REPORT OF THE TESTING IN ACCORDANCE WITH EN1154:1997/A1:2002/AC:2006 SAMPLE B.

AST4003

COMMERCIAL IN CONFIDENCE
TEST REPORT NWL-910-688

Northwest Laboratories Ltd
Unit 3 Astra Business Centre
Roman Way, Preston PR2 5AP

Registered in England: 12616379

www.northwestlabs.co.uk

This report shall not be reproduced except in full, (and then only as permitted by copyright laws), with written approval from Northwest Laboratories.

INTRODUCTION

The test was conducted by Northwest Laboratories Ltd at their premises at Unit 3 Astra Business Centre, Roman Way, Preston PR2 5AP, United Kingdom.

Test Specimen received : 04/03/2024

Test start date: 04/03/2024

Test end date: 09/05/2024

Tests performed by: James Gibbs

Test observed by: Mark Gallagher

Test report: NWL-910-688

Report issued by: Mark Gallagher Date: 09/05/2024

CLIENT DETAILS

Report prepared for: Astra Door Controls

Address: Unit 3, Astra Business Centre, Preston, PR2 5AP

Customer Product Ref: AST4003

Product Type: Concealed Jamb Mounted

Power Size: 3

Item(s) were received in good condition? Yes

If no describe the issues found:

Contents

Page 4 – Cycle Test report (Form 940)

Page 7 – Efficiency test report (Form 950)

Page 8 – Overload test report (Form 960)

Page 9 – Decision Rule and End of Report

Reason for Test				Power Size	
EN1154:1997/A1:2002 Sample B				3	
Planned Start	**Description of Test Unit**			**Start Counter**	**Test Rig No.**
04/03/2024	AST4003 – Concealed Jamb Mounted			0	16
Part No	**Description**	**Revision**	**Comments**		
AST4003	4000 series power size 3	-	Supplied by the manufacturer (D.O.M 04.03.2024)		
Customer Notes Test to EN1154:1997/A1:2002 sample B					

Specification	Requirement	Result
Closer strength – Size 3	Test Door Mass 60Kg	60kg
Max Opening angle	105° Grade 3 or 180° Grade 4	105°
Door Closes from	105° Grade 3 or 180° Grade 4	105°
Door under control from	70° minimum	75°
Set closing time 90° to 0°	3-7 Secs	6
Set Opening time 0° to 90°	2-3 Secs	2.5
Latch effect adjustable	If incorporated must be effective over a maximum range of 15° and shall be adjustable.	N/A
Measured latch angle		N/A

Date Finish	Results			End Counter
03.05.2024	Pass ☒	Fail ☐	Stopped ☐	500,000

Conclusions
500,000 cycles completed

Further Actions
N/A

Counter	Date	Temp (°C)	Comments
0	04.03.24	21.5	Start - Cycle to 5,000
5,000	05.03.24	20	Cycle test paused for power trace and overload

Tests after 5000 cycles

Specification	Test requirement	Test Result
Cycles completed	5,000 Cycles	5,000 Cycles
Ambient Temp	15-30°C	20°C
Closer Temp	Within 2° of ambient	19.5°C

Closing time	Min: less than/equal to 3 Secs	2.23 secs
	Max: greater than/equal to 20 Secs	33.45 secs
Closing Overload Test (5000)	SEE QP 9.6/FORM 960	
Delayed Action Tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer Position of end of delay zone. Delay time adjustable to >20 secs	n/a

Continued cycling 5000 to 500,000 cycles

Delayed action closers only	Delay time set to 20 secs Dwell time set to 270 secs Perform 500 cycles Delay time for last 5 cycles 10-30 s	n/a
Closing time	Closing time 90-0° set to 3-7 secs	n/a
Back Check	Opening speed at 60° between 51.6 and 63° per sec. Arrest angle < 80°	n/a
Backcheck closers cycle up to 100,000 cycles with backcheck as set.		
Backcheck	Opening speed at 60° between 51.6 and 63° per sec. Arrest angle < 90°	n/a
Backcheck closers cycle from 100,000-500,000 without backcheck		n/a
None backcheck closers cycle from 5,000-500,000 Cycles		n/a

Cycle Test Log

Counter	Date	Temp (°C)	Comments
5,039	05.03.24	20	Cycle test resumed
21,861	07.03.24		
142,817	21.03.24	22	
251,742	03.04.24		Cycle test paused for rig maintenance
251,779	03.04.24		Cycle test resumed
260,660	04.04.24		Cycling fine
375,819	18.04.24		
500,000	03.05.24		Cycle test completed

Tests after 500,000 cycles

Specification	Test requirement	Test Result
Cycles completed	500,000 Cycles	500,000
Ambient Temp	15-30°C	20°C
Closer Temp	Within 2° of ambient	20.5°C

Specification	Test requirement	Test Result
Closing time	Min: less than/equal to 3 Secs	secs
	Max: greater than/equal to 20 Secs	secs
Closing Overload Test (500,000)	SEE QP 9.6/FORM 960	
Delayed Action Tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer. Position of end of delay. Delay time adjustable to >20 secs.	n/a

This report applies only to the following part(s) of EN1154:1997/A1:2002 clause 7.3 Sample B

Power Size: 3 <-- Set power size
Door Mass: 60 Kg
Test option:

Job Ref: 688
Product Code: AST4003

5000 Cycle Test

Test 1	05/03/2024 10:19
Test 2	05/03/2024 10:25
Test 3	05/03/2024 10:33

Closer Temperature: 19.5 °C
Ambient Temperature: 20 °C

Specification	Test 1	Test 2	Test 3	Average	Test requirement		
Opening 0-4°	*26.71*	*26.80*	*26.78*	26.76	*47*	Nm Max	Pass
Opening 0-60°	*31.36*	*31.25*	*31.27*	31.29	*47*	Nm Max	Pass
Opening 88-92°	*31.03*	*30.48*	*30.74*	30.75	*4*	Nm Min	Pass
Closing 0-4°	*22.04*	*21.97*	*22.04*	22.02	*18*	Nm Min	Pass
Closing 88-92°	*21.07*	*21.15*	*21.13*	21.12	6	Nm Min	Pass
Closing 105-2°	*20.87*	*21.00*	*20.94*	20.94	*4*	Nm Min	Pass
Efficiency	*82.54*	*81.95*	*82.30*	82.26	*55*	% Min	Pass

500,000 Cycle Test

Test 4	03/05/2024 09:16
Test 5	03/05/2024 09:24
Test 6	03/05/2024 09:28

Closer Temperature: 20.5 °C
Ambient Temperature: 20 °C

Specification	Test 1	Test 2	Test 3	Average	Test requirement		
Opening 0-4°	*25.33*	*25.48*	*25.38*	25.39	*47*	Nm Max	Pass
Opening 0-60°	*31.00*	*30.33*	*30.53*	30.62	*47*	Nm Max	Pass
Opening 88-92°	*34.14*	*33.45*	*33.14*	33.58	*4*	Nm Min	Pass
Closing 0-4°	*21.62*	*21.55*	*21.51*	21.56	*18*	Nm Min	Pass
Closing 88-92°	*21.15*	*21.11*	*20.76*	21.01	6	Nm Min	Pass
Closing 105-2°	*16.98*	*16.77*	*17.68*	17.14	*4*	Nm Min	Pass
Efficiency	*85.36*	*84.58*	*84.78*	84.91	*55*	% Min	Pass

			Closing			Opening		Efficiency
Power Size	Leaf mm Max	Door Mass Kg	0-4 Min Nm Min	0-4 Max Nm Max	88-92 Nm Min	Any Nm Min	0-60 Nm Max	0-4 % Min
1	750	20	9	13	3	2	26	50
2	850	40	13	18	4	3	36	50
3	950	60	18	26	6	4	47	55
4	1100	80	26	37	9	6	62	60
5	1250	100	37	54	12	8	83	65
6	1400	120	54	87	18	11	134	65
7	1600	160	87	140	29	18	215	65

Taken from EN1154:1997/A1:2002 : Table 1

This report applies only to the following part(s) of EN1154:1997/A1:2002 clause 7.2 Sample A

Uncertainty of Measurement

Clause **7.1.1** of the standard sets out the following tolerances for measurement made throughout testing:

Mass, expressed in kilograms (KG)	±2%
Length, expressed in millimetres (mm)	±2%
Angular position, expressed in degrees (°)	±2°
Force, expressed in Newtons (N)	±2%
Time, expressed in seconds (s)	±5%
Temperature, expressed in degrees celcius (°C)	±2°C
Moment, expressed in Newton-meters (Nm)	±2%

The uncertainty of measurements calculated for a confidence level of 95% throughout these tests are within the limits of these tolerances.

Power Size: 3 <-- Set power size

Door Mass: 60kg

Overload Weight 21kg

Job Ref: 688

Product Code: AST4003

5000 Cycles

Specification	Test requirement	Test Result	Pass/Fail
Closing time	Min: less than/equal to 3 Secs	2.23 sec	Pass
	Max: greater than/equal to 20 Secs	33.45 sec	Pass
Closing Overload	Overload weight	21kg	Pass
Test	Closing time 90-0° set to 10 secs	9.91	Pass
	Overload weight arrest at 15°	15°	Pass
	10x Overload tests performed	10	Pass
Delayed Action Tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer Position of end of delay zone. Delay time adjustable to >20 secs	N/A	N/A

500,000 Cycles

Specification	Test requirement	Test Result	Pass/Fail
Closing time	Min: less than/equal to 3 Secs	2.18 sec	Pass
	Max: greater than/equal to 20 Secs	28.25 secs	Pass
Closing Overload	Overload weight	21kg	Pass
Test	Closing time 90-0° set to 10 secs	9.94	Pass
	Overload weight arrest at 15°	15	Pass
	10x Overload tests performed	10	Pass
Delayed Action Tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer Position of end of delay zone. Delay time adjustable to >20 secs	N/A	N/A

Power Size:	1	2	3	4	5	6	7
Test Door mass:	*20kg*	*40kg*	*60kg*	*80kg*	*100kg*	*120kg*	*160kg*
Overload Test weight:	15kg	18kg	21kg	24kg	27kg	30kg	33kg
Nm Min:	3	4	6	9	12	18	29

Taken from EN1154:1997/A1:2002 Table 2

This report applies only to the following part(s) of EN1154:1997/A1:2002 clause 7.3.4.4

Uncertainty of Measurement	
Clause **7.1.1** of the standard sets out the following tolerances for measurement made throughout testing:	
Mass, expressed in kilograms (KG)	±2%
Length, expressed in millimetres (mm)	±2%
Angular position, expressed in degrees (°)	±2°
Force, expressed in Newtons (N)	±2%
Time, expressed in seconds (s)	±5%
Temperature, expressed in degrees celcius (°C)	±2°C
Moment, expressed in Newton-meters (Nm)	±2%
The uncertainty of measurements calculated for a confidence level of 95% throughout these tests are within the limits	

The AST4003, Concealed Jamb mounted door closer was fully tested to EN1154:1997/A1:2002 Sample B Sample B at power size 3, and met with all the durability, efficiency and overload requirements with no visual or mechanical signs of any issues.

Decision Rule

To comply with the requirements of ISO 17025:2017 the decision rules used by Northwest labs are as follows:-

If a result falls within the acceptance interval it will be a PASS for that section of the test and the risk of false accept will be 2.5%.

If the result falls within the specified guard band, it will be a CONDITIONAL PASS for that section and the risk of false accept will be 50%.

If the result falls outside the tolerance limits it will be a FAIL.

Based on our measured uncertainty multiplied by a factor of k=2.0 to give a confidence level of 95%.

The decision rule applies to the following forms within this document:

Forms 940, 950 and 960

Signed by: Mark gallagher ..... Date: 09.05.2024

Reviewed by ..... Date 09.05.2024

End of test report.