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**Intertek Test Report 141204028GZU-002**

EVALUATION  
OF

**Cylindrical Knob Lockest, AGK-1000, Grade 2**

FOR

**ASSA ABLOY KOREA\_ANGEL METAL.**

131, Seongseo4chacheomdan-ro, 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 Cylindrical Knob Lockest, AGK-1000, Grade 2. Samples were received in good condition on December 3, 2014 from ASSA ABLOY KOREA ANGEL METAL.

Testing was conducted at Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

**TEST DATES:**

From December 10, 2014 to January 20, 2015.

**RESULTS:**

COMPLIANT

<b>Subsection</b>	<b>Test Description</b>	<b>Initial Test Results</b>	<b>Retest Test Results</b>
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-1000	4000	F109	2	key/knob	—	—

Date Started: 2014-12-10 Date Completed: 2015-1-20

**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	5.7	6.7	5.8	7.3	6.0	7.1	9.0	11.0
Outside CCW	6.5	7.3	6.4	7.4	5.0	6.7	9.0	11.0
Inside CW	5.8	6.2	6.2	6.2	6.0	6.4	9.0	11.0
Inside CCW	6.2	6.4	6.4	6.5	5.5	6.5	9.0	11.0

Comments: By knob

**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	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: Not applicable for locks that allows to be unlocked by the key to permit the bolt to be retracted by operating trim.

**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	26.6	23.9	26.6	31.0	23.0	24.8	45.0	54.0
Outside CCW	23.0	28.3	24.8	30.1	25.7	28.3	45.0	54.0
Inside CW	22.1	23.0	27.4	24.8	22.1	22.1	45.0	54.0
Inside CCW	22.1	21.2	22.1	23.9	21.2	23.0	45.0	54.0

Comments: by knob

**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	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: 

Not applicable for locks that allows to be unlocked by the key to permit the bolt to be retracted by operating trim.
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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
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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	0.379	0.374	0.380	0.340	0.377	0.329	0.250	0.203

Comments: 

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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	0.312	0.283	0.315	0.262	0.285	0.267	0.219	0.172

Comments: 

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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	1.8	2.3	2.2	2.5	1.5	3.3	4.5	5.4
Locked	1.6	2.1	1.7	3.0	1.5	3.3	4.5	5.4

Comments: 

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## 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
inside CCW	N/A	N/A	N/A	N/A
inside CCW	N/A	N/A	N/A	N/A

Comments:

By knob

### 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:

### 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:

### 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:

No handleset or thumb piece

**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:

**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:

**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:

**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:

**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:

**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

**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: No handleset

**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	5.7	5.8	5.1	11.0
Outside CCW	6.5	5.7	5.5	11.0
Inside CW	5.5	5.5	5.7	11.0
Inside CCW	5.3	6.0	5.3	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
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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	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A

Comments: 

Not applicable for locks that allows to be unlocked by the key to permit the bolt to be retracted by operating trim.
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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
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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	20.4	15.9	19.5	45.0
Outside CCW	17.7	14.2	20.4	45.0
Inside CW	14.2	16.8	20.4	45.0
Inside CCW	13.3	14.2	16.8	45.0

Comments: 

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**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	N/A	N/A	N/A	N/A
CCW	N/A	N/A	N/A	N/A

Comments: Not applicable for locks that allows to be unlocked by the key to permit the bolt to be retracted by operating trim.

**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	0.355	0.346	0.357	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:

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	N/A

Comments:

**11 Cycle Test 3 samples**

Compliant/Non: Compliant

Rotation	Counter Reading	Date	Technician's Initials
CW	0	2014-12-11	Jordan Lin
CW	55,563	2014-12-13	Jordan Lin
CW	100,152	2014-12-16	Jordan Lin
CCW	154,356	2014-12-17	Jordan Lin
CCW	200,000	2014-12-20	Jordan Lin
CW	232,445	2014-12-22	Jordan Lin
CW	275,138	2014-12-24	Jordan Lin
CW	300,214	2014-12-25	Jordan Lin
CCW	327,653	2014-12-26	Jordan Lin
CCW	376,864	2014-12-28	Jordan Lin
CCW	400,000	2014-12-29	Jordan Lin

**11.5 Performance After Cycle Test**

Compliant/Non: Compliant

Are locks operative in all respects including dead locking of the latch bolt?

Yes   ✓    
No           

Comments:

**11.6 Cylinder Cycle Test - 1 sample**

Compliant/Non: Compliant

Rotation	Counter Reading	Date	Technician's Initials
CW	0	2014-12-24	Jordan Lin
CW	20,000	2014-12-25	Jordan Lin
—	—	—	—
—	—	—	—
—	—	—	—

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.: #007

Impacts 2 blows of 60ft-lbf  
2 blows of 90ft-lbf

Operable ✓  
Inoperable \_\_\_\_\_

Entry \_\_\_\_\_  
Non-Entry ✓

Comments:

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

Compliant/Non: Not applicable

Sample No.: N/A

Load	Torque Applied
N/A	N/A

Operable N/A  
Inoperable N/A

Entry N/A  
Non-Entry N/A

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

Comments:

**12.3 Locked Lever or Paddle Vertical Impact Test Grade 1 only**

Compliant/Non: Not applicable

Sample No.: N/A

Impacts N/A

Operable N/A  
Inoperable N/A

Entry N/A  
Non-Entry N/A

Paddle Mount	Measured Inside Paddle Force	Inside Paddle Force Max.
Vertical	N/A	N/A
Horizontal	N/A	N/A

Comments:

**12.4 Locked Cylinder in the Lever Face Impact Test** Compliant/Non: Not applicable  
**Grade 1 only** Sample No.: N/A

Impacts	Impacts Conducted
N/A	N/A

Operable N/A Entry N/A  
 Inoperable N/A Non-Entry N/A

Comments:

**12.5 Locked Lever or Knob Catch Attack Test** Compliant/Non: Compliant  
 Sample No.: #008

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

Operable ✓ Entry           
 Inoperable          Non-Entry ✓

Comments:

**12.6 Cylinder Assembly Pulling Test** Compliant/Non: Compliant  
 Grade 1: Tension 500 lbf Measured Tension: 300 lbf Sample #009  
 Grade 2: Tension 300 lbf  
 Grade 3: Tension 250 lbf

Grade achieved: 2 Operable          Entry           
 Inoperable ✓ Non-Entry ✓

Comments:

**12.7 Cylinder Assembly Torque Test** Compliant/Non: Compliant  
 Grade 1: Torque 300 lbf-in Measured Torque: 150 lbf-in Sample #010  
 Grade 2: Torque 150 lbf-in  
 Grade 3: Torque 120 lbf-in

Grade achieved: 2 Operable          Entry           
 Inoperable ✓ Non-Entry ✓

Comments:

### 13 Material Evaluation Tests

#### 13.1 Knob Crush Test

Compression Load: 1000 lbf

Compliant/Non: Compliant  
 Sample No.: #011

Deformation	Initial Diam.	Final Diam.	%	Max Allowable (%)
Outside Knob	2.126	2.104	1.0%	25.0%
Inside Knob	2.125	2.108	0.8%	25.0%
		Measured (lbf-in)	Maximum Allowable (lbf-in)	
Key Torque-At Test Completion	CW	N/A	N/A	
	CCW	N/A	N/A	

Comments:

#### 13.2 Rose Assembly Dent Test

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

Sample No.: #012

Compliant/Non: Compliant

	Measured Depth (in)	Max. Depth Allowable (in)
Inside	0.043	0.100
Outside	0.045	0.100

Comments:

#### 13.3 Outside Rose Deformation Test

Sample No.: #013

Compliant/Non: Compliant

Initial Rose Width (in)	Load (lbf)	Final Rose Width (in)	Min. Allowable (in)
2.563	560	2.544	2.307

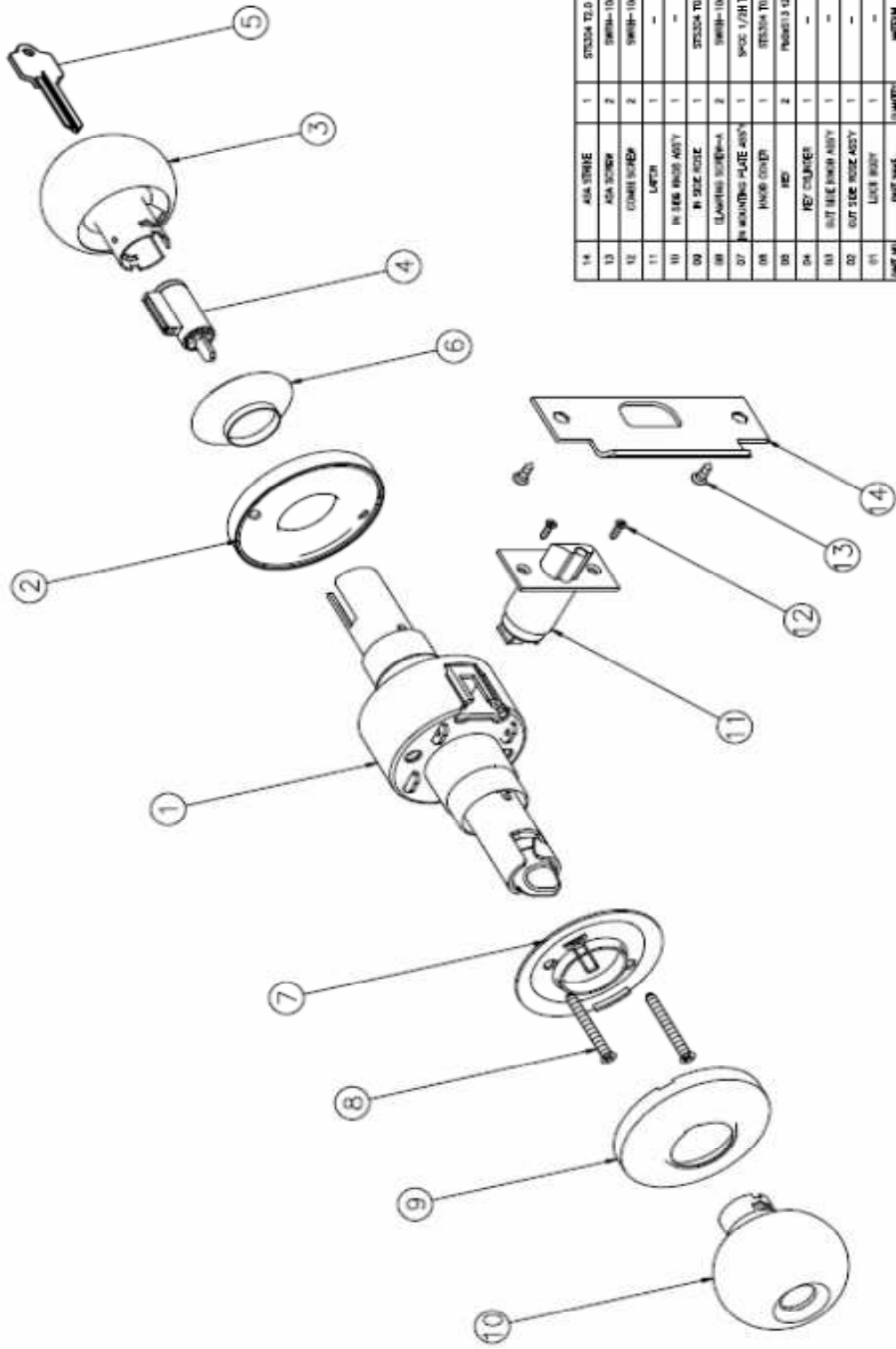
Comments:

Product Photo



# Product Drawing and BOM (1)

REVISED	APPROVED
DATE	DATE
BY	BY



ITEM NO.	QTY	DESCRIPTION	UNIT
14	1	STUSSA TOL-10A	10A
13	2	SWISS-10A	10A
12	2	SWISS-10A	10A
11	1	LATCH	1
10	1	IN 1/8" BORE ASSY	1
09	1	IN 1/8" BORE	1
08	2	SWISS-10A	10A
07	1	SPAC 1/8" TOL-2	1
06	1	STUSSA TOL-2	1
05	2	IN 1/8" BORE ASSY	1
04	1	KEY COUNTER	1
03	1	OUT SIDE BORE ASSY	1
02	1	OUT SIDE BORE ASSY	1
01	1	LATCH BODY	1

ITEM NO.	QTY	DESCRIPTION	UNIT
1	1	AG-4000K ENT	ENT
2	1	ASSSEMBLY-ENT	ENT

## Revision Page

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Revision No.	Date	Changes	Author	Reviewer
Original	January 30,2015	First issue	Jordan Lin	Credy Chen
1.0	February 4, 2015	Footer model change from "GAK-1000" to "AGK-1000"	Jordan Lin	Credy Chen