DOC. No. MHS230821-1

STRUCTURAL ANALYSIS REPORT

FY22 LXFB123876 REPLACE MUNITIONS STRUCTURES KADENA AMMO STORAGE ANNEX SITE #1 KADENA AIR BASE, OKINAWA, JAPAN

September .07. 2023

www.mhsc.co.kr
25, Gasan digital 1-ro Geumcheon-gu
Seoul Daeryng Techno Town 17Cha 1508

Contents

1 General

1.1 Project

- FY22 LXFB123876 REPLACE MUNITIONS STRUCTURES KADENA AMMO STORAGE ANNEX SITE #1 KADENA AIR BASE, OKINAWA, JAPAN
- MHS is an engineering service and consulting company which specialized in heat/flow/structure/dynamics, in South Korea. MHS conducted structural analysis, using RecurDyn 2023 program after 3D modeling through 2D drawings provided SAMHOON Co., Ltd., for the "FY22 LXFB123876 REPLACE MUNITIONS STRUCTURES KADENA AMMO STORAGE ANNEX SITE #1 KADENA AIR BASE, OKINAWA, JAPAN," the project conducting by SAMHOON Co., Ltd.

1.2 Main Specifications

1.2.1 Door Size w/Frame : 900mm x 2,100mm

(Door Size: 880.4mm x 2,079.3mm)

1.2.2 Door Type: Swing Type

1.2.3 Opening Type : RHR

1.2.4 Face Material : STAINLESS STEEL 316L 1.5mm(Appendix 5.2)

Door Reinf. Material : STAINLESS STEEL 316L 1.5mm

1.2.5 Insulation : Mineral Board Test Report (ASTM C612-KCC)

1.2.6 Applied Hardware Lists

No.	DESCRIPTION	MODEL	UNIT	Q'TY
1	**ENTRANCE FUNCTION LOCKSET THREE POINT LOCKSET/ TYPHOON RATED** Manufactured by Schlage	LM9300_Series	EA	1
2	**FULL MORTISE HINGE(114 x 114)** Manufactured by ASSA ABLOY	ANGEL METAL AHG2-5040 A8112 ‘’	EA	3

3	**ASSA ABLOY HIGH SECURITY HASP** Manufactured by ASSA ABLOY	PA/21/190/DP	EA	1
4	**CLOSER - NON-HOLD OPEN** Manufactured by ASSA ABLOY Korea Samhwa Precision Co., Ltd	K-907	EA	1
5	**SADDLE THRESHOLD** Manufactured by ASSA ABLOY	PEMKO 154	0.9M	1
6	**SCREW ON WEATHER SEAL** Manufactured by ASSA ABLOY	PEMKO 2891	0.9M	1
7	**Sweeps** Manufactured by ASSA ABLOY	PEMKO 18061_NB	0.9M	1

1.3 Analysis and Design Requirement

1.3.1 Wind pressure load : 7.65KPa

1.3.2 The load combination shall be Dead Load + Live Load, with load factor of 1.0 for all loads.

1.3.3 Design Criteria

- Stress : σ_{max} < Yield strength of material
- Drift Limits for Wind Loading : D_{max} < L/120 (Appendix 5.3)

1.4 Used Program

- RecurDyn 2023, FunctionBay
- RecurDyn is an interdisciplinary, CAE software package whose primary function is the simulation of Multi-Body Dynamics.
- https://support.functionbay.com/

2 Load

2.1 Dead Load

2.1.1 Dead load shall be self-weight only, and it is automatically calculated by program. (RecurDyn 2023)

2.1.2 Additional dead load such as Bracket, Closer, et are usually 10 to 15% of total self-weight. In this case, 15% of the total self-weight is applied as an additional dead load.

2.2 Live Load

2.2.1 Wind pressure load : 7.65KPa

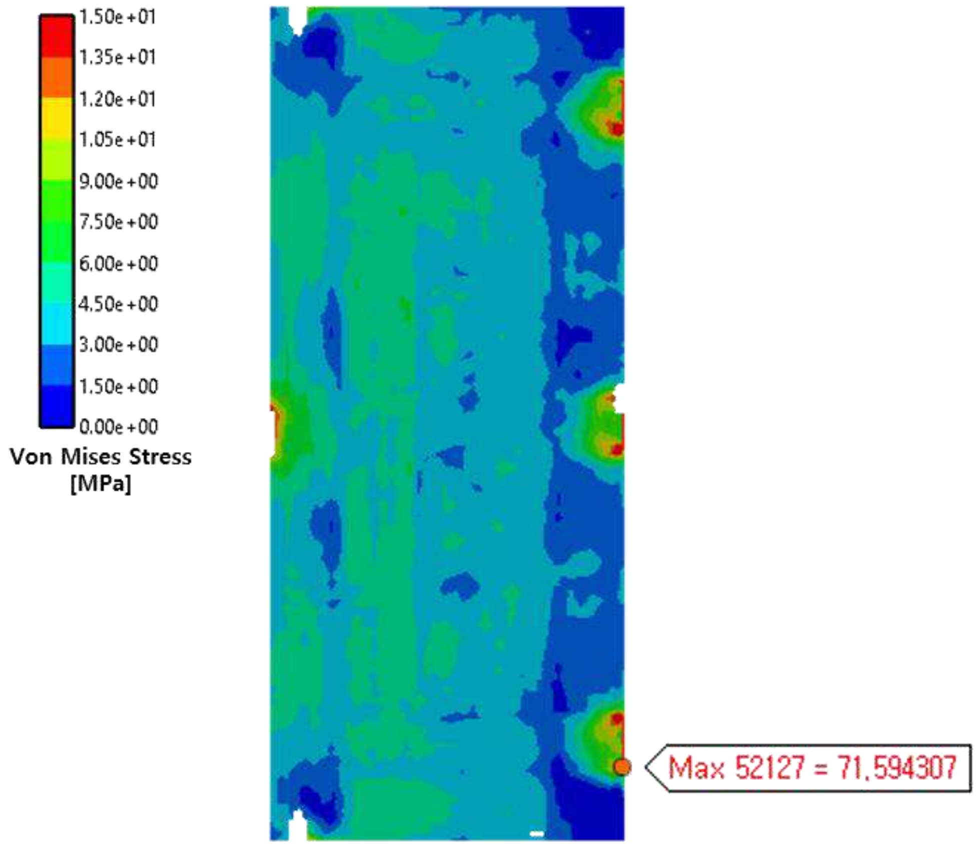
2.2.2 Wind pressure load are applied across the front of the door and are assigned by program (RecurDyn 2023)

- Wind pressure load was determined as 7.65KPa, because the Door and Frame can withstand more than 7.65KPa, confirmed by SAMHOON Co., Ltd.,

  Applied Hardware; **THREE POINT LOCKSET/ TYPHOON RATED TYPE(Model :** LM9300_Series, Manufactured by Schlage) can withstand Wind pressure load 7.65KPa, thus the maximum Wind pressure load was determined as 7.65KPa.

3 Structual Analysis

3.1 Stress distribution



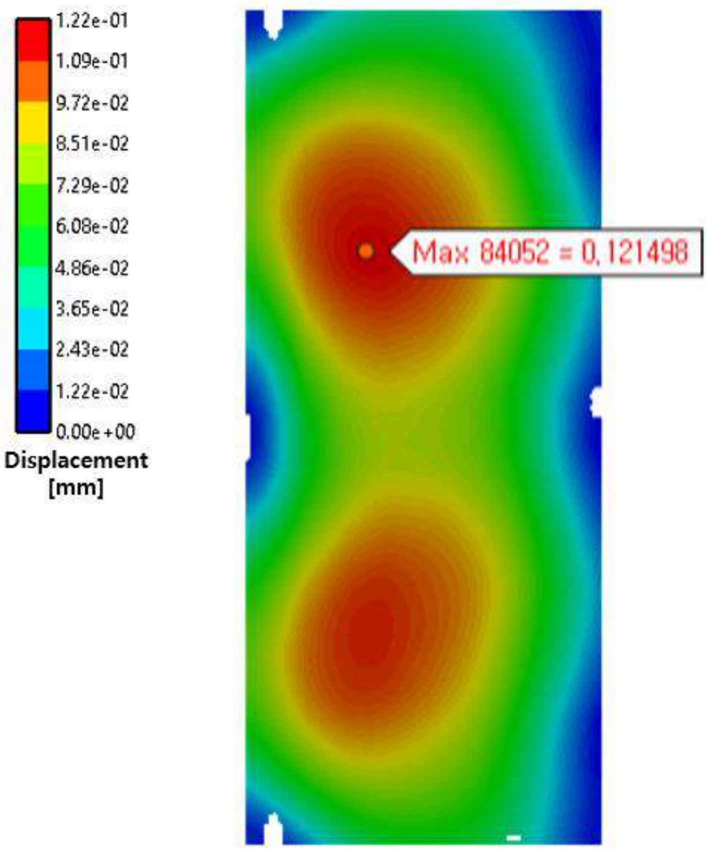
Stress Distribution on Door ass'y

*Von Mises Stress

σ_{max} = 71.59 MPa ≤ $\sigma_a = \frac{177}{1.5}$ = 118.00 MPa : O.K

MAT`L : STAINLESS STEEL 316L, F_Y : 177MPa

3.2 Deformation distribution



Deformation Distribution on Door ass'y

*Deformation

D_{max} = 0.12mm ≤ D_a = 0.68 mm : O.K

3.3 Strength Calculation on Main Parts

3.3.1 Frame anchor

3.3.1.1 Load

See "Fx", "Fy" of the Joint "Reaction Force" (Appendix 5.5)

F = $\sqrt{Fx^2 + Fy^2}$ = $\sqrt{13995.08^2 + 0.53^2}$ = 13995.08 N

3.3.1.2 Sectional area

Number of anchors : 17ea

Anchor diameter : ø 9.1 = 0.0091 mm

$$A = \frac{\pi}{4} \times (0.0091)^2 = 6.50 \times 10^{-5}\ m^2$$

3.3.1.3 Shearing Stress

$$\tau = \frac{F}{A} = \frac{13995.08}{17 \times 6.50 \times 10^{-5}}$$

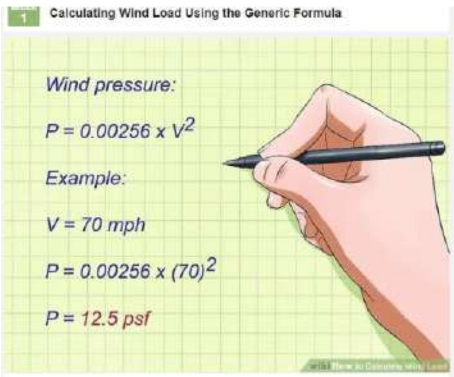
$= 12{,}665{,}230.77$ Pa

$= 12.67$MPa $\leq \tau_a = \frac{235}{1.5\sqrt{3}} = 90.45$ MPa : O.K

MAT`L : SS400, F_Y : 235MPa

3.3.2 LM9300 three-point lock

Schlage LM9300 three-point lock provided by SAMHOON Co., Ltd certified by the manufacturer as follows. "The LM9300 Series is part of a three-point locking system designed for tornado, hurricane, or high security applications, providing superior protection with familiar operation. Latches at the top, side and bottom of the door provide protection from high wind speeds and 15-lb. projectile impacts up to 100 mph when paired with a Steelcraft Paladin tornado resistant door. ICC-500 Tornado approved to FEMA 361 and FEMA 320 and ICC 500 tornado shelter guidelines when paired with specific Steelcraft and Republic doors and frames" Thus, structural analysis of this LM9300 three point lock is not necessary. The manufacturer`s design standards include design criteria for tornado pressure load 7.65KPa. (Appendix 5.6)



3 **Calculate wind pressure.** The simple formula for wind pressure P in imperial units (pounds per square foot) is $P = 0.00256V^2$, where V is the speed of the wind in miles per hour (mph). To find the pressure in SI units (Newtons per square meter), instead use $P = 0.613V^2$, and measure V in meters per second.[3]

- This formula is based on the American Society of Civil Engineers code. The 0.00256 coefficient is the result of a calculation based on typical values for air density and gravitational acceleration.
- Engineers use a more accurate formula to take into account factor such as the surrounding terrain and type of construction. You can look up one formula in ASCE code 7-05, or use the UBC formula below.
- If you're not sure what the wind speed is, look up the peak wind speed in your area using the Electronic Industries Alliance (EIA) standard. For example, most of the U.S. is in Zone A with 86.6 mph wind, but coastal areas might be in Zone B (100 mph) or Zone C (111.8 mph).

Wind Load Calculation (ASCE Code):

$P\ (psf) = 0.00256 \times V\ (mph)^2$			
$V=$	250	mph	
P=	160	psf	
	1.11	psi	
	7.65	kPa	

4 Conclusion

The results of the structural analysis using RecurDyn 2023 program showed the satisfactory that the stainless steel swing door withstand tornado load 7.65KPa sufficiently.

Page	Analysis Result	
5	Stress of Door ass'y	σ_{max} = 71.59 MPa ≤ σ_a = 118.00 MPa : O.K
5	Deformation of Door ass'y	D_{max} = 0.12mm ≤ D_a = 0.68 mm : O.K
6	Stress of Anchor	τ = 12.67 MPa ≤ τ_a = 90.45 MPa : O.K

* No plastic deformation occurs on doors and main parts

5 Appendix

5.1 Document Author

Prepared by

Signature

- Jae Min Kim, R&D Center 3, MHS
- Bachelor's degree in Mechanical Engineering at Seoul National University of Science and Technology.

Reviewed by

Signature

- Tae Jin Kim, R&D Center 3, MHS
- Master's degree in Mechanical Design and Robot Engineering at Seoul National University of Science and Technology.

Additional reviewed by

Signature

- Jee Hoon Moo, SAMHOON CO., LTD.
- Graduation from Norwich University of Mechanical Engineering with Suma Cum Laude
- Member of Tau Beta Pi Association, the engineering honor society that represents engineers of all disciplines
- Master of Science in Nuclear Engineering at Texas A&M University of Graduated with honor.
- Licensed Engineer in Civil Engineering by Human Resources Development Service of Korea

Signature

Approval by

- Project Manager/LXFB123876 REPLACE MUNITIONS STRUCTURES KADENA AMMO STORAGE ANNEX SITE #1 KADENA AIR BASE, OKINAWA, JAPAN

5.2 Material Properties_ Stainless Steel 361L

Chemical Composition of Stainless Steel 316 316L

Grade		C	Mn	Si	P	S	Cr	Mo	Ni	N
316	Min.	≤0.08	≤2.00	≤1.00	≤0.035	≤0.03	16.0-18.5	2.0-3.0	10.0-14.0	-
316L	Max.	≤0.03	≤2.00	≤1.00	≤0.045	≤0.03	16.0-18.0	2.0-3.0	10.0-14.0	-

316	316L
The tensile strength (MPa) was 620 MIN	Tensile strength σb (MPa) : ≥480
The yield strength (MPa) was 310 MIN	Conditional yield strength σ0.2 (MPa) : ≥177
Elongation rate (%) 30 MIN	Elongation Δ5 (%) : ≥40
Area reduction (%) 40 MIN	Section shrinkage ψ(%) : ≥60
	Hardness: 187 hb or less;
	90 HRB or less;
	200 hv or less
	Density: 7.98g/cm3;
	Specific heat capacity ratio (20℃) : 0.502J/(g*K)

POSCO

Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 220308-RC01PN-0089A1-0001
Date of Issue/발행일자 : Sep., 15, 2022
Surface Finish /표면마무리 : NO.2B

Order No./계약번호 : 01S5380265
PO No./주문번호 : 01S5380265

Supplier /주문자 : SM STEEL CO., LTD.
Commodity /품명 : STS CR AP COIL

Customer /고객사 : SM STEEL CO., LTD.
Spec & Type /규격 : ASTM-A240M-316/316L

Size/치수 (㎜)	Product No. /제품번호	Quantity /수량	Weight /중량 (kg)	Heat No. /제강번호	Position	Tensile Test /인장시험 YS 0.2% (㎫)	TS	EL (%)	Hardness /경도 HRB	Division	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Mo (%)	N (ppm)
1.5x1524xC	QEB0020	1	13,959	SD56285	T	270	583	59	77.9	L	0.0184	0.376	1.065	0.0304	0.0028	16.157	10.092	2.056	133
					B	263	580	60	77.0										

*** Sub Total (010) *** 1 13,959 (kg)
** Heat Treatment ** Solution Treatment Min 1040℃ Quenching.
*** Grade Total *** 1 13,959 (kg)
*** Grand Total *** 1 13,959 (kg)

=== Last Item ===

참고(견본)용 COPY본으로서
도외의 사용을 엄격히 금지합니다
담당자: 20 . . .

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 50 ㎜(Rectangular), YP Method : 0.2 % off-set
* Division - L : Ladle Analysis

We hereby certify that the material herein has been made in accordance with the order and above specification.
No repair welding was performed to the products.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.

본 검사증명서 위.변조시 사문서 위조28형법 제231조29로 불이익을 당할 수 있으며, 본 증서는 KOLAS와 관련이 없습니다.

Surveyor To :

T.C.BAE

Chief of material testing section — Bae, Tae Chul

POSCO Pohang Works, 6262, Donghaean-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, 37877, Korea

< PAGE : 1 >

5.3 Drift Limits for Wind Loading

11.2.3 Drift Limits for Wind Loading

For lightweight metal building systems, seismic loading rarely controls the design of lateral-load-resisting framing—wind loading usually does. The model building codes are silent about lateral drift limits for wind, a fact that may reflect a lack of consensus on the matter and an understanding that such limits relate to building quality and should not be code-mandated. The guidelines are available elsewhere, however.

Since as early as 1940, a lateral deflection limit of *H*/500 has been recommended for tall buildings.[5] The authoritative *Structural Engineering Handbook*[6] states that the deflection index spectrum commonly used is 0.0015 to 0.0035 (which translates to a range of drift limits between *H*/666 to *H*/286). It includes a Weiskopf & Pickworth deflection-index guide that charts the index values as a function of the magnitude of wind loads and wind exposure. The handbook points out that engineering judgment must recognize economic values involved, and that a speculative office building might be constructed to a less stringent drift limit than a single-occupancy corporate or prestige building.

The *Building Structural Design Handbook*[7] reflects that a 0.0025 drift index (*H*/400), even from a 25-year storm, "may be appropriate for a speculative office building. On the other hand, it may be completely inappropriate for a hospital, library, or any other type of high-quality building project." It goes on to suggest that the issue may be addressed by specifying a strict limit on the drift, say *H*/500, but for the drift to be computed using a smaller design wind loading than that imposed by a 50-year storm. For example, the loading from a 10- or 25-year windstorm might be used.

A survey of structural engineers around the country by the ASCE Task Committee on Drift Control of Steel Building Structures of the ASCE Committee on Design of Steel Building Structures[8] has found that the design practices with respect to wind drift vary considerably. Most designers, however, specify drift indexes of 0.0015 to 0.003 (corresponding to the limits of *H*/666 to *H*/333) caused by a 50-year mean wind recurrence interval for all types of structures. The most commonly used wind-drift limit for low-rise structures is, again, 0.0025 (*H*/400) caused by a 50-year wind. Incidentally, the task committee felt that wind-induced drift limits should not be codified.

A commentary to Section B1.2 of ASCE 7-98[9] summarizes the Task Committee finding that the drift limits in common usage for building design are of the order of *H*/600 to *H*/400. ASCE 7 then states that smaller drift limits may be appropriate for brittle cladding. It suggests that an absolute drift limit may be needed, because some partitions, cladding, and glazing may be damaged by drifts more than $^3/_8$ in, unless special detailing is used to accommodate movement. To compute the drift, the commentary suggests using 70 percent of service wind loading computed by the procedures of ASCE 7.

11.2.4 Drift Limits in AISC Design Guide No. 3

Recognizing a dearth of serviceability criteria for metal building systems under wind loading, MBMA and AISC have published a design guide entitled *Serviceability Design Considerations for Low-Rise Buildings.*[10] The guide's eminent authors, James M. Fisher and Michael A. West, have undertaken a major effort to stimulate discussion on various serviceability topics, including drift and deflections. The guide should be read by everybody involved in structural design of low-rise buildings.

Reflecting a subjective nature of serviceability criteria, the guide's authors base many of its recommendations on their own judgment and experience. They admit that the criteria are controversial and envision the guide as a catalyst for the debate rather than a final word in the discussion. (Some metal building manufacturers, however, seem to think exactly the opposite—that no further questions remain.)

The guide uses a 10-year mean recurrence interval wind speed loading for its drift-limit criteria, rather than a 50-year loading used for strength calculations. The rationale is that 50-year storms are rare events that have little in common with day-to-day experience of buildings. Furthermore, the consequences of serviceability failures are "noncatastrophic" and should be weighted against high up-front costs required to prevent the failures. The guide states that 10-year wind pressures can be reasonably approximated by using 75 percent of the 50-year wind pressure values.

(Some other sources have also questioned the common practice of basing wind-drift calculations on the wind loads likely to return only once in 50 years. Galambos and Ellingwood,[11] for example,

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advocate using a reference period of 8 years, which represents the average period of one tenancy in an office building.)

For several types of walls, the guide proposes certain maximum limits on the magnitude of bare-frame lateral drift, horizontal deflection, and racking (lateral movement parallel to the wall). Reproduced below are the criteria for foundation-supported cladding; the guide also considers criteria for column- and spandrel-supported panels. In the following expressions, H stands for the wall height and L for the length of a supporting steel member.

The maximum recommended story drift for various materials is

$H/60$ to $H/100$ for metal panels

$H/100$ for precast concrete

$H/200$ for reinforced masonry (can be reduced to $H/100$ with proper detailing)

Where interior partitions are used, bare-frame story drift is limited to $H/500$.

The maximum recommended horizontal deflections of girts or wind columns supporting metal or masonry walls are

$L/120$ for metal panels

$L/240$, but not over 1.5 in, for masonry walls

A limit on racking of $H/500$ is recommended for column- and spandrel-supported curtain walls. Again, all these criteria are for a 10-year wind loading.

The limitations on lateral drift and horizontal deflections proposed by the guide are more liberal than those of other sources. Some engineers find it counterintuitive that the guide seems to offer a larger degree of protection to interior drywall partitions than to brittle exterior walls. The drift limits of the Guide are reprinted in the MBMA *Metal Building Systems Manual.*[12]

11.2.5 How Lateral Drift Is Computed

Prior to a discussion of the various criteria listed above, it is necessary to briefly examine how drift and horizontal deflections are calculated and what the numbers actually mean.

The total story drift is a sum of two components—the frame drift and the diaphragm displacement between the frames (Fig. 11.3). For a typical pre-engineered building with rigid frames spaced 20 to 30 ft apart and a horizontal-rod roof bracing, the diaphragm deflection component might be insignificant. At another extreme, in buildings where no roof bracing is present at all, and wind loading is distributed to frames by eave struts, the diaphragm deflections could be larger than the frames' drift. Unfortunately, the diaphragm deflection computations are occasionally neglected by some metal building designers.

The actual frame drift can be readily determined by most pre-engineered building software. For preliminary calculations, any general structural analysis computer program can be used. The approximate formula of Fig. 11.4 could be handy for rough checks of two-hinge frames with constant member sections. Naturally, the process is much more complex for rigid frames with tapered columns and beams, in which case computers are a must.

11.2.6 Lateral Drift from Gravity Loads

A discussion focused solely on the lateral drift resulting from wind or seismic loading misses one important point: frame sidesway can be caused not only by lateral loads but also by gravity loads. Many structural engineers used to the design of conventional buildings do not realize that a gable frame can have a substantial amount of "kicking out" at the roof level when loaded with snow or roof live load (Fig. 11.5). Lateral displacements at the frame knees from large snow loads could exceed story drifts caused by winds. The codes do not address the issue, probably because gable frames are largely endemic to metal building systems.

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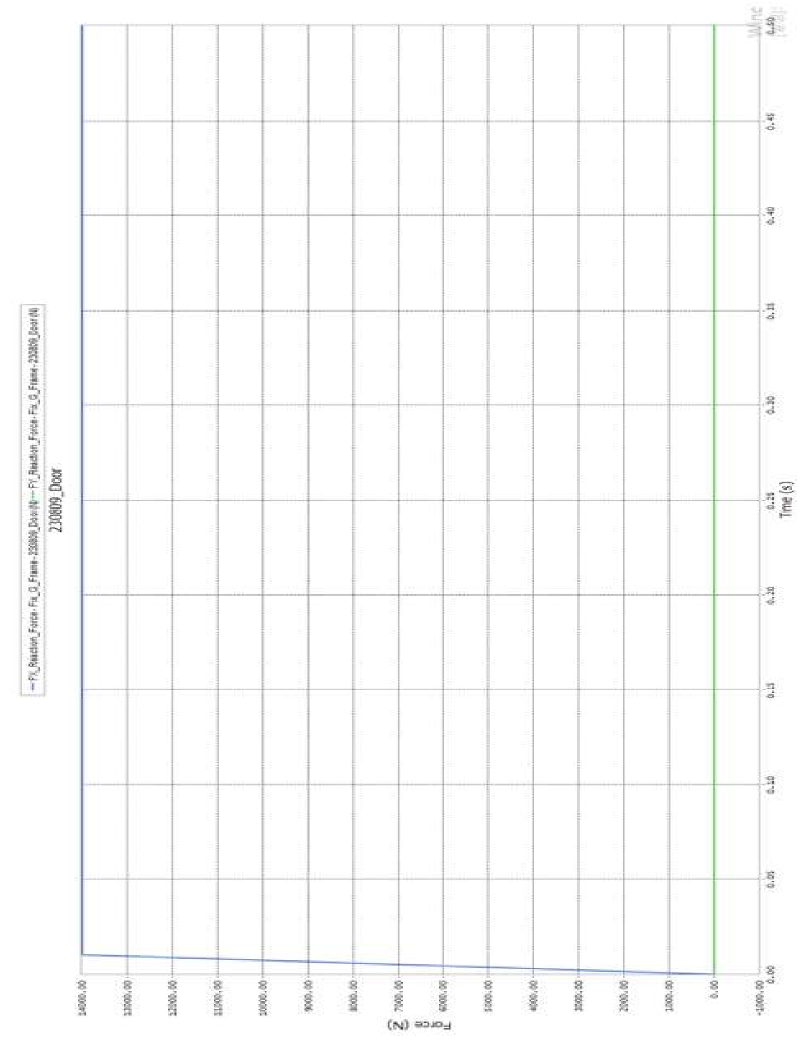
5.4 Reaction Force of door frame joint

Time	Y:FX_Reaction_Forc_Frame	Y:FY_Reaction_Forc_Frame
0	4.3716085	0.000270824
0.020253	13995.082	-0.52799798
0.040253	13995.083	-0.52800007
0.060253	13995.083	-0.52800007
0.080253	13995.083	-0.52800007
0.100253	13995.083	-0.52800007
0.120253	13995.083	-0.52800007
0.140253	13995.083	-0.52800007
0.160253	13995.083	-0.52800007
0.180253	13995.083	-0.52800007
0.200253	13995.083	-0.52800007
0.220253	13995.083	-0.52800007
0.240253	13995.083	-0.52800007
0.260253	13995.083	-0.52800007
0.280253	13995.083	-0.52800007
0.300253	13995.083	-0.52800007
0.320253	13995.083	-0.52800007
0.340253	13995.083	-0.52800007
0.360253	13995.083	-0.52800007
0.380253	13995.083	-0.52800007
0.400253	13995.083	-0.52800007
0.420253	13995.083	-0.52800007
0.440253	13995.083	-0.52800007
0.460253	13995.083	-0.52800007
0.480253	13995.083	-0.52800007
0.5	13995.083	-0.52800007



5.5 LM9300 three-point lock" Specification

Schlage, Von Duprin and Steelcraft have combined to offer a complete solution

specifically designed for severe weather

Locks, MultiPoint locks, exit devices and doors offer safety and security from tornadoes and/or hurricanes, complying with the most stringent testing standards. Tornado solutions meet the most stringent FEMA 361/FEMA 320/ICC 500 requirements, withstanding 250 mph windspeeds and 15 lb projectile impacts at 100 mph. Hurricane solutions are likewise tested to meet wind-only or wind & impact requirements for inland or coastal regions.

	Schlage MultiPoint locks	Von Duprin exit devices	Schlage locks	Steelcraft Doors
Door swing	Inswing (single and pairs) Outswing (single and pairs)	Outswing only	Outswing only (L9400 Series approved inswing/outswing)	
Application	Single or pair doors, storm shutters	Single or pair doors	Single or pair doors	
Tornado	LM9300 Series	Von Duprin WS98/9927 (pair doors), WS98/9957 (single doors)	Not applicable for tornado applications	Paladin (PW) Paladin Light (PN, PNF, PV, PVF)
Hurricane Wind & Impact	LM9300 Series (Compatible with H Series door only)	33A/35A Series, 88 Series, 98/99 Series, WS98/9927, XP98/99 Rim, 2670	AL, D, and ND Series cylindrical locks, L Series mortise locks, B600/700/800 Series deadbolts, AD/CO Series electronic locks	Hurricane (H) Hurricane Embossed (HE)
Hurricane Wind-only (non-impact)	Not required for hurricane wind-only applications	All Von Duprin exit devices	A, AL, D, and ND Series cylindrical locks, L Series mortise locks, B600/700/800 Series deadbolts, AD/CO Series electronic locks	Steel reinforced (B) Embossed (CE) Honeycomb core (L) Mineral board core (T)

SCHLAGE

Grade 1, multi-point locks

LM9300 three-point lock

Overview

The LM9300 lock provides a three-point locking system designed for tornado, hurricane, fire rated, or high security applications. Latches at the top, side and bottom of the door provide protection from high wind speeds and 15-lb. projectile impacts up to 100 mph when paired with a Steelcraft Paladin tornado-resistant door.

All three latches engage when the door is shut and retract simply by rotating the lever, providing superior protection with familiar operation. Available in six functions and with 33 lever designs, the LM9300 can easily integrate into any application and suite with other Schlage® locks, as well as Von Duprin® exit devices.

Finishes

605
Bright Brass

606
Satin Brass

609
Antique Brass

612[1]
Satin Bronze

613[1]
Oil Rubbed Bronze

619
Satin Nickel

622
Matte Black

625
Bright Chrome

626
Satin Chrome

626AM
Satin Chrome, Antimicrobial

629[2]
Bright Stainless

630[2]
Satin Stainless

630AM[2]
Satin Stainless, Antimicrobial

643e
Aged Bronze

[1] Available on standard levers only, not available on M Collection, Latitude, Longitude, Accent, Asti, or Merano
[2] Not available on Accent, Asti, or Merano

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Specifications

Chassis	
Case material	CRS with zinc dichromate plating
Case size	4 7/16" x 6 1/16" x 1" (113 mm x 154 mm x 25 mm) (chassis only)
Door thickness	1 3/4" (44 mm)
Handing	Handed to order, not field reversible
Trim	
Levers	Forged brass or bronze and cast stainless steel
Roses/ escutcheons	L full face and concealed: cold-forged brass or bronze and stainless steel N full face: heavy wrought reinforced brass or bronze and stainless steel Roses A, B, C: wrought brass or bronze and stainless steel; Roses AVA and MER: forged brass
Combinations	Available with levers only. Interior and exterior lever designs can be different. Roses cannot be combined with escutcheons.
Latch	
Backset	2 3/4" (70 mm) only
Armor	Standard: 1 1/4" x 8" x 7/32" (32 mm x 203 mm x 6 mm) Optional: 1 1/16" x 8" x 7/32" (27 mm x 203 mm x 6 mm)
Latches	3/4" (19 mm) throw stainless steel latches; top and bottom latches via concealed vertical rod
Strike	Standard: ANSI curved lip strike 1 1/4" x 4 7/8" (32 mm x 124 mm) x 1 3/16" (30 mm) lip to center with dust box Optional: Extended lip strike options (7/8", 1", 1 1/2", 1 3/4", 2")
Keying	
Cylinder format	6-pin Conventional cylinder in full face mortise housing (standard); also available in concealed mortise housing, FSIC, SFIC and 7-pin SL cylinder formats plus less cylinder options.
Keyway	Patented Everest 29 S123 (standard); also available in open, restricted, and Primus XP security levels with available master keying and construction keying.
Warranty	
	3 year limited mechanical

ALLEGION

Specifications

Certifications	
ANSI/BHMA	ANSI/BHMA A156.37-2014, Grade 1 operation and security; with FSIC Grade 2 security; with SFIC Grade 3 security
UL/cUL	UL 10C and CAN/ULC-S104 3-hour Fire Listed When furnished with the door trim and strike plate, LM9300 is intended for use on single swing doors or on the active leaf of pair doors rated up to 3 hours, with individual door leafs measuring up to and including 4' x 8' UL 437 listed when using Primus XP UL 437 cylinder
CA Fire Code	All levers with a return to door of 1/2" (64 mm) or less comply
FL Building Code	Florida Building Commission Listings
Tornado	Tornado Assembly Approvals: With Intertek Testing UL approved to FEMA 361 and FEMA 320 and ICC 500 tornado shelter guidelines when paired with Steelcraft Paladin doors and frames
Federal	BAA compliant

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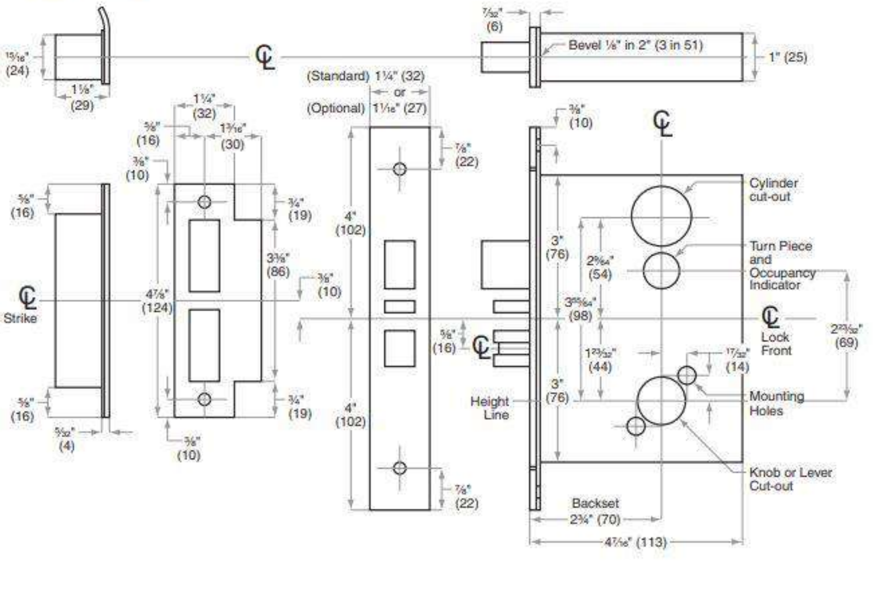
Lock dimensions

L/LV9000, LM9300



5.6 Product 2D Drawings

Drawing List

No.	Drawing No.	Drawing Title	Remark
1	SAMHOON-001	GENERAL NOTE AND HARDWARE SCHEDULE	Rev.0
2	SAMHOON-002	DOOR ELEVATION	Rev.0
3	SAMHOON-003	STAINLESS STEEL DOOR	Rev.0
4	SAMHOON-004	DOOR REINF. DETAIL	Rev.0
5	SAMHOON-005	HARDWARE LOCATION	Rev.0
6	SAMHOON-006	DOOR REINF. DETAIL	Rev.0
7	SAMHOON-007	FRAME DETAIL	Rev.0
8	SAMHOON-008	BUTT HINGE REINF. DETAIL	Rev.0
9	SAMHOON-009	DOOR DETAIL	Rev.0
10	SAMHOON-010	THREE POINT LOCKSET MORTISE LOCK REINF. DETAIL	Rev.0
11	SAMHOON-011	AUTO FLUSH BOLT REINF. DETAIL	Rev.0
12	SAMHOON-012	DOOR CLOSER REINF. DETAIL	Rev.0
13	SAMHOON-013	OVERHEAD HOLDER REINF.DETAIL	Rev.0
14	SAMHOON-014	DOOR COORDINATION REINF. DETAIL	Rev.0
15	SAMHOON-015	DOOR CLOSER(KING 900 SERIES)	Rev.0
16	SAMHOON-016	BUTT HINGE(AHG2-5040)	Rev.0
17	SAMHOON-017	Pemko 2891_PK Heavy Duty Perimeter Gasketing	Rev.0
18	SAMHOON-018	Pemko 18137_NB (DB) Door Bottom Sweep	Rev.0
19	SAMHOON-019	Pemko 154_ Saddle Threshold	Rev.0
20	SAMHOON-020	HIGH SECURITY HASP, PA/21/190/DP	Rev.0
21	SAMHOON-021	FRAME ANCHOR DETAIL	Rev.0
22	SAMHOON-022	NAME PLATE DETAIL	Rev.0

www.mhsc.co.kr
25, Gasan digital 1-ro Geumcheon-gu
Seoul Daeryng Techno Town 17Cha 1508