

ADDITION FOR ASHDE DREADDRAVAL OF

OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

MANUFACTURER'S CERTIFICATION (OPM) APPLICATION #: OPM-0444-13
ALL SIGNIFICATION OF THE VEHICLE
OSHPD Preapproval of Manufacturer's Certification (OPM)
Type: ☐ New ☐ Renewal ☐ Update to Pre-CBC 2013 OPA Number: 2710-10
Manufacturer Information
Manufacturer: Middle Atlantic Products Inc.
Manufacturer's Technical Representative: Angelo Cacciatore
Mailing Address: 300 Fairfield Road Fairfield, NJ 07004
Telephone: 973-839-1011 x1035 Email: Angelo.cacciatore@middleatlantic.com
Product Information OS Dnd
Product Name: BGR Series Equipment Rack Enclosures
Product Type: Racks and Enclosures OPM-0444-13
Product Model Number: BGR-1927, BGR-2527, BGR-3827, BGR-4127, BGR-4527, BGR-2532, BGR-3832, BGR-4132, BGR-4532, BGR-4138, BGR-4538
General Description: Gang-able Floor Standing Enclosures intended to enclose audio, video and IT equipment.
Applicant Information
Applicant Company Name: Middle Atlantic Products Inc. LD INC
Contact Person: Keith Carney
Mailing Address: 300 Fairfield Road Fairfield, NJ 07004
Telephone: 973-839-1011 Email: Keith.carney@middleatlantic.com
I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.
Signature of Applicant: Date: 8-30-17
Title: VP Engineering Company Name: Middle Atlantic Products Inc.

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Registered Design Professional Preparing Engineering Recommendations
Company Name: Simpson Gumpertz & Heger
Name: William M. Bruin California License Number: C57867
Mailing Address: 500 12 th Street, Suite 270 Oakland, CA 94607
Telephone: 510-457-4449 Email: wmbruin@sgh.com
OSHPD Special Seismic Certification Preapproval (OSP)
Special Seismic Certification is preapproved under OSP- (Separate application for OSP is required)
Special Seismic Certification is not preapproved
Certification Method(s)
☐ Testing in accordance with: ☐ ICC-ES AC156 ☐ FM 1950-16 ☐ Other* (Please Specify): Finite Element Analysis
*Use of criteria other than those adopted by the California Building Standards Code, 2016 (CBSC 2016) for component supports and attachments are not permitted. For distribution system, interior partition wall, and suspended ceiling seismic bracings, test criteria other than those adopted in the CBSC 2016 may be used when approved by OSHPD prior to testing.
 Analysis Experience Data Combination of Testing, Analysis, and/or Experience Data (Please Specify):
List of Attachments Supporting the Manufacturer's Certification
 ☐ Test Report ☐ Drawings ☐ Calculations ☐ Manufacturer's Catalog ☐ Other(s) ☐ Other(s) ☐ Drawings ☐ Calculations ☐ Manufacturer's Catalog ☐ Other(s)
OFFICE HOE ONLY COURD ARRESTAL VALID FOR ORGANIA S ALL RRE 2040 CORE RACER RROLLEGES
OFFICE USE ONLY – OSHPD APPROVAL VALID FOR CBC 2016 & ALL PRE-2016 CODE BASED PROJECTS
Signature: Date: 10-12-2018 Print Name: Jeffrey Kikumoto
Title: SSE
Condition of Approval (if applicable):

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GENERAL

- 1. THIS OSHPD PREAPPROVAL OF MANUFACTURER'S CERTIFICATION (OPM) IS BASED ON THE CBC2016. THE DEMAND (DESIGN FORCE) FOR USE WITH THIS OPM SHALL BE BASED ON THE CBC 2016
- 2. THE WORK SHOWN ON THESE DRAWINGS IS FOR THE SEISMIC SUPPORTS & ATTACHMENTS OF THE SUBJECT RACK ENCLOSURES. MAXIMUM PERMISSIBLE CONTENT CAPACITIES FOR VARIOUS HEIGHTS WITHIN THE BUILDING ARE PROVIDED IN TABLES 1 THRU 7.
- 3. SEISMIC SUPPORTS & ATTACHMENTS DESIGN HAS BEEN DONE IN ACCORDANCE WITH THE 2016 EDITION OF THE CALIFORNIA BUILDING CODE, PART 2, VOLUME 2 OF 2, AND ASCE 7-10, USING THE FOLLOWING PARAMETERS:

 $\begin{array}{l} I_{P} = 1.5 \; (CBC \; \S1616A.1.17) \\ S_{DS} \leq 2.04G \\ \Omega \circ = 2.0 \; (CBC \; \S1616A.1.23) \\ ap= 2.5, \; R_{P} = 6 \\ Z, \; H= \; VARIES \end{array}$

LATERAL FORCE, $F_{P,H} = [(0.4 \text{ a}_P S_{DS} \text{ I}_P W_P) / R_P]^*(1 + 2 \text{ Z/H})$ VERTICAL FORCE, $F_{P,V} = 0.2S_{DS}W_P$

- DESIGN LOADS SHOWN IN TABLE 1 ARE FACTORED LOADS THAT SHALL BE USED FOR STRENGTH DESIGN.
- 5. THIS PREAPPROVAL COVERS ONLY THE SUPPORTS & ATTACHMENTS OF THE EQUIPMENT TO THE STRUCTURE. IT DOES NOT COVER THE COMPONENT OR ITS CONTENTS. IF THE RACKS CONTAIN INTERNAL COMMUNICATION SERVERS & ROUTERS, SPECIAL SEISMIC CERTIFICATION IS REQUIRED.
- MFR RESPONSIBLE FOR EQUIPMENT INCLUDING SEISMIC BRACKETS. CONTRACTOR RESPONSIBLE FOR ANCHOR HARDWARE & INSTALLATION.

INSTALLATION NOTES

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- 1. RACK ENCLOSURES MAY BE ANCHORED TO EITHER A SAND LIGHT-OR NORMAL-WEIGHT, REINFORCED CONCRETE FLOOR OR SLAB (TABLES 2-4) OR SAND LIGHT- OR NORMAL-WEIGHT CONCRETE FILL OVER METAL DECK (TABLES 5-7). IN ALL CASES, THE MINIMUM CONCRETE COMPRESSIVE STRENGTH (F'C) SHALL BE 3,000 PSI.
- 2. REINFORCED CONCRETE FLOOR SLAB (OR CONCRETE FILL OVER METAL DECK) SHALL HAVE MINIMUM THICKNESS BASED ON THE ANCHOR TYPES AS NOTED IN TABLE 8 AND 9
- INSTALLATION OF THE RACK ENCLOSURES IS LIMITED TO INTERIOR LOCATIONS ONLY, WHERE DESIGN IS CONTROLLED BY SEISMIC FORCES.

- CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS PRE-APPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- 5. SEOR MUST ENSURE THE ENCLOSURE RACK IS LOADED SO THAT THE CG IS NO HIGHER THAN THE CG SHOWN HEREIN. THE EQUIPMENT MANUFACTURER HAS DESIGNED THE UNIT TO MAKE THE C.G. LESS THAN OR EQUAL TO THE HEIGHT DIMENSION SHOWN ON SHEETS 6 & 7.

TABLE 1: MAXIMUM DEMAND LOADS FOR BGR SERIES ENCLOSURES (SEE FOOTNOTES 1-3)

	Maximum Shear (Vu) and Tension (Tu) Per Anchor (pounds)					
Anchor Type	5					
(Reference Table)	Demand Parameter	0 (Ground)	1/3	2/3	≤1	
Epoxy Anchor	Vu	826	826	1019	1285	
Solid Slab of NW Concrete (Table 2)	OPM-0	444-1 2588	2588	2859	2819	
Expan <mark>sion Anc</mark> hor	D TV Vu Tof	786	786	999	1036	
Solid Slab of NW Concrete (Table 3)	XXXXXXXIT	1898	1898	1882	1916	
Expans <mark>ion Anch</mark> or	DAME:	107412	2 (74)1 8	729	724	
Solid Slab of Sand LW Concrete (Table 4)	Tu	1300	1300	1296	1272	
Expansion Anchor	Vu	733	733	729	714	
NW Concrete Fill over Deck (Table 5)	77.	1222	1222	1219	1254	
Expansion Anchor	Vu B	U 7502	N 502	497	489	
Sand LW Concrete Fill over Deck (Table 6)	Tu	835	835	842	845	
Thru-Bolt Connection	Vu	1376	1376	1376	1376	
Concrete Fill over Deck (Table 7)	Tu	2189	2189	2189	2189	

FOOTNOTES TABLE 1

- 1. INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES.
- 2. DEMAND LOADS ARE MAXIMUM ULTIMATE LOADS PER ANCHOR, INCLUDING AN OVERSTRENGTH FACTOR (Ω_{O} = 2.0).
- DEMAND LOADS ARE THE WORST CASE FOR A GIVEN ANCHOR AND ELEVATION COMBINATION, LOADED TO THE CONTENT CAPACITIES PROVIDED IN THE REFERNCED TABLES.



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Simpson Gumpertz & Heger Inc., 500 12th Street, Suite 270 Oakland, California 94607 main: 510.457.4600 tax: 510.457.4599 www.sgh.com Bosto Chicage Hausto Los Angele New Yor San Francisco Washington, DO



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RACK ENCLOSURE CAPACITY TABLES

TABLE 2: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH APPROVED EPOXY ANCHORING SYSTEM IN SOLID SLAB NORMAL WEIGHT CONCRETE (SEE FOOTNOTES 1-4)

RACK ELEVATION IN BUILDING (Z/H)			
GROUND	1/3	2/3	≤1.0
			1200
			1200
1200	1200	1150	850
1200	1200	1050	800
1100	1100	980	720
1200	1200	1200	1200
1200	1200	1150	850
1200	1200	1050	800
1200	1200	980	720
1200	1200	1050	800
1200	1200	980	720
1200	1200	1200	1200
1200	1200	1200	1150
1200	1200	1100	800
1200	1200	1000	750
1100	1100	950	680
1200	1200	1200	1150
1200	1200	1100	800
1200	1200	1000	750
1200	1200	950	680
	GROUND 1200 1200 1200 1200 1200 1200 1200 120	GROUND 1/3 1200	GROUND 1/3 2/3

FOOTNOTES TABLE 2

D

- INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A
 HEIGHT OF 45 SPACES
- 2. RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH HILTI HIT-RE 500 V3 (ICC-ES ESR 3184) OR SIMPSON STRONG-TIE SET-XP (ICC-ES ESR 2508). REFER TO TABLE 8.

TABLE 3: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH APPROVED EXPANSION ANCHORS IN SOLID SLAB NORMALWEIGHT CONCRETE (SEE FOOTNOTES 1-4)

RACK ENCLOSURE	ELEVATION GROUND	IN BUILDIN 1/3	G (Z/H) 2/3	≤1
BGR-1927	1200	1200	1200	950
BGR-2527	1200	1200	1050	800
BGR-3827	1000	1000	750	550
BGR-4127	900	900	680	500
BGR-4527	850	850	600	450
BGR-2532	1200	1200	1050	800
BGR-3832	1000	100	750	550
BGR-4132	900	900	680	500
BGR-4532	850	850	600	450
BGR-4138	OP1900 0444	_ 900	680	500
BGR-4538	850	850	600	450
BGR-19SA-27	1200	1200	1200	950
BGR-25SA-27	1200	1200	1050	750
BG <mark>R-38S</mark> A-27	By 950effrey	7950 Kil	cumo 1700	500
BGR-41SA-27	900	900	650	450
BGR-45SA-27	800	800	550	400
BGR-25SA-32	1200	1200	1050	700
BGR-38SA-32	DA 7950: 10/	1295020	18 700	500
BGR-41SA-32	900	900	650	450
BGR-45SA-32	800	800	550	, 400

FOOTNOTES TABLE 3

- 1. INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES
- 2. RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH HILTI KWIK-BOLT TZ OR SIMPSON STRONG-TIE STRONG BOLT 2. REFER TO TABLE 8.

TABLE 4: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH APPROVED EXPANSION ANCHORS IN SOLID SLAB SAND-LIGHTWEIGHT CONCRETE (SEE FOOTNOTES 1-4)

RACK ENCLOSURE	ELEVATION IN GROUND	BUILDING (Z/F	H) 2/3	≤1
=======================================	:=======	========	_,	===
BGR-1927	1150	1150	850	650
BGR-2527	950	950	700	520
BGR-3827	650	650	460	320
BGR-4127	600	600	420	300
BGR-4527	540	540	380	250
BGR-2532	950	950	700	520
BGR-3832	650	650	460	320
BGR-4132	600	600	420	300
BGR-4532	540	540	380	250
BGR-4138	600	600	420	300
BGR-4538	540	540	380	250
BGR-19SA-27	1150	1150	850	600
BGR-25SA-27	900	900	650	480
BGR-38SA-27	600	600	420	300
BGR-41SA-27	550	550	380	250
BGR-45SA-27	500	500	320	200
BGR-25SA-32	900	900	650	480
BGR-38SA-32	600	600	420	300
BGR-41SA-32	550	550	380	250
BGR-45SA-32	500	500	320	200
BGR-25SA-27 BGR-38SA-27 BGR-41SA-27 BGR-45SA-27 BGR-25SA-32 BGR-38SA-32 BGR-41SA-32	1150 900 600 550 500 900 600 550	1150 900 600 550 500 900 600 550	850 650 420 380 320 650 420 380	600 480 300 250 200 480 300 250

FOOTNOTES TABLE 4

- 1. INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES
- RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH HILTI KWIK-BOLT TZ OR SIMPSON STRONG-TIE STRONG BOLT 2. REFER TO TABLE 8.

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TABLE 5: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH APPROVED EXPANSION ANCHORS IN NORMAL WEIGHT CONCRETE FILL OVER METAL DECK (SEE FOOTNOTES 1-4)

RACK ENCLOSURE	ELEVATION GROUND	IN BUILDING	G (Z/H) 2/3	≤1
BGR-1927	1150	1150	 850	640
BGR-2527	950	950	680	500
BGR-3827	600	600	450	300
BGR-4127	550	550	400	280
BGR-4527	500	500	350	250
BGR-2532	950	950	680	500
BGR-3832	600	600	450	300
BGR-4132	550	550	400	280
BGR-4532	500	500	350	250
BGR-4138	550	550	400	280
BGR-4538	500	500	350	250
BGR-19SA-27	1100	1100	850	600
BGR-25SA-27	900	900	650	450
BGR-38SA-27	600	600	400	280
BGR-41SA-27	500	500	350	240
BGR-45SA-27	450	450	300	200
BGR-25SA-32	900	900	650	450
BGR-38SA-32	600	600	400	280
BGR-41SA-32	500	500	350	240
BGR-45SA-32	450	450	300	200

FOOTNOTES TABLE 5

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- INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES
- 2. RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH HILTI KWIK-BOLT TZ OR SIMPSON STRONG-TIE STRONG BOLT 2. REFER TO TABLE 9.

TABLE 6: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH APPROVED EXPANSION ANCHORS IN SAND-LIGHTWEIGHT CONCRETE FILL OVER METAL DECK (SEE FOOTNOTES 1-4)

RACK	ELEVATION	ELEVATION IN BUILDING (Z/H)				
ENCLOSURE	GROUND	1/3	2/3	≤1		
=========		=======		=====		
BGR-1927	750	750	550	400		
BGR-2527	600	600	440	320		
BGR-3827	400	400	250	180		
BGR-4127	340	C (340 F	220	150		
BGR-4527	300	300	200	120		
BGR-2532	600	600	440	320		
BGR-3832	400	400	250	180		
BGR-4132	340	340	220	150		
BGR-4532	300	300	200	120		
BGR-4138	340	340	220	150		
BGR-4538	300	300	200	120		
BGR-19SA-27	0.00000000000000000000000000000000000	4 - 750	550	400		
BGR-25SA-27	580	580	400	280		
BGR-38SA-27	350	350	220	140		
BGR-41SA-27	300	300	180	100		
BGR-45SA-27	Ry 250effre	y Y250 Kiku	ımot 150	80		
BGR-25SA-32	580	580	400	280		
BGR-38SA-32	350	350	220	140		
BGR-41SA-32	300	300	180	100		
BGR <mark>-45SA</mark> -32	DA7250: 10,	/1250201	8 150	80		

FOOTNOTES TABLE 6

- 1. INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES
- RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH HILTI KWIK-BOLT TZ OR SIMPSON STRONG-TIE STRONG BOLT 2. REFER TO TABLE 9.

TABLE 7: BGR SERIES ENCLOSURES & MAXIMUM OSHPD SEISMIC CONTENT CAPACITY WITH $1\!\!/\!\!2$ " THRU-BOLTS IN NORMALWEIGHT OR SAND-LIGHTWEIGHT CONCRETE FILL OVER METAL DECK. (SEE FOOTNOTES 1-4)

ELEVATION IN BUILDING (Z/H)				
GROUND	1/3	2/3	≤1	
:=======				
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
1200	1200	1200	1200	
	GROUND 1200 1200 1200 1200 1200 1200 1200 120	GROUND 1/3 1200	GROUND 1/3 2/3	

FOOTNOTES TABLE 7

- INCLUDES ALL BGR SERIES RACK ENCLOSURES UP TO A HEIGHT OF 45 SPACES
- RACK ENCLOSURES SHOULD BE INSTALLED WITH MIDDLE ATLANTIC BGR-Z4 SEISMIC BRACKETS AND 5/8" WELD WASHERS (BY CONTRACTOR) AT EACH ANCHOR LOCATION, AS DETAILED ON SHEET 6 AND 7.
- 3. THE SUPPORTED RACK ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE ENCLOSURE SUCH THAT 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK ENCLOSURE HEIGHT, 25% IN THE MIDDLE THIRD, AND 25% IN THE TOP THIRD. CONTENTS ARE IN ADDITION TO UNIT SELF-WEIGHT
- ANCHORAGE WITH 1/2" DIAMETER THRU-BOLTS OF ASTM F1554 GRADE 36 OR 105, WITH CONNECTION TO THE DECK SOFFIT AS DETAILED ON THE DRAWINGS. REFER TO TABLE 9.



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		DIMENSIONS ARE IN		l		BGR-SE	KIE2	OSHPL)	l l
	SEE COMPONENTS	TOLERANCES ARE: DECIMAL: 2 PLC ±0							PART	REV
	SEE COMPONENTS	3 PLC ±80		PART NO.						
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CONCRETE ANCHOR NOTES

- CONCRETE ANCHORS FOR THE SUBJECT RACK ENCLOSURES INSTALLED IN SOLID REINFORCED CONCRETE SHALL BE ONE OF THE TYPES LISTED IN TABLE 8, WITH THE DIAMETER, EMBEDMENT, AND EDGE DISTANCES SPECIFIED. ANCHORS SHALL BE OF CARBON STEEL AND FOLLOW ALL INSTALLATION REQUIREMENTS SPECIFIED IN THE CORRESPONDING ESR REPORTS.
- 2. CONCRETE ANCHORS FOR THE SUBJECT RACK ENCLOSURES INSTALLED IN TOP SIDE OF CONCRETE FILL OVER METAL DECK SHALL BE ONE OF THE TYPES LISTED IN TABLE 9, WITH THE DIAMETER, EMBEDMENT, AND EDGE DISTANCES SPECIFIED. ANCHORS SHALL BE OF CARBON STEEL AND FOLLOW ALL INSTALLATION REQUIREMENTS SPECIFIED IN THE CORRESPONDING ESR REPORTS
- ALTERNATIVELY, SUBJECT RACK ENCLOSURES MAY BE INSTALLED IN TOP SIDE OF CONCRETE FILL OVER METAL DECK USING THE THRU-BOLT CONNECTION AS LISTED IN TABLE 9 AND SHOWN ON THE DRAWINGS.
- 4. LOCATE ALL EXISTING REINFORCING BARS WITHIN 12 INCHES OF PROPOSED ANCHOR LOCATIONS PRIOR TO DRILLING FOR CONCRETE ANCHORS. DO NOT CUT, CORE, OR DRILL THROUGH EXISTING REINFORCING BARS.
- 5. ALL CONCRETE ANCHORS SHALL BE INSTALLED WITH PROPER TOOLS AND PROCEDURES IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ICC EVALUATION SERVICE REPORTS REFERENCED ABOVE.
- CONCRETE ANCHORS REQUIRE SPECIAL INSPECTION FOR INSTALLATION IN ACCORDANCE WITH CBC TABLE 1705A.3.
- 7. CONCRETE ANCHORS SHALL BE TESTED A MINIMUM OF 24
 HOURS AFTER INSTALLATION TO VERIFY PROPER INSTALLATION
 IN ACCORDANCE WITH CBC SECTION 1910A.5
- 8. A MINIMUM OF TWO ANCHORS (50%) PER ENCLOSURE MUST BE TESTED (CBC 1910A.5.3).
- 9. TESTING OF THE POST INSTALLED ANCHORS SHALL BE DONE IN THE PRESENCE OF THE SPECIAL INSPECTOR & A REPORT OF THE TEST RESULTS SHALL BE SUBMITTED TO THE ENFORCEMENT AGENCY (CBC 1910A.5.3)
- ANCHORS SHALL BE TESTED TO LOADS SHOWN BELOW (CBC 1910A.5.4):

A) EPOXY ANCHORS IN NORMAL WEIGHT CONCRETE - 3700LB

B) EXPANSION ANCHORS IN NORMAL WEIGHT CONCRETE – 40 FT-LB

C) EXPANSION ANCHORS IN SAND-LIGHTWEIGHT CONCRETE – 25 FT-LB

11. TEST ACCEPTANCE CRITERIA (CBC 1910A.5.5):

A) HYDRAULIC RAM METHOD (EPOXY ANCHORS): ANCHOR SHALL MAINTAIN TEST LOAD FOR A MINIMUM OF 15 SECONDS AND SHALL EXHIBIT NO DISCERNIBLE MOVEMENT (AS EVIDENCED BY THE LOOSENING OF THE WASHER UNDER THE NUT)

B) TORQUE WRENCH METHOD (EXPANSION ANCHORS): ANCHOR SHALL ATTAIN THE SPECIFIED TORQUE WITHIN ½ TURN OF THE NUT.

BOLTS THROUGH CONCRETE ON METAL DECK

- A. BOLTS SHALL BE TORQUED by 34 TURN OF THE NUTS AFTER THE SNUG TIGHT (THE SNUG-TIGHT CONDITION IS DEFINED AS THE TIGHTNESS REQUIRED TO BRING THE CONNECTED PLIES INTO FIRM CONTACT) CONDITION IS ACHIEVED, UNLESS OTHERWISE NOTED.
- B. THROUGH BOLT HOLES SHALL BE 1/16' LARGER THAN BOLT SIZE (HOLE SIZE = BOLT SIZE + 1/16) FOR CONCRETE
- C. THROUGH-BOLTS IN CONCRETE SHALL RECEIVE SPECIAL INSPECTION AND TESTING (THROUGH-BOLTS WITH STEEL TO STEEL CONNECTION IN TENSION DO NOT REQUIRE TENSION TESTING) IN ACCORDANCE WITH REQUIREMENTS FOR POSTINSTALLED ANCHORS.



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TABLE 8: ACCEPTABLE FASTENERS FOR ANCHORING OF THE BGR SERIES OF RACK ENCLOSURES TO SOLID REINFORCED CONCRETE (SEE NOTE 1)

Anchor Type	ICC ESR	Anchor Diameter (inches)	MIN Embedment (inches) (hef)	MIN Slab Thickness (inches)	MIN Edge Distance (Inches)	MIN Spacing (inches) (Note 5)
HILTI HIT RE 500V3 Threaded Rod Epoxy (Notes 2,4)	3814	0.5	6	8.5	6	18
Simpson Strong- Tie Set-XP Threaded Rod Epoxy Anchors (Notes 2,4)	2508	0.5	6	8.5	6	18
HILTI KWIK Bolt TZ Expansion Anchors (Note 3)	1917	0.5	3.25	6	6	18
Simpson Strong- Tie Strong-Bolt 2 Expansion Anchors (Note 3)	3037	0.5	3.375	6	6	18

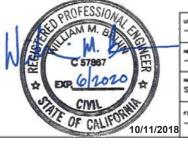
NOTES TABLE 8

- FOR NORMALWEIGHT OR SAND-LIGHTWEIGHT CONCRETE WITH A MINIMUM FC = 3000 PSI. EPOXY ANCHORS MAY ONLY BE USED IN NORMAL WEIGHT CONCRETE.
- 2. APPLIES TO THE BGR SERIES ENCLOSURES LISTED IN TABLES 1-
- 3. APPLIES TO THE BGR SERIES ENCLOSURES LISTED IN TABLES 5-7 ALSO, PROVIDE FOR FULL THREAD ENGAGEMENT OF NUT & WASHER.
- STANDARD THREADED ROD SHALL BE ASTM F1554 GRADE 36, OR 105.
- 5. MIMIMUM SPACING APPLIES TO MULTIPLE UNITS INSTALLED ADJACENT TO ONE ANOTHER, AND IS TAKEN AS THE DISTANCE FROM CENTERLINE TO CENTERLINE OF ANCHORS.



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TABLE 9: ACCEPTABLE FASTENERS FOR ANCHORING OF THE BGR SERIES OF RACK ENCLOSURES TO TOPSIDE OF CONCRETE FILL OVER METAL DECK (NOTES 1,2)

Anchor Type	ICC ESR	Outside Diameter (inches)	Effective Embedment (inches) (hef)	MIN Thick Above/Within Flute (inches)	MIN Edge Distance (Inches)	MIN Spacing (inches)
HILTI KWIK Bolt TZ Expansion Anchors	1917	0.5	2	3.25/1.5	6	6.5
Simpson Strong-Tie Strong-Bolt 2 Expansion Anchors	3037	0.5	2.25	3.25/1.5	6	8
ASTM F1554 Thru-Bolt (Note 3)	NA	0.5	NA	3.25/1.5	6	NA

NOTES TABLE 9

D

- FOR NORMALWEIGHT OR SAND-LIGHTWEIGHT CONCRETE WITH A MINIMUM FC = 3000 PSI
- 2. APPLIES TO THE BGR SERIES ENCLOSURES LISTED IN TABLES 4-
- 3. ASTM F1554 GRADE 36 OR 105 THRU-BOLTS WITH CONNECTION TO THE DECK SOFFIT AS DETAILED ON THE DRAWINGS.

RESPONSIBILITIES OF THE SEOR

- THE STRUCTURAL ENGINEER-OF-RECORD (SEOR) SHALL VERIFY THAT THE WEIGHT OF RACK ENCLOSURE CONTENTS DOES NOT EXCEED THE APPROVED CAPACITY FOR THE LOCATION OF INSTALLATION.
- 2. THE SEOR SHALL VERIFY THAT PROJECT SPECIFIC SEISMIC PARAMETERS ($S_{DS} \& z/h$) DO NOT EXCEED THE DESIGN VALUES STATED ON THESE DRAWINGS
- 3. THE SEOR SHALL VERIFY THAT THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE LOADS AND REACTIONS IMPOSED BY THE ANCHORED RACK ENCLOSURE IN ADDITION TO ALL OTHER LOADS AND FORCES. MAXIMUM ANCHORAGE DEMAND LOADS ARE LISTED IN TABLE 1.
- 4. SEOR SHALL VERIFY THAT A PLACARD IS PLACED ON THE RACK STATING THE FOLLOWING:
 - A. UNIT MODEL NUMBER.
 - B. NAME OF THE BUILDING IN WHICH IT WILL BE INSTALLED.
 - C. HIGHEST FLOOR WHERE IT CAN BE USED.
 - D. MAXIMUM TOTAL WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK.
 - E. MAXIMUM WEIGHT THAT CAN BE STORED ON EACH SHELF BASED ON THE WEIGHT DISTRIBUTION SPECIFIED IN THIS OPM.
 - F. MAXIMUM SDS VALUE AS LISTED IN THIS OPM.

- 5. SEOR SHALL VERIFY THAT THE CONCRETE FLOOR MEETS THE REQUIREMENTS OF THIS PRE-APPROVAL.
- 6. VERIFY THAT THE CONCRETE SLAB TO WHICH THE EQUIPMENT IS ANCHORED MEETS ALL REQUIREMENTS OF THE APPLICABLE ICC ESR.
- VERIFY THAT THE ANCHORS ARE AN ADEQUATE DISTANCE FROM ANY SLAB EDGES OR OPENINGS.
- 8. VERIFY THAT ALL NEW OR EXISTING ANCHORS ARE AN ADEQUATE DISTANCE FROM THE ANCHORS SHOWN IN THIS PRE-APPROVAL. VERIFY THAT THERE IS NO ADVERSE INTERACTION WHERE OTHER ANCHORS ARE WITHIN 18" OR 6 hef FROM THIS UNIT'S ANCHORS.
- VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE 2016 CBC AND THE DETAILS SHOWN IN THIS PRE-APPROVAL.



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