LABORATORY DATA PACKAGE

Number of pages in this package 29 **[** including additional pages 0 **]**
(Fill in when using printed copy as record)

CLIENT INFORMATION	
Company Name	ZHEJIANG DORRENHAUS HARDWARE INDUSTRY CO LTD
Address	#350-1 Guilan Rd Qiaodun Town Cangnan, Zhejiang 325806 China

AUDIT INFORMATION:		
[ ] Description of Tests	Per Standard No.	ANSI/BHMA A156.4 Edition 2019-7-9
[x] Tests Conducted by[1]		Zhong Jianghua/Zhang Shaoxiu
[x] UL Staff conducting or witnessing testing (WTDP, TMP, WMT only) **[]** UL Staff supervising UL Staff in training		Wilson Wang
[]Authorized Signatory (CTDP, TPTDP, TCP, PPP, SMT)	Printed Name	Signature. Include date for CTDP, TPTDP, TCP, PPP, WMT, TMP, SMT

TESTS TO BE CONDUCTED:			
Test No.	Done[3]	Test Name	**[ ]** Comments/Parameters **[ ]** Tests Conducted by[2] **[ ]** Link to separate data files[4]
1.	x	PREPARATION FOR PERFORMANCE TEST:	
2.	x	BREAK-IN CYCLE TEST:	
3.	x	STATIC TEST 1:	
4.	x	STATIC TEST 2 TWO SPEEDS OF CONTROL:	
5.	x	STATIC TEST 3:	
6.	x	STATIC TEST 5 (Closing Force for Closers with Adjustment Through Range of Sizes):	
7.	x	STATIC TEST 6 (Door Closer Efficiency):	
8.	x	STATIC TEST 7 Checking Cylinder Test:	
9.	x	STATIC TEST 8 Backcheck Tests:	
10.	x	STATIC TEST 9 Delayed Action Closer Test:	
11.	x	STATIC TEST 11:	
12.	x	INTERMEDIATE CYCLE TEST:	
13.	x	INTERIM STATIC TEST:	

TESTS TO BE CONDUCTED:			
Test No.	Done[3]	Test Name	[ ] Comments/Parameters [ ] Tests Conducted by[2] [ ] Link to separate data files[4]
14.	x	FINAL CYCLE TEST:	
15.	x	FINAL STATIC TEST:	

Instructions -
1 - When all tests are conducted by one person, name can be inserted here instead of including name on each page containing data.
2 - When test conducted by more than one person, name of person conducting the test can be inserted next to the test name instead of including name on each page containing data. Test dates may be recorded here instead of entering test dates on the individual datasheet pages.
3 - Use of this field is optional and may be employed differently. If used to include a date instead of entering the testing date on the individual datasheet pages, the date shall be the date the test was conducted.
4 – Link to separate data files for a test can be inserted here. The link must be to a server that is accessible to UL staff, that provides for backup, required retention periods and a path, including file name, that does not change and result in a broken link. Not applicable to DAP.

Special Instructions -

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, C ±	Relative Humidity, % ±	Barometric Pressure, mBar ±

WITNESS TEST DATA PROGRAM (WTDP) INFORMATION:

Environment:	
Accommodations and Environmental conditions, including proper power source meet the requirements of the test standard or UL default criteria (ISO/IEC 17025 Clause 5.3.1, 5.3.2. 5.3.3, 5.3.4)	**[ ]**Yes **[ ]**No **[x]**N/A
Personnel:	
Lab Management shall authorize personnel to operate particular types of equipment used in testing. (ISO/IEC 17025 5.5.3)	**[x]**Yes **[ ]**No
Equipment:	
Testing is being conducted within the test equipment calibration dates. (See Test Instrument Information Page and ISO/IEC 17025 5.5.1, 5.5.2, 5.5.4, 5.5.5, 5.5.8,)	**[x]**Yes **[ ]**No
Calibrations for testing equipment is traceable to SI Units. Refer to 00-OP-C0032 (Calibration Certificate Analysis). (ISO/IEC 17025 5.6.2.2)	**[x]**Yes **[ ]**No
Critical Consumables:	
Critical consumables are compliant with test standard requirements. (ISO/IEC 17025 Clause 4.6)	**[x]**Yes **[ ]**No **[ ]**N/A
Sample Identification:	
Identification of items to be tested has been made (e.g. model no., Serial No., etc.) (See Test Sample Identification page and ISO/IEC 17025 Clause 5.8.2)	**[x]**Yes **[ ]**No
Additional Requirements:	
Testing at a third party laboratory selected by UL and not part of the Third Party Test Data Program requires a Mutual Nondisclosure (NDA) and Confidentiality Agreement, 00-LE-F0025, or alternate agreement form approved by UL's Legal Department to be stored and included with the Test Package.	**[ ]**Yes **[ ]**No **[x]**N/A
Summary:	
The test facility **[** was **]**~~**[was not]**~~ deemed to have the environment and capabilities necessary to perform the tests included in this data package.	

Tested by: Date 2020-7-6~2020-12-1

[ ] The CAS Staff as indicated below, (a competent L1, L2 or L3 in a similar CCN/Standard for a similar test method) was utilized to conduct the witnessing of tests on behalf of the project handler. (Please complete the table below to document the rationale and approval.)

Name of UL Staff conducting WTDP	CCN/Standard to be witnessed	Test(s) to be witnessed	L1, L2 or L3 Competency	Similar CCN/Standard Competency	L3 Reviewer Approval & Date (Similar CCN/Standard)

[ ] The Field Services Staff Member, as indicated below, (with a competent program competency as authorized by the FOM) was informed and utilized to conduct the witnessing of tests on behalf of the project handler. (Please complete the table below to document the information and approval.)

Name of UL Staff conducting WTDP	CCN/Standard to be witnessed	Test(s) to be witnessed	FOM Approver (name)	L3 Reviewer Approval & Date

TEST LOCATION: (To be completed by Staff Conducting the Testing)	
[]UL or Affiliate **[x]**WTDP **[]**CTDP **[]**TPTDP **[]**TCP **[]**PPP **[]**WMT **[]**TMP **[]**SMT	
Company Name:	ZHEJIANG DORRENHAUS HARDWARE INDUSTRY CO LTD
Address:	#350-1 Guilan Rd Qiaodun Town Cangnan, Zhejiang 325806 China

TEST EQUIPMENT INFORMATION

[ ] UL test equipment information is recorded on Meter Use.

[ ] UL test equipment information is recorded on <<insert location and local laboratory equipment system identification.>>

Inst. ID No.	Instrument Type	Test Number +, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date
1.	Weight Scale	1,11,15	0.05kg/100kg	2019-12-6	2020-12-5
2.	Tape measure	1,8,13,15	1mm/0-2m	2020-1-3	2021-1-2
3.	Stop Watch	2,5,8,10,11,13,15	0.01s/0-24h	2020-1-6	2021-1-5
4.	Caliper	1,4,6,7,8,13,15	0.02mm/0-150mm	2020-3-9	2021-3-8
5.	Push/Pull Gauge	1,6,7,8,13,15	1N/0-200N	2020-1-2	2021-1-1
6.	Protractor	1,2,3,4,5,9,10,11,12,13,14,15	1°/0°-180°	2020-4-3	2021-4-2

+ - If Test Number is used, the Test Number must be identified on the data sheet pages or on the Data Sheet Package cover page.

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.
1.	Wuyi Dahe/TCS-150kg/956065/-
2.	Deli/（0—2）m/-/DHS-JC-002
3.	Shanghai No.5 watch/JD-1A/-/DHS-P1-001
4.	Shanghai Tool/0—150mm/JP203296/-
5.	HANDPI/NK-200/2200140613624/DHS-R7-004
6.	Jiangxi Wanzaitianhe/0°-180°/-/DHS-G3-001

TEST SAMPLE IDENTIFICATION:

The table below is provided to establish correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	[] Test No.+	Sample No.	Manufacturer, Product Identification and Ratings
-	-	All	-	Zhejiang DORRENHAUS Hardware Industry Co Ltd, Door Closer, Model:D8000A DA,Size1-6 with Back Check, Standard, Paralle, Frame installation methods.
-	-	-	-	All the tests conducted with above 3 installation methods except endurance test conducted with standard installation.

+ - If Test Number is used, the Test Number or Numbers the sample was used in must be identified on the data sheet pages or on the Data Sheet Package cover page.

[ ] Sampling Procedure -

[ ] This document contains data or information using color and if printed, should be printed in color to retain legibility and the information represented by the color.

Note-client applied models D8000A DA, D8000 DA, D8000F DA, D8000, D8000A, D8000ALG, D8000F; Testing D8000A DA covers D8000 DA, D8000F DA; D8000, D8000A, D8000ALG, D8000F due to similarity.

PREPARATION FOR PERFORMANCE TEST: Section 3

Weight - The test door weight shall be as specified in Table 1 below. Center of gravity of the weighted door shall be 18 in (457 mm) from the pivot center of the door for size 2 or larger closers and 15 in. (381 mm) for size 1 closers. For light screen or combination storm door closers test door weight shall be 30 lbs (13.6 kg). Door weight is for test purposes only.

TABLE 1

Closer Size	Closing Force between the ½ in. (12.77 mm) and 3 in. (76 mm) mark (F1)		Test Door Weight
	lbf	N	
I	From 2 up to 3	From 9 up to 13	50 lbs/23 kg
II	From 3 up to 5	From 13 up to 22	80 lbs/36 kg
III	From 5 up to 8	From 22 up to 36	100 lbs/45 kg
IV	From 8 up to 11	From 36 up to 49	125 lbs/57 kg
V	From 11 up to 14	From 49 up to 62	155 lbs/70 kg
VI	14 and above	Above 62	180 LBS/82 KG

Mounting - Doors shall be hung on hinges, accurately aligned with vertical pins or on offset or center pivots, if required by the door closer. Force required to overcome friction or out of balance condition, shall be a 1/4 lbf. (1.1 N) or less, throughout the test measured perpendicular to the face of the door at a point 30 in (762 mm) from pivot center. Forces required to overcome friction or out of balance conditions are permitted to be greater than a 1/4 lbf. (1.1 N), if acceptable to closer manufacturer. Top jamb mounting shall be 2 in + 1/8 in (51 + 3 mm) reveal. Any force due to hinge friction shall not be used to adjust test data.

Actuating Means for mechanically opening the door to the 90 degree position (+ 5 degrees) and releasing shall be provided for the cycling test.

The Door Closer to be Tested - If door closer bodies of the same type are of substantially the same construction, the cycle test shall be required only for one arm application (i.e. regular arm, parallel arm, track arm, bracket mounting or top jamb mounting) under tests PT 1, PT 2, and PT 3. All other tests as applicable shall be required for all arm applications.

Door Opening Templates and Floor Marking - In preparation for the testing, attach a pointer to bottom the leading edge of door 30” from pivot center, and provide a template (Figure 4 of ANSI/BHMA A156.4) or floor markings along the swing of the pointer mounted on the test door at the following intervals: 135, 115, 90, 70, and 45 degrees. For the applicable tests, the door will be opened to the line being parallel to the leading edge of the door degree where the pointer intersects the required location. In addition, for tests which require an opening to a specified distance, mark lines (Figure 5 of ANSI/BHMA A156.4) at ½, 2, 3, 4 and 12 inches perpendicular to the door in the closed position, and 30 in. (762 mm) from the pivot center of the door.

Installation - The door closer shall be installed in accordance with the manufacturer's written installation instructions.

PREPARATION FOR PERFORMANCE TEST: (CONT'D) Section 3

Applied Forces and Force Readings All applied forces or force readings shall be made perpendicular to the face of the door at a point 30 in (762 mm) from the pivot center of the door. Force applications and readings shall be applied by a force gauge with a combined calibration and reading accuracy within 5%.

Overload Abuse Test Weights - In closers with adjustable spring power, set the closing force to the closest increment within the values specified for the closer size in Table 1.

TABLE 2

Door Closer Size	I	II	III	IV	V	VI
Overload Test Weight	35 lbs (16 kg)	40 lbs (18 kg)	45 lbs (21 kg)	55 lbs (25 kg)	60 lbs (27 kg)	65 lbs (30 kg)

BREAK-IN CYCLE TEST: Section 4.1

METHOD

This test was conducted for Grades 1, 2, 3 (PT1, PT2, PT3, PT5, PT6, PT7, & Other PT Options closers).

The door closer was mounted on the test apparatus and the door closing time was regulated from 90 degrees to between 3 and 6 seconds. This time was maintained during the cycling by re-regulating if necessary. The backcheck valve was fully open, where applicable. The door closer was operated for 4,000 cycles. After the 4,000 cycles, the static tests were conducted.

RESULTS

The door closer **[**did**]** ~~**[**did not**]**~~ complete the 4,000 cycles.

STATIC TEST 1: Section 4.2

METHOD

[x] Surface or Concealed-in-Door Closers, (PT1, PT2, PT7) and Concealed-in-Floor or Overhead Concealed Closers, (PT3, PT5, PT 6)

After the 4,000 break in cycles were completed the general speed regulating valve on the closer was completely closed. The door was opened to 135° or the maximum designed opening if less than 135 degrees and release. The point at which the closing motion of the door essentially stopped (a slow creeping motion after deceleration shall be disregarded) was measured.

[ ] Concealed-in-Floor or Overhead Concealed Closers, Optional (PT8A)

After the 4,000 break in cycles were completed the general speed regulating valve on the closer was completely closed. The door was opened to the maximum opening and release. The point at which the closing motion of the door essentially stopped (a slow creeping motion after deceleration shall be disregarded) was measured.

RESULTS

[x] Surface or Concealed-in-Door Closers, Grade 1 (PT1) and Concealed-in-Floor or Overhead Concealed Closers, Grade 1 (PT5)

The point at which the closing motion of the door essentially stopped ~~[was]~~ **[**was not**]** more than 20° from release point.

~~**[ ]** Surface or Concealed-in-Door Closers, Grade 2 (PT2) and Concealed-in-Floor or Overhead Concealed Closers, Grade 2 (PT6)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 25° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Grade 3 (PT7) and Surface or Concealed-in-Door Closers, Grade 3 (PT3)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 30° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Optional (PT8A)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 7° from release point.~~

Tested by: _____ Date 2020-7-6~2020-12-1

STATIC TEST 2 TWO SPEEDS OF CONTROL: Section 4.3

METHOD

Surface or Concealed-in-Door closers, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5)

[x] a) After the Static Test 1 the general speed regulating valve was adjusted for a normal closing motion and the latch speed regulating valve was fully opened. The door was opened to approximately 45 degrees and release. The point at which the door noticeably accelerates measured.

[ ] b) If the valves do not allow a latch speed faster than the closing speed, the general speed regulation for normal closing motion was adjusted and the latching speed regulating valve was closed. The door was opened to about 45 degrees and release. The point at which the door noticeably decelerates measured.

[ ] In lieu of the above test for Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5) and at the option of the manufacturer, with the door closer mounted and adjusted to close from 90 degrees to closed between 3 and 6 seconds, the door was opened to 30 +/- 3 degrees and released. The closing force shall exceed by 30% the value specified by Table 1.

RESULTS

Surface or Concealed-in-Door closers, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5).

[x] a) The point at which the door noticeably accelerates **[**was**]** ~~**[**was not**]**~~ between the 12 in. (305 mm) and 2 in. (51 mm) marks.

[ ] b) The point at which the door noticeably decelerates shall be between the 12 in. (305 mm) and 2 in. (51 mm) marks.

~~Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5).~~

~~**[ ]** For Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5) and at the option of the manufacturer, The closing force **[**did**]** **[**did not**]** exceed by 30% the value specified by Table 1.~~

TABLE 1

Closer Size	Closing Force between the ½ in. (12.77 mm) and 3 in. (76 mm) mark (F1)		Test Door Weight
	lbf	N	
I	From 2 up to 3	From 9 up to 13	50 lbs/23 kg
II	From 3 up to 5	From 13 up to 22	80 lbs/36 kg
III	From 5 up to 8	From 22 up to 36	100 lbs/45 kg
IV	From 8 up to 11	From 36 up to 49	125 lbs/57 kg
V	From 11 up to 14	From 49 up to 62	155 lbs/70 kg
VI	14 and above	Above 62	180 LBS/82 KG

Tested by: _____ Date 2020-7-6~2020-12-1

STATIC TEST 3: Section 4.4

METHOD

Surface or Concealed-in-Door closers, Grades 1, 2, 3 (PT1, PT2, PT3, PT5, PT6, PT7)

Test #1 With the general and latch speed regulating valve(s) fully closed the door was opened to 90 degrees and release.

Test #2 With the general and latch speed regulating valve(s) fully opened the door was opened to 90 degrees and release.

RESULTS

Results #1 The door **[**did**]** ~~**[**did not**]**~~ take 60 seconds or longer to fully close.

Results #2 The door **[**did**]** ~~**[**did not**]**~~ fully close in 3 seconds or less.

STATIC TEST 5 (CLOSING FORCE FOR CLOSERS WITH ADJUSTMENT THROUGH RANGE OF SIZES): Section 4.6

METHOD

Surface or Concealed-in-Door closers, Optional (PT4H PT8M)

Test #1 The general and latch speed regulating valves were fully opened and then the closing force was adjusted to the minimum available for the closer being tested. The door was opened beyond the 3 in. (76 mm) line drawn on the floor. Holding the door open with a force meter, the door was allowed to close slowly under the power of the door closer. The greatest force exerted by the power of the door closer as the door travels between the 3 in. (76 mm) and
½ in. (12.7 mm) marks was read and recorded.

Test #2 The general and latch speed regulating valves were fully opened and then the closing force was adjusted to the maximum available for the closer being tested. The door was opened beyond the 3 in. (76 mm) line drawn on the floor. Holding the door open with a force meter, the door was allowed to close slowly under the power of the door closer. Read the greatest force exerted by the power of the door closer as the door travels between the 3 in. (76 mm) and ½ in. (12.7 mm) marks and record force.

RESULTS

Test #1 The recorded force **[**was**]** ~~**[**was not**]**~~ less than the maximum value specified in Table 1 for the minimum size closer specified by the manufacturer.

Test #2 The recorded force **[**was**]** ~~**[**was not**]**~~ equal to, or greater than the minimum value specified in Table 1 for the maximum size closer specified by the manufacturer.

Tested by: Date 2020-7-6~2020-12-1

STATIC TEST 6 (DOOR CLOSER EFFICIENCY): Section 4.7

METHOD

Surface or Concealed-in-Door closers, Grades 1, 2, 3 (PT1, PT2, PT3) and Grades 1, 2 (PT5, PT6)

The general and latch speed regulating valves were fully opened. Using a force meter, the door was opened slowly and uniformly. The opening forces F3, F4, and F5 as the door edge passes the 2 in. (51 mm), 3 in. (76 mm), and 4 in. (102 mm) mark respectively were recorded. Then starting beyond the 4 in. (102 mm) mark, the door closer was allowed to close the door in a slow and uniform manner resisted by the force meter. The force readings F6, F7, and F8 as the door edge passed the 4 in. (102 mm), 3 in. (76 mm), and 2 in. (51 mm) marks respectively were recorded. Calculate the door closer efficiency by the following formula:

Percent Efficiency = ((F6 + F7 + F8) / (F3 + F4 + F5)) x 100.

RESULTS

	F3	F4	F5	F6	F7	F8	Efficiency
Standard	114	107	98	70	73	79	69.9%
Frame	87	79	68	49	55	60	70%
Parallel	80	73	65	46	52	53	69.3%

The door closer efficiency **[**was**]** ~~**[**was not**]**~~ a minimum of 50% for sizes I and II and 60% for sizes III through VI.

STATIC TEST 7 CHECKING CYLINDER TEST: Section 4.8

METHOD

Surface, Concealed-in-Door Closers, Concealed in floor, Overhead Concealed Grades 1,2 (PT1, PT2, PT5, PT6)

The general and latch speed regulating valves were opened and then the closing force was adjusted to the maximum in accordance with the manufacturer's instructions. The door was opened beyond the 3 in. (76 mm) line drawn on the floor. The door was held open with a force meter and then allowed to close slowly under the power of the door closer. The greatest force exerted by the power of the door closer was read as the door traveled between the 3 in.
(76 mm) and ½ in. (12.7 mm) marks, and recorded as force (F1).

The force equaled or exceeded the minimum values specified in the table below, so both the latch and speed regulating valves were fully close. The door was opened to 90 degrees, then release and the door was pushed closed with a 20 lbf (89 N) force applied 30 in (762 mm) from the pivot center.

TABLE 1

Closer Size	Closing Force between the ½ in. (12.77 mm) and 3 in. (76 mm) mark (F1)		Test Door Weight
	lbf	N	
I	From 2 up to 3	From 9 up to 13	50 lbs/23 kg
II	From 3 up to 5	From 13 up to 22	80 lbs/36 kg
III	From 5 up to 8	From 22 up to 36	100 lbs/45 kg
IV	From 8 up to 11	From 36 up to 49	125 lbs/57 kg
V	From 11 up to 14	From 49 up to 62	155 lbs/70 kg
VI	14 and above	Above 62	180 LBS/82 KG

RESULTS

The time required for the door to fully close ~~[was]~~ **[**was not**]** less than 8 seconds.

STATIC TEST 8 BACKCHECK TESTS: Section 4.9

METHOD

[x] Adjustable Backcheck for Surface or Concealed-in-Door closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4D) and Adjustable Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT5 and PT6 only), Optional (PT8F).

The general and latch speed regulating valves were opened and the closing force was set. The backcheck valve was fully opened and tested by the actuating means of the test apparatus by pushing the door to 50 degrees maximum door opening. The actuating means pushed with a velocity sufficient to propel the door to a minimum opening angle of 110 degrees with the backcheck valve fully open.

The backcheck valve was then adjusted to provide an observable reduction in the door opening speed.

~~**[ ]** Advanced Backcheck for Surface or Concealed-in-Door closers, Optional (PT4J)~~

~~The general and latch speed regulating valves were opened and the closing force was set. The backcheck function was disengaged and the door was manually opened. The backcheck valve was then adjusted to provide an observable reduction in the door opening speed prior to 70 degrees of door opening, at an angle specified by the manufacturer.~~

~~**[ ]** Factory Pre-Set Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4E)~~

~~Using A closer with an adjustable backcheck as chosen by the manufacturer as representative of the model with construction which is the same or similar construction as the Factory Pre-Set Backcheck model under test, was mounted on the door closer and both the general and latch speed regulating valves were opened. The closing force was set and the backcheck valve was opened. The backcheck function was tested by the actuating means of the test apparatus pushing the door to 50 degrees maximum door opening. The actuating means pushed with a velocity sufficient to propel the door to a minimum opening angle of 110 degrees with the backcheck valve fully open. The closer was then replaced with adjustable backcheck with a closer with Factory Pre-Set Backcheck. The closer was mounted in accordance with the manufacturer's instructions for 90 degrees of opening. The general and latch speed regulating valves were both opened.~~

STATIC TEST 8 Backcheck Tests:(CONT'D) Section 4.9

RESULTS

[x] Adjustable Backcheck for Surface or Concealed-in-Door closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4D) and Adjustable Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT5 and PT6 only), Optional (PT8F).

When the backcheck valve was then adjusted the closer **[**did**]** ~~**[**did not**]**~~ have an observable reduction in the door opening speed between 60 degrees and 85 degrees of door opening and the door [did] ~~[did not]~~ completely stopped at a maximum of 90 degrees.

~~**[ ]** Advanced Backcheck for Surface or Concealed-in-Door closers, Optional (PT4J)~~

~~When the backcheck valve was then adjusted, the closer **[**did**]** **[**did not**]** have an observable reduction in the door opening speed prior to 70 degrees of door opening.~~

~~**[ ]** Factory Pre-Set Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4E)~~

~~The Factory Pre-Set Backcheck **[**did**]** **[**did not**]** provide an observable reduction in the door opening speed between 60 degrees and 85 degrees and the door **[**did**]** **[**did not**]** completely stopped at a maximum of 90 degrees.~~

STATIC TEST 9 DELAYED ACTION CLOSER TEST: Section 4.10

METHOD

Surface or Concealed-in-Door closers, Optional (PT4F) and Concealed-in-Floor or Overhead Concealed closers, Optional (PT8J)

The general and latch speed regulating valves were fully opened, the spring force was adjusted and the delayed action-regulating valve was fully close. The door was opened to 90 degrees and release.

RESULTS

The closing time between 90 degrees and 70 degrees **[**was**]** ~~**[**was not**]**~~ a minimum of 20 seconds. The point at which the door noticeably accelerates **[**was**]** ~~**[**was not**]**~~ a minimum of 60 degrees.

STATIC TEST 11: Section 4.12

METHOD

Overload Abuse Test for Surface or Concealed-in-Door closers, 1 and 2 only (PT1 and PT2 only)

The door closer was mounted on the test apparatus, as shown in Fig. 3 of ANSI/BHMA A156.4. The closing time was adjusted from 90 degrees to the closed position to 10 seconds. The test door weight shall be as described in Table 1 of ANSI/BHMA A156.4. The weights were attached to the cable in accordance with Table 2 ANSI/BHMA A156.4.

The door was opened and held to 90 degrees with the cable and weights attached. The door was then released allowing the weights to fall. The falling test weight was arrested when the door was 15 degrees from the closed position. The door was allowed to continue to close under its own momentum until it is arrested by the energy absorbing stop at 5 degrees or the door frame at 0 degrees, or in the case of double action closers, until it stops of its own accord. For Grade 1 (PT1) closers it was cycle 10 times and for Grade 2 (PT2) closers it was cycle 5 times.

RESULTS

The door closer **[**did**]** ~~**[**did not**]**~~ complete the cycles.

INTERMEDIATE CYCLE TEST: Section 5

METHOD

~~[ ] For Surface or Concealed-in-Door Closers without Back check, Grades 1, 2, 3 (PT1, PT2, PT3)and Concealed-in-Floor or Overhead Concealed Closers without Back check, Grades 1, 2, 3 (PT5, PT6, PT7)~~

~~Both the general and latch speed regulating valves were opened and the spring force was adjusted. The door was mechanically opened to 90 degrees and released, which allowed the door closer to close the door. One opening and closing constitutes one cycle.~~

~~Test Cycle door with the door closer maintaining control over the door for:~~
~~[ ] For Grade 1 (PT1), run 1,000,000 cycles for a total of 1,004,000 cycles~~
~~[ ] For Grade 2 (PT2), run 500,000 cycles for a total of 504,000 cycles~~
~~[ ] For Grade 3 (PT3), run 496,000 cycles for a total of 500,000 cycles~~

[x] For Surface or Concealed-in-Door Closers with Back check, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed Closers with Back check, Grades 1, 2, 3 (PT5, PT6, PT7)

1) Both the general and latch speed regulating valves were opened and the closing force was set. The back check valve was opened and tested by the actuating means of the test apparatus pushing the door to the 50 degrees maximum door opening. The actuating means did push with a velocity sufficient to propel the door to a minimum opening angle of 110 degrees with the back check valve fully open.

The back check valve was adjusted to provide an observable reduction in the door opening speed between 60 degrees and 85 degrees of door opening and the door shall be completely stopped at a maximum of 90 degrees. The door closer was cycled as listed below:
[x] For Grade 1 (PT1, PT5), run 100,000 cycles with the back check control functional.
[ ] For Grade 2 (PT2, PT6), run 50,000 cycles with the back check control functional.

2) Both the general and latch speed regulating valves were opened, the back check control was turned off, and the spring force adjusted. The door was mechanically opened to 90 degrees and release allowing the door closer to close the door. One opening and closing constitutes one cycle. Cycle door with the door closer maintaining control over the door for:
[x] For Grade 1 (PT1, PT5), run 400,000 cycles with back check control disengaged for a total of 504,000 cycles.
[ ] For Grade 2 (PT2, PT6), run 200,000 cycles with back check control disengaged for a total of 254,000 cycles.
[ ] For Grade 3 (PT3, PT7), run 496,000 cycles with back check control disengaged for a total of 500,000 cycles.

INTERMEDIATE CYCLE TEST: (CONT'D) Section 5

RESULTS

The door closer **[**did**]** ~~**[**did not**]**~~ complete the cycles.

Note on Spring Force Adjustment: Once spring force is set, adjust all speed regulating valves for a door closing time from a 90 degree opening to between 3 and 6 seconds. Maintain this time during the cycling by re-regulating if necessary.

INTERIM STATIC TEST: Section 6

METHOD

The following tests were repeated, as applicable to the closer type:

[x] Range of Checking Control (4.2),
[x] Adjustment Through Range of Sizes (4.6),
[x] Door Closer Efficiency (4.7),
[x] Checking Cylinder Test (4.8),
[x] Backcheck Tests (4.9),
[x] Delayed Action Closer Test (4.10).

RESULTS

[x] Range of Checking Control (4.2):
[x] Surface or Concealed-in-Door Closers, Grade 1 (PT1) and Concealed-in-Floor or Overhead Concealed Closers, Grade 1 (PT5)

The point at which the closing motion of the door essentially stopped ~~**[**was**]**~~ **[**was not**]** more than 20° from release point.

~~**[ ]** Surface or Concealed-in-Door Closers, Grade 2 (PT2) and Concealed-in-Floor or Overhead Concealed Closers, Grade 2 (PT6)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 25° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Grade 3 (PT7) and Surface or Concealed-in-Door Closers, Grade 3 (PT3)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 30° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Optional (PT8A)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 7° from release point.~~

[x] Adjustment Through Range of Sizes (4.6)
Test #1 The recorded force **[**was**]** ~~**[**was not**]**~~ less than the maximum value specified in Table 1 for the minimum size closer specified by the manufacturer.

Test #2 The recorded force **[**was**]** ~~**[**was not**]**~~ equal to, or greater than the minimum value specified in Table 1 for the maximum size closer specified by the manufacturer.

INTERIM STATIC TEST: (CONT'D) Section 6

[x] Door Closer Efficiency (4.7),

	F3	F4	F5	F6	F7	F8	Efficiency
Standard	113	105	98	70	74	80	70.9%
Frame	87	77	67	49	57	61	72.3%
Parallel	80	72	64	47	53	53	70.8%

The door closer efficiency **[**was**]** ~~**[**was not**]**~~ a minimum of 50% for sizes I and II and 60% for sizes III through VI.

[x] Checking Cylinder Test (4.8),
The time required for the door to fully close ~~**[**was**]**~~ **[**was not**]** less than 8 seconds.

[x] Backcheck Tests (4.9),
[x] Adjustable Backcheck for Surface or Concealed-in-Door closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4D) and Adjustable Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT5 and PT6 only), Optional (PT8F).

When the backcheck valve was then adjusted the closer **[**did**]** ~~**[**did not**]**~~ have an observable reduction in the door opening speed between 60 degrees and 85 degrees of door opening and the door **[**did**]** ~~**[**did not**]**~~ completely stopped at a maximum of 90 degrees.

~~**[ ]** Advanced Backcheck for Surface or Concealed-in-Door closers, Optional (PT4J)~~

~~When the backcheck valve was then adjusted, the closer **[**did**]** **[**did not**]** have an observable reduction in the door opening speed prior to 70 degrees of door opening.~~

~~**[ ]** Factory Pre-Set Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4E)~~

~~The Factory Pre-Set Backcheck **[**did**]** **[**did not**]** provide an observable reduction in the door opening speed between 60 degrees and 85 degrees and the door **[**did**]** **[**did not**]** completely stopped at a maximum of 90 degrees.~~

[x] Delayed Action Closer Test (4.10)
The closing time between 90 degrees and 70 degrees **[**was**]** ~~**[**was not**]**~~ a minimum of 20 seconds. The point at which the door noticeably accelerates, **[**was**]** ~~**[**was not**]**~~ a minimum of 60 degrees.

FINAL CYCLE TEST: Section 7

METHOD

~~[ ] For Surface or Concealed-in-Door Closers without Backcheck, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed Closers without Backcheck, Grades 1, 2, 3 (PT5, PT6, PT7)~~

~~The general and latch speed regulating valves were opened and the spring force was adjusted. The door was mechanically opened to 90 degrees and released, which allowed the door closer to close the door. One opening and closing constitutes one cycle.~~
~~[ ] For Grade 1 (PT1, PT5), run 996,000 cycles for a total of 2,000,000 cycles.~~
~~[ ] For Grade 2 (PT2, PT6), run 496,000 cycles for a total of 1,000,000 cycles.~~
~~[ ] For Grade 3 (PT3, PT7), total cycle requirement of 500,000 cycles.~~

[x] For Surface or Concealed-in-Door Closers with Back check, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed Closers with Backcheck, Grades 1, 2, 3 (PT5, PT6, PT7)

The general and latch speed regulating valves were opened, the back check control was turned off and the spring force was adjusted. The door was mechanically opened to 90 degrees and released, which allowed the door closer to close the door. One opening and closing constitutes one cycle.

[x] For Grade 1 (PT1, PT5), run 996,000 cycles for a total of 1,500,000 cycles.
[ ] For Grade 2 (PT2, PT6), run 496,000 cycles for a total of 750,000 cycles.
[ ] For Grade 3 (PT3, PT7), total cycle requirements of 500,000 cycles.

[ ] Additional Test Required for Double Acting Floor & Overhead Concealed Closers, Grades 1 & 2
Cycle a grade 1 closer an additional 10,000 cycles and a grade 2 closer for 5,000 cycles from 20 degrees to 0 degrees to 20 degrees (opposite direction) for a total of 40 degrees of door travel.

The latch speed was adjusted to have hydraulic control by making closing speed from the 20 degree open position 1 second +/- 10% slower than that with the valves completely open.

The door was cycled with an air actuator exerting 15 lbf (67 N) applied both ways at 30 in. (762 mm) from the pivot point.

RESULTS

The door closer **[**did**]** ~~**[**did not**]**~~ complete the cycles.

FINAL STATIC TEST: Section 8

METHOD

[x] Range of Checking Control (4.2),
[x] Two speeds of closing control (4.3)
[x] Adjustable Closing Speed (4.4)
[ ] Closing force for fixed closers 15 to 50% adjustment (4.5),
[x] Adjustment Through Range of Sizes (4.6),
[x] Door Closer Efficiency (4.7),
[x] Checking Cylinder Test (4.8),
[x] Backcheck Tests (4.9),
[x] Delayed Action Closer Test (4.10),
[ ] Dead Stop Test (4.11),
[x] Overload Abuse Test for Surface or Concealed-in-Door closers (4.12),
[ ] Automatic Hold-Open Test for Concealed-in-Floor or Overhead Concealed closers (4.13),
[ ] Selector Hold-Open or Non-Hold-Open Test for Concealed-in-Floor or Overhead Concealed closers (4.14),
[ ] 165 Degree of Door Opening Test for Concealed-in-Floor or Overhead Concealed closers (4.15).

RESULTS

[x] Range of Checking Control (4.2):
[x] Surface or Concealed-in-Door Closers, Grade 1 (PT1) and Concealed-in-Floor or Overhead Concealed Closers, Grade 1 (PT5)

The point at which the closing motion of the door essentially stopped ~~**[**was**]~~ **[**was not**]** more than 20° from release point.

~~**[ ]** Surface or Concealed-in-Door Closers, Grade 2 (PT2) and Concealed-in-Floor or Overhead Concealed Closers, Grade 2 (PT6)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 25° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Grade 3 (PT7) and Surface or Concealed-in-Door Closers, Grade 3 (PT3)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 30° from release point.~~

~~**[ ]** Concealed-in-Floor or Overhead Concealed Closers, Optional (PT8A)~~

~~The point at which the closing motion of the door essentially stopped **[**was**]** **[**was not**]** more than 7° from release point.~~

[x] Two speeds of closing control (4.3)
Surface or Concealed-in-Door closers, Grades 1, 2, 3 (PT1, PT2, PT3) and Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5).

FINAL STATIC TEST: (CONT'D) Section 8

[x] a) The point at which the door noticeably accelerates **[**was**]** ~~**[**was not**]**~~ between the 12 in. (305 mm) and 2 in. (51 mm) marks.

[ ] b) The point at which the door noticeably decelerates shall be between the 12 in. (305 mm) and 2 in. (51 mm) marks.

~~Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5).~~

~~**[ ]** For Concealed-in-Floor or Overhead Concealed closers, Grades 1 (PT5) and at the option of the manufacturer, The closing force **[**did**]** **[**did not**]** exceed by 30% the value specified by Table 1.~~

[x] Adjustable Closing Speed (4.4)

Results #1 The door **[**did**]** ~~**[**did not**]**~~ take 60 seconds or longer to fully close.

Results #2 The door **[**did**]** ~~**[**did not**]**~~ fully close in 3 seconds or less.

[ ] Closing force for fixed closers 15 to 50% adjustment (4.5)

[x] Adjustment Through Range of Sizes (4.6)
Test #1 The recorded force **[**was**]** ~~**[**was not**]**~~ less than the maximum value specified in Table 1 for the minimum size closer specified by the manufacturer.

Test #2 The recorded force **[**was**]** ~~**[**was not**]**~~ equal to, or greater than the minimum value specified in Table 1 for the maximum size closer specified by the manufacturer.

[x] Door Closer Efficiency (4.7),

	F3	F4	F5	F6	F7	F8	Efficiency
Standard	108	103	97	76	80	80	76.6%
Frame	70	76	83	55	59	63	77.3%
Parallel	74	67	59	47	51	57	77.5%

The door closer efficiency **[**was**]** ~~**[**was not**]**~~ a minimum of 50% for size I and II and 60% for sizes III through VI.

[x] Checking Cylinder Test (4.8),
The time required for the door to fully close ~~**[**was**]**~~ **[**was not**]** less than 8 seconds.

FINAL STATIC TEST: (CONT'D) Section 8

[x] Backcheck Tests (4.9),
[x] Adjustable Backcheck for Surface or Concealed-in-Door closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4D) and Adjustable Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT5 and PT6 only), Optional (PT8F).

When the backcheck valve was then adjusted the closer **[**did**]** ~~**[**did not**]**~~ have an observable reduction in the door opening speed between 60 degrees and 85 degrees of door opening and the door **[**did**]** ~~**[**did not**]**~~ completely stopped at a maximum of 90 degrees.

~~**[ ]** Advanced Backcheck for Surface or Concealed-in-Door closers, Optional (PT4J)~~

~~When the backcheck valve was then adjusted the closer **[**did**]** **[**did not**]** have an observable reduction in the door opening speed prior to 70 degrees of door opening.~~

~~**[ ]** Factory Pre-Set Backcheck for Concealed-in-Floor or Overhead Concealed closers, Grades 1 and 2 only (PT1 and PT2 only), Optional (PT4E)~~

~~The Factory Pre-Set Backcheck **[**did**]** **[**did not**]** provide an observable reduction in the door opening speed between 60 degrees and 85 degrees and the door **[**did**]** **[**did not**]** completely stopped at a maximum of 90~~ degrees.

[x] Delayed Action Closer Test (4.10)
The closing time between 90 degrees and 70 degrees **[**was**]** ~~**[**was not**]**~~ a minimum of 20 seconds. The point at which the door noticeably accelerates **[**was**]** ~~**[**was not**]**~~ a minimum of 60 degrees.

~~**[ ]** Dead Stop Test (4.11)~~
~~**[ ]** Dead Stop Degree Test for Surface or Concealed-in-Door closers, (PT4G)~~
~~The degree at the opening **[**was**]** **[**was not**]** 90 +/- 2 degrees.~~

~~**[ ]** Dead Stop Degree Test for Concealed-in-Floor or Overhead Concealed closers, (PT8G)~~
~~The degree at the opening **[**was**]** **[**was not**]** 85 to 105 +/- 2 degrees.~~

~~**[ ]** Dead Stop Test for PT4G and PT8G~~
~~The door closer **[**did**]** **[**did not**]** withstand the force as listed with no impairment of function to the closer mechanism or mounting: Grade 1 - 150 lbf (890 N), Grade 2 - 100 lbf (445 N), Grade 3 - 50 lbf (225 N).~~

FINAL STATIC TEST: (CONT'D) Section 8

[x] Overload Abuse Test for Surface or Concealed-in-Door closers (4.12)
The door closer **[**did**]** ~~**[**did not**]**~~ complete the cycles.

~~**[ ]** Automatic Hold-Open Test for Concealed-in-Floor or Overhead Concealed closers (4.13),~~
~~The closer **[**did**]** **[**did not**]** have an automatic hold-open between 85 and 180 +/- 2 degrees.~~

~~**[ ]** Selector Hold-Open or Non-Hold-Open Test for Concealed-in-Floor or Overhead Concealed closers (4.14),~~
~~a) The hold-open **[**did**]** **[**did not**]** occur at the door opening specified by the manufacturer +/- 2 degrees.~~

~~b) The closer **[**did**]** **[**did not**]** engage hold-open.~~

~~**[ ]** 165 Degree of Door Opening Test for Concealed-in-Floor or Overhead Concealed closers (4.15).~~
~~For single acting closers, the door **[**did**]** **[**did not**]** open to 165 +/- 2 degrees without harm to the closer, trim permitting.~~

~~For double acting closers, the door **[**did**]** **[**did not**]** open to 165 +/- 2 degrees in either direction, trim permitting.~~

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