

# **User Instructions Manual**

skyTECH™ Rocket E-Launcher

SKY-EL-00R

Skyline Ziplines Ltd.

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# Revision History

Revision	Sections Affected	Changes	Date
0.0	-	Original Publication	05 May 2021
1.0	1.0, 4.0	Updated SKU's, revised description of parts, updated description of features	20 June 2024





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## Warnings and Important Notices

You will find on this page, and throughout this user instructions manual, many warnings and important notices that must be considered seriously when operating this system. It is imperative to understand the meaning of the warnings and potential hazards.



It is the responsibility of the operator to maintain and inspect the product before use and to document said inspection and maintenance in a logbook. Skyline Ziplines supplies inspection criteria and guidelines, forms and log sheets specific to all manufactured systems and equipment. It is the responsibility of the operator to follow all guidelines, intervals, and criteria set forth by these documents.



WARNING: This product is designed for zip line operations only. The operator(s) must read and understand the instructions in this manual before using this product. Manufacturer's instructions must be followed for the proper use and maintenance of the system and provided equipment. Alterations or misuse of this equipment, or failure to follow instructions, may result in serious injury or death.



This document does not replace the complete training necessary for the use of this product. Knowledge by the user of all appropriate techniques and risks is required.



This manual contains information and instructions specific to the skyTECH™ Rocket E-Launcher and associated equipment manufactured by Skyline Ziplines Ltd. Make sure this User Instructions Manual is the latest version available. Contact Skyline Ziplines to obtain the latest document revisions, important Updates and other notices.



Products and systems manufactured by Skyline Ziplines are intended for use by professionals trained and experienced in the use, inspection, and maintenance of these products, or for use by persons under the direct visual surveillance of competent and responsible persons.



Before using this equipment, record the product identification information from the ID label in the inspection and maintenance log at the end of this document. Make sure this User Instructions Manual is readily available with the product. Contact Skyline Ziplines Ltd to obtain additional copies of this manual.



# 1.0 Description

### 1.1 Applications

The skyTECH™ Rocket E-Launcher is to be used as a trolley retention and release device for zipline amusement rides.

#### 1.2 Standards

Refer to local, provincial/state and federal laws and regulations pertaining to the installation and use of this type of equipment.

### 1.3 Description of skyTECH™ Rocket E-Launcher

### 1.3.1 skyTECH™ Rocket E-Launcher Features

- Designed for use with skyTECH™ Rocket, M8, and M24 Trolleys.
- CNC Machined Aluminum Arms and Acetal Body
- Stainless Steel Hardware
- Acetal Retention Teeth
- Integrates with skyTECH™ Safe Launch System
- 2"-Stroke, 50-lbf Actuator Utilizes 12/24V Power
- SKU: SKY-EL-00R

## 1.3.2 skyTECH™ Rocket E-Launcher Clamp Set

\*User must request/ensure to have the correct clamp size to fit their cable. See below.

Product Codes:

- 1/2" Cable Clamp: SKY-LS-13-A1
- 5/8" Cable Clamp: SKY-LS-13-A2
- 3/4" Cable Clamp: SKY-LS-13-A3
- 7/8" Cable Clamp: SKY-LS-13-A4



# 2.0 Limitations

Consider the following application limitations before using this equipment:

### 2.1 Capacity and Working Load Limit

- Not to be used in operations exceeding 300 lbs. patron weight.
- Not to be used in operations with launch angles greater than 40%

#### 2.2 Environmental Hazards

Use of this equipment in areas with environmental hazards may require additional precautions to prevent injury to the user or damage to the equipment. Hazards may include, but are not limited to: heat, chemicals, corrosive environments, electrical fields and wires, gases and sharp edges.

### 2.3 Sharp Edges

Avoid using where the zip line equipment or other system components will be in contact with, or abrade against unprotected sharp edges

### 2.4 Training

SkyTECH™ Rocket E-Launcher must only be installed and used by persons trained in their correct application and use (See Section 5).



# 3.0 System Requirements

## 3.1 Compatibility of Components

Skyline equipment is designed for use with the Skyline approved components and subsystems only. Substitution or replacements made with non-approved components or subsystems may jeopardize compatibility of equipment and may affect the safety and reliability of the complete system.

### **Approved Trolleys**

- skyTECH™ Rocket Trolley
- skyTECH™ M8 Trolley
- skyTECH™ M24 Trolley
- Contact Skyline Ziplines for any questions regarding trolley compatibility

### 3.2 Compatibility of Linear Actuators

The skyTECH™ Rocket E-Launcher is designed for and compatible with only one model of linear actuator, the <u>Progressive Automations Mini Linear Actuator PA-14-2-50</u>. You must source the correct version to accommodate your system's power supply (12V or 24V). Please contact Skyline Ziplines for any questions regarding linear actuators.

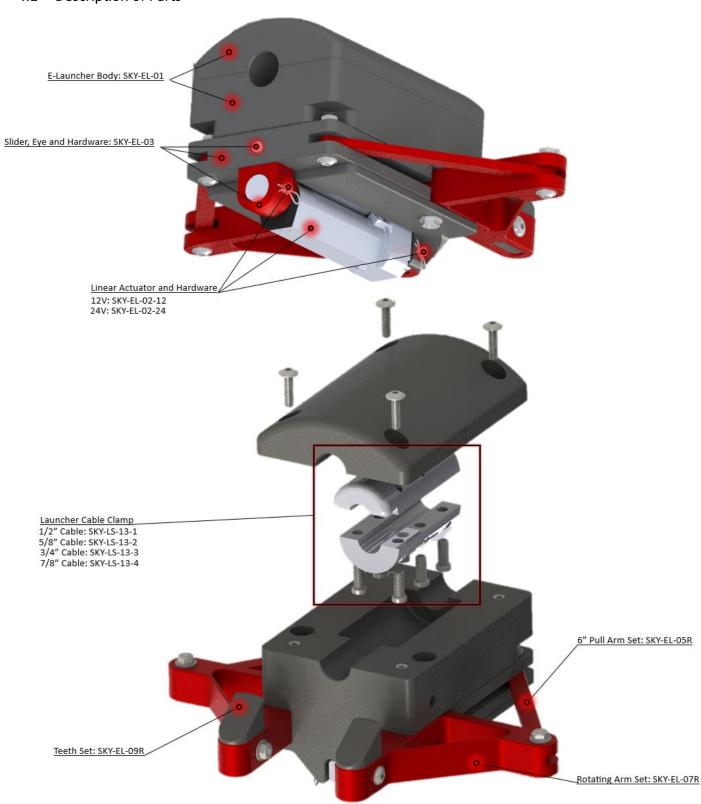
### 3.3 Making Connections

Use only connectors that are suitable to each application. Ensure all connectors are compatible in size, shape, and strength. Do not use equipment that is not compatible. Ensure all connectors are fully closed and locked.



# 4.0 Nomenclature and Assembly

# 4.1 Description of Parts





### 4.2 Procedure for Assembling Rocket E-Launcher

Tools Required: (2) 7/16" Sockets, (2) Socket Wrenches, (1) 5/32" Allen Wrench

- 4.2.1 Remove lower body by removing the 1/4" x 1" bolts with the 5/32" allen wrench.
- 4.2.2 Remove bolts from cable clamp module using 5/32" allen wrench.
- 4.2.3 Install cable clamp module on cable with longer half on top with excess facing downhill. Ensure bolts are level horizontally.
- 4.2.4 Evenly tighten all six bolts with a torque of 15Nm.
- 4.2.5 Place linear actuator (SKY-EL-02) into body upper and line up square end of actuator between the ears on body-upper. Thread the wire through the hole leading it to the outside of the body.
- 4.2.6 Fasten actuator to body-upper using the 1/4" x 1-3/4" clevis pin and hairpin to connect the square end of the actuator to the ears of the body.
- 4.2.7 Install the slider eye into the slider using the 3/16"x1" pin and retaining ring with the rounded side of the slider's slot contacting the slider eye.
- 4.2.8 Then slide the assembly into the back of the body-upper, fitting the round plunger end of actuator into the slider eye.
- 4.2.9 Secure the actuator in place in the slider eye using the 1/4"x 1-1/2" clevis pin and hairpin.
- 4.2.10 Install the rotating arms (SKY-EL-07R) into the body-upper using the 1/4" x 1-3/4" hex head bolts to secure the arms in place. Be sure to use a washer on both sides and torque the nylon-insert nut down until it is snug. Make sure the bolts are not so tight as to limit the rotation of the rotating arms but still tight enough to not allow any movement of the bolt.
- 4.2.11 Insert the 6" pull arms into the slider and connect them using two 1/4" x 1-1/4" screws, washers, and nylon-insert nuts. Torque to 7 Nm.
- 4.2.12 Connect the other end of the 6" pull arms to the rotating arms using two 1/4" x 1-1/4" screws. Torque to 8 Nm.
- 4.2.13 Insert the retention teeth (SKY-EL-09R) into the slots of the rotating arms, ensuring the ramped face is pointed away from the body. Secure them in place using two ¼" x 1-1/4" screws, washers and nylon-insert nuts. Torque to 8Nm.
- 4.2.14 Place body-upper assembly on the bottom of the cable clamp and body-lower on the top.

  Then connect the two body sections using four 1/4" x 1" bolts. Torque to 8Nm.
- 4.2.15 Wire the linear actuator leads to appropriate Safe Launch leads, ensuring the positive and negative terminals are connected properly.
- 4.2.16 Check that actuating motion functions properly.



# 5.0 Standard Operating Procedures



The following operating procedures outline only the necessary steps required to complete each process. The procedures do not consider additional safety requirements and additional safety considerations that should be considered for each site. Please consult a qualified person and/or your site-specific manual to ensure all necessary steps are taken to guarantee safety in your operations.

### 5.1 Standard Procedures for Operations

- 5.1.1 Take a trolley from the guest
- 5.1.2 Attach the trolley backup tether to the deck safety line.
- 5.1.3 Optional: Recommend connecting tether to trolley to prevent losing/dropping it.
- 5.1.4 Place the guest trolley on the cable in front of the E-Launcher
- 5.1.5 Push trolley back against the e-launcher. The bumper plate of the trolley should slide up and over the teeth, holding it in place.
- 5.1.6 Attach the Guest to the trolley and have them load their harness
- 5.1.7 Perform final check and radio protocol
- 5.1.8 Remove the trolley safety tether
- 5.1.9 Follow proper launch protocol on launch control panel, press the "Launch" button to release the trolley



## 6.0 Training

It is the responsibility of the buyer/user of this equipment to make sure that they understand these instructions and are sufficiently trained in the correct use and care of this equipment. The user must be aware of the operating characteristics, application limits, and the consequences of improper use. Training must be done prior to use and the user must be evaluated for his/her competence to use this equipment. Gaining an adequate education in proper techniques and methods of safety is your own responsibility. Training should be done under the supervision of competent persons.

It is recommended that Skyline Ziplines perform a manufacturer's training session to cover the material in this document, use with other equipment, and site-specific training.

\*Competent persons: (OSHA) One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are hazardous our dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.





# 7.0 Inspection

## 7.1 Frequency

- 7.1.1 The skyTECH™ Rocket E-Launcher must be formally inspected daily prior to initial use and recorded in the inspection log
- 7.1.2 The Rocket E-Launcher must be informally inspected prior to each use for normal operation, orientation, and overall condition
- 7.1.3 The Rocket E-Launcher must be inspected by the manufacturer or approved competent person(s) at least once a year (or more frequently if deemed necessary by the frequency and/or conditions of use). The results of this formal inspection must be recorded in the inspection and maintenance log at the end of this manual

### 7.2 Daily Pre-Use Inspection Process

The daily pre-use inspection process is included in Appendix A. The forms available in this manual may be used for operations and as a template for site specific forms. It is critical that every item presented on the provided form is inspected and documented.

#### 7.3 Documentation Process

Located in Appendix A is a sample Inspection form that Skyline Ziplines recommends using as a template. Located in Appendix B is a sample Maintenance form that Skyline Ziplines recommends using as a template. Located in Appendix C is a flowchart explaining the appropriate process for inspections, maintenance, and documentation. It is important to reference this flowchart for proper Quality Assurance documentation.



## 7.4 Lock Out, Tag Out

To ensure the highest standard of safety, it is required that all sites produce a Lock Out, Tag Out system. The system/process is designed to identify and prevent the use of all equipment identified through the inspection process as REJECTED (not suitable for use). Below is an example provided by Skyline Ziplines and is also included in the flowchart in Appendix C:

- 7.4.1 Item identified as rejected or failed during inspection by staff member
- 7.4.2 Failure/rejection is noted on inspection log
- 7.4.3 Item is marked with a tag with the following information:
  - 7.4.3.1 Name of staff member
  - 7.4.3.2 Date of inspection
  - 7.4.3.3 Reason for rejection
- 7.4.4 Item is placed in designated Lock Out, Tag Out area. This area must be removed from the operating area to avoid any chance of use.





# 8.0 Maintenance and Storage

### 8.1 Storage

Proper storage of equipment leads to longer equipment life and assurance of the integrity of the product. Follow the below guidelines for long term storage:

- Store the product in a cool, dry, and clean environment out of direct sunlight
- Avoid areas that vapors may exist
- Avoid stacking launchers on top of each other and metal to metal contact
- Thoroughly inspect all equipment after extended storage

### 8.2 Replacement Parts and Repairs

All replacement parts must be purchased through Skyline Ziplines Ltd. All equipment repairs must be performed by the following: Skyline Ziplines Ltd, an authorized contractor/vendor of Skyline Ziplines Ltd with approval, or trained and authorized onsite personnel.

### 8.3 Rocket E-Launcher Maintenance – Replacing Retention Teeth

Tools Required: (1) 7/16" Socket, (1) Socket Wrench, (1) 5/32" Allen Wrench

- 8.3.1 Remove 1/4" x 1-1/4" bolt, washer, and nut that holds the retention tooth in place.
- 8.3.2 Remove the worn retention tooth (SKY-EL-09R) and replace it with a new one.
- 8.3.3 Replace the 1/4" x 1-1/4" bolt, washer and nut through the rotating arm and retention tooth. Torque to 8Nm.
- 8.3.4 Repeat with the second retention tooth, if necessary.
- 8.3.5 Inspect unit and record maintenance in log (Appendix B).

## 8.4 Rocket E-Launcher Maintenance – Replacing Rotating Arms

Tools Required: (2) 7/16" Sockets, (2) Socket Wrenches, (1) 5/32" Allen Wrench

- 8.4.1 Remove the retention teeth following the steps found in Section 8.3.
- 8.4.2 Remove the 1/4" x 1-1/4" screws that connect the rotating arms to the 6" pull arms.
- 8.4.3 Remove the 1/4" x 1-3/4" hex head bolts that connect the arms to the body-upper.
- 8.4.4 Remove the old arms and install new rotating arms (SKY-EL-07R) into the body using the 1/4" x 1-3/4" hex head bolts and tighten until snug, still allowing the arms to rotate.
- 8.4.5 Re-install the pull arms into the new rotating arms using the 1/4" x 1-1/4" screws, washers, and nuts. Torque to 8Nm.
- 8.4.6 Re-install the retention teeth or replace them (SKY-EL-09R), if worn, according to the steps in Section 8.3.

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8.4.7 Inspect unit and record maintenance in log (Appendix B)



### 8.5 Rocket E-Launcher Maintenance – Replacing the Linear Actuator

Tools Required: None

- 8.5.1 <u>Disconnect or shut off all power leading to the launch system as to avoid the possibility of</u> electric shock.
- 8.5.2 Disconnect the wiring to the actuator.
- 8.5.3 Remove hairpin from 1/4" x 1-1/2" clevis pin and remove pin from slider eye.
- 8.5.4 Pull slider back, away from launcher body, freeing the actuator's piston end.
- 8.5.5 Remove hairpin from 1/4" x 1-3/4" clevis pin and remove it from the assembly.
- 8.5.6 Remove and replace the linear actuator with a new unit, running the wire through the designated hole on the launcher body.
- 8.5.7 Replace the 1/4" x 1-3/4" clevis pin and hairpin connecting the actuator to the body-upper.
- 8.5.8 Push the slider back into the body, lining up the actuator piston with the slider eye.
- 8.5.9 Re-place the 1/4" x 1-1/2" clevis pin and hairpin, securing the actuator in place.
- 8.5.10 Wire the actuator into the respective leads, ensuring the positive and negative leads are connected correctly.
- 8.5.11 Check that E-launcher teeth open and close freely.
- 8.5.12 Inspect unit and record maintenance in log (Appendix B)





# 9.0 Lifetime

The expected lifetime of a skyTECH Rocket E-Launcher is two years. The actual lifetime depends on the intensity and the frequency of use as well as the environment. An exceptional circumstance might limit the product lifetime to a single use. A product that was not inspected at least once per year should be removed from service and replaced.

# 10.0 Incident and Failure Reporting

In the unfortunate situation that a Skyline Rocket E-Launcher is involved in an incident or a failure, please notify Skyline Ziplines immediately so that prompt corrective measures can be taken by Skyline Ziplines. Product Safety Alerts are available at request and are sent out to all previous customers via email.

Complete information concerning the incident (date, location, details as to event and consequence, etc.) must be communicated to admin@skylineziplines.ca and/or called in to the office at 604-905-4149.

Skyline Ziplines will investigate the incident and if a product recall alert is required, shall notify all known customers and distributors who have purchased the product.



## 11.0 Warranty

Subject to the following limitations, terms, and conditions, Skyline Ziplines LTD warrants to the original purchaser of each Product that such Products, when purchased new, are free of defects in materials and workmanship. This limited warranty may be exercised for a period of up to <u>one year</u> from the date of receipt. This limited warranty does not apply to normal wear and tear, nor to claimed defects, malfunctions or failures that result from abuse, neglect, improper assembly, improper maintenance, alteration, collision, crash, or misuse.

EXCEPT AS EXPRESSLY SET FORTH ABOVE, SKYLINE ZIPLINES LTD DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PURPOSE. SKYLINE ZIPLINES LTD'S RESPONSIBILITY FOR WARRANTY CLAIMS IS LIMITED TO, AT SKYLINE ZIPLINES LTD'S SOLE DISCRETION, REIMBURSEMENT OF THE ORIGINAL PURCHASE PRICE, REPAIR OF THE PRODUCT, OR REPLACEMENT OF THE PRODUCT WITH THE SAME OR SIMILAR PRODUCT. NOTWITHSTANDING anything in THESE TERMS to the contrary, SKYLINE ZIPLINES LTD SHALL NOT be responsible or held liable for punitive, indirect, incidental or consequential damages, including without limitation, liability for loss of use, loss of profits, loss of Product or business interruption however the same may be caused, including fault or negligence of SKYLINE ZIPLINES LTD.

To exercise rights under this limited warranty, Customer must return the affected Product to Skyline Ziplines LTD (unless otherwise instructed by Skyline Ziplines LTD) to:

SKYLINE ZIPLINES LTD
6-1006 LYNHAM ROAD
WHISTLER, BRITISH COLUMBIA, CANADA V8E 0S3

Skyline Ziplines LTD will use reasonable commercial efforts to return all product in a timely manner to the designated location and will be responsible for all shipping costs. Skyline Ziplines LTD reserves the right to modify this limited warranty at any time, in its sole discretion.



# Appendix A – Inspection Form

\*Sample files available upon request



# **INSPECTION FORM I-17**

## skyTECH E-Launcher



#### Inspection Information

Frequency: Daily Pre-Use Models: Universal and Rocket E-Launchers (SKY-EL-00E and 00R)

Performed By: Trained Staff Member Manufacturer: Skyline Ziplines LTD.

Inspect all matching equipment in accordance with the inspect criteria listed below. At the bottom, record the equipment's disposition by marking the appropriate ID number. If the answer is YES to one or more of the following questions, the unit is deemed UNFIT for service.

#### 1. Known Equipment History

- Has the unit been used by a person weighing more than 300 lbs?
- Has the unit received forces resulting from a fall or shock loading without a subsequent inspection?
- Has the unit been exposed to detrimental chemical products or an intensive source of heat?
- Has the unit not been formally inspected within the last year by a competent person?

#### 2. Preliminary Observations

- Are any fasteners missing nuts, washers, retaining rings, or hairpins?
- -Are any fasteners loose or backing out?
- Has the product undergone modifications or alterations not performed or authorized by the manufacturer?

#### 3. Body Inspection

- Are there any visual indications of damage to the body, extensions, slider, arms, or retention flaps such as chips, bends, cracks, or excessive wear?
- -If applicable; are any springs broken, missing, or not functioning effectively?

#### 4. Operation Inspection

-Are there any problems with the E-Launcher opening and closing freely?

#### 5. Auto Controls Inspection

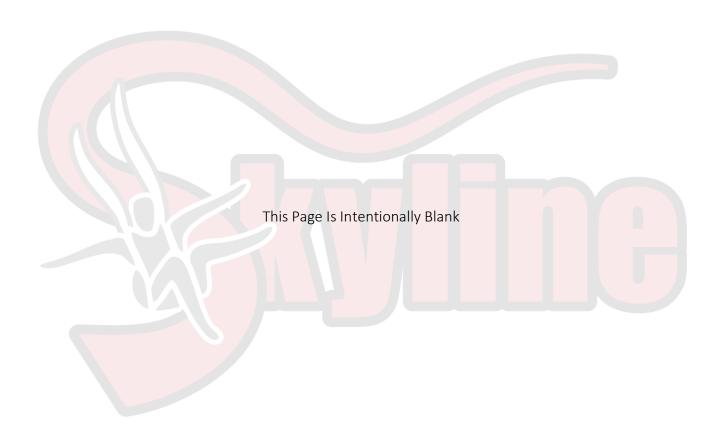
- -Are there any visual indications of damage to the actuator body and/or actuator piston?
- -Are there any issues with the actuator's cycling operation?

Disposition - Circle all line numbers correlating with all units that have PASSED the inspection and are FIT for service									
01	02	03	04	05	06	07	08	09	10
Failed Equi	pment - List all	I ID numbers	for units deem	ed UNFIT for se	ervice. Consult	the manual for	proper Lock O	ut, Tag Out Pro	otocol
Notes/Com	nments								
				Ins	pected By:				



# Appendix B - Maintenance Log

\*Sample files available upon request



# MAINTENANCE FORM M-13

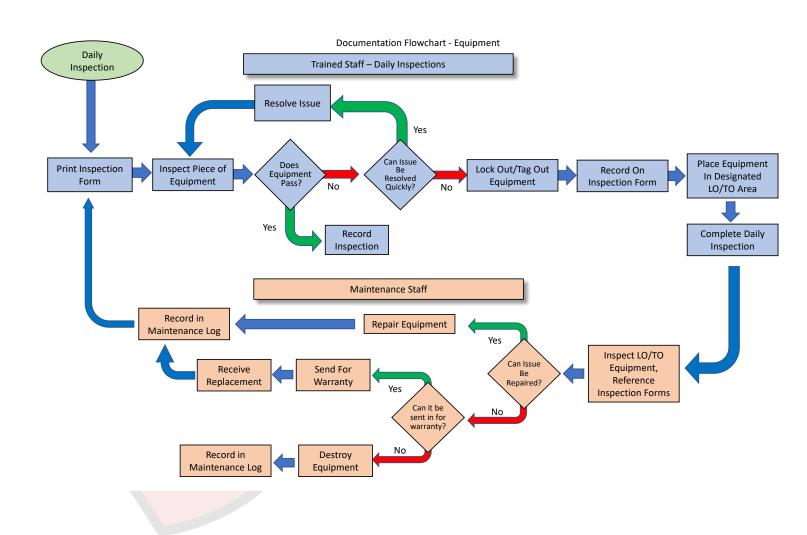
# skyTECH E-Launcher



Unit ID:	Performed By:	Date:	
Work Performed:			
		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:		Vardiet/Cirola Ona), FIT LINET DETIDED	
Unit ID:	Performed By:	Verdict (Circle One): FIT UNFIT RETIRED  Date:	
Work Performed:	renormed by.	Date.	
Work renormed.		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:			
		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:			
		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:			
		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:		Verdict (Circle One): FIT UNFIT RETIRED	
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Unit ID:	Performed By:	Date:	
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		Verdict (Circle One): FIT UNFIT RETIRED	
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Work Performed:			
		Verdict (Circle One): FIT UNFIT RETIRED	
Unit ID:	Performed By:	Date:	
Work Performed:		Verdict (Circle One): FIT UNFIT RETIRED	
		, ,	



# Appendix C - Documentation Process Flowchart





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