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Intertek Test Report GZ12010693-1

EVALUATION
OF
AGK-7000, Cylindrical lock, knob, Grade 2
FOR
ANGEL METAL CO., LTD.
#1099, WORAM-DONG, DALSEO-GU, DAEGU, SOUTH KOREA

TEST STANDARD:
Per customer's specifications, using the following standard as a guideline: ANSI/BHMA A156.2 - 2011 "American National Standard for Bored and Preassembled Locks & Latches".

SAMPLES:
Samples were identified by the client as AGK-7000, Cylindrical lock, knob, Grade 2.
Samples were received in good condition on January 13, 2012 from ANGEL METAL CO., LTD.
Testing was conducted at Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

TEST DATES:
From January 18, 2012 to February 21, 2012.

RESULTS: COMPLIANT

Subsection	Test Description	Initial Test Results	Retest Test Results
9	Operational Tests	Compliant	N/A
10	Strength Tests	Compliant	N/A
11	Cycle Tests	Compliant	N/A
12	Security tests	Compliant	N/A
13	Material Evaluation Tests	Compliant	N/A

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

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TEST RESULTS
ANSI/BHMA A156.2-2011 AMERICAN NATIONAL STANDARD FOR BORED AND PREASSEMBLED LOCKS AND LATCHES

Model	Series	Function	Grade	Trim	Finish	Base Material
AGK-7000	4000	F82A	2	Knob	—	—

Date Started: 2012-1-18 Date Completed: 2012-2-21

9 Operational Tests

9.1 Force to Retract Unloaded Bolt Compliant/Non: Compliant

9.1.1 Torque to retract latch bolt by lever - Maximum (lbf in.)

9.1.2 Torque to retract latch bolt by knob - Maximum (lbf in.)

Knob/Lever Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Outside CW	7.1	8.3	6.9	7.4	6.7	6.9	9.0	11.0
Outside CCW	6.9	8.1	6.7	7.6	6.5	7.6	9.0	11.0
Inside CW	7.4	7.4	7.3	8.1	6.9	7.1	9.0	11.0
Inside CCW	7.8	8.0	7.1	8.3	6.7	8.1	9.0	11.0

Comments:

9.1.3 Force to retract latch bolt with Thumbpiece (lbf) Compliant/Non: Not applicable

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

Comments: No thumb piece.

9.1.4 Force to retract latch bolt by Paddle (lbf) Compliant/Non: Not applicable

Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Inside Force	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Outside Force	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments: No paddle.

9.1.5 Torque to retract latch bolt by key, with deadlatch depressed (lbf-in). Compliant/Non: Not applicable

Key Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
CW	6.4	7.3	6.5	7.4	6.9	7.3	9.0	11.0
CCW	6.5	7.8	6.5	7.6	6.7	7.4	9.0	11.0

Comments:

9.1.6 Torque to retract latch bolt by turn. (lbf-in) Compliant/Non: Not applicable

Turn Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
CW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments: No turn.

9.2 Force to Retract Preloaded Bolt. (Warped Door) (lbf in.) with 50 lb load applied
Repeat 9.1.1 - 9.1.4

9.1.1 Torque to retract latch bolt by lever - Maximum (lbf in.)

9.1.2 Torque to retract latch bolt by knob - Maximum (lbf in.)

Compliant/Non: Compliant

Knob/Lever Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Outside CW	21.2	37.2	18.6	24.8	22.1	28.3	45.0	54.0
Outside CCW	23.9	32.7	20.4	23.9	23.0	30.1	45.0	54.0
Inside CW	21.2	38.1	19.5	23.0	22.1	31.9	45.0	54.0
Inside CCW	18.6	42.5	18.6	25.7	21.2	33.6	45.0	54.0

Comments:

9.1.3 Force to retract latch bolt with Thumbpiece (lbf) Compliant/Non: Not applicable

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

Comments: No thumb piece.

9.1.4 Force to retract latch bolt by Paddle (lbf) Compliant/Non: Not applicable

Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Inside Force	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Outside Force	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments: No paddle.

9.1.5 Torque to retract latch bolt by key, with deadlatch depressed (lbf-in). Compliant/Non: Compliant

Key Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
CW	21.2	19.5	23.0	19.5	22.1	19.5	33.0	33.0
CCW	22.1	20.4	21.2	21.2	21.2	18.6	33.0	33.0

Comments:

9.1.6 Torque to retract latch bolt by turn. (lbf-in) Compliant/Non: Not applicable

Turn Direction	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
CW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments: No turn.

9.3 Latch Bolt Projection Minimum (in.) when depressed to dead latched position. Compliant/Non: Compliant

	Specimen #001		Specimen #002		Specimen #003		Minimum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Projection	0.392	0.349	0.387	0.350	0.384	0.388	0.250	0.203

Comments:

9.4 Dead Latch or Aux. Latch Projection (in.) at first effective dead locking of latch bolt. Compliant/Non: Compliant

	Specimen #001		Specimen #002		Specimen #003		Minimum Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Projection	0.235	0.202	0.230	0.189	0.233	0.221	0.219	0.172

Comments:

9.5 Force to latch door (lbf) Compliant/Non: Compliant

Force	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
	Initial	50%	Initial	50%	Initial	50%	Initial	50%
Unlocked	3.4	3.5	3.4	3.4	3.2	3.4	4.5	5.4
Locked	3.3	3.5	3.3	3.3	3.3	3.4	4.5	5.4

Comments:

10 Strength Tests

10.1 Locked Torque Test

Compliant/Non: Compliant

Knob/Lever Direction	Specimen #004	Specimen #005	Specimen #006	Test Torque Minimum (lbf-in)
Outside CW	150	150	150	150
Outside CCW	150	150	150	150

Comments: By knob. Grade 2.

10.2 Axial Load Test - Minimum (lbf)

Compliant/Non: Compliant

Knob/Lever	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	300	300	300	300
Inside	300	300	300	300

Comments: By knob. Grade 2.

10.2.2 Lever Load 2 inches from Spindle (lbf)

Compliant/Non: Not applicable

Knob/Lever	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	N/A	N/A	N/A	N/A
Inside	N/A	N/A	N/A	N/A

Comments: For lever lock only.

10.2.3 Entry Handleset, outside thumb piece

Compliant/Non: Not applicable

Thumb Piece	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	N/A	N/A	N/A	N/A

Comments: For handleset only.

10.3 Vertical Load Test - Minimum (lbf)

Compliant/Non: Compliant

Knob/Lever	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	250	250	250	250
Inside	250	250	250	250

Comments: By knob. Grade 2.

Locked Outside Thumb piece Load Compliant/Non: Not applicable

Thumb Piece	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	N/A	N/A	N/A	N/A

Comments: No thumb piece.

Paddle Load Compliant/Non: Not applicable

Paddle Mount	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Vertical	N/A	N/A	N/A	N/A
Horizontal	N/A	N/A	N/A	N/A

Comments: No paddle.

10.4 Latch Bolt Strength - Minimum (lbf) Compliant/Non: Compliant

	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Load	800	800	800	800

Comments: Grade 2.

10.5 Latch Bolt End Pressure - Minimum (lbf) Compliant/Non: Compliant

	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Load	100	100	100	100

Comments: Grade 2.

10.6 Unlocked Outside Lever or Knob Torque Test - Compliant/Non: Compliant
downward for levers, clockwise for knobs

Unlocked Knob/Lever	Specimen #004	Specimen #005	Specimen #006	Test Torque Minimum (lbf-in)
Load	150	150	150	150

Comments: By knob. Grade 2.

10.7 Unlocked Entry Handleset Load Test Compliant/Non: Not applicable

Unlocked Handleset	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Load	N/A	N/A	N/A	N/A

Comments: For handleset only.

10.8 Qualification Requirements Compliant/Non: Compliant

9.1 Force to Retract Unloaded Bolt Compliant/Non: Compliant

9.1.1 Torque to retract latch bolt by lever - Maximum (lbf in.)

9.1.2 Torque to retract latch bolt by knob - Maximum (lbf in.)

Knob/Lever Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
Outside CW	7.2	7.3	7.4	11.0
Outside CCW	7.4	7.6	7.6	11.0
Inside CW	7.6	7.6	7.7	11.0
Inside CCW	8.0	7.8	8.0	11.0

Comments:

9.1.3 Force to retract latch bolt with Thumbpiece (lbf) Compliant/Non: Not applicable

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

Comments: No thumb piece.

9.1.4 Force to retract latch bolt by Paddle (lbf) Compliant/Non: Not applicable

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

Comments: No paddle.

9.1.5 Torque to retract latch bolt by key, with deadlatch depressed. (lbf-in) Compliant/Non: Not applicable

Key Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
CW	6.5	6.7	6.5	11.0
CCW	6.5	6.9	6.5	11.0

Comments:

9.1.6 Torque to retract latch bolt by turn. (lbf-in) Compliant/Non: Not applicable

Turn Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
CW	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A

Comments: No turn.

9.2 Force to Retract Preloaded Bolt (Warped Door) (lbf in.) with 50 lb load applied
Repeat 9.1.1 - 9.1.4

9.1.1 Torque to retract latch bolt by lever - Maximum (lbf in.)

9.1.2 Torque to retract latch bolt by knob - Maximum (lbf in.)

Compliant/Non: Compliant

Knob/Lever Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
Outside CW	23.0	20.4	22.1	45.0
Outside CCW	23.9	21.2	23.9	45.0
Inside CW	23.0	23.0	23.0	45.0
Inside CCW	20.4	23.9	21.2	45.0

Comments:

9.1.3 Force to retract latch bolt with Thumbpiece (lbf) Compliant/Non: Not applicable

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

Comments: No thumb piece.

9.1.4 Force to retract latch bolt by Paddle (lbf) Compliant/Non: Not applicable

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

Comments: No paddle.

9.1.5 Torque to retract latch bolt by key, with deadlatch depressed. (lbf-in) Compliant/Non: Compliant

Key Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
CW	19.5	23.0	21.2	33.0
CCW	20.4	22.1	20.4	33.0

Comments:

9.1.6 Torque to retract latch bolt by turn. (lbf-in) Compliant/Non: Not applicable

Turn Direction	Specimen #004	Specimen #005	Specimen #006	Maximum Allowed Torque (lbf-in)
CW	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A

Comments: No turn.

9.3 Latch Bolt Projection Minimum (in.) Compliant/Non: Compliant
when depressed to dead latched position.

	Specimen #004	Specimen #005	Specimen #006	Minimum (inches)
Projection	0.323	0.327	0.326	0.250

Comments:

Lever can not deflect 3/8", nor can it touch the door with 25lbf at 2" from spindle. Compliant/Non: Not applicable

	Specimen #004	Specimen #005	Specimen #006	Standard
Lever Deflection (in)	N/A	N/A	N/A	N/A
Did lever touch the door? (Y/N)	N/A	N/A	N/A	N/A

Comments: For lever lock only.

The lever rotational position shall be within 22.5 degrees of the original resting position.
Grade 1 only Compliant/Non: Not applicable

	Specimen #004	Specimen #005	Specimen #006	Standard
Lever rotation	N/A	N/A	N/A	22.5 degrees

Comments: For grade 1 lever lock only.

11 Cycle Test 3 samples Compliant/Non: Compliant

Rotation	Counter Reading	Date	Technician's Initials
CW	0	2012-1-18	Jackie
CW	421,051	2012-1-19	Jackie
CW	842,106	2012-1-20	Jackie
CCW	100,003	2012-1-21	Jackie
CCW	143,610	2012-1-30	Jackie
CCW	183,335	2012-1-31	Jackie
CW	223,430	2012-2-1	Jackie
CW	265,123	2012-2-2	Jackie
CCW	305,202	2012-2-3	Jackie
CCW	344,512	2012-2-4	Jackie
CCW	381,592	2012-2-5	Jackie
CCW	400,000	2012-2-6	Jackie

11.5 Performance After Cycle Test Compliant/Non: Compliant

Are locks operative in all respects including dead locking of the latch b Yes ×
No

Comments:

11.6 Cylinder Cycle Test - 1 sample Compliant/Non: Compliant

Rotation	Counter Reading	Date	Technician's Initials
—	0	2012-2-17	Credy
—	20,000	2012-2-18	Credy

Are locks operative in all respects including dead locking of the latch bolt? Yes × No

Comments:

12 Security Tests

12.1 Dead Latch and Strike Impact Test

Compliant/Non: Compliant
Sample No.: #008
Impacts 2 @ 60 FT-LBF grade 3 plus
2 @ 90 FT-LBF grade 2 plus
2 @ 120 FT-LBF grade 1
Entry
Non-Entry ×

Comments: Two blows of 60 ft-lbf and two blows of 80 ft-lbf for grade 2.

12.2 Abusive Locked Lever Test - Outside Locked Levers - Grade 1 only

Compliant/Non: Not applicable
Sample No.:

Load	Torque Applied
1200 in-lbs	

Entry Non-Entry

	Measured (in.)	Minimum (in.)
9.3 Dead Latch Projection:		
9.4 Aux. Projection to Dead Latch:		

Comments: For grade 1 lever lock only.

12.3 Locked Lever or Paddle Vertical Impact Test Grade 1 only

Compliant/Non: Not applicable
Sample No.:
Impacts 5 @ 12 INCHES
Entry
Non-Entry

Paddle Mount	Measured Inside Paddle Force	Inside Paddle Force Max.
Vertical		48
Horizontal		48

Comments: For grade 1 lever or paddle lock only.

12.4 Locked Cylinder in the Lever Face Impact Test Compliant/Non: Not applicable

Grade 1 only Sample No.:

Impacts	mpacts Conducte
5 @ 60 ft-lbs	

Entry

Non-Entry

Comments: For grade 1 lever lock only.

12.5 Locked Lever or Knob Catch Attack Test Compliant/Non: Compliant

Sample No.: #009

	Catch Force (lbf)	Axial Force (lbf)
Applied Force	50	100

Entry

Non-Entry ×

Comments: The knob can not be removed.

12.6 Cylinder Assembly Pulling Test Compliant/Non: Compliant

Grade 1: Tension 500 lbf Measured Tension: 300 lbf Sample #010

Grade 2: Tension 300 lbf

Grade 3: Tension 250 lbf Operable Entry

Grade achieved: 2 Inoperable × Non-Entry ×

Comments

12.7 Cylinder Assembly Torque Test Compliant/Non: Compliant

Grade 1: Torque 300 lbf-in Measured Torque: 150 lbf-ft Sample #011

Grade 2: Torque 150 lbf-in

Grade 3: Torque 120 lbf-in Operable Entry

Grade achieved: 2 Inoperable × Non-Entry ×

Comments

13 Material Evaluation Tests

13.1 Knob Crush Test

Compliant/Non: Compliant

Compression Load: 1000 lbf

Sample No.: #012

Deformation	Initial Diam.	Final Diam.	%	Max Allowable (%)
Outside Knob	2.238	2.231	0.3%	25.0%
Inside Knob	2.236	2.229	0.3%	25.0%

		Measured (lbf-in)	Maximum Allowable (lbf-in)
Key Torque-At Test Completion	CW	7.6	11
	CCW	7.1	11

Comments:

13.2 Rose Assembly Dent Test

Compliant/Non: Compliant

Drop an 8 ounce projectile from a height of 12" in a drop tube

Sample No.: #013

	Measured Depth (in)	Max. Depth Allowable (in)
Inside	0.014	0.100
Outside	0.022	0.100

Comments:

13.3 Outside Rose Deformation Test

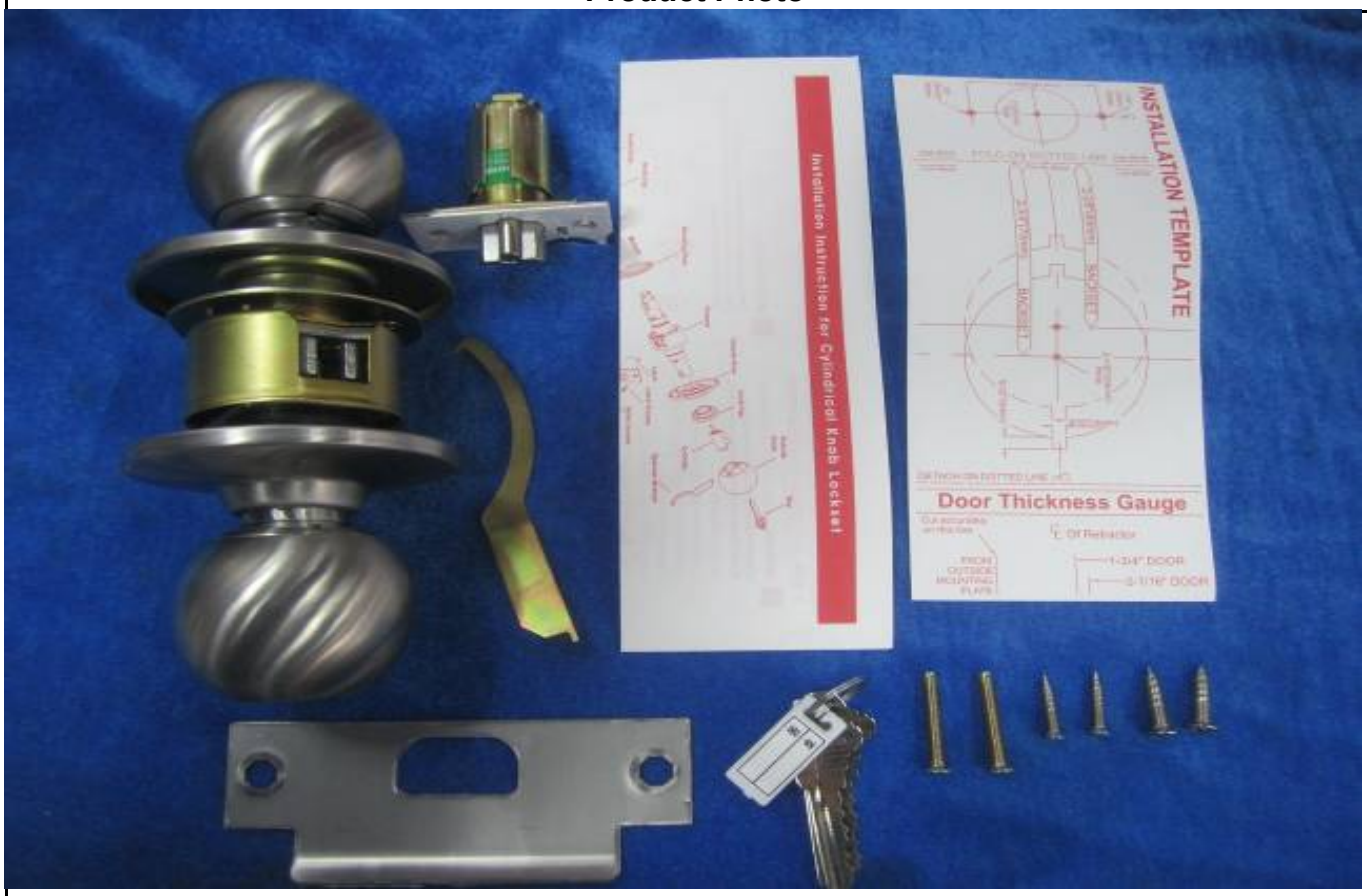
Compliant/Non: Compliant

Sample No.: #014

Initial Rose Width (in)	Load (lbf)	Final Rose Width (in)	Min. Allowable (in)
3.148	560	3.059	2.833

Comments:

Product Photo



Product Drawing