

Allegion Security Technologies (China) Co., Ltd.

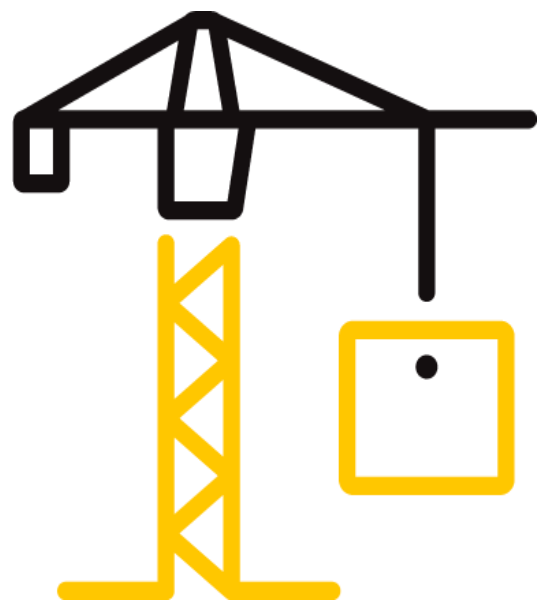
TEST REPORT

REPORT NUMBER
190726006SHF-002

ISSUE DATE
2019/8/5

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15

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Test Report

Issue Date: 2019/8/5 Intertek Report No. 190726006SHF-002

Applicant: Allegion Security Technologies (China) Co., Ltd.

Applicant Address: Building 10, No. 8158, Tingwei Road, Jinshan Industry Park, Shanghai, P.R.China

Attn: Joe ZHU

SUBJECT: Performance test
 Controlled door closing devices

Brand name: Briton

Dear Sir,

This test report for represents the results of our evaluation of the above referenced product(s) to the requirements contained in the following standards:

| TEST METHODS AND STANDARDS | |
|------------------------------------|--|
| Refer to the next following Pages. | |

| SAMPLE ID | MODEL | SPECIFICATION |
|-----------------------|----------|--|
| S190121010SHF.001~005 | C3024C-B | Cam Action concealed door closer, Dual swing, EN2-4 adjustable, Backcheck function, TRACK ARM |
| S190121010SHF.006 | C3024C | Cam Action concealed door closer, Dual swing, EN2-4 adjustable, without Backcheck function, TRACK ARM. |

SAMPLE RECEIEVED: 2019/1/19 and 2019/6/6
 TESTED FROM: 2019/3/19 TO 2019/6/18

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Testing and Product information:

| Testing information | |
|---|--|
| Standard: | EN 1154:1996/A1:2002/AC:2006 |
| Rating(s): | 3 8 2/4 — 1 4 |
| Testing Laboratory name: | Intertek Testing Services Shanghai Ltd. |
| Address: | Plant 5, No 6958 Daye Road Fengxian District, Shanghai, China 201405 |
| Possible Test Case Verdicts | |
| Test Case does not apply to the Test object: | N/A |
| Test object does meet the requirement: | P (Pass) |
| Test object does not meet the requirement: | F (Fail) |
| Conclusion: | |
| The submitted samples COMPLIED WITH all applicable mechanical performance requirements of EN 1154:1996/A1:2002/AC:2006 for the ratings. | |
| * When determining the test result, measurement uncertainty has been considered. | |

General product information:

| The product detail information list on the following form | | | | | | | |
|---|--------------|------------|---------------|---------------|-----------|------------|---------------|
| Model C3024C-B, Performance and durability tests base on Regular installation (standard installation recommended by client). | | | | | | | |
| Documents and drawing of two models of Door Closer, Model C3024C-B and Model C3024C were checked and found that these two door closers have the same installation method, the similar material and similar design. The main difference between these two door closers were back check device. Model C3024C-B with more complicated structure was selected to be tested to cover model C3024C. | | | | | | | |
| Model No. | Product type | Power size | Speed control | Latch control | Hold open | Back check | Delay closing |
| C3024C-B | Door closer | 2/4 | Yes | Yes | No | Yes | No |
| C3024C | Door closer | 2/4 | Yes | Yes | No | No | No |

| Detail "Ratings" information listed as following: | | |
|---|-----------|--|
| First digit (Category of use): | Grade 3 | — For closing doors from at least 105° open; |
| Second digit (Durability): | Grade 8 | — 500 000 test cycles; |
| Third digit (Door closer power size): | Grade 2/4 | — Power size 2/4 |
| Fourth digit (suitability for use on fire/smoke doors): | Grade — | — No performance determined. |
| Fifth digit (Safety): | Grade 1 | — All door closers are required to satisfy the essential requirement of safety in use; |
| Sixth digit (Corrosion resistance): | Grade 4 | — Very high resistance. |

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Test Items, Method and Results:

| EN 1154:1996/A1:2002/AC:2006 Building hardware- Controlled door closing devices -Requirements and test methods | | | | | | | |
|--|---|----------------|--------|--|-----------------|--------------------------|---------------------------------|
| Clause | Requirement - Test | | | Result - Remark | | Verdict | |
| 4 | Classification | | | | | | |
| 4.1 | Door closer shall be classified by six digit coding system: | | | | | | |
| 4.2 | Category of use (1 st) : | | | Grade 3 | | -- | |
| 4.3 | Durability (2 nd) : | | | Grade 8 | | -- | |
| 4.4 | Door closer power size (3 rd) | | | Grade 2/4 | | -- | |
| 4.5 | Suitability for use on fire/smoke doors (4 th) | | | Grade — | | -- | |
| 4.6 | Safety (5 th) | | | Grade 1 | | -- | |
| 4.7 | Corrosion resistance (6 th) | | | Grade 4 | | -- | |
| 5 | REQUIREMENTS | | | | | | |
| 5.1 | <p>"Product information A door closer manufactured to this standard shall be supplied with clear, detailed instructions for its installation, regulation and maintenance, which shall include any limitations of opening angle. Where a door closer is recommended for fitting in other than a standard application, these instructions shall clearly define the door closer power size for each application of fitting position stated."</p> | | | <p>Supplied with clear, detailed instructions. For standard installation: Power size: 2 to 4</p> | | P | |
| 5.2 | Performance | | | | | | |
| | Table 1 | | | | | | |
| | Door closer Power size | Closing moment | | | | Opening moment 0° to 60° | Door closer efficiency 0° to 4° |
| | | 0° to 4° | | 88° to 92° | Any other angle | | |
| | | Nm min. | Nm max | Nm min. | Nm min. | | |
| | 1 | 9 | < 13 | 3 | 2 | 26 | 50 |
| | 2 | 13 | < 18 | 4 | 3 | 36 | 50 |
| | 3 | 18 | < 26 | 6 | 4 | 47 | 55 |
| | 4 | 26 | < 37 | 9 | 6 | 62 | 60 |
| 5 | 37 | < 54 | 12 | 8 | 83 | 65 | |
| 6 | 54 | < 87 | 18 | 11 | 134 | 65 | |
| 7 | 87 | < 140 | 29 | 18 | 215 | 65 | |

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|-------|---|--|---|
| 5.2.1 | <p>General</p> <p>When tested in accordance with clauses 6 and 7, the door closer shall satisfy the relevant performance requirements of 5.2.2 to 5.2.11, and 5.2.12 to 5.2.18 as appropriate</p> | See below clauses | — |
| 5.2.2 | <p>Durability</p> <p>The door closer shall be able to close a test door conforming to 6.1.1 and 6.2 from an opening angle of 90°, for a minimum of 500,000 test cycles :</p> | 500,000 cycles | P |
| 5.2.3 | <p>Closing moment</p> <p>After 5000 test cycles and after 500,000 test cycles the measured closing moments shall be not less than the value stated in Table 1 :</p> | <p>Standard Installation:</p> <p>Power size: 2</p> <p>After 5 000 cycles</p> <p>0° ~ 4°: 14,9 Nm</p> <p>88° ~ 92°: 8,7 Nm</p> <p>0° ~ 180°: 7,9 Nm</p> <p>after 500 000 cycles</p> <p>0° ~ 4°: 16,6 Nm</p> <p>88° ~ 92°: 8,3 Nm</p> <p>0° ~ 180°: 4,2 Nm</p> <p>Power size: 4</p> <p>After 5 000 cycles</p> <p>0° ~ 4°: 26,2 Nm</p> <p>88° ~ 92°: 11,4 Nm</p> <p>0° ~ 180°: 7,0 Nm</p> <p>after 500 000 cycles</p> <p>0° ~ 4°: 26,3 Nm</p> <p>88° ~ 92°: 9,6 Nm</p> <p>0° ~ 180°: 6,4 Nm</p> | P |

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| 5.2.4 | <p>Opening moment</p> <p>After 5 000 test cycles the maximum measured opening moment shall be not more than the value stated in Table 1 for the particular power size of closer being tested. :</p> | <p>Standard Installation:</p> <p>Power size: 2 0° ~ 60°: 21,9 Nm</p> <p>Power size: 4 0° ~ 60°: 34,1 Nm</p> | P |
| 5.2.5 | <p>Efficiency</p> <p>After 5000 test cycles and after 500,000 test cycles the measured efficiency shall be not less than value stated in Table 1 :</p> | <p>Standard Installation:</p> <p>Power size: 2 67,7 %</p> <p>Power size: 4 80,1 %</p> | P |
| 5.2.6 | <p>Closing time</p> <p>After 5000 test cycles and after 500,000 test cycles, the closing time, from a door opening angle of 90 degree, shall be capable of adjustment to 3 seconds or less, and 20 seconds or more. After 500,000 test cycles, the closing time set at 5000 test cycles shall not have increased by more than 100%, or decreased by more than 30 % :</p> | <p>Standard Installation:</p> <p>Power size: 2</p> <p>After 5000 cycles</p> <p>The range of closing time:</p> <p>Minimum 2,84 s</p> <p>Maximum > 5 min</p> <p>Set closing time: 4,44 s</p> <p>After 500,000 test cycles</p> <p>The range of closing time:</p> <p>Minimum 2,90 s</p> <p>Maximum > 5 min</p> <p>Closing time: 3,45 s</p> <p>Not decrease more than 30%</p> | P |
| 5.2.6 | <p>Closing time</p> <p>After 5000 test cycles and after 500,000 test cycles, the closing time, from a door opening angle of 90 degree, shall be capable of adjustment to 3 seconds or less, and 20 seconds or more. After 500,000 test cycles, the closing time set at 5000 test cycles shall not have increased by more than 100%, or decreased by more than 30 % :</p> | <p>Power size: 4</p> <p>After 5000 cycles</p> <p>The range of closing time:</p> <p>Minimum 2,93 s</p> <p>Maximum >5 min</p> <p>Set closing time: 4,26 s</p> <p>After 500,000 test cycles</p> <p>The range of closing time:</p> <p>Minimum 2,88 s</p> <p>Maximum >5 min</p> <p>Closing time: 4,49 s</p> <p>Not decrease more than 30%</p> | P |

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| 5.2.7 | <p>Angles of operation The door closer shall permit the test door to open according to its grade, and on closing, shall control the door from a minimum angle of 70 degree :</p> | <p>Standard Installation: Power size: 2 After 5000 test cycles Max. opening angle: 105° The controlled angle: 91° After 500,000 test cycles Max. opening angle: 105° The controlled angle: 103°</p> | P |
| 5.2.7 | <p>Angles of operation The door closer shall permit the test door to open according to its grade, and on closing, shall control the door from a minimum angle of 70 degree :</p> | <p>Power size: 4 After 5000 test cycles Max. opening angle: 105° The controlled angle: 73° After 500,000 test cycles Max. opening angle: 105° The controlled angle: 97°</p> | P |
| 5.2.8 | <p>Overload performance The door closer shall be capable of withstanding the closing overload tests :</p> | <p>Standard Installation: After 5000 and 500 000 test cycles Power size: 2 Overload weight 18 kg Power size: 4 Overload weight 24 kg No any defects, function normally after 10 times overload test.</p> | P |

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| 5.2.9 | <p>Temperature dependence A set closing time of 5 seconds at an ambient temperature of 20 degree C, shall not increase to more than 25 seconds or decrease to less than 3 seconds when tested at -15 degree C and 40 degree C :</p> | <p>Power size: 2 Closing time at 20°C: 5,03 s Closing time at -15°C: 7,54 s Closing time at 40°C: 4,96 s</p> <p>Power size: 4 Closing time at 20°C: 4,85 s Closing time at -15°C: 5,92 s Closing time at 40°C: 4,48 s</p> | P |
| 5.2.10 | <p>Fluid leakage Throughout the test programme there shall be no leakage of fluid from the door closer :</p> | Not found any fluid leakage throughout the test | P |
| 5.2.11 | <p>Damage Throughout the test programme there shall be no damage to the door closer or its arms that would adversely affect its performance to this standard :</p> | Not found any damage throughout the test | P |
| 5.2.12 | <p>Latch control (optional) Accelerated closing shall be effective over a maximum range of 15 degree from the closed position, and shall be adjustable :</p> | Latch control was adjustable, maximum control angle: 5° | P |
| 5.2.13 | <p>Backcheck (optional) The door closer shall be capable of arresting the test door before 90 degree position :</p> | <p>After 100 000 cycles test, Power size 2 arrested 81 ° at: Power size 4 arrested 83 ° at:</p> | P |

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| <p>5.2.14</p> | <p>Delay closing (optional) The delay time shall not be less than 20 seconds. The delay zone shall not extend below the 65 degree open position. The moment required to override manually the delay action shall not exceed 150 Nm. The delay time at the conclusion of 500 test cycles shall be between 10 seconds to 30 seconds :</p> | <p>Power size: 2 Before cycle test Delay zone: from — ° to — ° Maximum delay time: Override force: — Nm After 500 delay cycles test Delay time: —</p> <p>Power size: 4 Before cycle test Delay zone: from — ° to — ° Maximum delay time: Override force: — Nm After 500 delay cycles test Delay time: —</p> | <p>N/A</p> |
| <p>5.2.15</p> | <p>Adjustable closing force (optional) If provided with an adjustable closing function, the door closer shall comply with the performance at both the minimum and maximum power settings claimed by manufacture :</p> | <p>Compliant with both the minimum and maximum power settings</p> | <p>P</p> |
| <p>5.2.16</p> | <p>Zero position (for double action door closers only) The amount of free play at the zero position of a new door closer shall not exceed 3 mm, and after 500,000 test cycles shall not exceed 6 mm :</p> | <p>Not applicable for door closer.</p> | <p>N/A</p> |

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| <p>5.2.17</p> | <p>Corrosion resistance The requirement shall be according to EN 1670. The closing moment of the door closer shall be not less than 80% of the closing moment measured prior to the test. The acceptance conditions of EN 1670 shall be met for all surfaces of the door closer which are visible :</p> | <p>Power size: 2 Before salt spray test 0° ~ 4°: 17,1 Nm 88° ~ 92°: 9,7 Nm 0° ~ 180°: 4,6 Nm Corrosion resistance grade: 4 Salt spray time: 240 hours Not found any rust or blister on the visible surface. After salt spray test 0° ~ 4°: 18,2 Nm 88° ~ 92°: 9,2 Nm 0° ~ 180°: 4,2 Nm Not less than 80%</p> | <p>P</p> |
| <p>5.2.18</p> | <p>Fire/smoke door suitability A door closer for use on a fire/smoke door assembly shall meet the necessary requirements of Annex A :</p> | <p>No performance determined.</p> | <p>—</p> |

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Appendix A: Product Documents

| Model No. | Document Ref. | Document Title | Issue | Date |
|-------------------|---|---|----------|----------|
| C3024C-B | C3024C-B Exploded Drawing and BOM list | C3024C-B Assemble Exploded Drawing and BOM list | 20190625 | 20190702 |
| C3024C-B | C3024C-B Body Detail Dimension Drawing | C3024C-B Body Detail Dimension Drawing | 20190625 | 20190702 |
| C3024C-B | C3024C-B Arm Linkage Assembly Dimension Drawing | C3024C-B Arm Linkage Assembly Dimension Drawing | 20190625 | 20190702 |
| C3024C | C3024C Exploded Drawing and BOM list | C3024C Assemble Exploded Drawing and BOM list | 20190625 | 20190702 |
| C3024C | C3024C Body Detail Dimension Drawing | C3024C Body Detail Dimension Drawing | 20190625 | 20190702 |
| C3024C | C3024C Arm Linkage Assembly Dimension Drawing | C3024C Arm Linkage Assembly Dimension Drawing | 20190625 | 20190702 |
| C3024C & C3024C-B | Installation Instruction | Instruction | 20190731 | 20190731 |

Note:

It is a mandatory requirement that Intertek is informed of any modifications or changes to the following:

- Product submitted for approval or that has been approved
- Manufacturing process
- Manufacturing address
- Materials
- Materials supplier
- Documents recorded within this register

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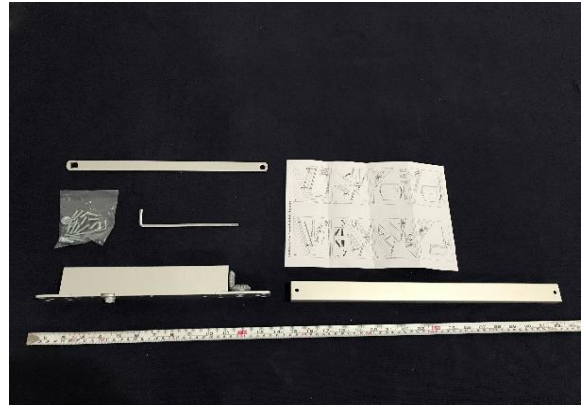
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Appendix B: Product photo of C3024C-B



Front view



Back view



Section view



Section view

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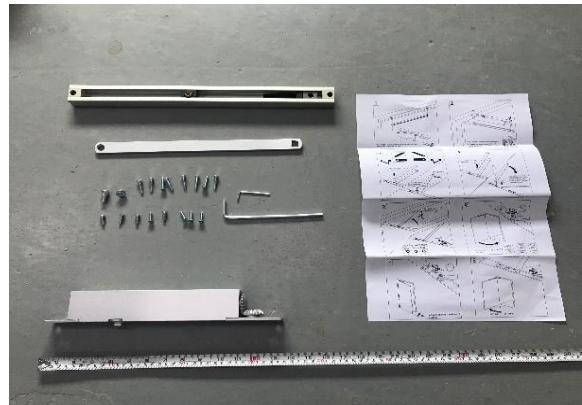
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Appendix C: Product photo of C3024C



Front view



Back view



Section view



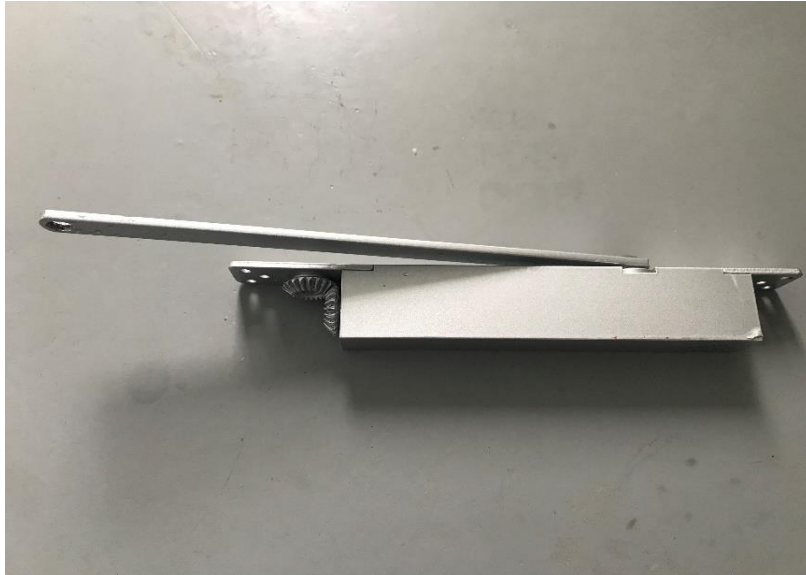
Section view

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Appendix D: After salt spray test of C3024C-B



Section view (afte 240h salt spray test)



Front view (afte 240h salt spray test)

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APPENDIX D: SAMPLE RECEIVED PHOTO



REPORT AUTHORIZED

When signed with physical or electronic signature, the contents of this report have been prepared and approved per Intertek's quality process in accordance with ISO 17025.

Jodie Zhou *Torres Qi*
Name: Jodie Zhou Name: Torres Qi
Title: Approver Title: Project Engineer



Revision:

| NO. | DATE | CHANGES | AUTHOR | REVIEWER |
|------------------|----------|-------------|-----------|------------|
| 190726006SHF-002 | 2019/8/5 | First issue | Torres Qi | Jodie Zhou |