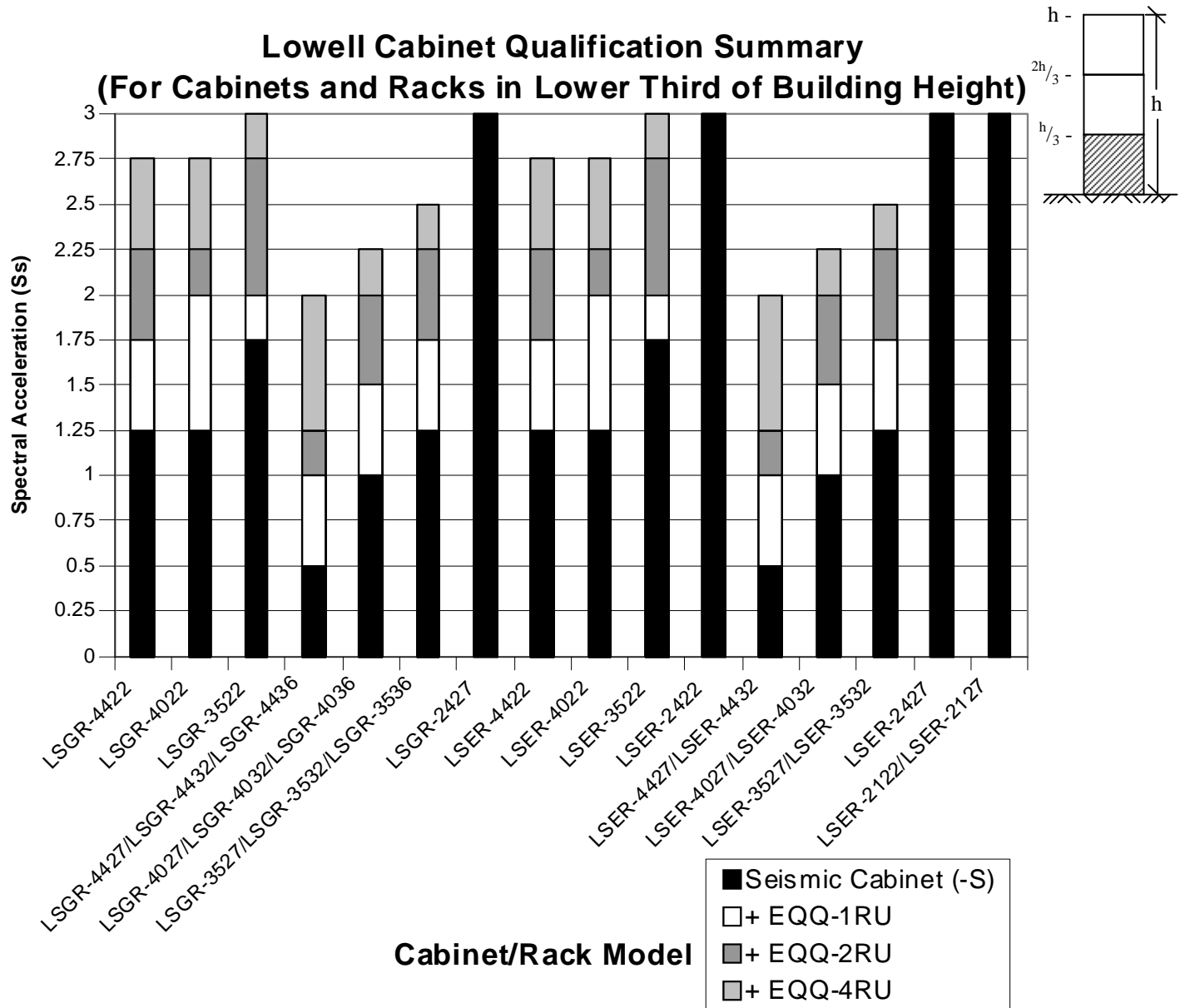
- LSER-F2122, LSER-F2422, LSER-F3522, LSER-F4022, LSER-F4422, LSER -F2127, LSER-F2427, LSER-F3527, LSER-F4027, and LSER-F4427.

The cabinets and racks shall be installed in accordance with the seismic instructions included herein as Appendix A. Figures 1a, 1b, and 1c provide a summary of the seismic qualification for the applicable Life Safety/Essential Systems cabinet/rack models vs. spectral acceleration,  $S_s$ . Table 3a, 3b, and 3c on sheets S1.3a, S1.3b, and S1.3c in Appendix A provide the detailed seismic qualification with respect to the maximum spectral acceleration ( $S_s$ ) for the respective cabinet series and model in this category ( $I_p = 1.5$ ).



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				DATE	5/2/2011



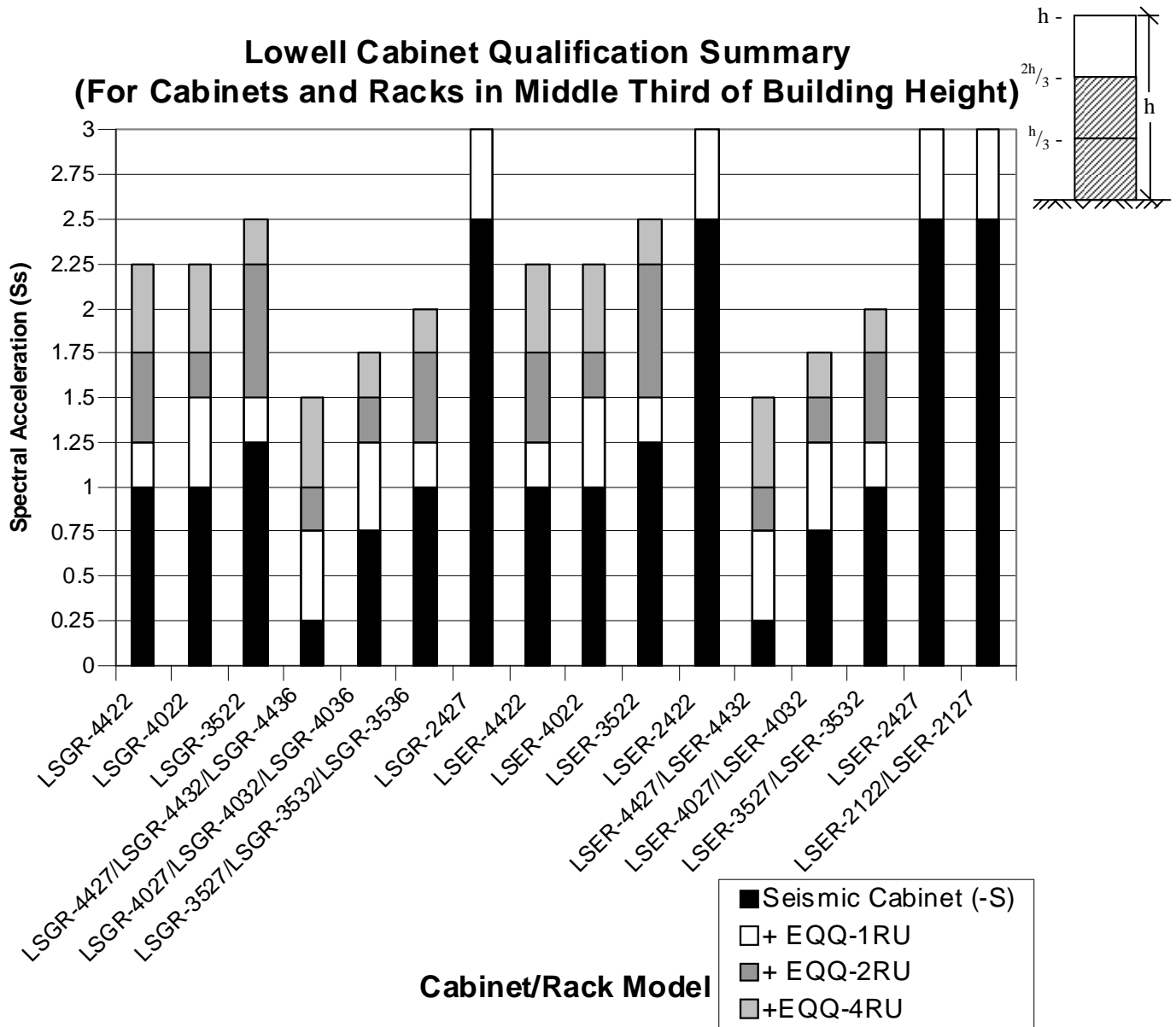
Note 1. Qualification based on the specified loading used in the calculations.

**Figure 1a:** Qualification for Lowell Manufacturing's  
LSGR-XX22, LSGR-XX27, LSGR-XX32, & LSGR-XX36 Rack Series  
and LSER-XX22, LSER-XX27, & LSER-XX32 Cabinet Series



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Note 1. Qualification based on the specified loading used in the calculations.

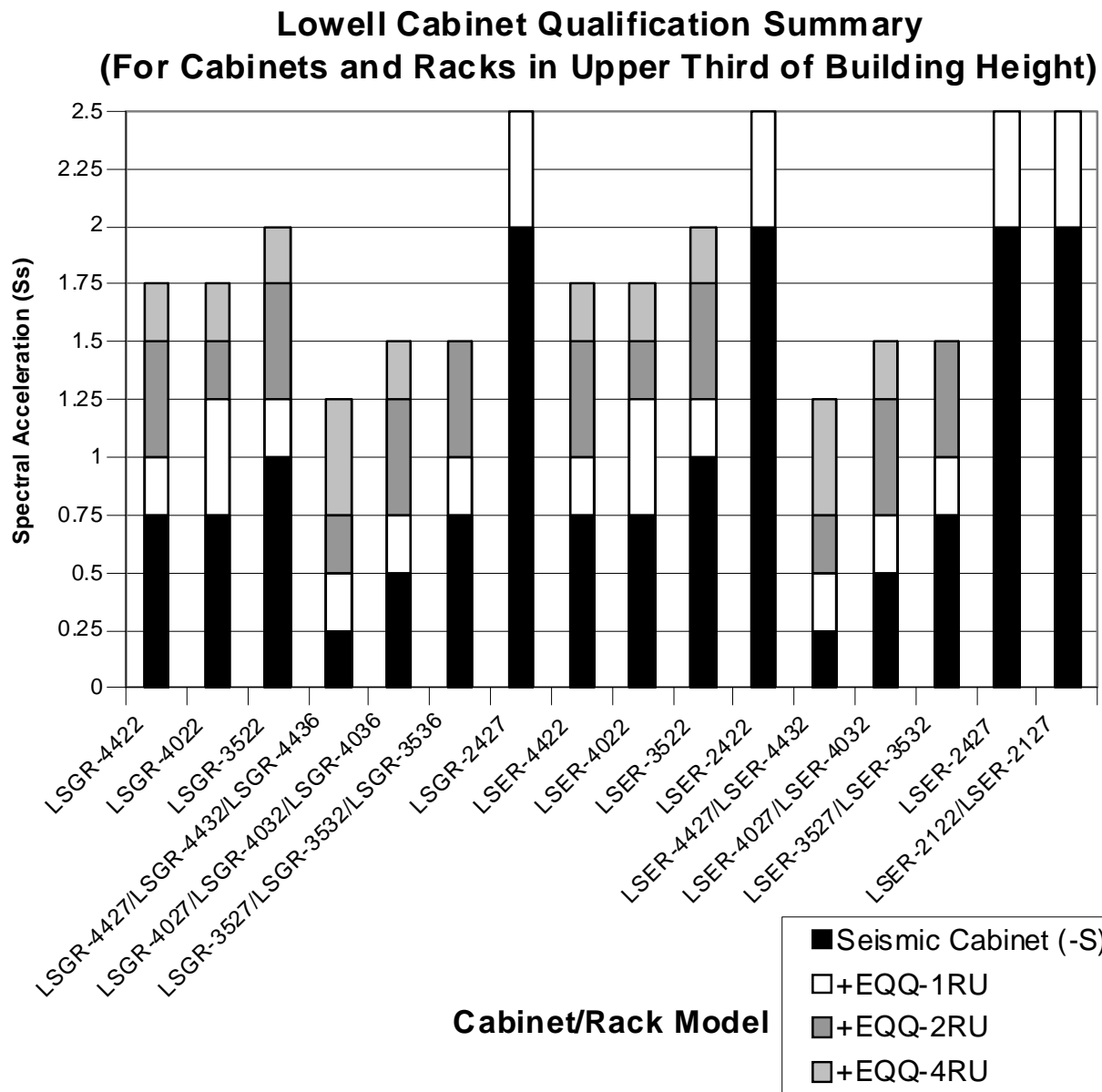
**Figure 1b:** Qualification for Lowell Manufacturing's  
LSGR-XX22, LSGR-XX27, LSGR-XX32, & LSGR-XX36 Rack Series  
and LSER-XX22, LSER-XX27, & LSER-XX32 Cabinet Series



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 BY CMS DATE 5/2/2011  
 CHK'D MJG DATE 5/2/2011



Note 1. Qualification based on the specified loading used in the calculations.

**Figure 1c:** Qualification for Lowell Manufacturing's  
 LSGR-XX22, LSGR-XX27, LSGR-XX32, & LSGR-XX36 Rack Series  
 and LSER-XX22, LSER-XX27, & LSER-XX32 Cabinet Series



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### **3.0 REFERENCES:**

1. American Concrete Institute "ACI 318-08 Building Code Requirements for Structural Concrete and Commentary" Second Printing, June 2008.
2. American Institute of Steel Construction, "*Steel Construction Manual*," Thirteenth Edition, 2005.
3. California Building Standards Commission, "2010 California Building Code, California Code of Regulations Title 24. 1<sup>st</sup> Printing, June 2010.
4. Computers and Structures, Inc., "ETABS Plus" Software Version 9.7.0, 1984-2010.
5. ICC Evaluation Service, "ICC-ES Evaluation Report ESR-1917" 2007.
6. ICC Evaluation Service, "ICC-ES Evaluation Report ESR-1771" 2008.
7. ICC Evaluation Service "ICC-ES Evaluation Report ESR-2502", 2010.
8. International Code Council, Inc., "International Building Code 2006 Edition" 2<sup>nd</sup> Printing November 2006.
9. International Code Council, Inc., "International Building Code 2009 Edition" 1<sup>st</sup> Printing February 2009.
10. Lowell Manufacturing Company, Product Specification Sheets
  - LSER-44XX and LSGR-44XX Series Specification Sheet 01-2920, 06-15-10
  - LSER-40XX and LSGR-40XX Series Specification Sheet 01-2921, 06-15-10
  - LSER-35XX and LSGR-35XX Series Specification Sheet 01-2922, 06-15-10
  - LSER-24XX and LSGR-24XX Series Specification Sheet 01-2923, 06-15-10
11. RSG Software Inc., "CFS" Software Version 6.0.2" 1988-2009.
12. SEI/ASCE 7-05, "ASCE Standard Minimum Design Loads for Buildings and Other Structures," American Society of Civil Engineers, 2006.



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## **APPENDIX A**

# **CBC Seismic-Certified Installation Details**

(30 pages excluding this cover)

## GENERAL NOTES

1. Lowell Manufacturing model applicability:
    - a. LSGR-XX22, LSGR-XX27, LSGR-XX32, & LSGR-XX36 series 19" ganging racks with seismic base. Ref. specific model loads in Table 1 & 2 below.
    - b. LSER-XX22, LSER-XX27, & LSER-XX32 series 19" stand alone cabinets with seismic base. Ref. specific model loads in Table 1 & 2 below.
  2. Design Criteria: The 2010 California Building Code (CBC), section 1613
    - 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. Qualification instructions not applicable to site class E & F sites.
    - c. Importance Factor,  $I_p$  = 1.5 (Life Safety /Essential Systems)  
 $I_p$  = 1.0 (Standard installations - anchorage only)
    - d. Equation 13.3-1 (ASCE 7-05)      Equation 13.3-3      Equation 13.3-2
- f. Cabinet supported on Normal or Light Weight Concrete with  $f'_c$ =3000 psi mi
- g. Maximum weight, cabinet and contents:

Table 1 Life Safety /Essential Systems ( $I_p$  = 1.5)

Models	WP	CONTENT WEIGHT
LSGR-4427, LSGR-4432, LSGR-4436, LSER-4427, LSER-4432	1,200 lb	980 lb
LSGR-4027, LSGR-3527, LSGR-4032, LSGR-3532, LSGR-4036, LSGR-3536, LSER-4027, LSER-3527, LSER-4032, LSER-3532	1,100 lb	900 lb
LSGR-4422, LSGR-4022, LSGR-3522, LSER-4422, LSER-4022, LSER-3522	900 lb	725 lb
LSER-2122, LSER-2127, LSGR-2427, LSER-2422, LSER-2427	600 lb	500 lb

Maximum attachment loads at anchorage to building structure (per anchor):

Max. tension = 665 lb

Max. shear = 225 lb



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**LOWELL**  
 LSGR-XX22, LSGR-XX27, LSGR-XX32,  
 LSGR-XX36, LSER-FXX22, LSER-FXX27,  
 LSER-XX22, LSER-XX27, & LSER-XX32  
 SEISMIC (-S) CABINET/RACK - CBC

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S1.0

GENERAL NOTES CONT'D

Table 2 Typical Installations Anchorage Only ( $I_p = 1.0$ )

Models	W/P	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-I422, 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 = 1,516 lb

Max. shear = 360 lb

3. Installation Instructions:

- a. Select desired cabinet or rack model. Verify content weight is not exceeded per Table 1 for Life Safety/Essential Systems ( $I_p = 1.5$ ) or Table 2 for Standard Installations ( $I_p = 1.0$ ).
- b. Determine The Spectral Response Acceleration,  $S_s$  at short periods -0.2 sec. from:
  - 2010 CBC Figure 1613.5(1)
  - Contact Lowell
- 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 Importance Factor
  - ( $I_p = 1.5$  for life safety/essential systems)
  - ( $I_p = 1.0$  for standard installations-anchorage only)



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**LOWELL**  
 LSGR-XX22, LSGR-XX27, LSGR-XX32,  
 LSGR-XX36, LSER-FXX22, LSER-FXX27,  
 LSER-XX22, LSER-XX27, & LSER-XX32  
 SEISMIC (-S) CABINET/RACK - CBC

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S1.1

# GENERAL NOTES CONT'D

- e. Determine Location in Bldg for Cabinet/Rack (lp = 1.5 only):
    - < 1/3 h of Building Height (S1.3a)
    - < 2/3 h of Building Height (S1.3b)
    - Top of Building Height (S1.3c)
  - f. Determine cabinet detail sheet from Table 3a, 3b or 3c on Sheet S1.3a, S1.3b or S1.3c dependent on location in Bldg (lp = 1.5 only).
  - g. Determine supporting concrete type (Normal or Light Weight, f'c = 3000 psi min.)
  - h. Determine anchor bolt installation parameters on sheet S3.0 & S3.1.
4. 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 (ICC-ES ESR-1771)
    - 3) Powers Power Stud SD2 (ICC-ES ESR 2502)
  - b. See Tables on sheet S3.1 for applicable anchorage requirements. See S3.0 for anchorage installation instructions.
  - c. Do not drill thru existing reinforcing when installing anchors. If reinforcing is hit, notify Engineer of Record for direction.
  - d. Anchor testing – special inspection (for lp = 1.5 components only):
    - 1) Torque test 50% of the installed anchors as follows:

	SIMPSON	HILTI	POWERS
1/2" Dia. –	50 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 within 24 hours of anchor installation.
    - 4) If any anchor fails, notify 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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**LOWELL**  
LSGR-XX22, LSGR-XX27, LSGR-XX32,  
LSGR-XX36, LSER-FXX22, LSER-FXX27,  
LSER-XX22, LSER-XX27, & LSER-XX32  
**SEISMIC (-S) CABINET/RACK – CBC**

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S1.2

Table 3a

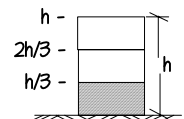
Cabinet Requirements and Details for Cabinets in Lower Third of Building Height												
Model	Maximum Considered Earthquake Ground Motion, IBC 2009											
	$S_s \leq 0.25$	$S_s \leq 0.50$	$S_s \leq 0.75$	$S_s \leq 1.00$	$S_s \leq 1.25$	$S_s \leq 1.50$	$S_s \leq 1.75$	$S_s \leq 2.00$	$S_s \leq 2.25$	$S_s \leq 2.50$	$S_s \leq 2.75$	$S_s \leq 3.00$
LSER-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4
LSER-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	(-S) CAB +EQQ-4RU S2.7	See Note 4
LSER-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.3	(-S) CAB +EQQ-4RU S2.4
LSER-2422 LSER-2122	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0
LSER-4427 LSER-4432	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4
LSER-4027 LSER-4032	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSER-3527 LSER-3532	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSER-2427 LSER-2127	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0
LSGR-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4
LSGR-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	(-S) CAB +EQQ-4RU S2.7	See Note 4
LSGR-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.3	(-S) CAB +EQQ-4RU S2.4
LSGR-4427 LSGR-4432 LSGR-4436	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-4027 LSGR-4032 LSGR-4036	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSGR-3527 LSGR-3532 LSGR-3536	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSGR-2427	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0

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).

3) Indicated detail sheet specifies the required installation instructions.

4) Lowell Cabinet/Rack model is not seismically qualified to this spectral acceleration level based on the conservative parameters used in the qualification analysis. Contact Lowell Manufacturing for possible inclusion based on specific installation conditions.



5-2-11

**LOWELL**  
LSGR-XX22, LSGR-XX27, LSGR-XX32, LSGR-XX36,  
LSER-XX22, LSER-XX27, & LSER-XX32  
SEISMIC (-S) CABINET/RACK - CBC

**Lowell**  
100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400

**CCS**  
CCS Group, Inc.  
1415 Elbridge Payne Rd Suite 265  
Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S1.3a

Table 3b

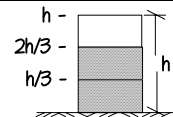
Cabinet Requirements and Details for Cabinets in Middle Third of Building Height												
Model	Maximum Considered Earthquake Spectral Acceleration, $S_s$ , IBC 2009											
	$S_s \leq 0.25$	$S_s \leq 0.50$	$S_s \leq 0.75$	$S_s \leq 1.00$	$S_s \leq 1.25$	$S_s \leq 1.50$	$S_s \leq 1.75$	$S_s \leq 2.00$	$S_s \leq 2.25$	$S_s \leq 2.50$	$S_s \leq 2.75$	$S_s \leq 3.00$
LSER-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4
LSER-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSER-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSER-2422 LSER-2122	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU S2.1
LSER-4427 LSER-4432	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSER-4027 LSER-4032	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSER-3527 LSER-3532	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4	See Note 4	See Note 4
LSER-2427 LSER-2127	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU S2.1
LSGR-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4
LSGR-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSGR-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSGR-4427 LSGR-4432 LSGR-4436	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-4027 LSGR-4032 LSGR-4036	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-3527 LSGR-3532 LSGR-3536	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-2427	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU 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).

3) Indicated detail sheet specifies the required installation instructions.

4) Lowell Cabinet/Rack model is not seismically qualified to this spectral acceleration level based on the conservative parameters used in the qualification analysis. Contact Lowell Manufacturing for possible inclusion based on specific installation conditions.



5-2-11

**LOWELL**  
**LSGR-XX22, LSGR-XX27, LSGR-XX32, LSGR-XX36,**  
**LSER-XX22, LSER-XX27, & LSER-XX32**  
**SEISMIC (-S) CABINET/RACK - CBC**

**Lowell**  
 100 Ingram Drive  
 Pacific, MO 63069  
 Phone (636) 257-3400



CCS Group, Inc.  
 1415 Elbridge Payne Rd Suite 265  
 Chesterfield, MO 63017  
 MO COA # 2006012384

JOB NO.  
**CCS10-050**

DATE  
**2 MAY 2011**

**S1.3b**

Table 3c

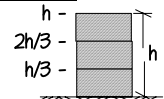
Cabinet Requirements and Details for Cabinets in Upper Third of Building Height										
Model	Maximum Considered Earthquake Spectral Acceleration, $S_s$ , IBC 2009									
	$S_s \leq 0.25$	$S_s \leq 0.50$	$S_s \leq 0.75$	$S_s \leq 1.00$	$S_s \leq 1.25$	$S_s \leq 1.50$	$S_s \leq 1.75$	$S_s \leq 2.00$	$S_s \leq 2.25$	$S_s \leq 2.50$
LSER-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4
LSER-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSER-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-2RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSER-2422 LSER-2122	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU S2.1
LSER-4427 LSER-4432	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.0	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSER-4027 LSER-4032	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4	See Note 4
LSER-3527 LSER-3532	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	See Note 4	See Note 4	See Note 4	See Note 4
LSER-2427 LSER-2127	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU S2.1
LSGR-4422	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4
LSGR-4022	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4
LSGR-3522	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-4RU S2.4	See Note 4	See Note 4
LSGR-4427 LSGR-4432 LSGR-4436	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.8	(-S) CAB +EQQ-2RU S2.9	(-S) CAB +EQQ-4RU S2.10	(-S) CAB +EQQ-4RU S2.10	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-4027 LSGR-4032 LSGR-4036	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.5	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-2RU S2.6	(-S) CAB +EQQ-4RU S2.7	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-3527 LSGR-3532 LSGR-3536	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.2	(-S) CAB +EQQ-2RU S2.3	(-S) CAB +EQQ-2RU S2.3	See Note 4	See Note 4	See Note 4	See Note 4
LSGR-2427	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	Seismic Cabinet (-S) S2.0	(-S) CAB +EQQ-1RU S2.1	(-S) CAB +EQQ-1RU S2.1

1) Table is applicable to Cabinet/Racks located at the roof and below.

2) For  $S_s$  see 2010 CBC, Figure 1613.5 (1).

3) Indicated detail sheet specifies the required installation instructions.

4) Lowell Cabinet/Rack model is not seismically qualified to this spectral acceleration level based on the conservative parameters used in the qualification analysis. Contact Lowell Manufacturing for possible inclusion based on specific installation conditions.



5-2-11

**LOWELL**  
**LSGR-XX22, LSGR-XX27, LSGR-XX32, LSGR-XX36,**  
**LSER-XX22, LSER-XX27, & LSER-XX32**  
**SEISMIC (-S) CABINET/RACK - CBC**

**Lowell**

100 Ingram Drive  
 Pacific, MO 63069  
 Phone (636) 257-3400



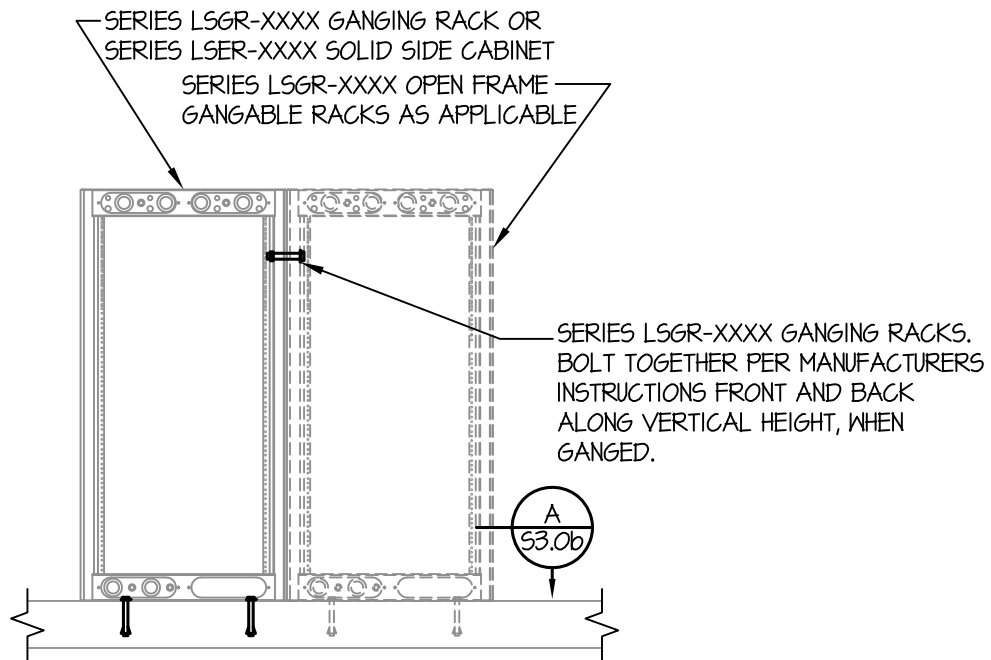
CCS Group, Inc.  
 1415 Elbridge Payne Rd Suite 265  
 Chesterfield, MO 63017  
 MO COA # 2006012384

JOB NO.  
**CCS10-050**

DATE

**2 MAY 2011**

**S1.3c**



ELEVATION

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-XX22, LSGR-XX27, LSGR-XX32,  
LSGR-XX36, LSER-XX22, LSER-XX27, &  
LSER-XX32  
**SEISMIC (-S) CABINET/RACK**  
**CBC QUALIFIED**

**Lowell**

100 Integram Drive  
Pacific, MO 63069  
Phone (636) 257-3400

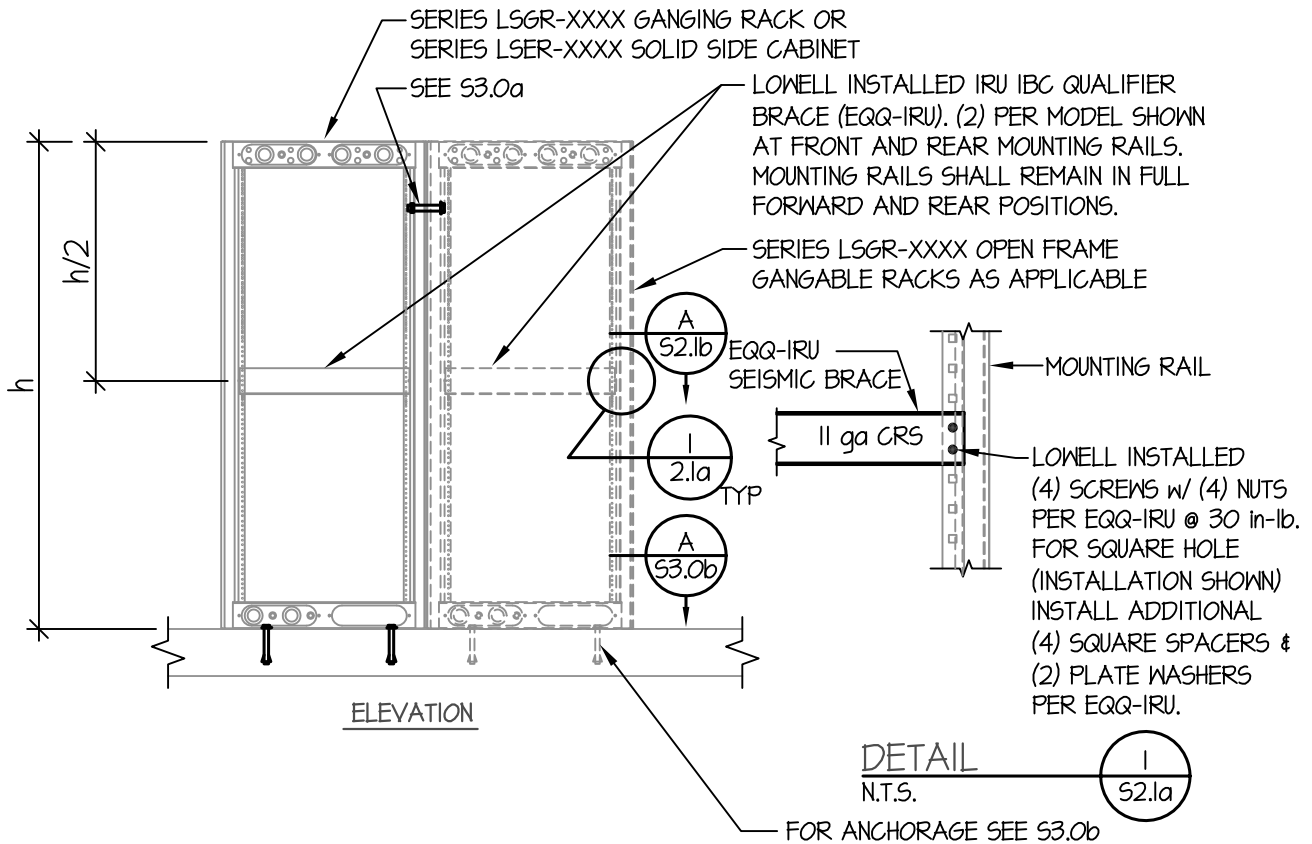


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1415 Elbridge Payne Rd Suite 265  
Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.0



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



**LOWELL**  
LSGR-2427, LSER-2422, LSER-2427  
LSER-2122, LSER-2127  
SEISMIC (-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**

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Pacific, MO 63069  
Phone (636) 257-3400



CCS Group, Inc.  
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Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050

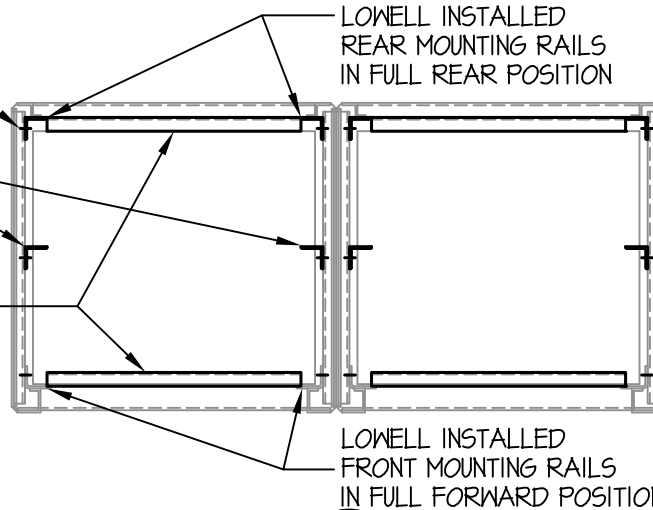
DATE  
2 MAY 2011

S2.1a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACE (EQQ-IRU)  
AT FRONT & REAR



SECTION  
N.T.S.

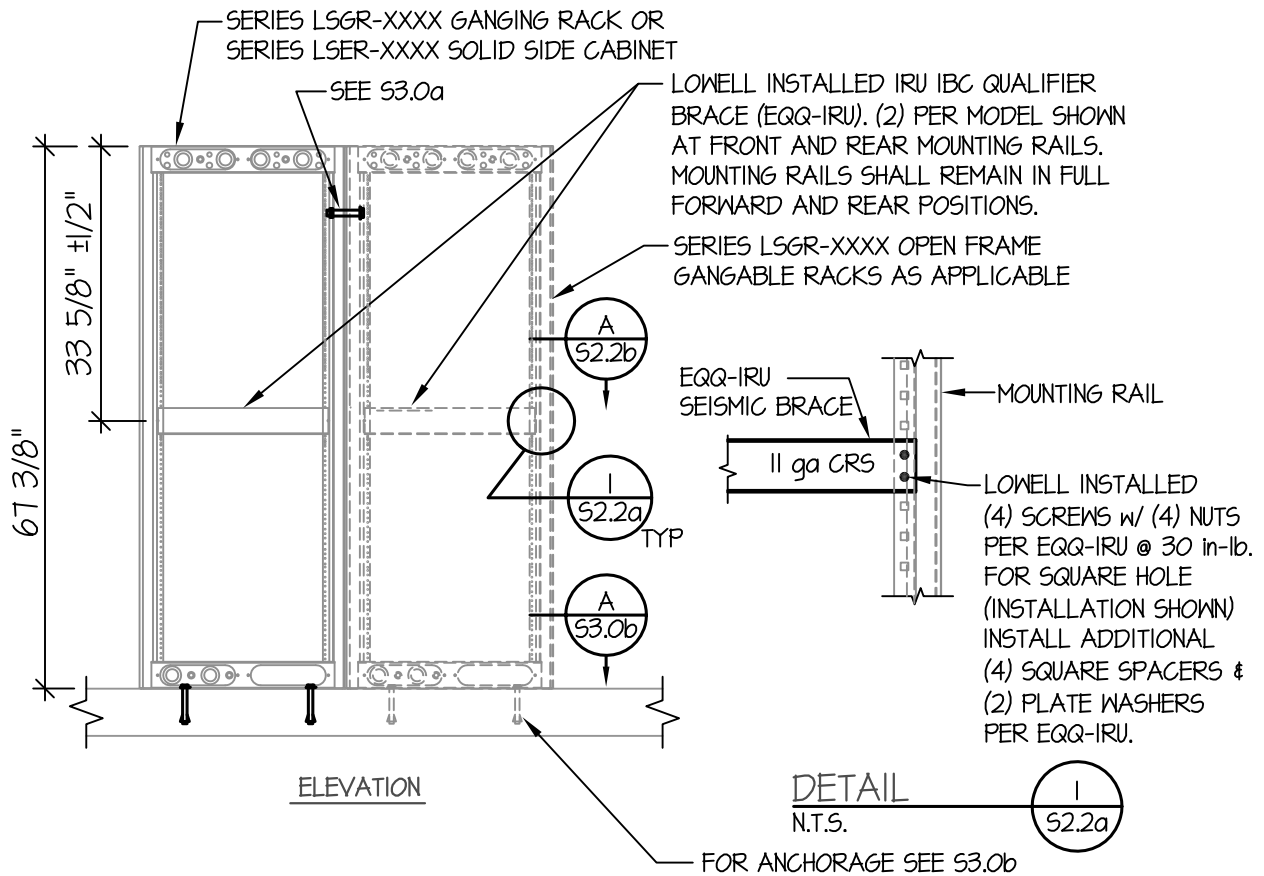
A  
S2.1b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



<p><b>LOWELL</b> LSGR-2427, LSER-2422, LSER-2427 LSER-2122, LSER-2127 SEISMIC (-S) CABINET/RACK + EQQ-1RU BRACE - CBC QUALIFIED</p>	<p><b>Lowell</b> 100 Ingram Drive Pacific, MO 63069 Phone (636) 257-3400</p>	<p><b>CCS</b> CCS Group, Inc. 1415 Ellbridge Payne Rd Suite 265 Chesterfield, MO 63017 MO COA # 2006012384</p>	<p>JOB NO. CCS10-050 DATE 2 MAY 2011 S2.1b</p>
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NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532 SEISMIC  
(-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**  
100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400



CCS Group, Inc.  
1415 Elbridge Payne Rd Suite 265  
Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.2a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACE (EQQ-IRU)  
AT FRONT & REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FORWARD POSITION

SECTION  
N.T.S.

A  
S2.2b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532 SEISMIC  
(-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**  
100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400

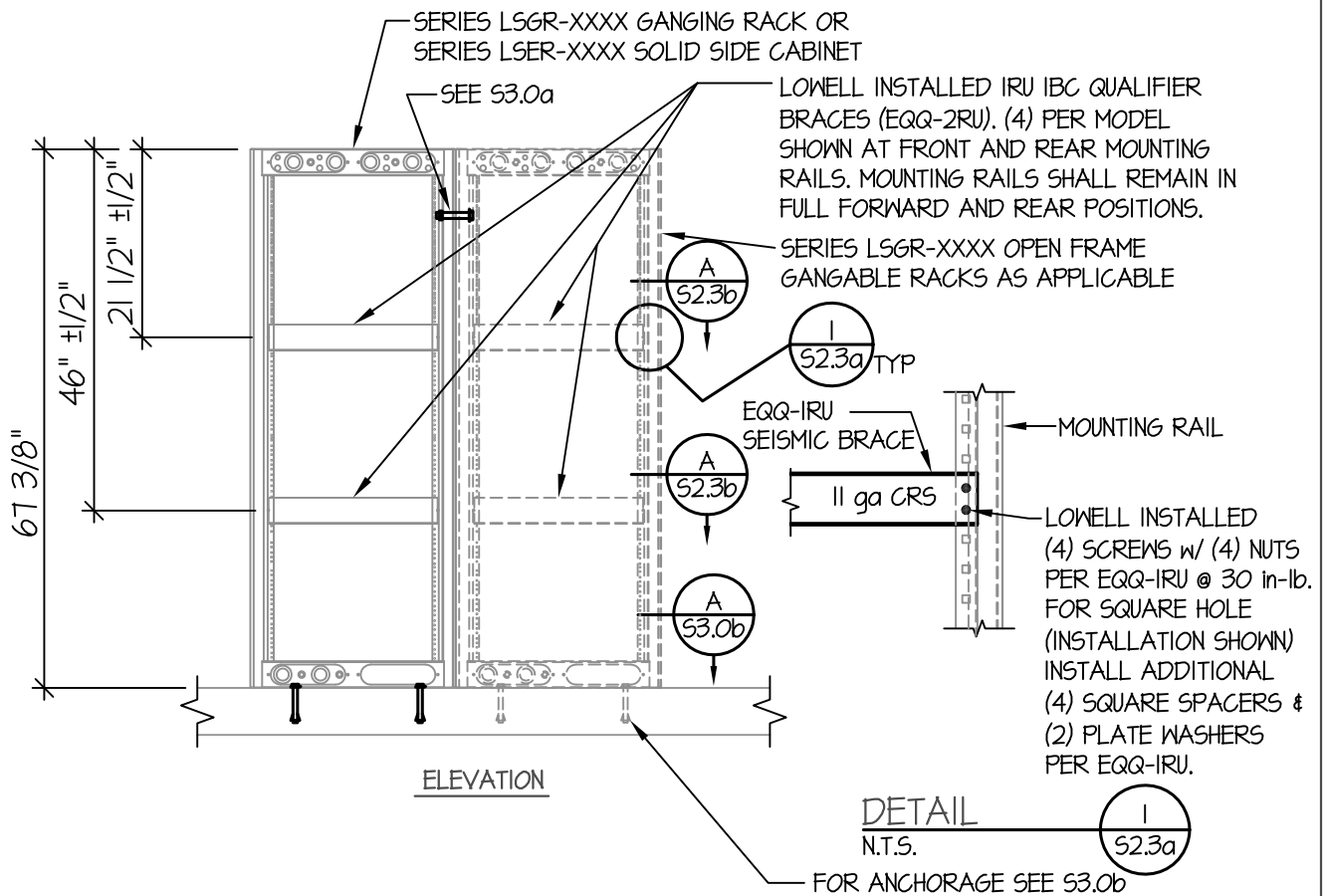


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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.2b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532  
SEISMIC (-S) CABINET/RACK  
+ EQQ-2RU BRACE - CBC QUALIFIED

**Lowell**  
100 Ingram Drive  
Pacific, MO 63069  
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CCS Group, Inc.  
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MO COA # 2006012384

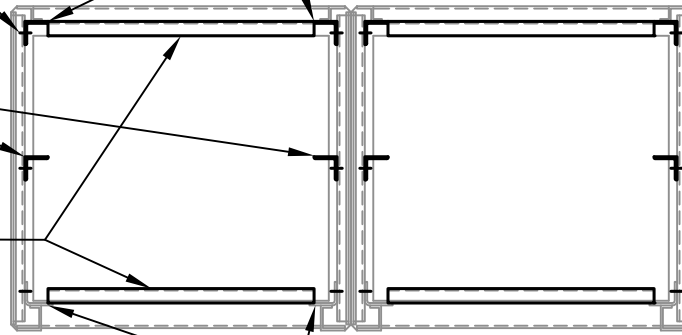
JOB NO.  
CCS10-050  
DATE  
2 MAY 2011  
S2.3a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACES (EQQ-2RU)  
AT FRONT AND  
REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION



SECTION  
N.T.S.

A  
S2.3b

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FORWARD POSITION

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532  
SEISMIC (-S) CABINET/RACK  
+ EQQ-2RU BRACE - CBC QUALIFIED

**Lowell**

100 Ingram Drive  
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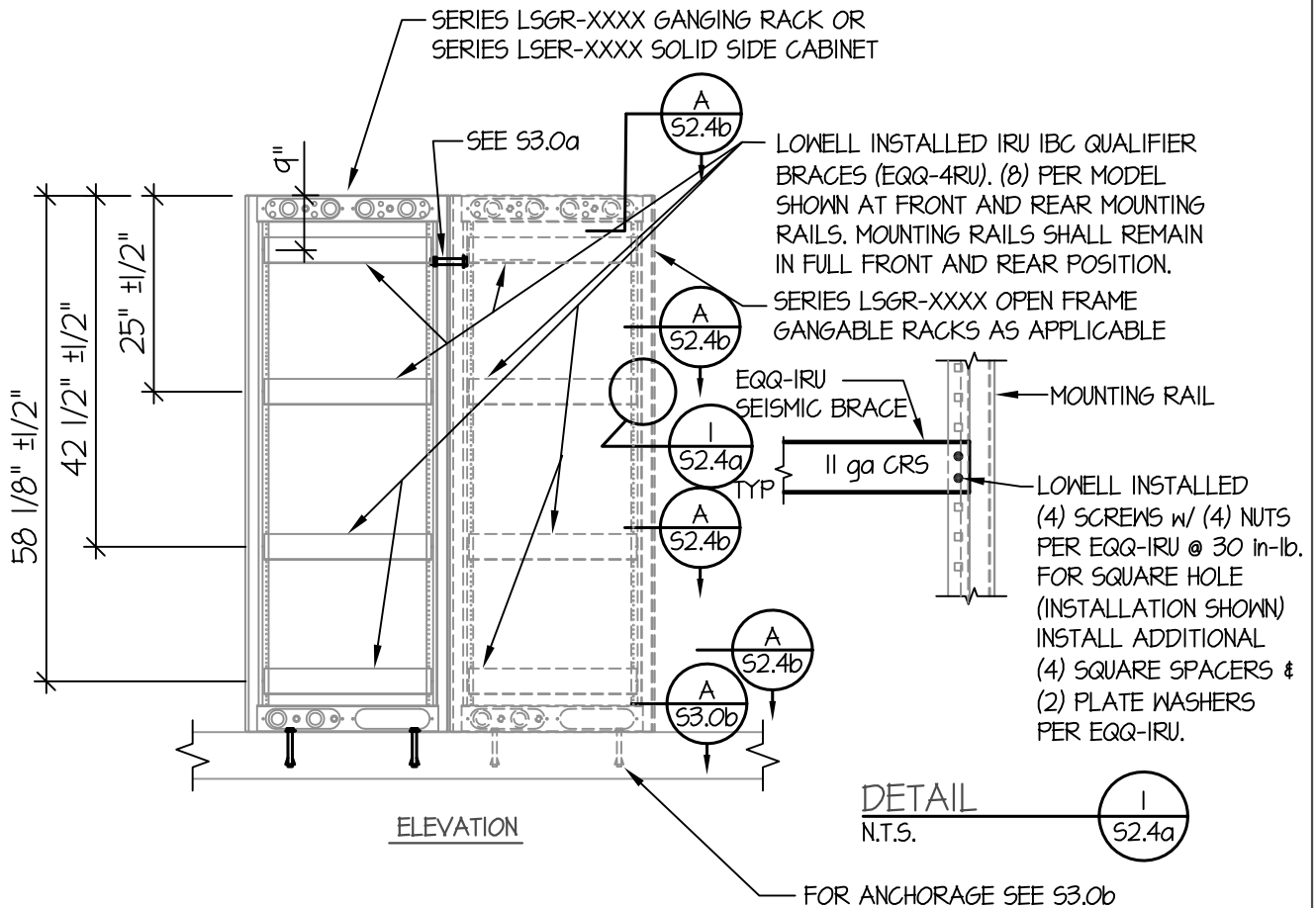


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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.3b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532  
SEISMIC (-S) CABINET/RACK  
+ EQQ-4RU BRACE - CBC QUALIFIED

**Lowell**

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Phone (636) 257-3400



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MO COA # 2006012384

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CCS10-050

DATE  
2 MAY 2011

S2.4a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACES (EQQ-4RU)  
AT FRONT & REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FORWARD POSITION

SECTION  
N.T.S.

A  
S2.4b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, or S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-3522, LSGR-3527, LSGR-3532, LSGR-3536,  
LSER-3522, LSER-3527, & LSER-3532  
SEISMIC (-S) CABINET/RACK  
+ EQQ-4RU BRACE - CBC QUALIFIED

**Lowell**

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Phone (636) 257-3400

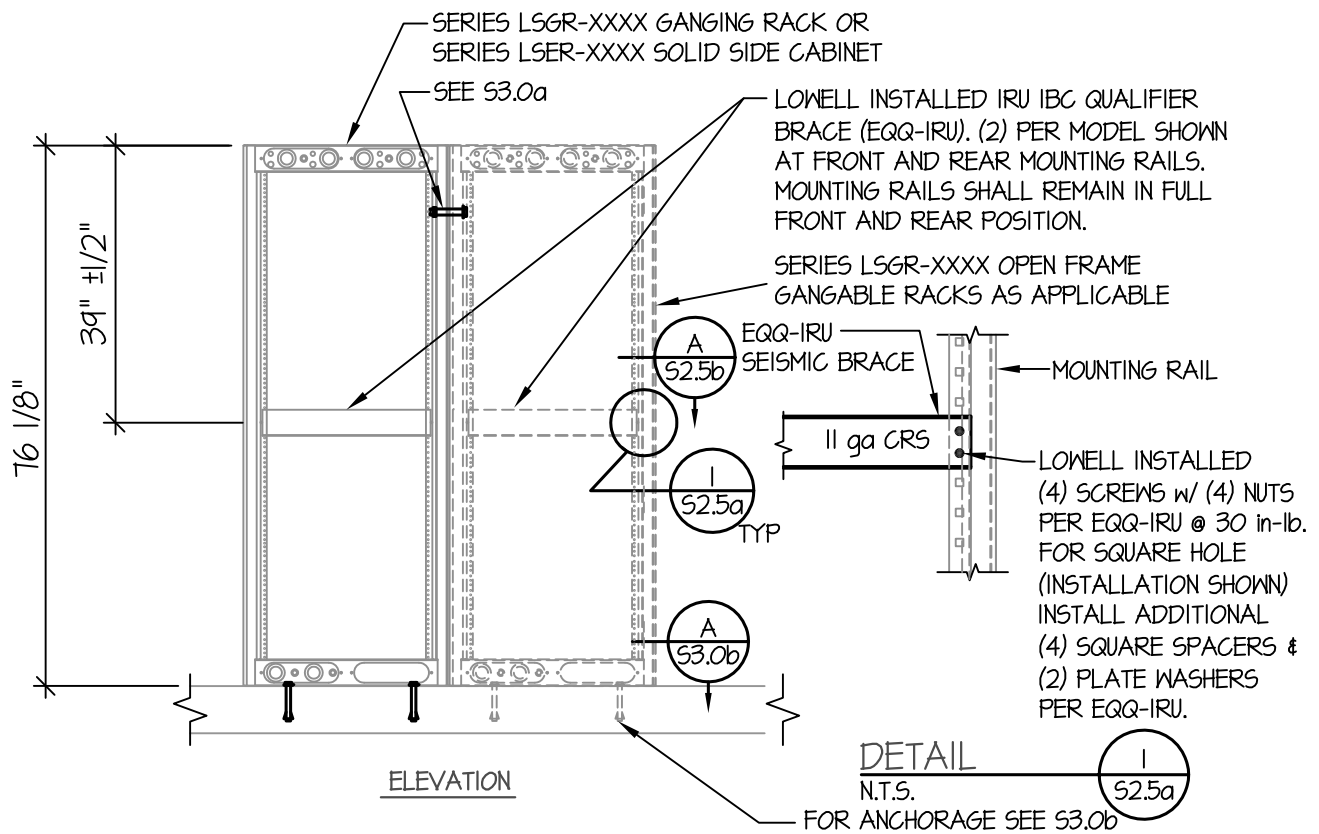


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DATE  
2 MAY 2011

S2.4b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, & LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**  
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Pacific, MO 63069  
Phone (636) 257-3400

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MO COA # 2006012384

JOB NO.  
CCS10-050  
DATE  
2 MAY 2011  
S2.5a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACE (EQQ-IRU) AT  
FRONT AND REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FORWARD POSITION

SECTION  
N.T.S.

A  
52.5b

NOTES:

1) REFER TO SHEET SI.3a, SI.3b, OR SI.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, & LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**

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Phone (636) 257-3400

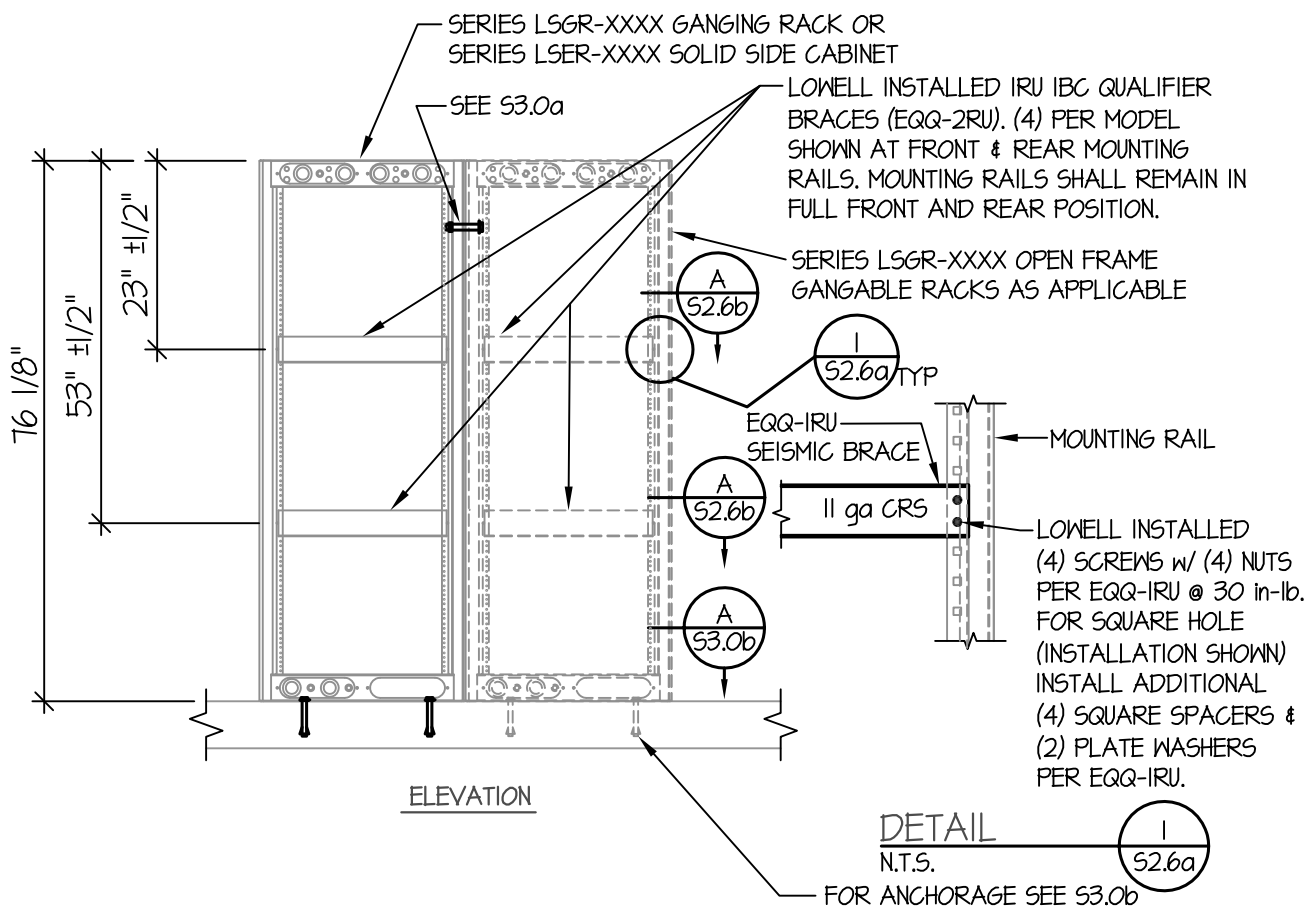


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MO COA # 2006012384

JOB NO.  
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DATE  
2 MAY 2011

S2.5b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-2RU BRACE - CBC QUALIFIED

**Lowell**

100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400



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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.6a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED IRU  
IBC QUALIFIER  
BRACES (EQQ-2RU) AT  
FRONT AND REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FORWARD POSITION

SECTION  
N.T.S.

A  
S2.6b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-2RU BRACE - CBC QUALIFIED

**Lowell**

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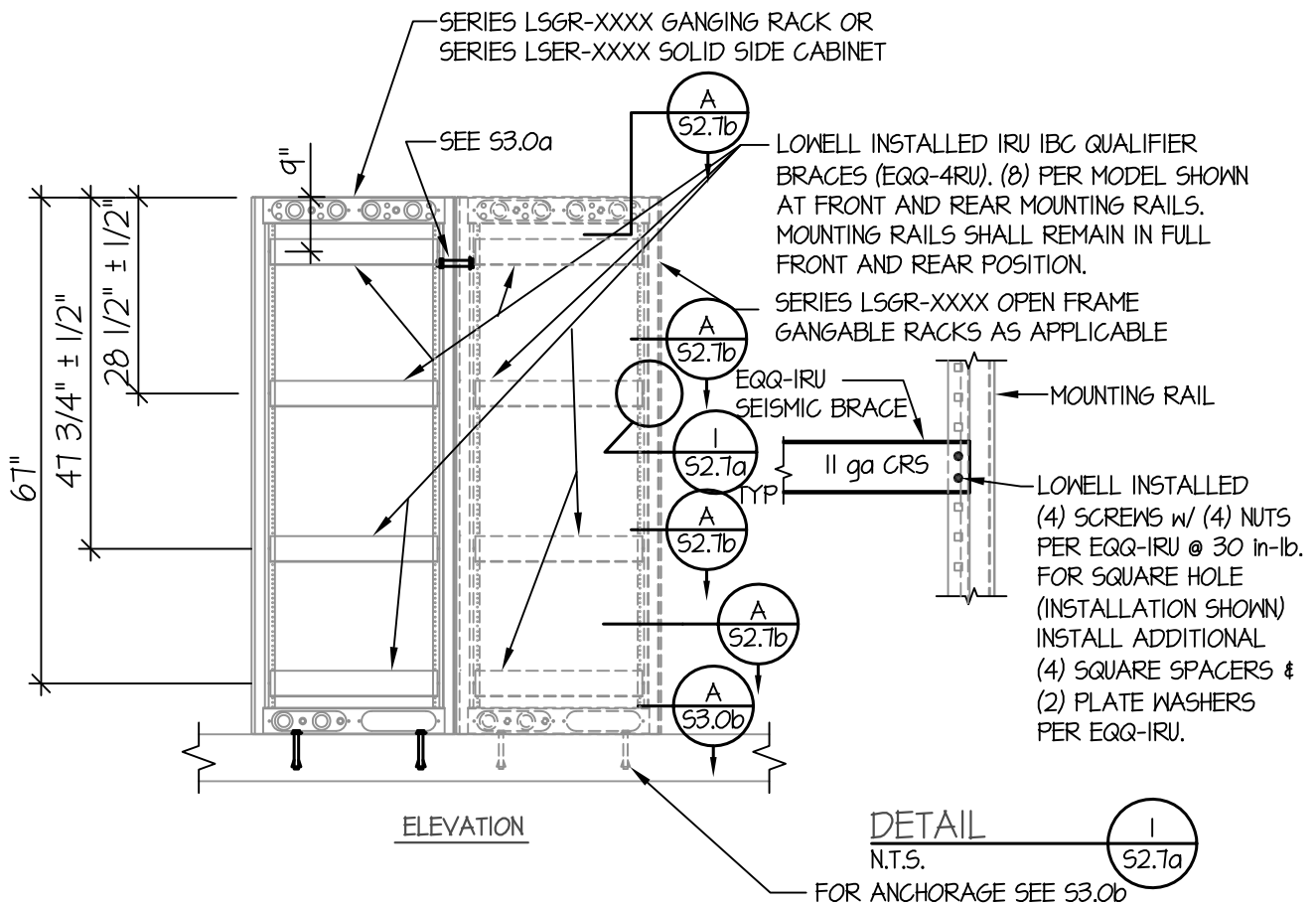


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S2.6b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, & LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-4RU BRACE - CBC QUALIFIED

**Lowell**  
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Pacific, MO 63069  
Phone (636) 257-3400

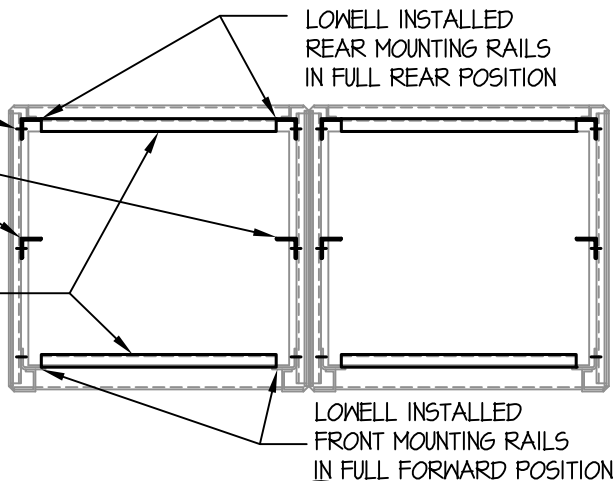
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Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050  
DATE  
2 MAY 2011  
S2.7a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACES (EQQ-4RU)  
AT FRONT & REAR



SECTION  
N.T.S.

A  
S2.7b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4022, LSGR-4027, LSGR-4032, LSGR-4036,  
LSER-4022, LSER-4027, & LSER-4032  
SEISMIC (-S) CABINET/RACK  
+ EQQ-4RU BRACE - CBC QUALIFIED

**Lowell**

100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400

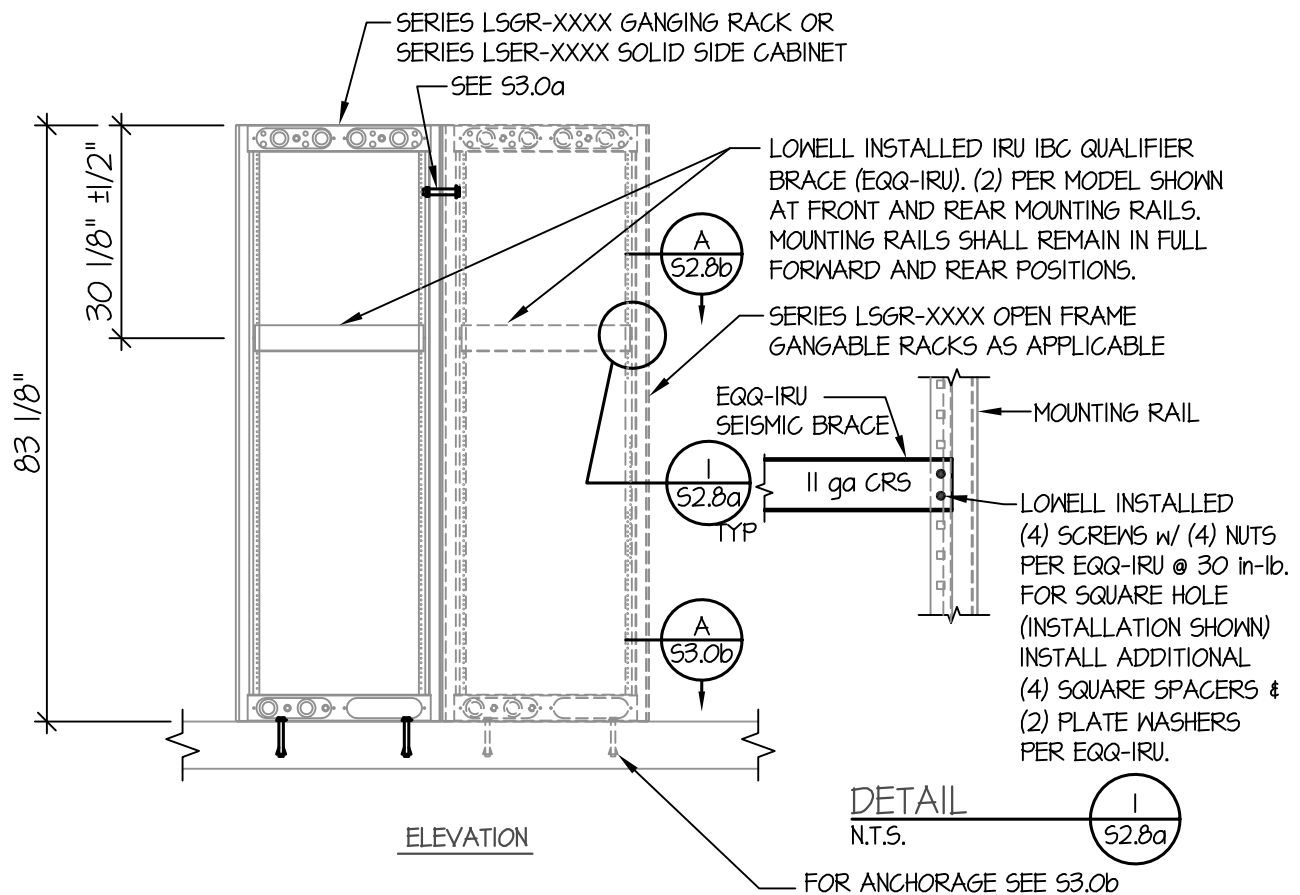


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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.7b



NOTES:

1) REFER TO SHEET 51.3a, 51.3b, OR 51.3c FOR COMPLETE MODEL NO. APPLICABILITY.



**LOWELL**  
LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436,  
LSER-4422, LSER-4427, & LSER-4432  
SEISMIC (-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**  
100 Ingram Drive  
Pacific, MO 63069  
Phone (636) 257-3400

**CCS**  
CCS Group, Inc.  
1415 Elbridge Payne Rd Suite 265  
Chesterfield, MO 63017  
MO COA # 2006012384

JOB NO.  
CCS10-050  
DATE  
2 MAY 2011  
S2.8a

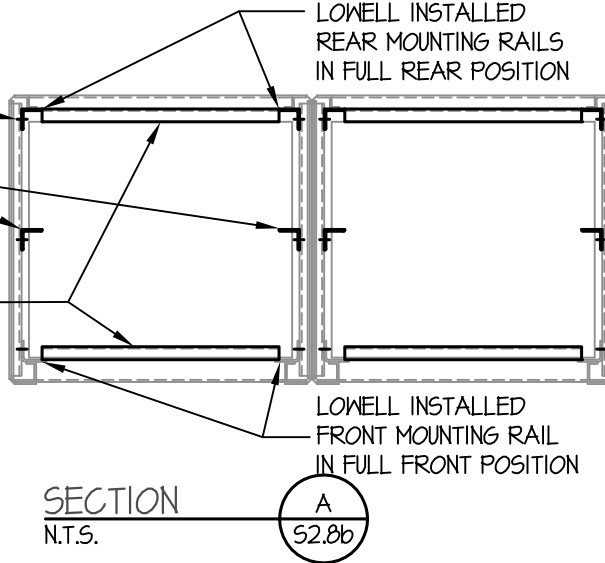
LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACE (EQQ-IRU)  
AT FRONT & REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAIL  
IN FULL FRONT POSITION



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436,  
LSER-4422, LSER-4427, & LSER-4432  
SEISMIC (-S) CABINET/RACK  
+ EQQ-1RU BRACE - CBC QUALIFIED

**Lowell**

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Phone (636) 257-3400

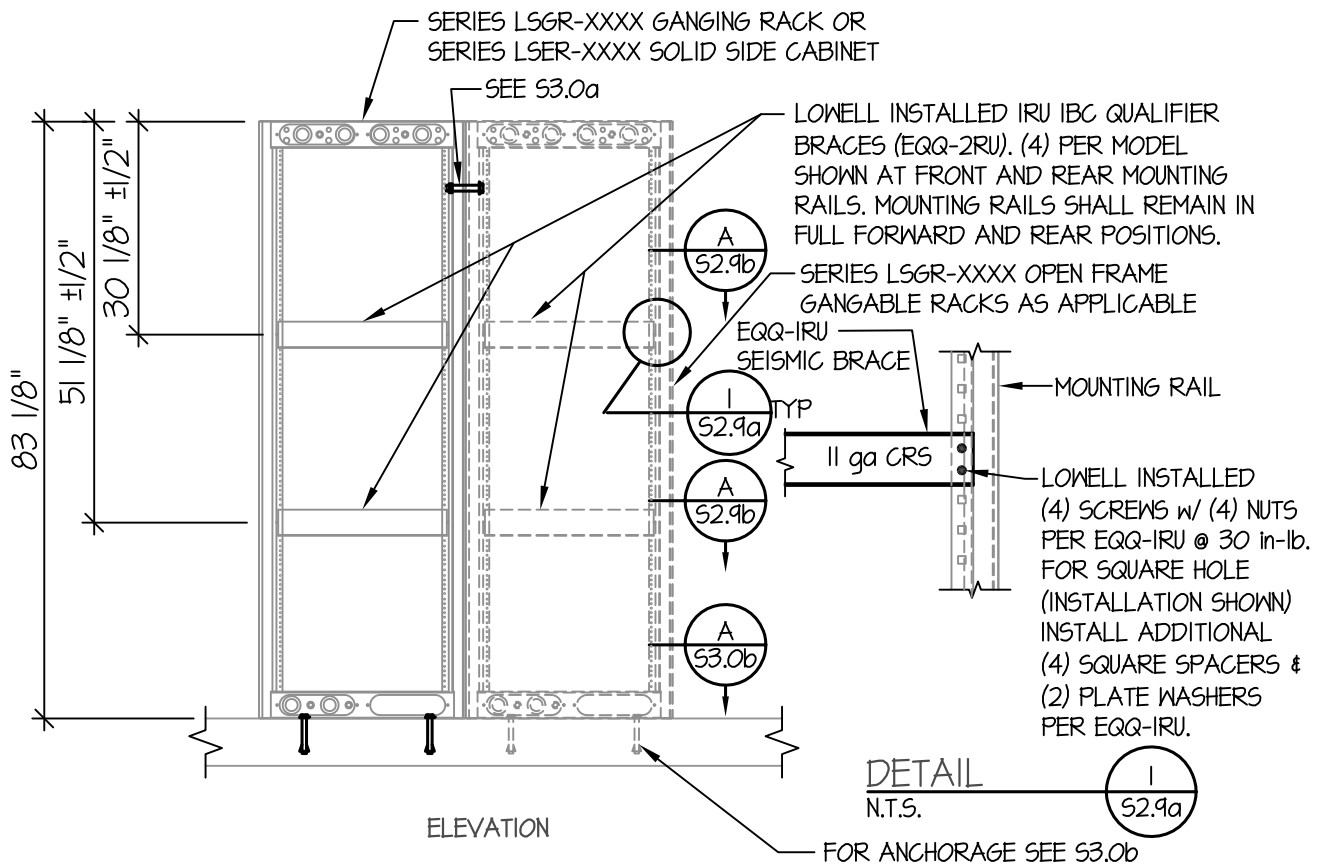


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CCS10-050

DATE  
2 MAY 2011

S2.8b



NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.

FOR ANCHORAGE SEE S3.0b



5-2-11

**LOWELL**  
 LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436,  
 LSER-4422, LSER-4427, & LSER-4432  
 SEISMIC (-S) CABINET/RACK  
 + EQQ-2RU BRACE - CBC QUALIFIED

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 Pacific, MO 63069  
 Phone (636) 257-3400

**CCS**  
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 Chesterfield, MO 63017  
 MO COA # 2006012384

JOB NO.  
 CCS10-050  
 DATE  
 2 MAY 2011  
 S2.9a

LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACES (EQQ-2RU)  
AT FRONT AND REAR

LOWELL INSTALLED  
REAR MOUNTING RAILS  
IN FULL REAR POSITION

LOWELL INSTALLED  
FRONT MOUNTING RAILS  
IN FULL FRONT POSITION

SECTION  
N.T.S.

A  
S2.9b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.



5-2-11

**LOWELL**  
LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436,  
LSER-4422, LSER-4427, & LSER-4432  
SEISMIC (-S) CABINET/RACK  
+ EQQ-2RU BRACE - CBC QUALIFIED

**Lowell**  
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Pacific, MO 63069  
Phone (636) 257-3400

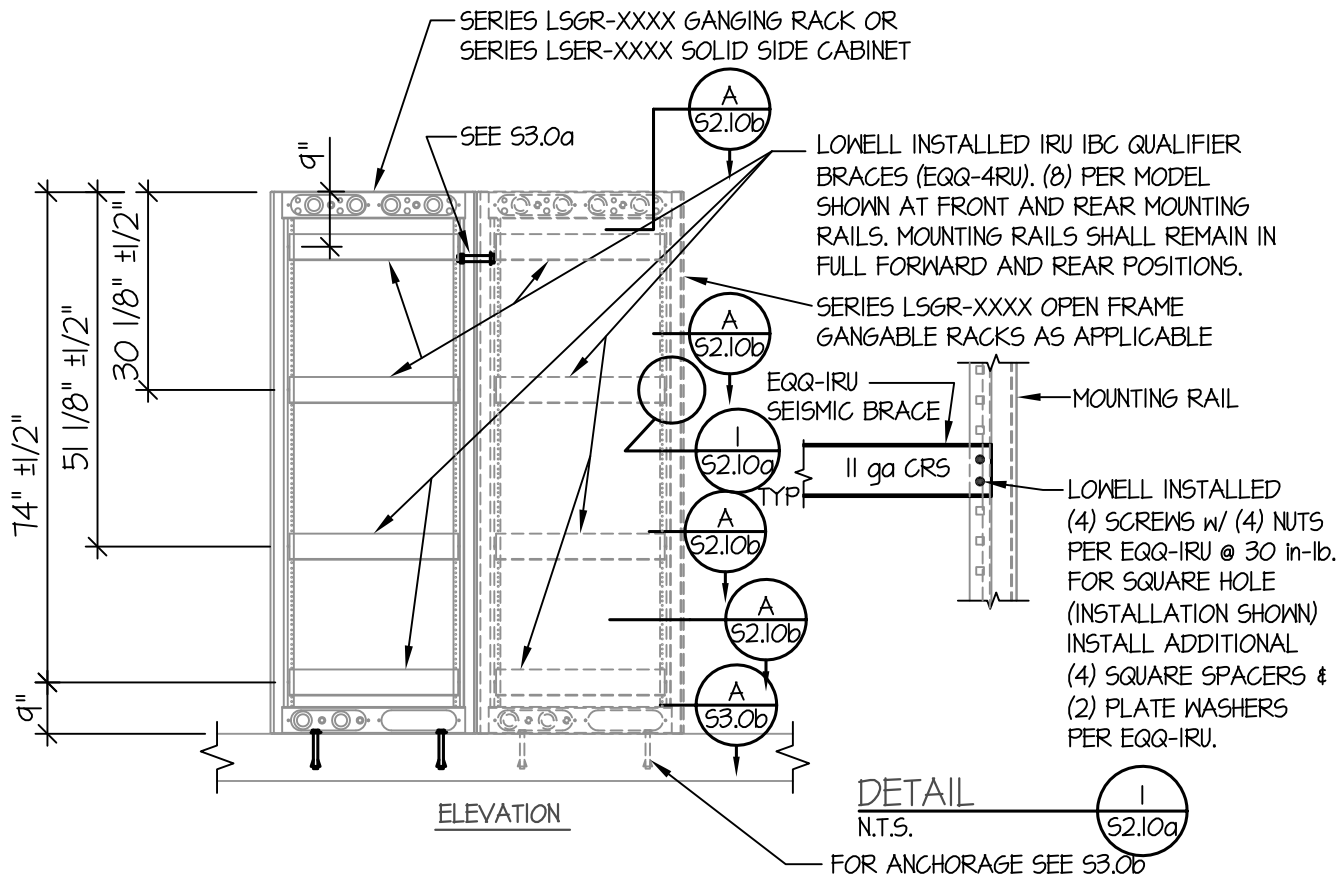


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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S2.9b



NOTES:  
1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.

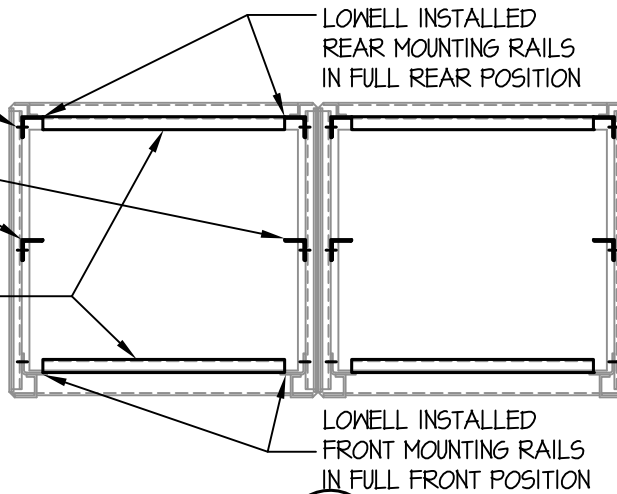


<p><b>LOWELL</b></p> <p>LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436, LSER-4422, LSER-4427, &amp; LSER-4432 SEISMIC (-S) CABINET/RACK + EQQ-4RU BRACE - CBC QUALIFIED</p>	<p><b>Lowell</b></p> <p>100 Ingram Drive Pacific, MO 63069 Phone (636) 257-3400</p>	<p><b>CCS</b></p> <p>CCS Group, Inc. 1415 Elbridge Payne Rd Suite 265 Chesterfield, MO 63017 MO COA # 2006012384</p>	<p>JOB NO. CCS10-050</p> <p>DATE 2 MAY 2011</p> <p>S2.10a</p>
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LOWELL INSTALLED  
1/4-20 WELD NUT -  
50 in-lb, TYP.  
1/4-20X5/8 SL IND  
HEX WASHER, TYP.

OPTIONAL  
ADJUSTABLE  
MOUNTING RAILS  
FIELD INSTALLED

LOWELL INSTALLED  
IRU IBC QUALIFIER  
BRACES (EQQ-4RU)  
AT FRONT & REAR



SECTION  
N.T.S.

A  
S2.10b

NOTES:

1) REFER TO SHEET S1.3a, S1.3b, OR S1.3c FOR COMPLETE MODEL NO. APPLICABILITY.

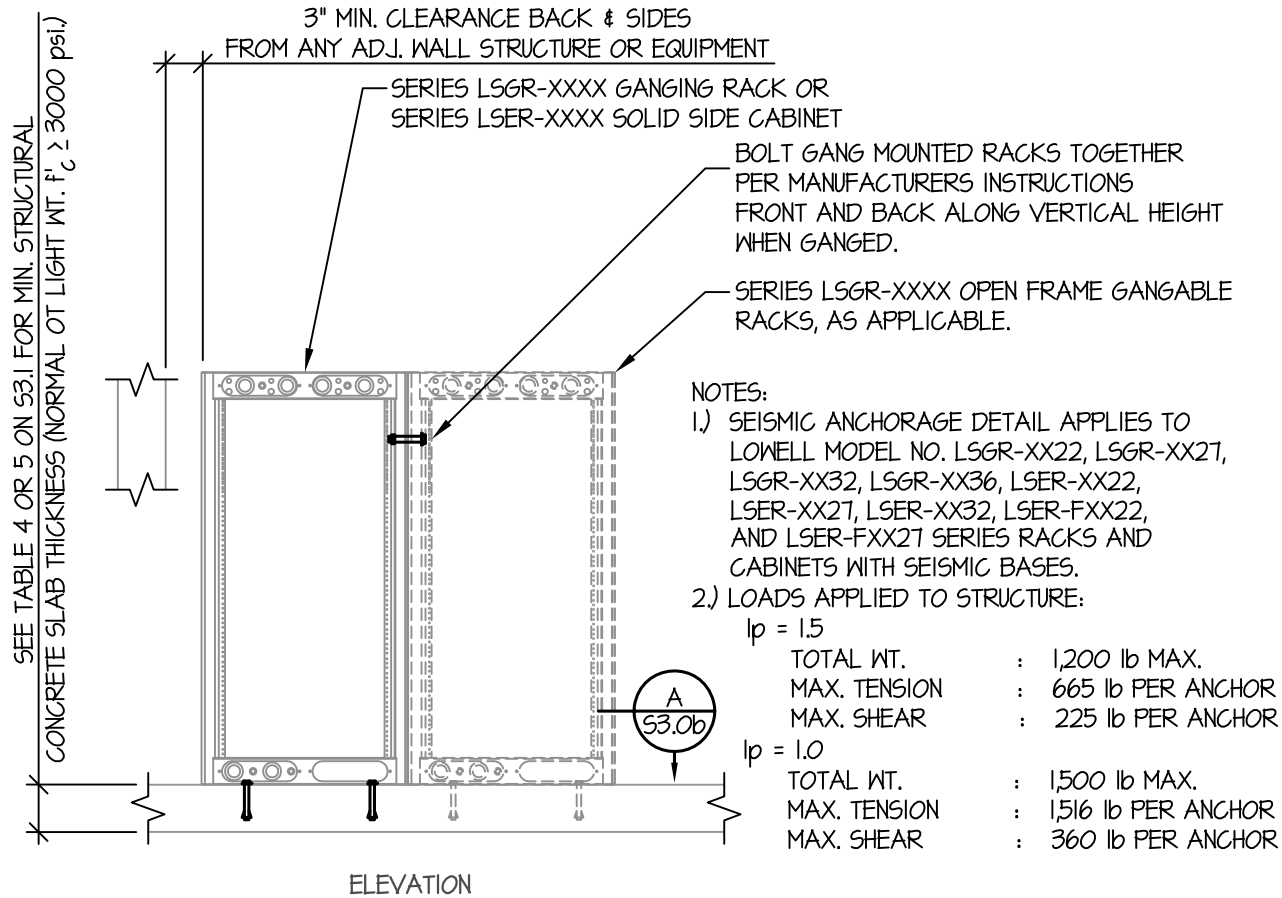


**LOWELL**  
LSGR-4422, LSGR-4427, LSGR-4432, LSGR-4436,  
LSER-4422, LSER-4427, & LSER-4432  
SEISMIC (-S) CABINET/RACK  
+ EQQ-4RU BRACE - CBC QUALIFIED

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MO COA # 2006012384

JOB NO.  
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DATE  
2 MAY 2011  
S2.10b



**LOWELL**  
LSGR-XX22, LSGR-XX27, LSGR-XX32,  
LSGR-XX36, LSER-FXX22, LSER-FXX27,  
LSER-XX22, LSER-XX27, & LSER-XX32  
SEISMIC (-S) CABINET/RACK - CBC

**Lowell**

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Phone (636) 257-3400

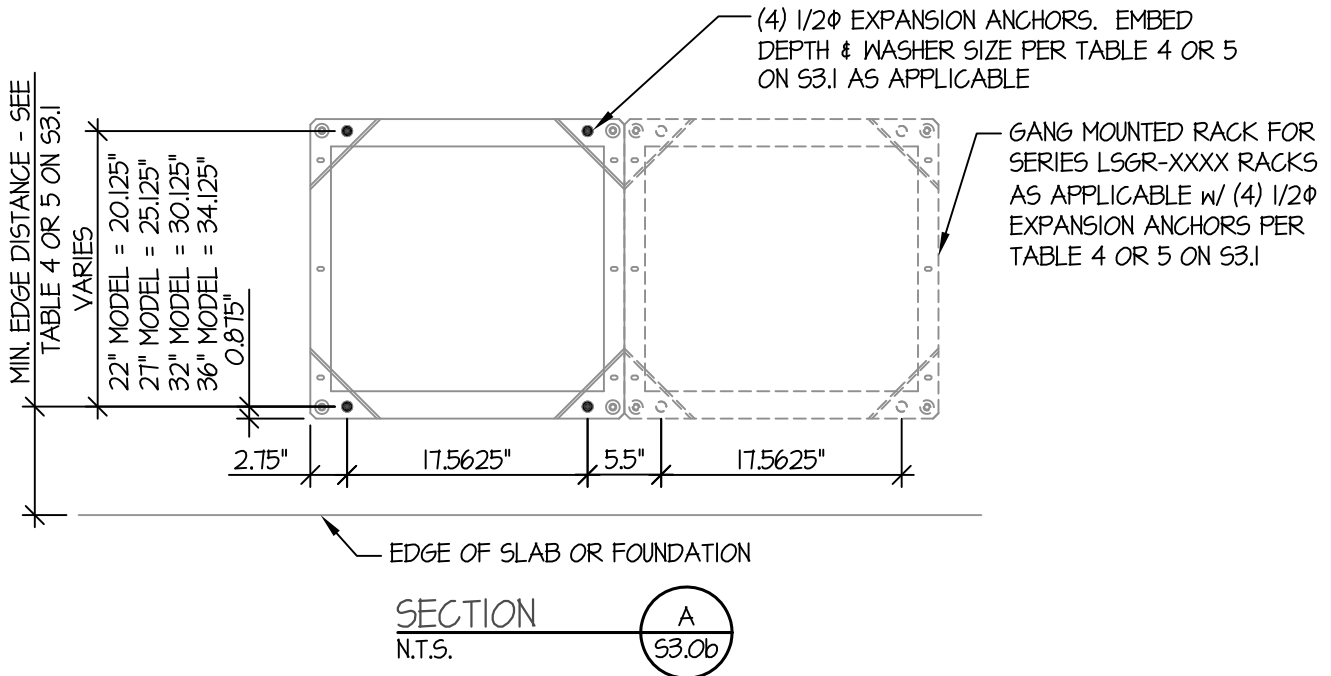


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MO COA # 2006012384

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DATE  
2 MAY 2011

S3.0a



5-2-11

**LOWELL**  
LSGR-XX22, LSGR-XX27, LSGR-XX32,  
LSGR-XX36, LSER-FXX22, LSER-FXX27,  
LSER-XX22, LSER-XX27, & LSER-XX32  
SEISMIC (-S) CABINET/RACK - CBC

**Lowell**

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Phone (636) 257-3400



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MO COA # 2006012384

JOB NO.  
CCS10-050

DATE  
2 MAY 2011

S3.0b

TABLE 4 - LIFE SAFETY/ESSENTIAL SYSTEM ANCHORAGE REQUIREMENTS ( $l_p = 1.5$ )

ANCHOR TYPE	NOMINAL EMBEDMENT	WASHER	MIN SLAB DEPTH	MIN EDGE DISTANCE
$\frac{1}{2}$ " HILTI Kwik Bolt TZ	$3\frac{3}{4}$ "	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	$2\frac{3}{4}"$
$\frac{1}{2}$ " SIMPSON STRONG BOLT	$3\frac{7}{8}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	4"
$\frac{1}{2}$ " POWERS POWER STUD SD2	$3\frac{3}{4}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	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 - TYPICAL INSTALLATION ANCHORAGE REQUIREMENTS ( $l_p = 1.0$ )

CONCRETE TYPE	ANCHOR TYPE	MAX $S_s$	NOMINAL EMBEDMENT	WASHER	MIN SLAB DEPTH	MIN EDGE DISTANCE
NORMAL WEIGHT CONCRETE	$\frac{1}{2}$ " HILTI Kwik Bolt TZ	3.00	$3\frac{3}{4}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	$2\frac{3}{4}"$
	$\frac{1}{2}$ " SIMPSON STRONG BOLT		$3\frac{7}{8}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	4"
	$\frac{1}{2}$ " POWERS POWER STUD SD2		$3\frac{3}{4}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	4"
LIGHT WEIGHT CONCRETE	$\frac{1}{2}$ " HILTI Kwik Bolt TZ	2.50	$3\frac{3}{4}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	5"
	$\frac{1}{2}$ " SIMPSON STRONG BOLT	2.00	$3\frac{7}{8}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	5"
	$\frac{1}{2}$ " POWERS POWER STUD SD2	2.50	$3\frac{3}{4}"$	$1\frac{1}{2}" \times \frac{1}{8}"$	6"	5"

- 1)  $W_p = 1500$  lb, 1200 lb CONTENTS
- 2)  $l_p = 1.0$  ONLY



**LOWELL**  
 LSGR-XX22, LSGR-XX27, LSGR-XX32,  
 LSGR-XX36, LSER-FXX22, LSER-FXX27,  
 LSER-XX22, LSER-XX27, & LSER-XX32  
 SEISMIC (-S) CABINET/RACK - CBC

**Lowell**

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 Pacific, MO 63069  
 Phone (636) 257-3400



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 MO COA # 2006012384

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S3.1