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Intertek Test Report 141204028GZU-001

EVALUATION
OF
Cylindrical Lever Lockest, AGL-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 Lever Lockest, AGL-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

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.

Prepared By:

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Engineer
Intertek

Report Reviewed By:

Credy Chen
Project Engineer
Intertek

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
AGL-1000	4000	F109	2	key/lever	—	ZN-DC

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	13.3	15.0	12.4	14.2	12.4	14.2	28.0	34.0
Outside CCW	15.9	15.9	15.9	15.9	16.8	13.3	28.0	34.0
Inside CW	13.3	14.2	14.2	13.3	15.0	16.8	28.0	34.0
Inside CCW	12.4	12.4	12.4	10.6	14.2	10.6	28.0	34.0

Comments: By lever

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

	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
Direction	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	33.6	39.8	31.0	31.9	30.1	39.8	70.0	85.0
Outside CCW	32.7	37.2	34.5	34.5	31.0	43.4	70.0	85.0
Inside CW	29.2	33.6	23.0	28.3	28.3	44.3	70.0	85.0
Inside CCW	26.6	33.6	22.1	31.0	32.7	43.4	70.0	85.0

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

	Specimen #001		Specimen #002		Specimen #003		Max Allowable	
Direction	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:

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	0.386	0.377	0.358	0.344	0.377	0.340	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	0.304	0.291	0.289	0.260	0.296	0.251	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	1.2	2.7	1.6	3.0	1.9	4.0	4.5	5.4
Locked	1.5	2.8	1.6	2.6	1.8	4.2	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	450	450	450	450
Outside CCW	N/A	N/A	N/A	N/A
inside CCW	N/A	N/A	N/A	N/A
inside CCW	N/A	N/A	N/A	N/A

Comments: By lever

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: Compliant

Knob/Lever	Specimen #004	Specimen #005	Specimen #006	Test Load Minimum (lbf)
Outside	150	150	150	150
Inside	150	150	150	150

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 handdleset 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: 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:

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	225	225	225	225

Comments: By lever

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	15.9	16.8	15.9	34.0
Outside CCW	14.2	17.7	18.6	34.0
Inside CW	15.9	15.0	15.0	34.0
Inside CCW	12.4	16.8	13.3	34.0

Comments: By lever

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:

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	39.8	31.9	37.2	70.0
Outside CCW	29.2	28.3	32.7	70.0
Inside CW	35.4	32.7	38.1	70.0
Inside CCW	34.5	31.0	33.6	70.0

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	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	0.357	0.349	0.320	0.250

Comments:

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

	Specimen #004	Specimen #005	Specimen #006	Standard
Lever Deflection (in)	0.06	0.06	0.05	3/8
Did lever touch the door? (Y/N)	NO	NO	NO	NO

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
Downward	0	2014-12-11	Jordan Lin
Downward	53,215	2014-12-13	Jordan Lin
Downward	85,152	2014-12-15	Jordan Lin
Downward	145,295	2014-12-17	Jordan Lin
Downward	200,000	2014-12-19	Jordan Lin
Downward	232,445	2014-12-22	Jordan Lin
Downward	285,138	2014-12-24	Jordan Lin
Downward	311,214	2014-12-25	Jordan Lin
Downward	338,223	2014-12-26	Jordan Lin
Downward	378,821	2014-12-28	Jordan Lin
Downward	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	mpacts Conducte
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: Complaint

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

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-in Sample #010

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: Not applicable

Compression Load: 1000 lbf

Sample No.: _____

Deformation	Initial Diam.	Final Diam.	%	Max Allowable (%)
Outside Knob	N/A	N/A	N/A	N/A
Inside Knob	N/A	N/A	N/A	N/A

		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

Compliant/Non: Compliant

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

Sample No.: #011

	Measured Depth (in)	Max. Depth Allowable (in)
Inside	0.064	0.100
Outside	0.074	0.100

Comments:

13.3 Outside Rose Deformation Test

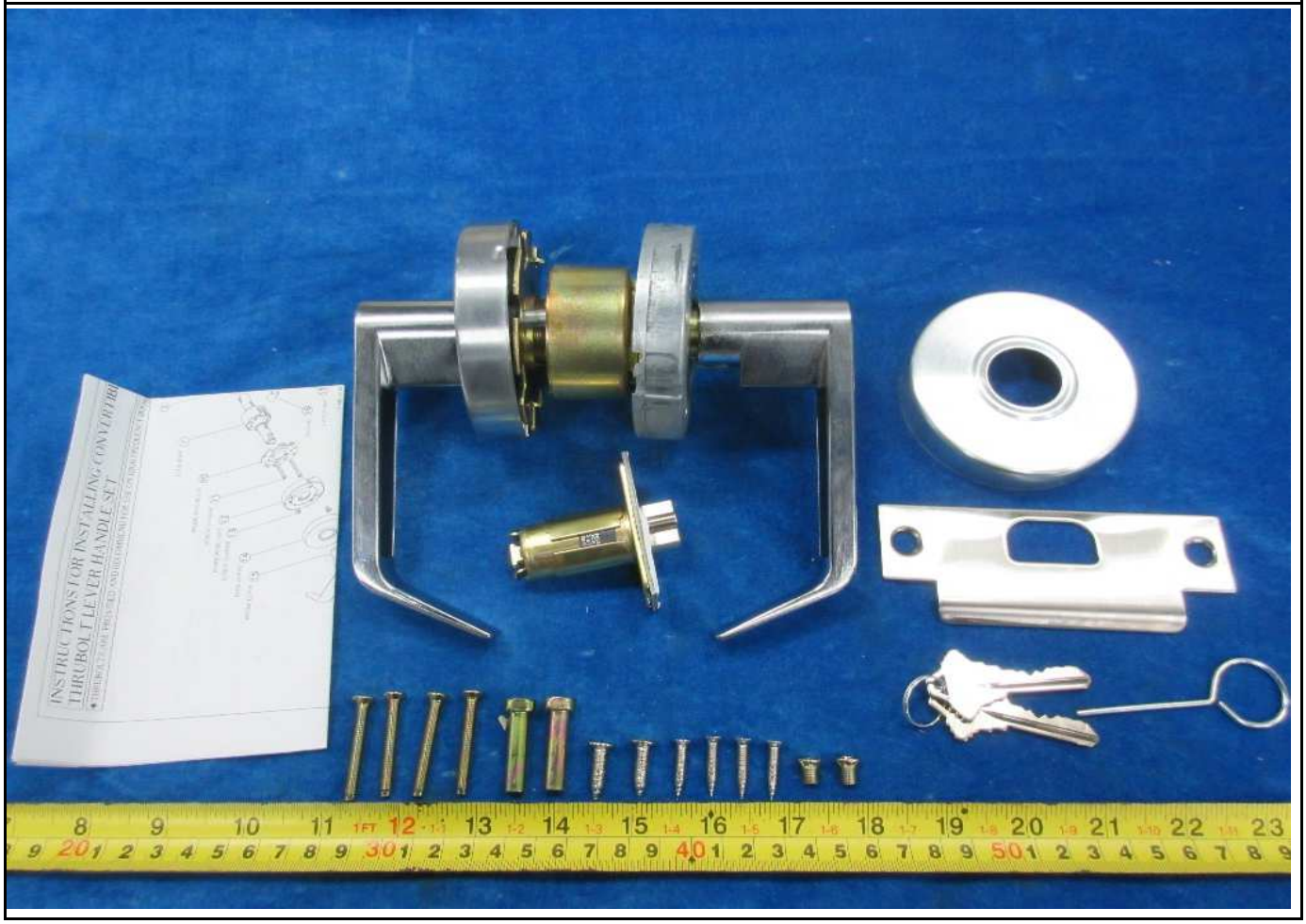
Compliant/Non: Compliant

Sample No.: #012

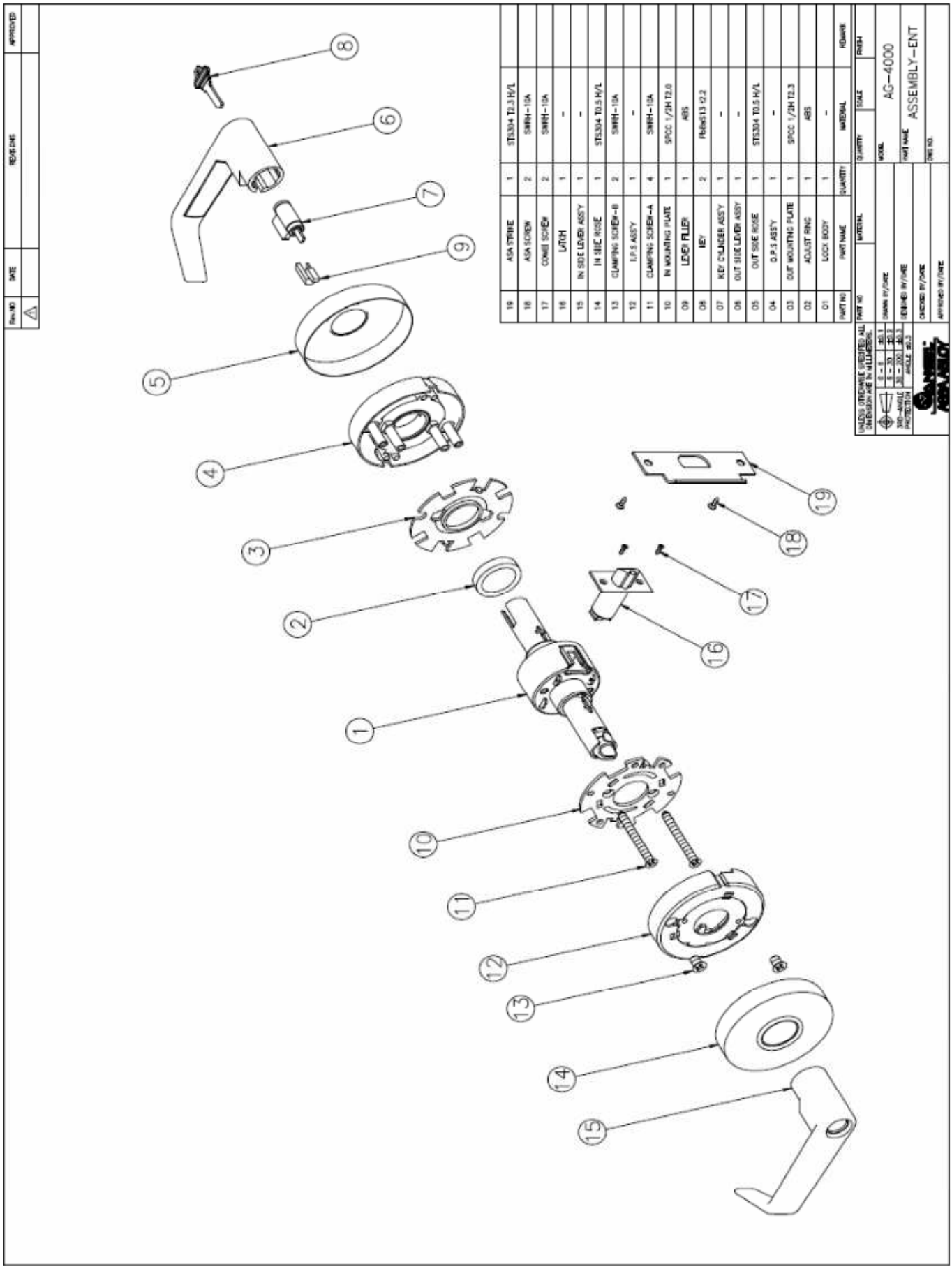
Initial Rose Width (in)	Load (lbf)	Final Rose Width (in)	Min. Allowable (in)
3.332	560	3.310	2.999

Comments:

Product Photo

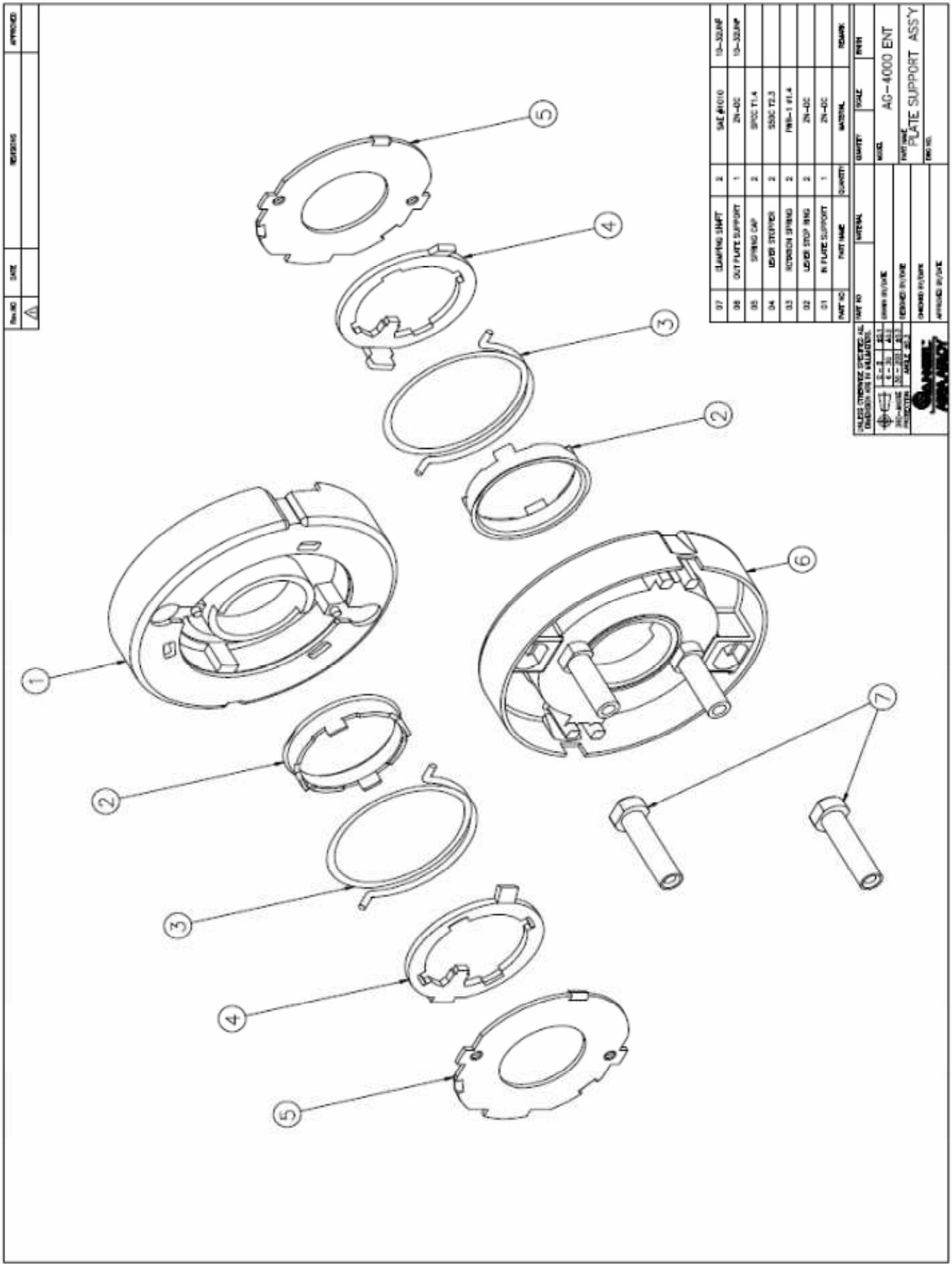


Product Drawing and BOM (1)



NO	PART NAME	QUANTITY	MATERIAL	REMARK
19	ASA STRIKE	1	STS304 T2.3 H/L	
18	ASA SCREW	2	SWRH-10A	
17	COVER SCREW	2	SWRH-10A	
16	LATCH	1	-	
15	IN SIDE LEVER ASSY	1	-	
14	IN SIDE ROSE	1	STS304 T0.5 H/L	
13	CLAMPING SCREW-B	2	SWRH-10A	
12	L.P.S ASSY	1	-	
11	CLAMPING SCREW-A	4	SWRH-10A	
10	IN MOUNTING PLATE	1	SPCC 1/2H T2.0	
09	LEVER PULLER	1	ABS	
08	KEY	2	PA66GF13 #2.2	
07	KEY CYLINDER ASSY	1	-	
06	OUT SIDE LEVER ASSY	1	-	
05	OUT SIDE ROSE	1	STS304 T0.5 H/L	
04	O.P.S ASSY	1	-	
03	OUT MOUNTING PLATE	1	SPCC 1/2H T2.3	
02	ADJUST RING	1	ABS	
01	LOCK BODY	1	-	
PART NO	PART NAME	QUANTITY	MATERIAL	REMARK

Product Drawing and BOM (2)



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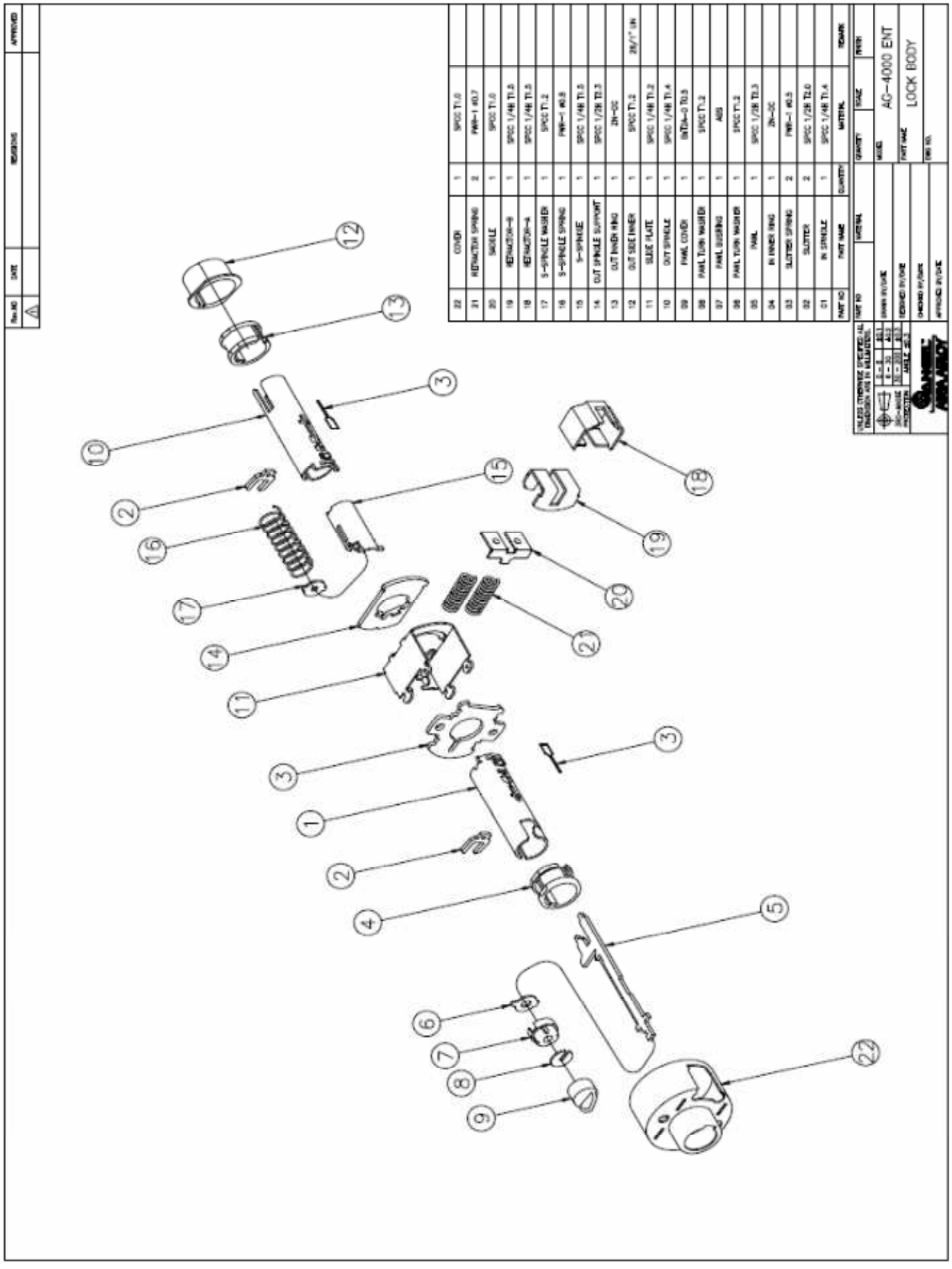

Revision Page

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 "GAL-1000" to "AGL-1000"	Jordan Lin	Credy Chen