050-19XX Family Cycle Test Report

Company: Tri*Mark* Corporation

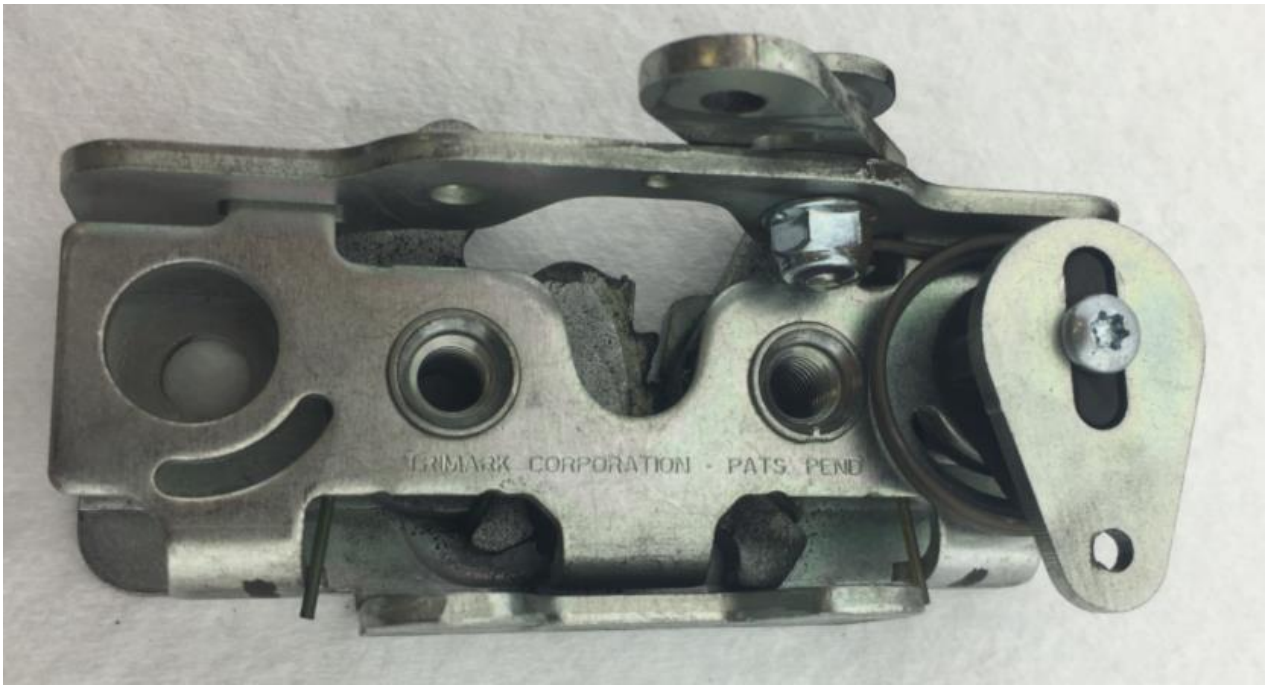
Address: 500 Bailey Ave
New Hampton, Ia. 50659

Product Code: 050-19XX (Two Position)

Reference Test Document: ET19428

Date Tested: 11/11/20 thru 7/01/21

PICTURE IS FOR REFERENCE ONLY



DISCLAIMERS

This document is intended to provide a general overview of elements that affect cycle life and performance of TriMark two-rotor latches. In no way is it intended to guarantee performance of such product in the customer's particular application.

TriMark recognizes that applications of this latch may fall within the requirements of FMVSS 206 and SAE J839 safety standards for on-road and off-road operator entrance doors.

These safety related requirements are dependent on door application, e.g. front and rear hinged doors, sliding doors, or hinged upward swinging doors. The entire door hardware system must be included in the design/analysis process: latch, handle, lock mechanism, rods/linkages, fasteners, hinges, etc. This ensures compatibility of all components within the hardware system. If FMVSS 206 is a requirement, then all of the components within the door system must comply with strength, inertia and locking requirements as specified within the Standard.

TriMark assumes no liability for application of latches within systems which are designed, validated, and produced without the involvement of TriMark engineering. It must also be noted that both FMVSS206 and SAEJ839 are standards intended to cover entire SYSTEMS and as such the latch is merely a component of that system and shall not be construed to be a system within itself.

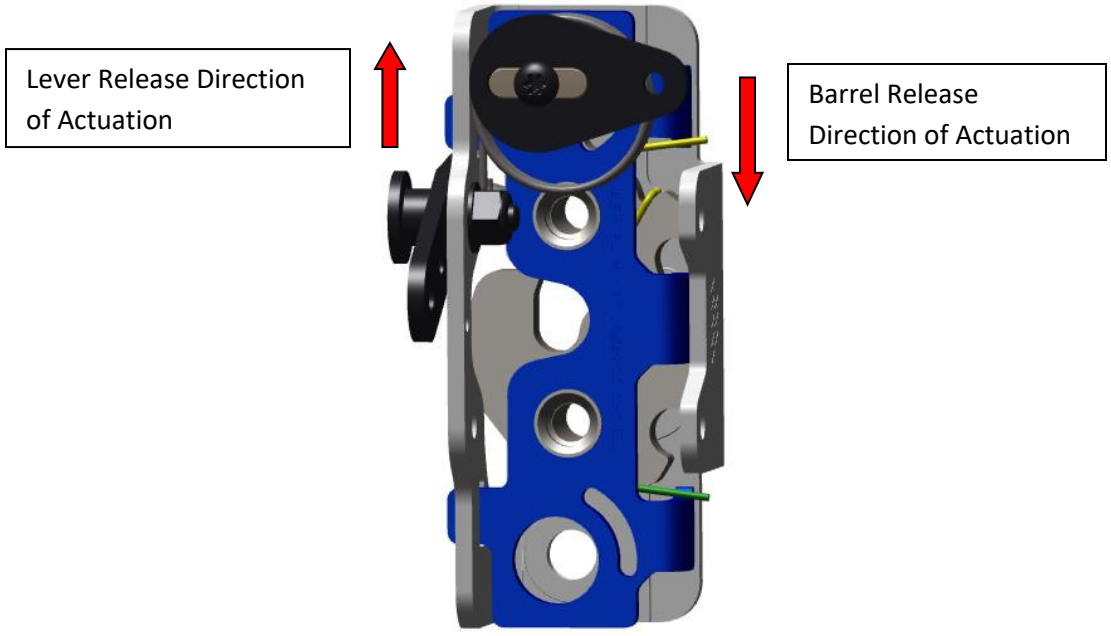
Customers applying TriMark product must take into account a myriad of factors to ensure proper life cycle and performance of the door entry system. TriMark encourages customers to seek the assistance of our professional Engineering Staff for details and assistance in applying our products to their needs.

Table of Contents

1. General Information

1.1 Description of Product

Manufacturer:	TriMark Corporation
Product Name:	050-1900, RH 2 Position Assembly
Sample Quantity:	14
Failure Criteria:	When the rotor and catch will no longer engage
	When the latch cannot hold the striker bolt load exerted by the test equipment
	When the latch will not run beyond 100 cycles without adjustment



2. Factors for Success

2.1 List of Factors

- Minimize Striker Bolt Load ***(SBL)*** throughout life of system

    - Take into account door seal loads
- Striker bolt alignment
    - Maintain proper control of installation alignment
    - Design for minimum hinge sag over time
    - Account for both centerline and axial alignment in design planning
    - For Proper alignment of striker please download Striker Installation pdf document on TriMark website. www.trimarkcorp.com
- Environmental conditions of the system
    - Minimize dust and dirt ingress
    - Minimize moisture ingress
- Weight of the door and how the door is supported.
    - Latch is designed to keep door closed, it is not designed to support the door
    - Design for minimum hinge sag over time
    - Welding on or near latches during installation is PROHIBITED and will cause premature failure of critical internal components
- Properly ***Torque*** mounting fasteners during installation
- Properly lubricate moving components throughout life of product

3. Test Information

(Testing was done in test department environment and results in actual application may show different results)

3.1 Test Equipment

Bench Cycle Test Equipment.

3.2 Laboratory Ambience Condition

70°F ambient temperature

3.3 Test Condition

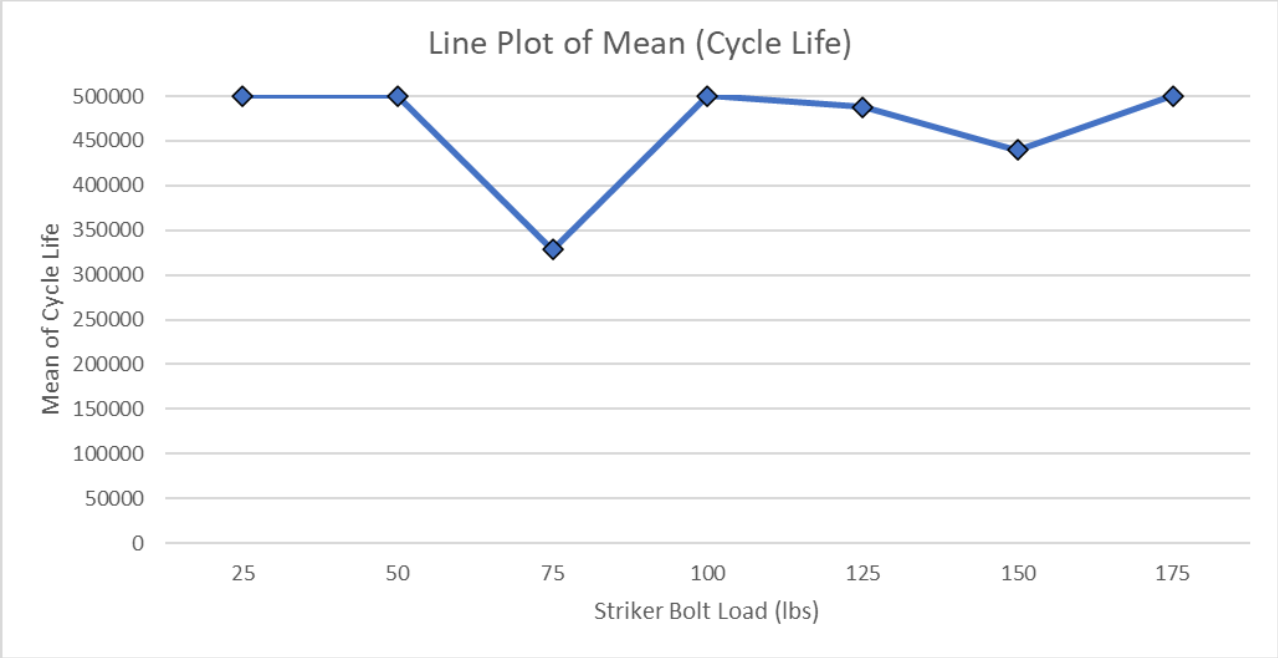
Fixture simulated proper Strike Bolt alignment.

3.4 Results and Observations

It is observed from this testing that the high striker bolt loads significantly contribute to reduced cycles of the latch.

3.4.1 Cycle Test Results

Example	SBL (lb)	SBL (kg)	Cycle Count
1	25	11.3	500000
2	25	11.3	500000
3	50	22.6	500000
4	50	22.6	500000
5	75	34	432385
6	75	34	224449
7	100	45.3	500000
8	100	45.3	500000
9	125	56.7	476159
10	125	56.7	500000
11	150	68	500000
12	150	68	380201
13	175	79.4	500000
14	175	79.4	500000



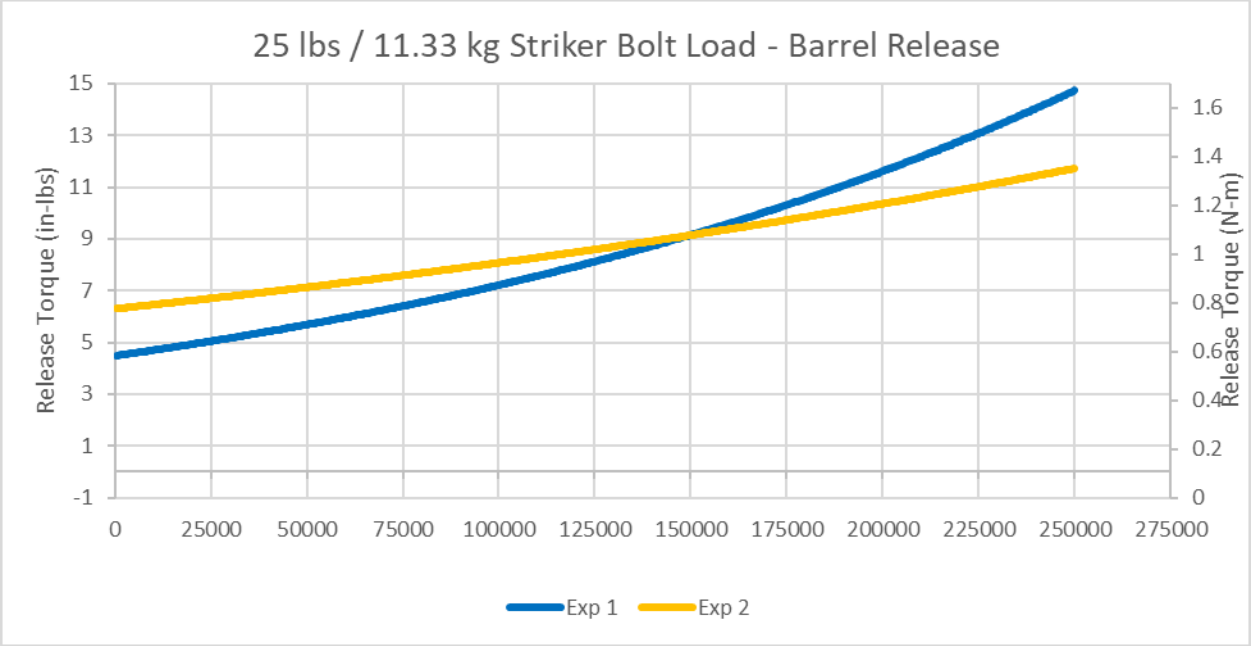
One cycle represents striker engaging latch – release from the barrel trip lever, then striker engaging latch again and releasing from the lever trip release. Thus, if the latch reaches 500,000 total cycles then each release lever achieved 250,000 cycles each.

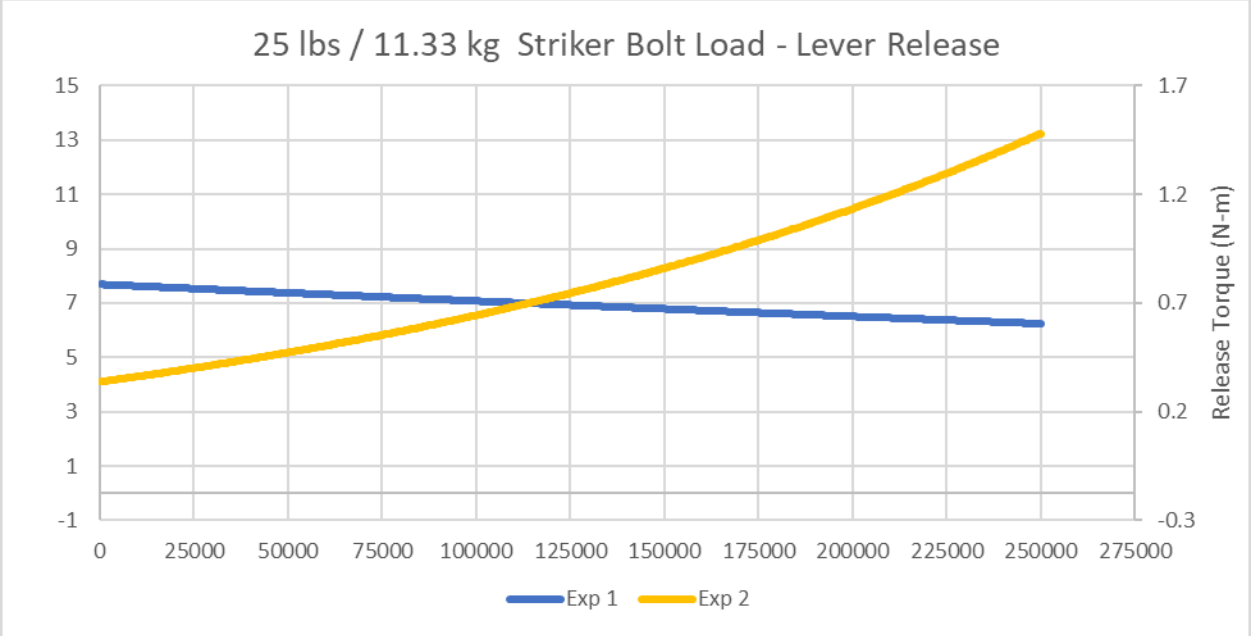
Lubrication

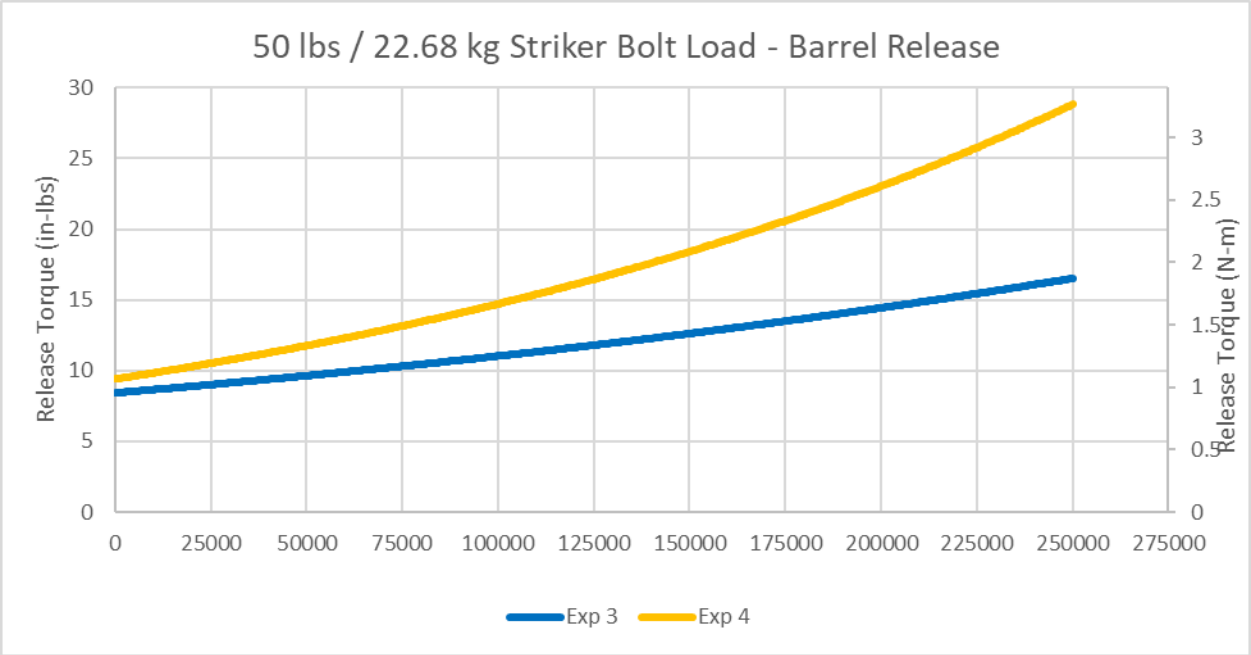
Products manufactured by Tri*Mark* are lubricated and shipped with the minimum amount of lubrication to function correctly when they leave the factory. Many products have a dry-type solid film lubricant applied that will give years of trouble free performance however; mechanical products do require maintenance and periodic lubrication. The application of a quality lubricant such as Alpha 2000 or its equivalent, will maintain the quality and performance of the Tri*Mark* products.

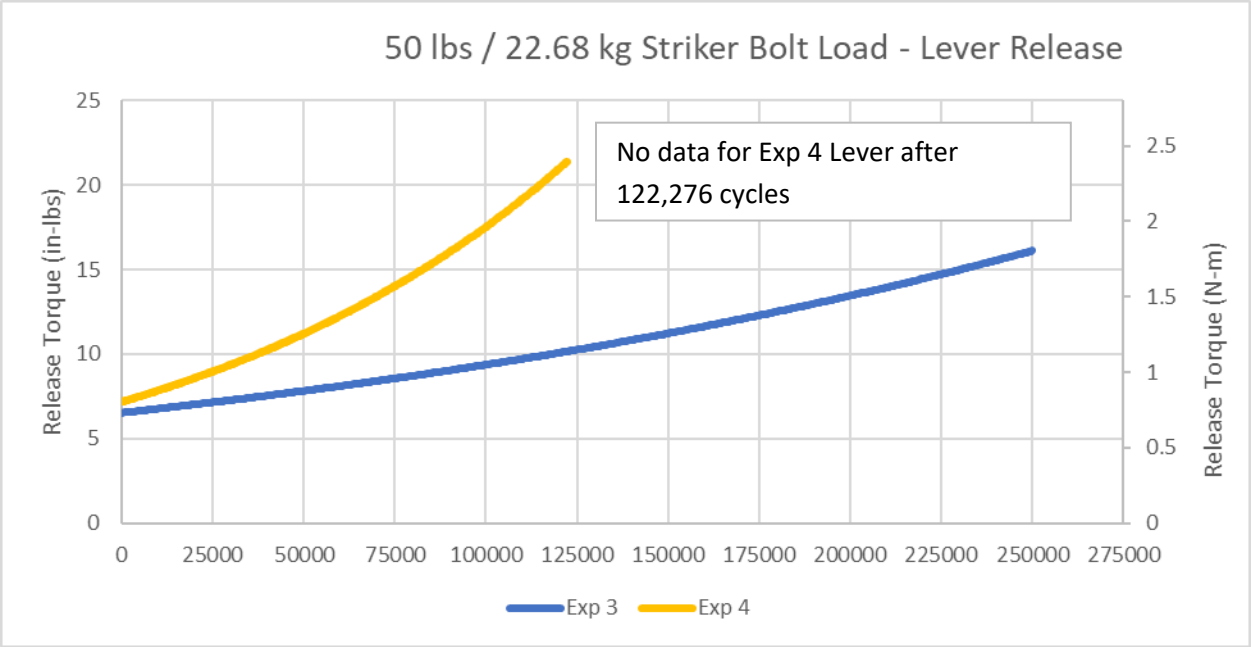
Please note by adding a lubricant to the latch it will increase the chance of the lubricant picking up contaminants such dust and dirt. These contaminants can cause adverse affects to the performance/life of the latch. However, the results of this testing conclude that, applications with a high strike bolt load require additional lubricant to increase the cycle life of the product.

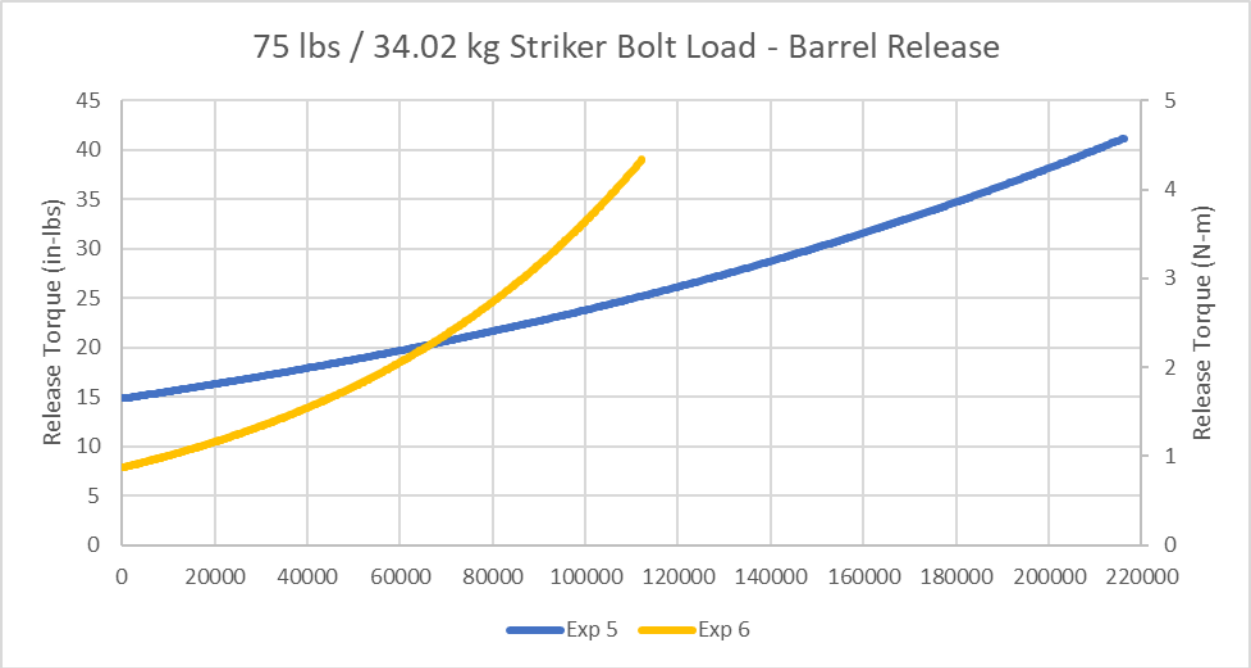
3.4.2 Average Release Efforts

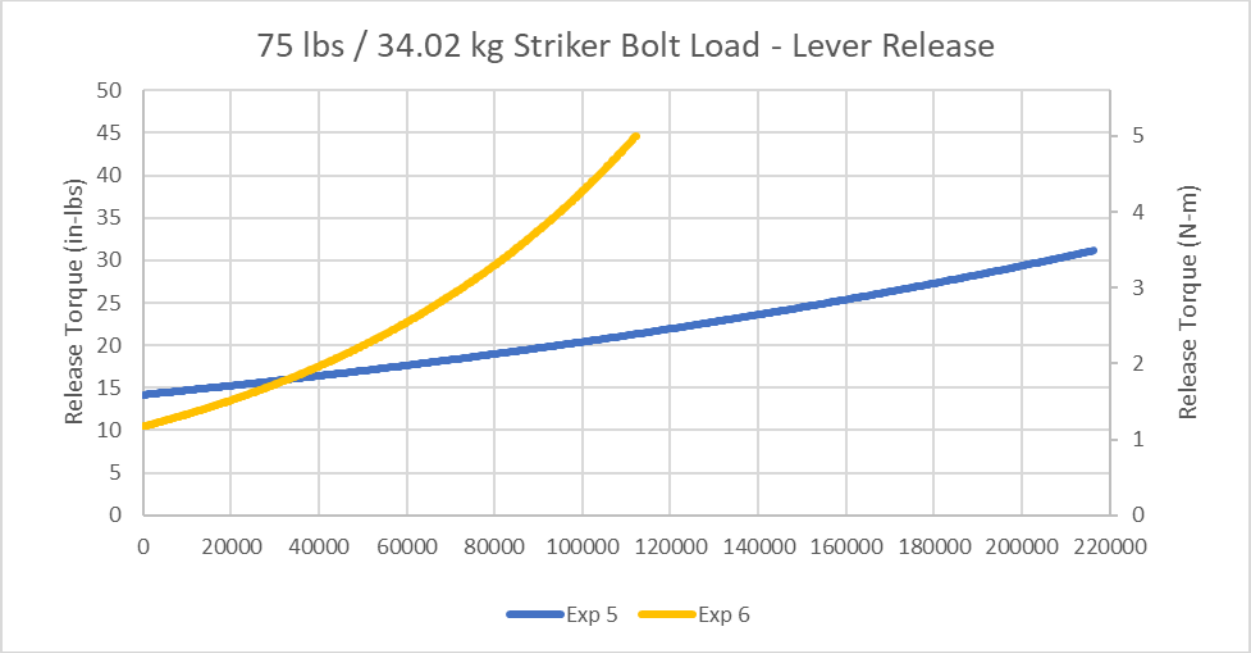

25 lbs / 11.33 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
15
13
11
9
7
5
3
1
-1
Release Torque (N-m)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 1
Exp 2

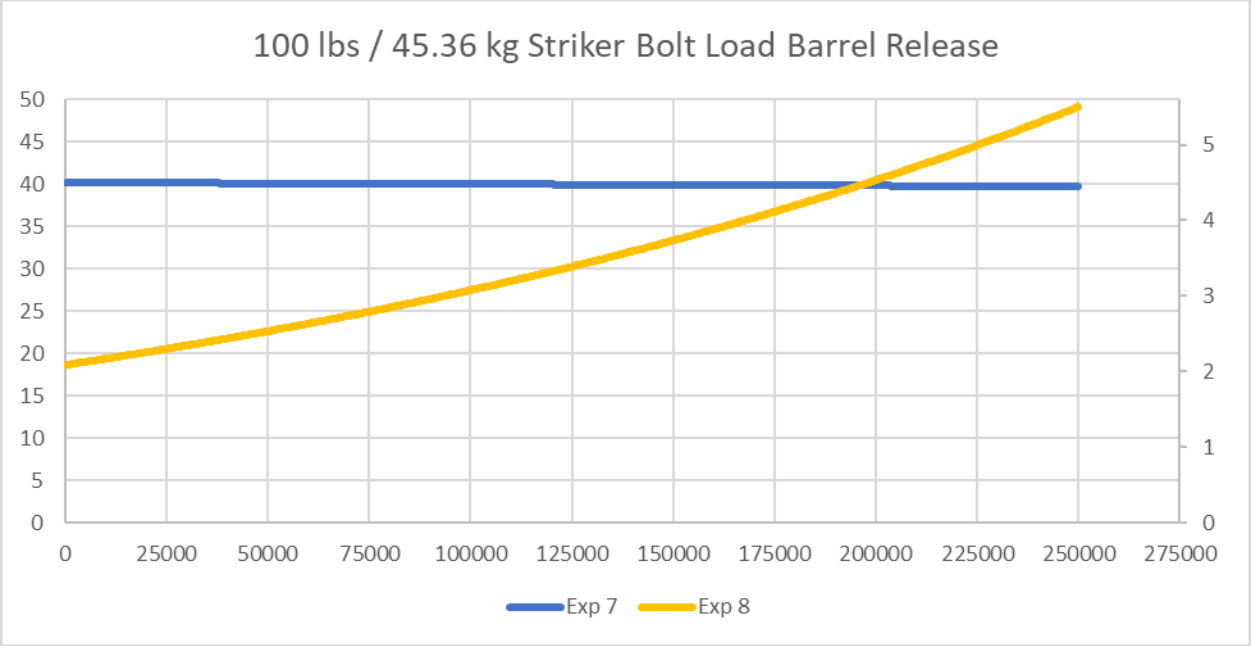

25 lbs / 11.33 kg Striker Bolt Load - Lever Release
15
13
11
9
7
5
3
1
-1
1.7
1.2
0.7
0.2
-0.3
Release Torque (N-m)
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 1
Exp 2

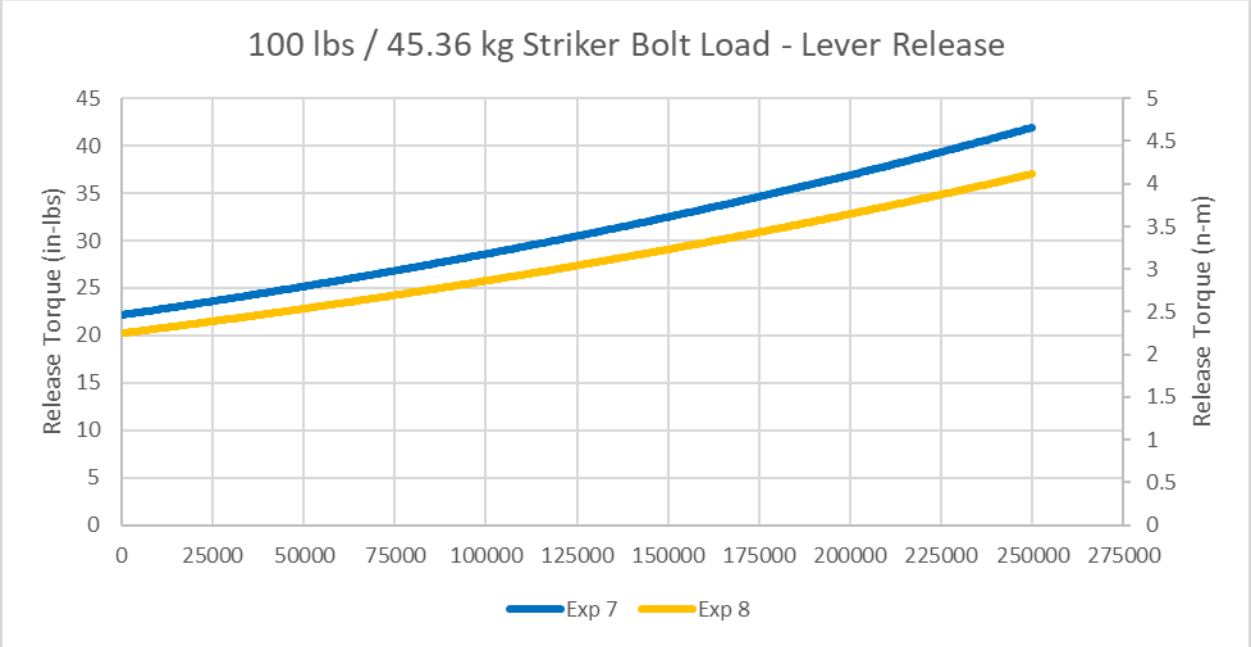

50 lbs / 22.68 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
0
0.5
1
1.5
2
2.5
3
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 3
Exp 4

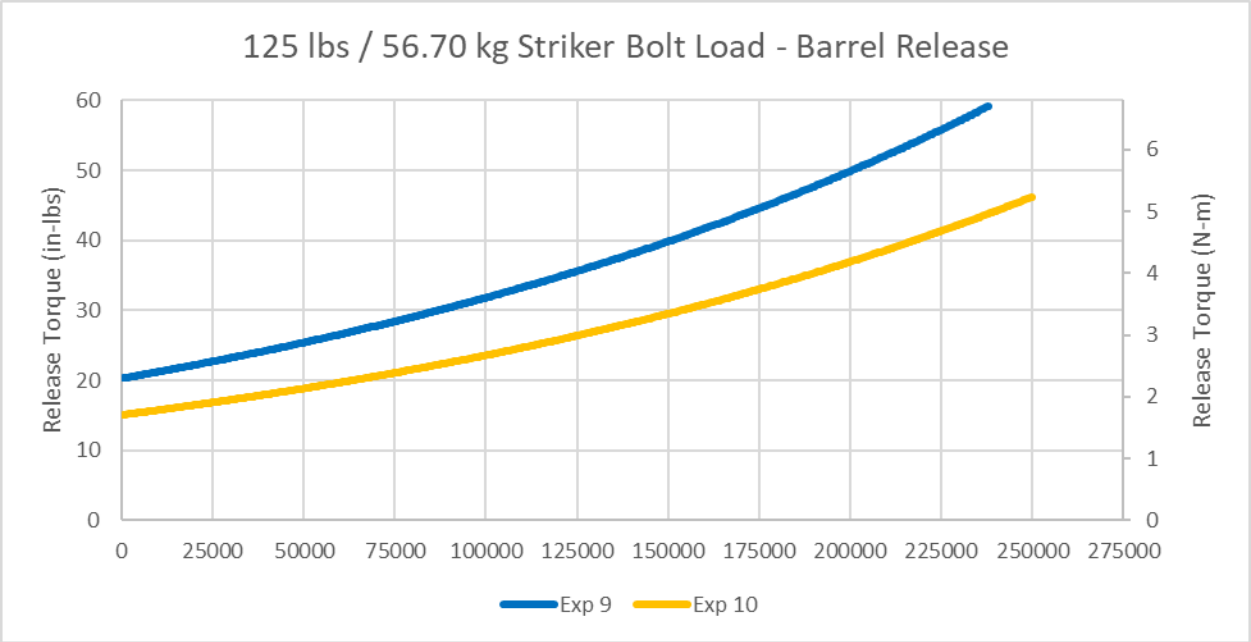

50 lbs / 22.68 kg Striker Bolt Load - Lever Release
No data for Exp 4 Lever after 122,276 cycles
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
0
0.5
1
1.5
2
2.5
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 3
Exp 4

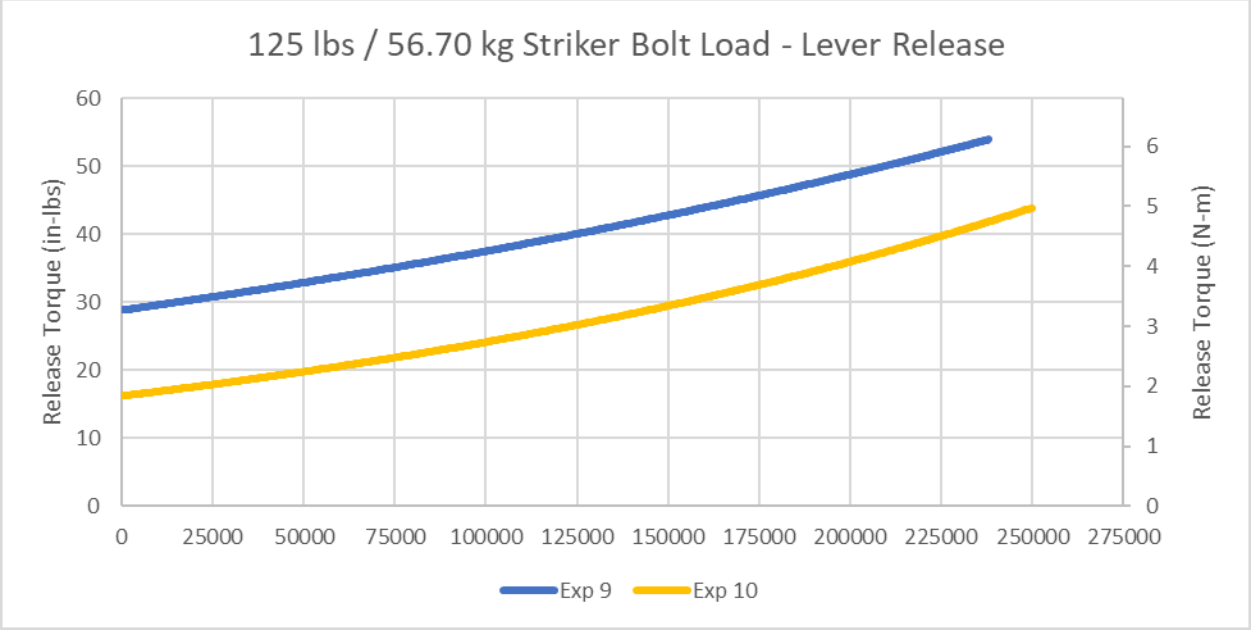

75 lbs / 34.02 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
35
40
45
0
1
2
3
4
5
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000
220000
Exp 5
Exp 6

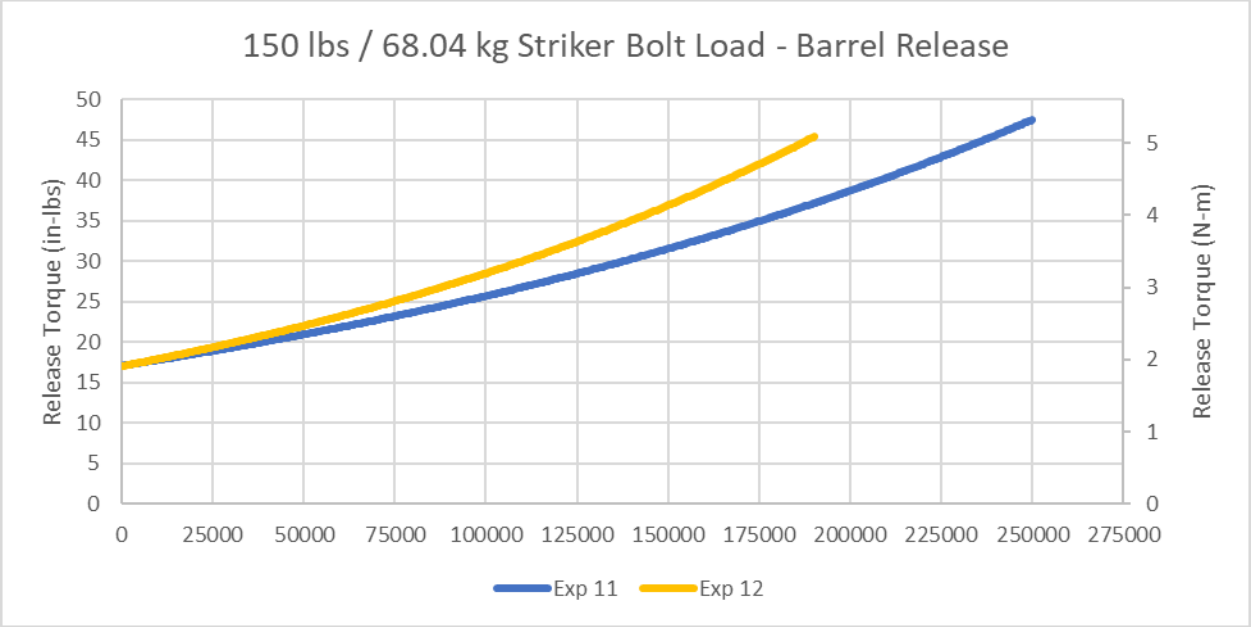

75 lbs / 34.02 kg Striker Bolt Load - Lever Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4
5
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000
220000
Exp 5
Exp 6

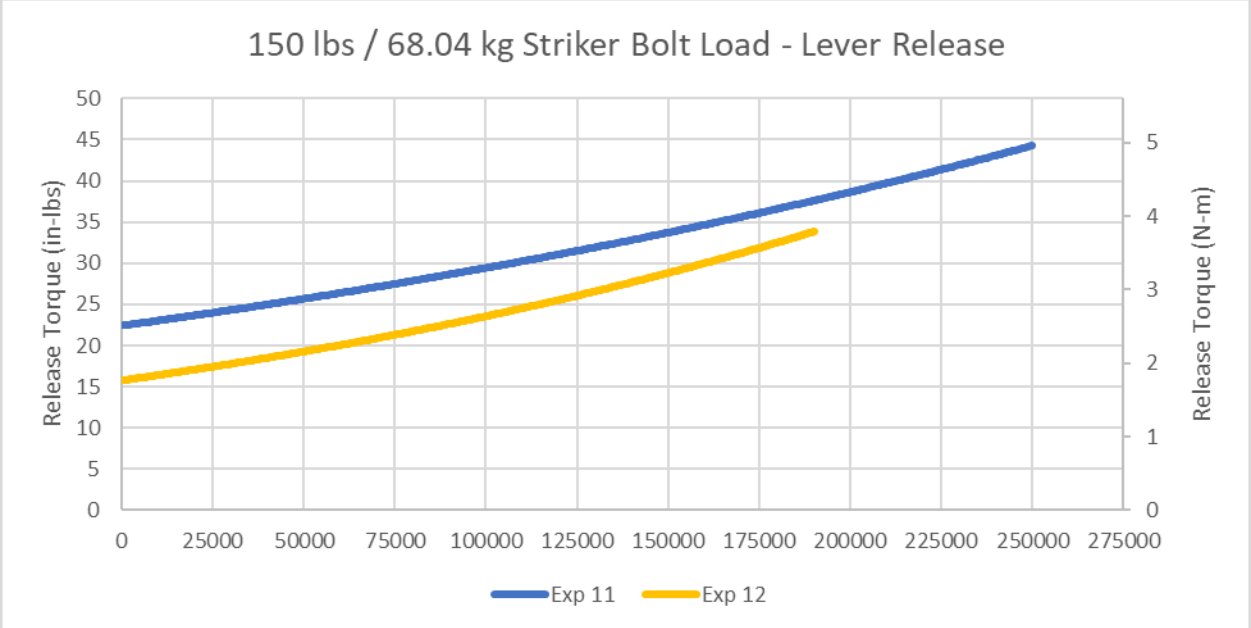

100 lbs / 45.36 kg Striker Bolt Load Barrel Release
50
45
40
35
30
25
20
15
10
5
0
5
4
3
2
1
0
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 7
Exp 8

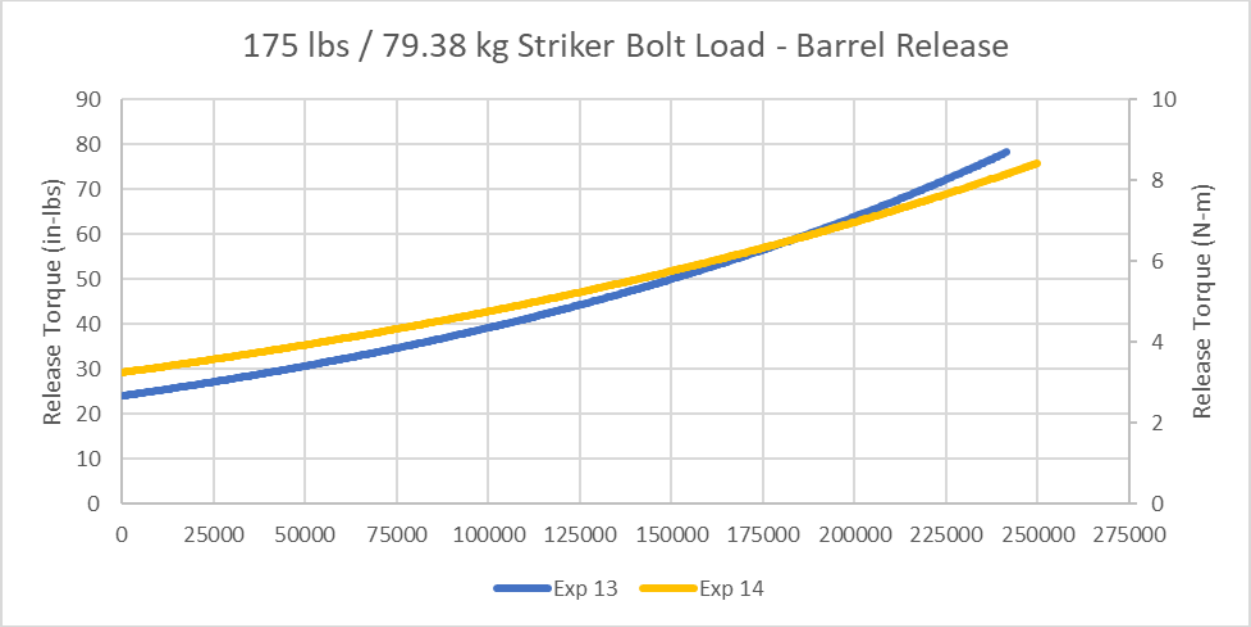

100 lbs / 45.36 kg Striker Bolt Load - Lever Release
Release Torque (in-lbs)
45
40
35
30
25
20
15
10
5
0
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Release Torque (n-m)
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 7
Exp 8

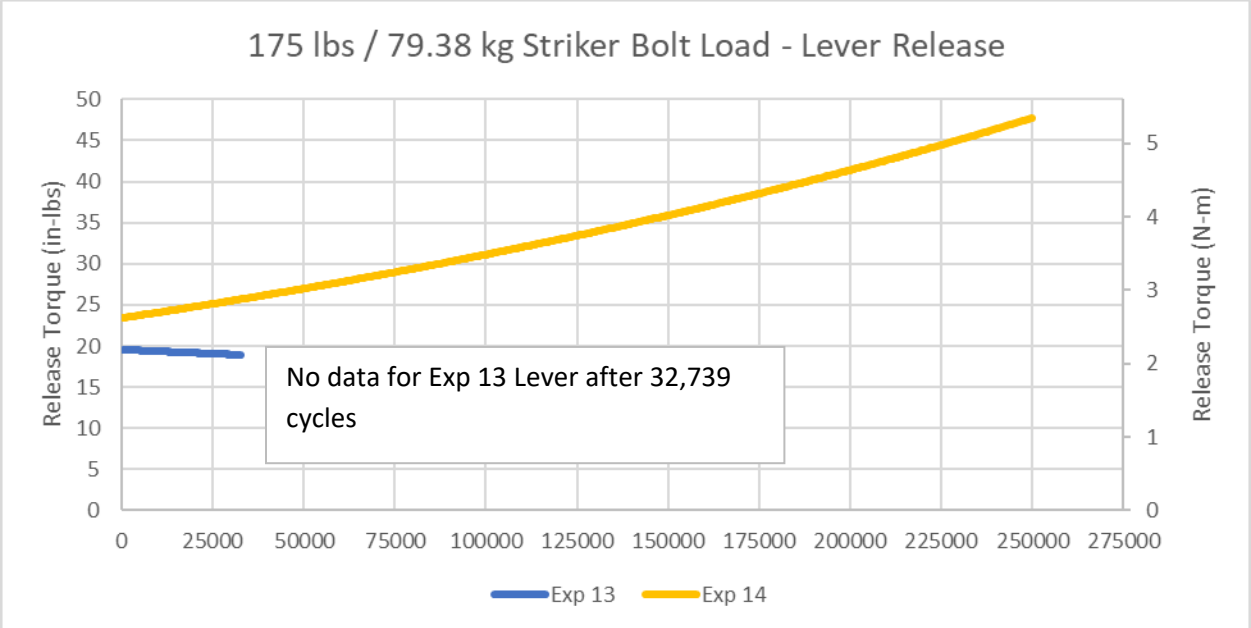

125 lbs / 56.70 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
Release Torque (N-m)
0
10
20
30
40
50
60
0
1
2
3
4
5
6
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 9
Exp 10


125 lbs / 56.70 kg Striker Bolt Load - Lever Release
Release Torque (in-lbs)
Release Torque (N-m)
0
10
20
30
40
50
60
0
1
2
3
4
5
6
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 9
Exp 10


150 lbs / 68.04 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4
5
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 11
Exp 12


150 lbs / 68.04 kg Striker Bolt Load - Lever Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4
5
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 11
Exp 12


175 lbs / 79.38 kg Striker Bolt Load - Barrel Release
Release Torque (in-lbs)
Release Torque (N-m)
0
10
20
30
40
50
60
70
80
90
0
2
4
6
8
10
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
Exp 13
Exp 14


175 lbs / 79.38 kg Striker Bolt Load - Lever Release
Release Torque (in-lbs)
Release Torque (N-m)
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4
5
0
25000
50000
75000
100000
125000
150000
175000
200000
225000
250000
275000
No data for Exp 13 Lever after 32,739 cycles
Exp 13
Exp 14

3.5 Technical Product Information

The following ***Technical Product Information*** is available by clicking the links below to direct you to the applicable pages on Tri*Mark* Corporation's website. These can also be found under the Products Tab of TriMark Corporation's home page.

Door Hardware Design and Consideration

Strength Guidelines

Loads on Rotary Door Latching

Measuring DCF (Door Closing Force) and SBL (Strike Bolt Load)

Guidelines for Mounting Torque

Latch and Striker Installation

Finishes

Materials

Lubrication

Glossary of Terms