



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR HCAI PREAPPROVAL OF
MANUFACTURER'S CERTIFICATION (OPM)

OFFICE USE ONLY

APPLICATION #: OPM-0684

HCAI Preapproval of Manufacturer's Certification (OPM)

Type: New Renewal/Update

Manufacturer Information

Manufacturer: VMC Group

Manufacturer's Technical Representative: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780

Email: john.giuliano@thevmcgroup.com

Product Information

Product Name: VMC Group Spring Vibration Isolators OPM-0684

Product Type: MS, MSS, MSSH, MSSHX

Product Model Number: M2SS-1E, M2SSH-1E, M2SSHX-1E, MSS-3E, MSSH-1E, MSSH-3C

General Description: Spring Vibration Isolators

Applicant Information

Applicant Company Name: VMC Group

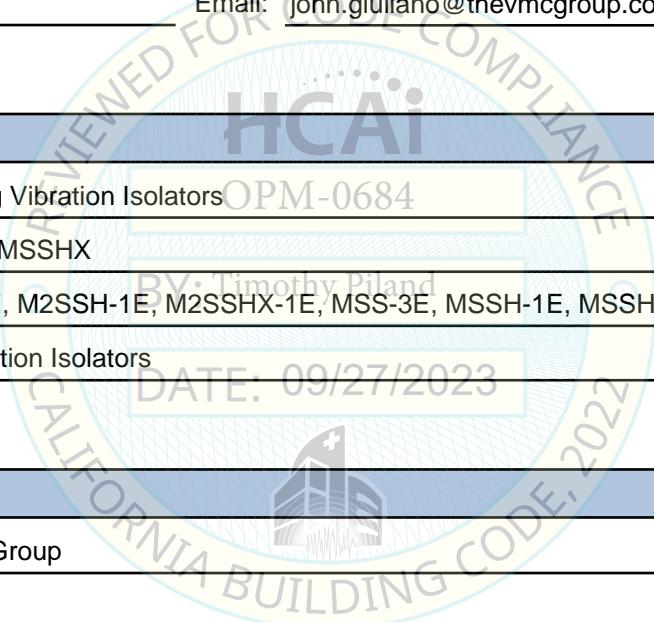
Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780

Email: john.giuliano@thevmcgroup.com

Title: President



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**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
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Registered Design Professional Preparing Engineering Recommendations

Company Name: THE VMC GROUP
Name: Kenneth Tarlow California License Number: S2851
Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814
Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

HCAI Special Seismic Certification Preapproval (OSP)

Special Seismic Certification is preapproved under OSP OSP Number: OSP-0117, OSP-0412, OSP-0621

Certification Method

Testing in accordance with: ICC-ES AC156 FM 1950-16
 Other(s) (Please Specify): OPM-0684

*Use of criteria other than those adopted by the California Building Standards Code, 2022 (CBSC 2022) 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 2022 may be used when approved by HCAI prior to testing.

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

HCAI Approval

Date: 9/27/2023
Name: Timothy Piland Title: Senior Structural Engineer
Condition of Approval (if applicable): _____

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VMC GROUP OPM-0684-22

Seismic Rated Spring Vibration Isolators



9/26/2023



Ken H. Tarlow



OPM-0684-22

VMC Group Seismic Rated
Spring Vibration Isolators

OPM-0684. Reviewed for Code Compliance by Timothy Piland

Mr. John P. Giuliano

John P. Giuliano

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1. General Notes and Seismic Capacity Determination

- a. HCAI Pre-Approval of Manufacturer's Certification (OPM) is based on the 2022 California Building Code (CBC).
- b. The S_{DS} level from an HCAI approved component shake table test is the basis for determining the seismic demands and limiting isolator capacities.
- c. Per ASCE 7-16 (ASCE7) Chp 13 equations, lateral and vertical seismic demands are applied at the isolators and are calculated as follows:
 - i. Horizontal Force, F_p (§13.3.3.1 Equation 13.3-1)

$$F_p = \frac{0.4a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\frac{z}{h}\right)$$

Where per ASCE7 Table 13.6-1 for isolated applications:

Amplification factor (a_p) = 2.5

Component Response Modification factor (R_p) = 2.0

Component importance factor (I_p) = 1.5

Component operating weight (W_p) = Dead load plus operating contents



Ken H. Tarlow

Date: 09/26/2023

- ii. Vertical Force, F_v (§13.3.1.2)

$$F_v = \pm 0.2 S_{DS} D$$
 - iii. Overstrength factor (Ω_0) is not pertinent to supports (only concrete attachments) and was not included in the demand calculations.
 - iv. Utilizing ASCE7 §2.3.6 Basic Combinations with Seismic Load Effects:
 - LRFD Load Combination 6. $1.2D + E_v + E_h$
 - LRFD Load Combination 7. $0.9D - E_v + E_h$
 Where:
 - D = Dead Load
 - $E_v = F_v$
 - $E_h = F_p$
 - v. Component seismic demands applied at the center of gravity (CG), relative to the center of rigidity (CR), using the basic principles of structural mechanics, $P/A \pm Mc/I$ in all orthogonal directions are resisted by the isolators (see 2a.ii) to determine the isolator vertical and lateral demands.

Where (if applicable):

$$I = I_0 + Ad^2 \text{ (Parallel Axis Theorem for rotation about edge of component)}$$
- d. Isolator capacities are limited to the maximum calculated demands from 1c.
 - e. It is the responsibility of the Registered Design Professional (RDP) in responsible charge to submit to the Structural Engineer of Record (SEOR) the following:
 - i. Project specific isolator demands \leq OPM listed capacities.
 - ii. Component attachment to the isolator and isolator attachment to the structure are in compliance with CBC and corresponding anchor attachments ICC-ES Reports.
 - iii. Component assembly installation, e.g., component, isolator, and attachments are in compliance with CBC and details within the OPM.
 - f. Environmental factors, e.g., wind, snow, rain/floods, etc., are beyond the scope of the OPM.



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Spring Vibration Isolators

OPM-0684 Reviewed for Code Compliance by Timothy Piland

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2. General Isolator Design Procedure

a. The isolator selection process is as follows:

- i. Based upon project requirements, select the appropriate isolator families.
- ii. Lateral and vertical seismic demands are resisted per isolator.
- iii. Calculate the seismic demands for each isolator supporting the equipment per 1c.
- iv. Select an isolator whose:
 - 1. Tested seismic capacities \geq the maximum calculated lateral and vertical seismic demands using the interaction force equation:

$$(T_u/T_s)^2 + (V_u/V_s)^2 \leq 1.0$$

Where:

- T_u = Maximum Tension Demand
- T_s = Tested Tension Capacity
- V_u = Maximum Shear Demand
- V_s = Tested Shear Capacity

- 2. And whose static spring capacity \geq the static load requirements for the point loads of the equipment.

3. Anchorage and Attachment Requirements

- a. It is the responsibility of the Registered Design Professional (RDP) in responsible charge to submit to the Structural Engineer of Record (SEOR) the following:
 - i. Equipment attachment to the isolator.
 - ii. Anchorage of the isolator to building structure.

4. Tested Isolator Capacities

a. Maximum Tested Capacities

Overall Summary of Maximum LRFD Capacities

Isolator	R shear	Rz tension	Rz compression
MSSH-1E	7300 lbs	5645 lbs	9050 lbs
M2SS-1E	7315 lbs	6680 lbs	10095 lbs
M2SSH-1E	9220 lbs	21215 lbs	29820 lbs
M2SSHX-1E	8635 lbs	32555 lbs	40615 lbs
MSS-3E	6655 lbs	5915 lbs	9015 lbs
MSSH-3C	6655 lbs	5915 lbs	9015 lbs

Shear capacity is any horizontal direction



Ken P. Tarlow

Date: 09/26/2023



5. Typical Isolator Submittal Drawings
a. MSSH-1E

REV.	DESCRIPTION	DATE	BY
172R-102904		7/17/23	
REV:9		7/17/23	

MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	SPRING COLOR CODE
MSSH-1E-195	195	1.95	100	DK. BLUE
MSSH-1E-400	400	1.32	303	BLACK
MSSH-1E-530N	530	1.17	453	BLACK/ DK. BLUE
MSSH-1E-650	650	1.06	619	RED
MSSH-1E-825N	825	1.07	771	RED/ DK. BLUE
MSSH-1E-1000	1000	1.00	1000	TAN
MSSH-1E-1200N	1200	1.04	1154	TAN/ DK. BLUE
MSSH-1E-1700N	1700	1.10	1550	PINK/ DK. BLUE
MSSH-1E-2000	2000	1.11	1800	WHITE
MSSH-1E-2330N	2376	1.11	2100	WHITE/ RED
MSSH-1E-2990N	2990	1.11	2682	WHITE/ DK. GREEN
MSSH-1E-3250N	3250	1.04	3125	WHITE/ GRAY

1 1/8" x 8" top view dimensions. 1 1/2" x 7 1/4" x 5 1/8" side view dimensions. 6 1/4" x 2 1/4" x 2 7/8" x 7/8" base plate dimensions. Callouts include: 1/16" DIA. HOLE FOR ATTACHMENT TO CONCRETE (4 TYP), (BASE PLATE) 3/4" DIA HOLE FOR ATTACHMENT TO STEEL BEAM (VIEW CUT AWAY FOR CLARITY), 2 7/8", 3/4 REMOVABLE ADJUSTING BOLT, 3/4 STD. WASHER (BY OTHERS), STEEL SHIM (REMOVE AFTER SPRING ADJUSTMENT), 1/4 AIR GAP (AFTER ADJUSTMENT), 1/4 AIR GAP (AFTER ADJUSTMENT), ELASTOMERIC SNUBBER, SHIPPING SPACER ASSY STRAP (NOT SHOWN IN OTHER VIEWS FOR CLARITY), 1/2 DIA. LIMIT STOP (NOT SHOWN IN TOP VIEW FOR CLARITY), 8" width, 10 1/4" height, 6 1/8" FREE & OPERATING HEIGHT.

NOTES:

- ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
- STANDARD FINISH: HOUSING - POWDER COAT (COLOR: BLACK); SPRING - POWDER COAT (COLOR: SEE TABLE); HARDWARE ZINC-ELECTROPLATE.
- EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP AND BOTTOM PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
- ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
- RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.

1. TWO-NESTED SPRINGS HELD THIS LOAD. THE COLOR CODE INDICATED IS FOR OUTER SPRING/INNER SPRING.

DATE: 09/26/2023

Professional Engineer Seal: KENNETH FARLEY, No. S 2851, EXP. 6/30/2024, REGISTERED PROFESSIONAL ENGINEER, STRUCTURAL, STATE OF CALIFORNIA.

SCALE: NONE SHEET: DRAWING NO.: REVISION:

MEMBER VSCMA

VMC GROUP THE POWER OF TOGETHER®
Bloomington, NJ 07403
Houston, TX 77041

MODEL MSSH-1E [195-3250] STATIC LBS.]
VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT
AND EXTERNAL ADJUSTMENT
1 INCH DEFLECTION

PROPRIETARY. EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF THE VMC GROUP AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE THE VMC GROUP EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED TO KNOW WHO BY THE USE HEREOF ACKNOWLEDGE THE VMC GROUP'S OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.



b. M2SS-1E

172R-101101	REV: 14	7/17/23	DESCRIPTION	DATE	BY
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MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	COLOR CODE
M2SS-1E-1300	1300	1.05	1240	RED
M2SS-1E-1650N	1650	1.07	1538	RED/DK. BLUE
M2SS-1E-2000	2000	1.00	2000	TAN
M2SS-1E-2400N	2400	1.04	2300	TAN/DK. BLUE
M2SS-1E-3400N	3400	1.10	3100	PINK/DK. BLUE
M2SS-1E-4000	4000	1.11	3600	WHITE
M2SS-1E-5150N	5150	1.11	4626	WHITE/DK. PURPLE
M2SS-1E-5980N	5980	1.11	5364	WHITE/DK. GREEN
M2SS-1E-6500N	6500	1.04	6250	WHITE/GRAY

Date: 09/26/2023

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

SCALE: NONE

SHEET: 1

DRAWING NO.: VMC GROUP

REVISION:

THE POWER OF TOGETHER

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Houston, TX 77041

MODEL M2SS-1E [1300-6500 STATIC LBS.]
VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT
AND EXTERNAL ADJUSTMENT
FOR 1 INCH DEFLECTION

- NOTES:
1. ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
 2. STANDARD FINISH: HOUSING - POWDER COAT (COLOR-BLACK), SPRING - POWDER COAT (COLOR-BLACK), SPRING - POWDER COAT (COLOR-BLACK), SPRING - POWDER COAT (COLOR-BLACK).
 3. EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
 4. ISOLATOR BASE PLATE MUST BE ANCHORED TO CONCRETE WITH (4) 3/4 DIA ANCHORS.
 5. ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
 6. STATIC RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.



9/27/2023

OPM-0684-22

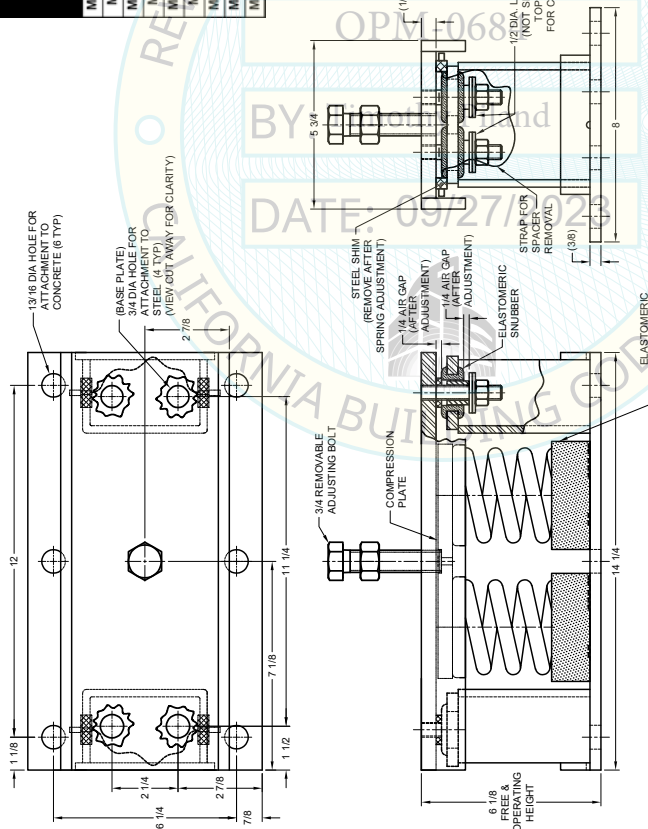
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Spring Vibration Isolators

Mr. John P Giuliano

c. M2SSH-1E

172R-102799	REV.14	7/17/23	DESCRIPTION	DATE	BY
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MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	SPRING COLOR CODE
M2SSH-1E-1650N	1650	1.07	1538	REDDK. BLUE
M2SSH-1E-2000	2000	1.00	2000	TAN
M2SSH-1E-2400N	2400	1.04	2300	TANDK. BLUE
M2SSH-1E-2800	2800	1.00	2800	PINK
M2SSH-1E-3400N	3400	1.10	3100	PINK/DK. BLUE
M2SSH-1E-4000	4000	1.11	3600	WHITE
M2SSH-1E-5160N	5150	1.11	4626	WHITE/DK. PURPLE
M2SSH-1E-5960N	5980	1.11	5364	WHITE/DK. GREEN
M2SSH-1E-6500N	6500	1.04	6250	WHITE/GRAY



- NOTES:
1. ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
 2. STANDARD FINISH: HOUSING - POWDER COAT (COLOR/BLACK), SPRING - POWDER COAT (COLOR: SEE TABLE).
 3. HARDWARE ZINC-ELECTROPLATE.
 4. EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP AND BOTTOM PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
 5. ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.



Date: 09/26/2023

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

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Houston, TX 77041

SCALE: NONE

SHEET: []

DRAWING NO.: []

REVISION: []

MODEL M2SSH-1E [1650-6500 STATIC LBS.]
VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT
AND EXTERNAL ADJUSTMENT
FOR 1 INCH DEFLECTION

PROPRIETARY. EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF THE VMC GROUP AND MUST NOT BE COPIED OR DISTRIBUTED OUTSIDE THE VMC GROUP EXCEPT TO AUTHORIZED PERSONS WITH A GENUINE NEED TO KNOW WHO BY THE USE HEREOF ACKNOWLEDGE THE VMC GROUP'S OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.



OPM-0684-22

VMC Group Seismic Rated Spring Vibration Isolators

Mr. John P Giuliano

d. M2SSHX-1E

172R-103990	REV: 4	7/17/23	DESCRIPTION	DATE	BY
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MODEL M2SSHX-1E SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 1" DEFLECTION					
MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	SPRING COLOR CODE	
M2SSHX-1E-1650N	1650	1.07	1538	RED/DK. BLUE	
M2SSHX-1E-2000	2000	1.00	2000	TAN	
M2SSHX-1E-3400N	3400	1.10	3100	PINK/DK. BLUE	
M2SSHX-1E-4000	4000	1.11	3600	WHITE	
M2SSHX-1E-5160N	5160	1.11	4626	WHITE/DK. PURPLE	
M2SSHX-1E-5980N	5980	1.11	5364	WHITE/DK. GREEN	
M2SSHX-1E-6500N	6500	1.04	6250	WHITE/GRAY	

Date: 09/26/2023

NOTES:
 1. ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
 2. STANDARD FINISH: HOUSING - POWDER COAT (COLOR: BLACK), SPRING - POWDER COAT (COLOR: SEE TABLE). HARDWARE ZINC-ELECTROPLATE.
 3. EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
 4. ISOLATOR BASE PLATE MUST BE ANCHORED OR BOLTED WITH (4) 3/4 DIA. GRADE 8 ANCHOR.
 5. ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
 6. RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.

BY: Timothy Piland
DATE: 09/26/23

SCALE: NONE
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MODEL M2SSHX-1E [1650-6500 STATIC LBS.]
EXTRA HIGH CAPACITY VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT AND
EXTERNAL ADJUSTMENT
1 INCH DEFLECTION

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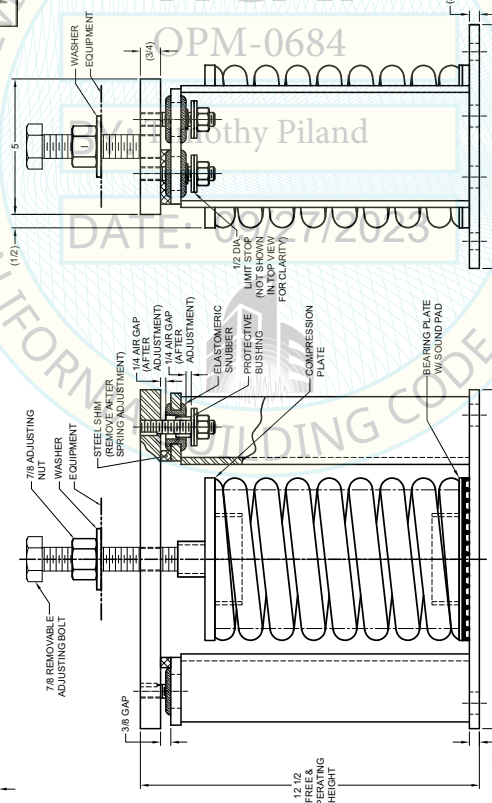
Mr. John P Giuliano

e. MSS-3E

REV.	DESCRIPTION	DATE	BY
172-103138	REV:5	7/17/23	

MODEL MSS-3E SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 3" DEFLECTION

MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LB/IN)	SPRING COLOR CODE
MSS-3E-1600	1600	3.00	533	DK. GRAY
MSS-3E-2110	2110	2.53	833	DK. YELLOW
MSS-3E-2440	2440	2.44	1000	RED
MSS-3E-3500	3500	2.63	1333	GREEN



Date: 09/26/2023

- NOTES:**
1. ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
 2. STANDARD FINISH: HOUSING - POWDER COAT (COLOR:BLACK). SPRING - POWDER COAT (COLOR:SEE TABLE). HARDWARE ZINC-ELECTROPLATE.
 3. EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
 4. ISOLATOR BASE PLATE MUST BE ANCHORED TO CONCRETE WITH (4) 1/2 DIA ANCHORS.
 5. ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
 6. RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

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SHEET: [Blank]

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Houston, TX 77041

MODEL MSS-3E [1600-3500 STATIC LBS.]
VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT
AND EXTERNAL ADJUSTMENT
3 INCH DEFLECTION

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Mr. John P Giuliano

f. MSSH-3C

REV.	DESCRIPTION	DATE	BY
172R-104083	REV.3	7/17/23	

MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	COLOR CODE
MSSH-3C-75	75	3.00	25	WHITE
MSSH-3C-145	145	2.80	60	LT PURPLE
MSSH-3C-215	215	2.59	83	LT BROWN
MSSH-3C-315	315	2.37	133	ORANGE
MSSH-3C-470	470	2.35	200	DK BROWN
MSSH-3C-600	600	2.25	267	DK PURPLE
MSSH-3C-950N	860	2.25	383	ORANGE / RED
MSSH-3C-1055N	1055	2.34	450	DK BROWN / RED
MSSH-3C-1165N	1165	2.35	517	DK PURPLE / RED

MODEL MSSH-3C SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 3" DEFLECTION

NOTES:

- ALL DIMENSIONS ARE IN INCHES. INTERPRET PER ANSI Y14.
- STANDARD FINISH: HOUSING - POWDER COAT (COLOR: SEE TABLE), SPRING - POWDER COAT (COLOR: SEE TABLE), HARDWARE ZINC-ELECTROPLATE.
- EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
- ISOLATOR BASE PLATE MUST BE ANCHORED TO CONCRETE WITH (4) 3/4 DIA ANCHORS.
- ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
- RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.

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Houston, TX 77041

SCALE: NONE

SHEET: _____

DRAWING NO.: _____

REVISION: _____

MODEL MSSH-3C [75-1165 STATIC LBS.]
VIBRATION ISOLATOR
WITH INTEGRAL SEISMIC RESTRAINT
AND EXTERNAL ADJUSTMENT
3 INCH DEFLECTION



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