

INTERTEK TESTING SERVICES SHENZHEN LTD. GUANGZHOU BRANCH

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Intertek Report No. 130708006GZU-001

EVALUATION

OF

Mortise Lock, ASM-10000-01, Grade 1 FOR

Angel Metal Co., Ltd

#1099 Woram-Dong, Dalseo-Gu, Daegu, South Korea

TEST STANDARD:

Per applicant's specifications, using the following standard as a guideline: ANSI/BHMA A156.13 - 2012 Mortise Locks and Latches

SAMPLES:

Samples were identified by the applicant as <u>Mortise Lock, Model ASM-10000-01, Grade 1.</u> Samples were received in good condition on <u>July 6, 2013,</u> which manufactured by Angel Metal Co., Ltd.

TEST DATES:

July 6, 2013 to October 22, 2013

RESULTS:

Compliant

Subsection	Test Description	Test Results
8	Operational Tests	Compliant
9	Cycle Tests	Compliant
10	Strength Tests	Compliant
11	Material Evaluation Tests	Compliant
12	Security Tests	Compliant

The attached summary and data are results of the product testing and evaluation.

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Intertek

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Test Results

Model	Series	Function	Grade	Trim	Finish	Base Material
ASM-10000-01	1000	F13	1	Knob/Turn/Key	SS	Stanless Steel

- 8 Operational Tests
- 8.1 Dead Bolt Torque
- 8.1.1 Torque to Retract Dead Bolt or Torque to Retract Dead Bolt and Latch Bolt by Turn (lbf-in)

Compliant

CCW

Specimen # 001		Specimen # 002		Specimen # 003		Maximum Allowable	
Initial	50%	Initial	50%	Initial	50%	Initial	50%
1.9	2.3	2.1	2.5	1.9	2.3	9.0	11.0

8.1.2 Torque to Retract Dead Bolt or Torque to Retract Dead Bolt and Latch Bolt by Key (lbf-in)

Compliant

Key Direction CW CCW

Specimen # 001		Specimen # 002		Specimen # 003		Maximum Allowable	
Initial	50%	Initial	50%	Initial	50%	Initial	50%
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.1	2.7	2.7	3.2	2.3	2.7	9.0	11.0

8.2 Force or Torque to Retract Latch Bolt or Latch Bolt and Dead Bolt

8.2.1 Knob or Lever (lbf-in)

Compliant

Outside CW
Outside CCW
Inside CW
Inside CCW

Specimen	# 001	- '		Specimen # 003		Maximum Allowable	
Initial	50%	Initial	50%	Initial	50%	Initial	50%
7.6	7.8	7.4	7.8	7.3	7.6	9.0	11.0
7.8	8.0	7.6	8.0	7.4	7.8	9.0	11.0
6.2	7.2	7.6	7.8	7.6	7.8	9.0	11.0
6.9	7.3	7.4	7.6	7.3	7.4	9.0	11.0

8.2.2 Entry Handleset Thumb Piece Force (lbf)

Not Applicable

	Specimen # 001		Specimen # 002		Specimen	# 003	Maximum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Outside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

8.2.3 Paddle Force (lbf)

Not Applicable

	Specimen # 001		Specimen # 002		Specimen # 003		Maximum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Outside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

8.3 Force to Latch Door - Force (lbf (N))

Compliant

	Specimen # 001		Specimen # 002		Specimen	# 003	Maximum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
ĺ	2.5	2.8	2.7	2.8	2.7	2.9	4.5	5.4

8.4 Torque to Retract Latch Bolt by Key (lbf-in)

Compliant

Key	
Direction	
CW	
CCW	

Specimen # 001 Specimen :		en # 002 Specimen # 003		Maximum Allowable			
Initial	50%	Initial	50%	Initial	50%	Initial	50%
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.0	3.9	2.7	4.2	3.2	3.9	9.0	11.0

8.5 Minimum Projection of Latch Bolt when Depressed to Dead Latched Position (in)

Compliant

Specimen # 001		Specimen # 002		Specim	en # 003	Minimum Allowable	
Initial	50%	Initial	50%	Initial	50%	Initial	50%
0.589	0.511	0.583	0.531	0.581	0.529	0.563	0.453

^{*}Latchbolt deadlatches when deadbolt is extended.

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8.6 Minimum Projection of Auxiliary Dead Latch to Dead Lock Latch Bolt (in)

pjection of Auxiliary Dead Latch to Dead Lock Latch Bolt (in)						Not	Applicable
Specimen # 001 Specimen # 002 Specimen # 003			Minimum	Allowable			
Initial	50%	Initial	50%	Initial	50%	Initial	50%
N/A N/A N/A N/A N/A					N/A	N/A	

8.7 Warped Door Test 50 lbf (222 N) Applied to Door, Measure Torque to retract.

8.7.1 Turn or Key Compliant

	Specime	en # 001	Specime	en # 002	Specim	en # 003	Maximum	Allowable
	Torque	(lbf-in)	Torque	(lbf-in)	Torque	e (lbf-in)	Torque	(lbf-in)
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Key CW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Key CCW	26.6	31.0	27.4	31.9	28.3	31.0	33.0	40.0
Turn CW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Turn CCW	2.1	2.7	2.3	2.8	2.1	3.2	33.0	40.0

8.7.2 Lever, Knob or Thumb piece

Compliant

	Specimen # 001		Specime	Specimen # 002		Specimen # 003		Maximum Allowable	
	Torque (lbf-in)		Torque (lbf-in)		Torque (lbf-in)		Torque (lbf-in)		
	Initial	50%	Initial	50%	Initial	50%	Initial	50%	
Outside CW	31.0	33.6	31.9	33.6	30.1	34.5	45.0	54.0	
Outside CCW	31.9	32.7	30.1	32.7	31.0	33.6	45.0	54.0	
Inside CW	30.1	33.6	31.0	31.9	31.9	32.7	45.0	54.0	
Inside CCW	31.0	34.5	31.9	33.6	30.1	31.9	45.0	54.0	

8.7.3 Entry Handleset Thumb Piece Force (lbf)

Not Applicable

	Specimen # 001		Specime	Specimen # 002		Specimen # 003		Maximum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%	
Outside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Inside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

8.7.4 Paddle Force (lbf)

Not Applicable

11017 (ppiloable								
	Specime	en # 001	Specimen # 002		Specimen # 003		Maximum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Outside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

9 Cycle Tests

Compliant

Rotation	Counter Reading	Date	Technicians Initials
CW	0	2013-7-13	Credy Chen
CW	76,005	2013-7-15	Credy Chen
CW	146,976	2013-7-17	Credy Chen
CW	250,000	2013-7-20	Credy Chen
CCW	366,013	2013-7-24	Credy Chen
CCW	431,562	2013-7-26	Credy Chen
CCW	500,000	2013-7-28	Credy Chen
CW	567,595	2013-7-30	Credy Chen
CW	634,497	2013-8-1	Credy Chen
CW	750,000	2013-8-5	Credy Chen
CCW	828,646	2013-8-7	Credy Chen
CCW	897,321	2013-8-9	Credy Chen
CCW	965,234	2013-8-11	Credy Chen
CCW	1,000,000	2013-8-12	Credy Chen

0.6 Do the locks function as originally intended?	Yes	
Comments:		

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10 Strength Tests

10.1 Locked Outside Lever or knob Torque Tes	(Repeat in the opposite direction f	for knob only) Compliant
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	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
Outside CW	300	300	300	300
Outside CCW	300	300	300	300

10.2 Axial Load Test

10.2.1 Lever or Knob at the Spindle Axis

Compliant

	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	500	500	500	500
Inside	500	500	500	500

10.2.2 Outside Lever Load 2 inches from Spindle

Not applicable

	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	N/A	N/A	N/A	N/A

10.2.3 Entry Handlesets Locked Outside Thumbpiece Load

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Test Load
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	N/A	N/A	N/A	N/A

10.2.4 Locked Outside Paddle Load

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Test Load
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside at Axle	N/A	N/A	N/A	N/A
Outside at 2" from Axle	N/A	N/A	N/A	N/A
Inside at Axle	N/A	N/A	N/A	N/A
Inside at 2" from Axle	N/A	N/A	N/A	N/A

10.3 Vertical Load Test

10.3.1 Vertical Load Test Lever or Knob

Compliant

	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	360	360	360	360
Inside	360	360	360	360

Vertical Load Test Paddles - Test one mounted horizontally and one mounted vertically.

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Horizontal Outside	N/A	N/A	N/A	N/A
Horizontal Inside	N/A	N/A	N/A	N/A
Vertical Outside	N/A	N/A	N/A	N/A
Vertical Inside	N/A	N/A	N/A	N/A

10.3.2 Vertical Load Test Entry Handlesets

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Test Load
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	N/A	N/A	N/A	N/A

10.4 Bolt strength Test

Compliant

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Latch Bolt	1200	1200	1200	1200
Dead Bolt	1350	1350	1350	1350

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10.5 Unlocked Outside Lever or Knob Torque Test

Compliant

	Specimen #004	Specimen #005	Specimen #006	Minimum Allowable
	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
Outside CW	300	300	300	300
Outside CCW	300	300	300	300
Inside CW	300	300	300	300
Intside CCW	300	300	300	300

10.6 Unlocked Entry Handleset Load Test

Not applicable

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A

- 10.7 Qualification Requirements
- 8.1 Dead Bolt Torque
- 8.1.1 Torque to Retract Dead Bolt or Torque to Retract Dead Bolt and Latch Bolt by Turn (lbf-in)

Compliant

Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
2.1	1.9	2.0	11.0

8.1.2 Torque to Retract Dead Bolt or Torque to Retract Dead Bolt and Latch Bolt by Key (lbf-in)

Compliant

Key
Direction
CW
CCW

Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
N/A	N/A	N/A	N/A
4.4	4.6	4.6	11.0

8.2 Force or Torque to Retract Latch Bolt or Latch Bolt and Dead Bolt

8.2.1 Knob or Lever (lbf-in)

Compliant

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
Outside CW	7.8	7.6	7.7	11.0
Outside CCW	8.0	7.8	7.8	11.0
Inside CW	8.1	8.1	7.9	11.0
Inside CCW	7.8	8.0	7.8	11.0

8.2.2 Entry Handleset Thumb Piece Force (lbf)

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
Outside	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A

8.2.3 Paddle Force (lbf)

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable	
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)	
Outside	N/A	N/A	N/A	N/A	
Inside	N/A	N/A	N/A	N/A	

8.3 Force to Latch Door - Force (lbf (N))

Compliant

Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)
2.8	2.7	2.7	5.4

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8.4 Torque to Retract Latch Bolt by Key (lbf-in)

Compliant

Key
Direction
CW
CCW

Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
N/A	N/A	N/A	N/A
4.6	4.8	4.6	11.0

8.5 Minimum Projection of Latch Bolt when Depressed to Dead Latched Position (in)

Compliant

Specimen #004	Specimen #004 Specimen #005		Minimum Allowable	
Projection (in.)	Projection (in.)	Projection (in.)	Projection (in.)	
0.521	0.526	0.511	0.453	

^{*}Latchbolt deadlatches when deadbolt is extended.

8.7 Warped Door Test 50 lbf (222 N) Applied to Door, Measure Torque to retract.

8.7.1 Turn or Key

Compliant

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
Key CW	N/A	N/A	N/A	N/A
Key CCW	28.3	29.2	28.3	33.0
Turn CW	N/A	N/A	N/A	N/A
Turn CCW	2.1	2.3	2.1	33.0

8.7.2 Lever, Knob or Thumb piece

Compliant

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable
	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)	Torque (lbf-in)
Outside CW	31.9	33.6	33.6	45.0
Outside CCW	32.7	31.9	34.5	45.0
Inside CW	31.9	32.7	31.9	45.0
Inside CCW	33.6	33.6	32.7	45.0

8.7.3 Entry Handleset Thumb Piece Force (lbf)

Not Applicable

	Specimen #004	Specimen #005	Specimen #005 Specimen #006	
	Force (lbf)	Force (lbf)	Force (lbf)	Maximum Allowable Force (lbf)
Outside	(- /	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A

8.7.4 Paddle Force (lbf)

Not Applicable

	Specimen #004	Specimen #005	Specimen #006	Maximum Allowable	
	Force (lbf)	Force (lbf)	Force (lbf)	Force (lbf)	
Outside	N/A	N/A	N/A	N/A	
Inside	N/A	N/A	N/A	N/A	

11 Material Evaluation Tests

11.1 Knob Crush Test

Sample #007

Compliant

Grade 1

Base Material Stainless Steel

Compression Load 1000 lbf

Deformation		Recorded Deformation (%)	Maximum Allowable (%)	
Outside Knob		0.09		
Inside Knob		0.04	10	
		Measured Torque (lbf-in)	Maximum Allowable (lbf-in)	
Key Torque	CW	N/A	N/A	
at Test Compression	CCW	N/A	N/A	

Comments:			
_			

11.2 F	Rose/Escuto	cheon Dent Test		Sa	mple # 008	
G	Grade	1				
		Measured Depth (in)	Maximum Depth Allo	wable (in)	Compliant / N	on Compliant
Ir	nside	0.011	0.075	` '	Comp	oliant .
C	Outside	0.009	0.075		Comp	oliant
11.3 C	Outside Ros	se Deformation Test		Sa	ample #009	Complian
G	Grade	1 Ba	se Material Stainless s			
		Compression Load (lbf)	Deformation	Defo	rmation Maximum	n Allowable
C	Dutside	650	0.04%		10%	
C	Comments:					
	Security Tes Knob, Lever	sts r, Handleset Thumbpied	ce, or Paddle Impact To	est Sa	ample #010	Compliar
lr	mpact	75lbf-ft(100J) 10 Blow	S Operable Inoperable	Х		Entry X

	a screw driver or by hand within 5 minutes.						
	Cylinder Guard (Sectional Trim) or Escutcheon ImpactTest			Sample #	Not applicable		
	Impact		Operable Inoperable		Entry Non-Entry		
	Comments:	The cylinder guard	projects 0.313", not over 3/8" from		٠,		
12.3	Cylinder Guard (Sectional Trim) or Escutcheon Tension Test			Sample #011	Compliant		
	Tension	3600 lbf	Operable		Entry		

	Inoperable	Х	_	Non-Entry	X
Comments:					
2.4 Lock Body or Housing Tension Test		(Sample #012		Complian
Tension 3600 lbf	Operable		_	Entry	
	Inoperable	Χ	<u></u>	Non-Entry	X
Comments:					
2.5 Lock Body or Housing Torque Test		(Sample #013		Complian
Torque 120 ft-lbf	Operable		_ ·	Entry	•
	Inoperable	Χ	_ _	Non-Entry	Х
Comments:					

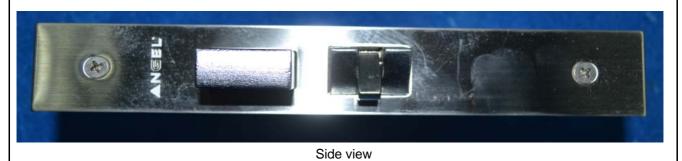
12.6		ed Knob or Lever.			Sample #014		Compliant
A	Torque ctual Torque	120 ft-lbf 75 ft-lbf	Ope Inope	rable X	_ _ _	Entry Non-Entry	X
		when the torque reached driver or by hand within	F'. (nob was destry			-
,		ed Paddle		rable rable	<u> </u>	Not Entry Non-Entry	
12.7	Torque Comments:	nard (Sectional Trim) or Es N/A The attempted torque ca	Oper Inoper an not be achie	rable X rable ved due to the	design featur	Entry Non-Entry es.	X
12.8	Impact	ce Impact Test 75lbf-ft (100J) 10 Blows		rablex		Entry Non-Entry	Compliant X
12.9		2 blows of 60 lbf-ft plus 2 blows of 90 lbf-ft plus 2 blows of 120 lbf-ft plus 2 Blows of 150 lbf-ft	Ope Inope	•	Sample #0117 		Compliant X
12.10	Width of De Thickness of	Sawing Test - All Grades - ead Bolt of Dead Bolt The dead bolt was not sa	1.12" 0.51"	Time:	Sample #018 more than 8	5 minutes	Compliant
12.11	•	essive Load Test Latch Bolt: 360 lbf Dead Bolt: 600 lbf			Sample # 019		Compliant
	Comments: After test, the Latch Bolt projects: 0.501"; Deadbolt projects:0.984"						

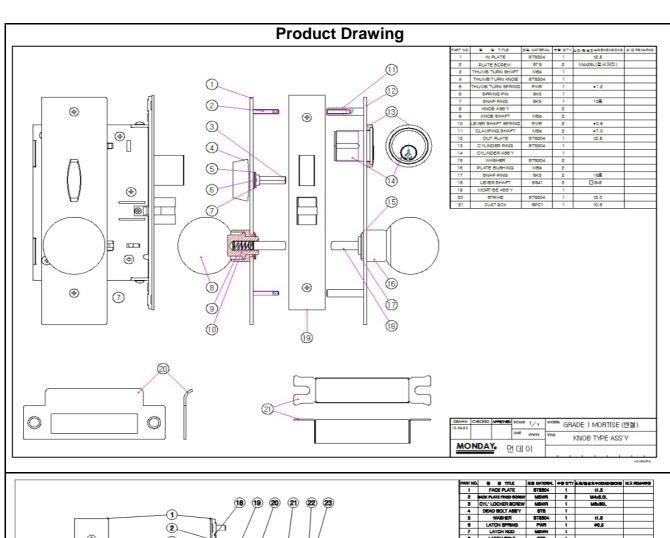
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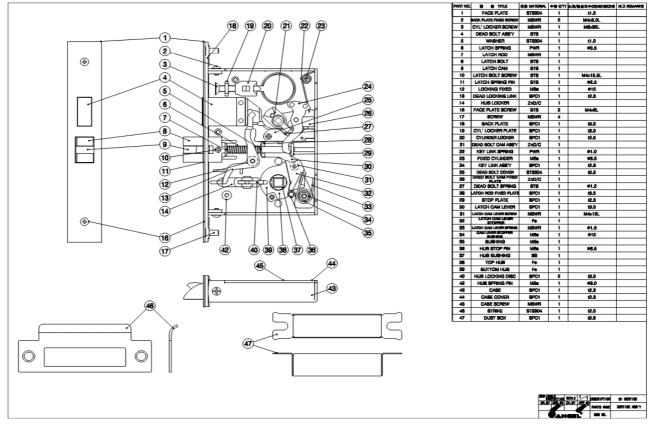
Product photos



Components







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Revision Page

Revision No.	Date	Changes	Author	Reviewer	
Original	6-Nov-2013	First issue	Credy Chen	Blusea Dong	
1.0	6-Nov-2013	Revised model name from 'ASM- 10000-1' to 'ASM-10000-01'			

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