TASK FORCE TIPS®
FIRE FIGHTING EQUIPMENT

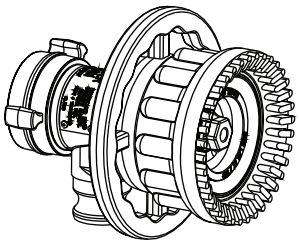
Master Foam Fixed GPM Self-Educting Foam Nozzle Series

INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE

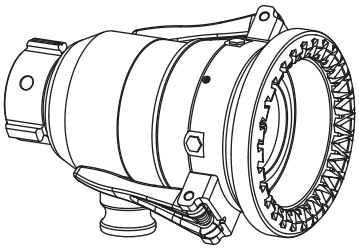
⚠WARNING **Understand manual before use. Operation of this device without understanding the manual and receiving proper training is a misuse of this equipment. Obtain safety information at tft.com/serial-number.**

This equipment is intended for use by trained and qualified emergency services personnel for firefighting. All personnel using this equipment shall have completed a course of education approved by the Authority Having Jurisdiction (AHJ).

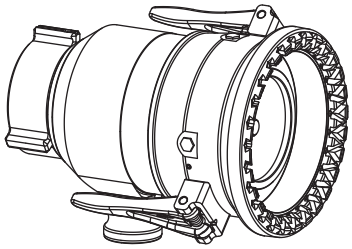
This instruction manual is intended to familiarize firefighters and maintenance personnel with the operation, servicing, and safety procedures associated with this product. This manual should be kept available to all operating and maintenance personnel.



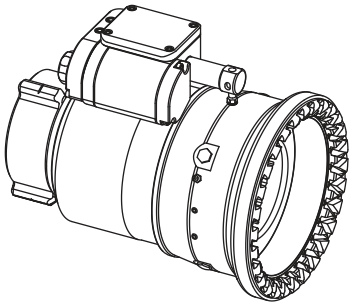
Fixed Flow Rate:
250, 350, 500, or 750 gpm
950, 1325, 1900, or 2900 l/min
Nominal Pressure:
100 psi (7bar)
Nominal Foam Percentages:
0.5%, 1%, 3%, or 6%



Fixed Flow Rate:
1000 or 1250 gpm
3800 or 4800 l/min
Nominal Pressure:
100 psi (7bar)
Nominal Foam Percentages:
1% or 3%



Fixed Flow Rate:
1500 or 2000 gpm
5700 or 7600 l/min
Nominal Pressure:
100 psi (7bar)
Nominal Foam Percentages:
1% or 3%



RC Fixed Flow Rate:
1000 or 1250 gpm
3800 or 4800 l/min
1500 or 2000 gpm
5700 or 7600 l/min
Nominal Pressure:
100 psi (7bar)
Nominal Foam Percentages:
1% or 3%

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⚠ DANGER

PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

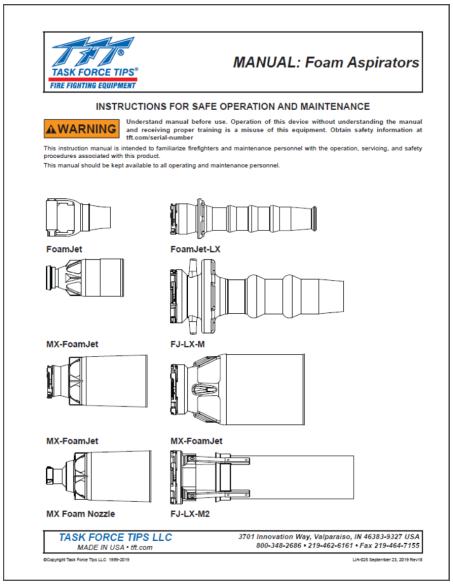
1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called upon to use.
3. It is your responsibility to know that you have been properly trained in Firefighting and /or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.
4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. It is your responsibility to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns or other severe injury.

FEMSA

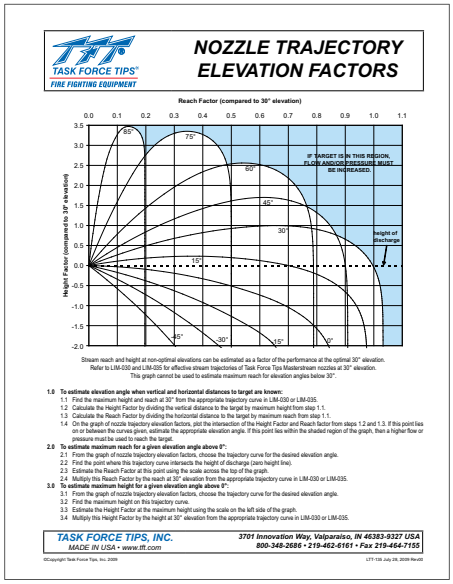
Fire and Emergency Manufacturers and Service Association
P.O. Box 147, Lynnfield, MA 01940 • www.FEMSA.org

SUPPORTING MATERIALS

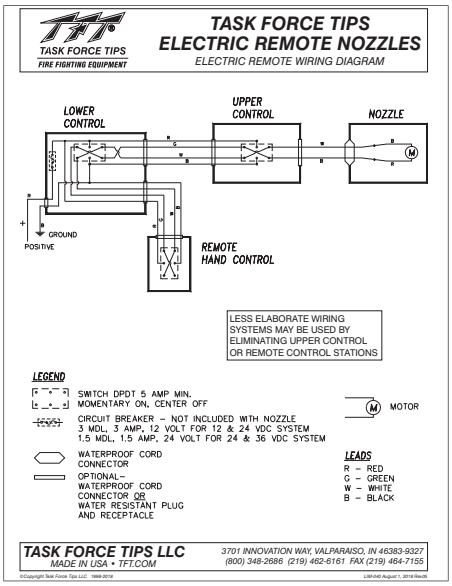
The following documents contain supporting safety and operating information pertaining to the equipment described in this manual.



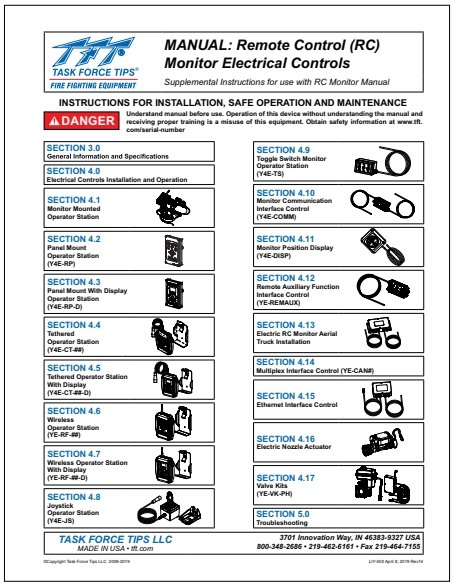
LIA-025
Manual: Foam Aspirators



LTT-135
Nozzle Trajectory Elevation Factors



LIM-040
ER Nozzle Wiring Guide



LIY-500
Manual: Remote Control (RC) Monitor Electrical Controls

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1.0 MEANING OF SAFETY SIGNAL WORDS

A safety related message is identified by a safety alert symbol and a signal word to indicate the level of risk involved with a particular hazard. Per ANSI Z535.6, the definitions of the four signal words are as follows:

DANGER **DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING **WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION **CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.**

NOTICE **NOTICE is used to address practices not related to physical injury.**

2.0 SAFETY

DANGER **An inadequate supply of pressure and/or flow will cause an ineffective stream and can result in injury or death. Choose operating conditions to deliver adequate fire suppression. See flow graphs.**

WARNING **This equipment is intended for use by trained personnel for firefighting. Use of this equipment for other purposes may involve hazards not addressed by this manual. Seek appropriate guidance and training to reduce risk of injury.**

WARNING **Injury or damage can occur from an inadequately supported monitor. The mounting must be capable of supporting the nozzle reaction force.**

FLOW		REACTION FORCE	
gpm	l/min	Pounds	Kilograms
250	950	132	60
350	1325	185	84
500	1900	265	120
750	2900	397	180
1000	3800	529	240
1250	4800	661	301
1500	5700	794	360
2000	7600	1058	480

WARNING **Some volatile liquids can be ignited by static discharge, which can occur during application of foam or water. Fire or explosion can result in injury or death. Follow procedures established by the AHJ to reduce risk of fire or explosion caused by static discharge.**

WARNING **Application of water or foam solutions on energized electrical equipment could cause electrocution. Serious injury or death could result. Assume circuits are energized until confirmed to be de-energized. Do not apply water or foam to energized electrical equipment.**

WARNING **The stream exiting a nozzle is very powerful and capable of causing injury and property damage. Make sure the nozzle is securely attached and pointing in a safe direction before water is turned on. Do not direct water stream to cause injury or damage to persons or property.**

WARNING **Equipment may be damaged if frozen while containing significant amounts of water. Such damage may be difficult to detect visually. Subsequent pressurization can lead to injury or death. Any time the equipment is subject to possible damage due to freezing, it must be tested and approved for use by qualified personnel before being considered safe for use.**

NOTICE **To prevent mechanical damage, do not drop or throw equipment.**

3.0 GENERAL INFORMATION

Master Foam nozzles come in three ranges. Each range determines water flow with baffle options. The removable baffle allows for flushing debris. On most Master Foam nozzles, changing the baffle changes the nozzle's water flow rate.

A vacuum created by water velocity pulls foam concentrate into the nozzle. Foam concentrate enters the peripheral jet uniformly at discharge without causing turbulence. Mixing and aeration happen immediately, resulting in superior stream quality and reach.

Master Foam Nozzles come with calibrated orifice plates to set the foam percentage. Orifice plates are easily inserted into the side foam port. A concentrate hose with camlock fitting (military standard MS27019) connects to the foam port capturing the orifice plate.

Fog angle is user adjustable between 90° wide fog and straight stream. Higher flow (1000 GPM and higher) nozzles provide a set screw for locking in a fog angle.

3.1 VARIOUS MODELS AND TERMS

RANGE	SMALL	MEDIUM	LARGE
INLET COUPLING	2.5" (65mm) NH, NPSH, or BSP	3.5" (89mm) NH, NPSH, or BSP	3.5" (89mm) NH 4.0" (100mm) BSP
RATED PRESSURE	100 psi (7bar)	100 psi (7bar)	100 psi (7bar)
FLOW RATING	250, 350, 500, or 750 gpm (950, 1325, 1900, or 2900 l/min)	1000 or 1250 gpm (3800 or 4800 l/min)	1500 or 2000 gpm (5700 or 7600 l/min)
FOAM ORIFICE PLATES	0.5%, 1%, 3%, and 6%	1% and 3%	1% and 3%
CONCENTRATE HOSE SIZE	10' x 1.5" diameter (2.4m x 38mm) UV Resistant	10' x 1.5" x 2.0" diameter (2.4m x 38mm x 52mm) UV Resistant	10' x 2.0" diameter (2.4m x 52mm) UV Resistant
NOZZLE CAMLOCK CONNECTION SIZE	1.5" (38mm)	1.5" (38mm)	2.0" (52mm)
FOG ADJUSTMENT	Halo ring is made from a non-corroding high temperature polymer	All aluminum Rotate using folding handles	All aluminum Rotate using folding handles
FOG TEETH	Rubber molded bumper and fog teeth	Cut metal fog teeth, hard anodized aluminum	Cut metal fog teeth, hard anodized aluminum
OPTIONAL FOAM ASPIRATOR	FJ-LX-M FoamJet low expansion air-aspirating attachment	n/a	n/a

Table 3.1

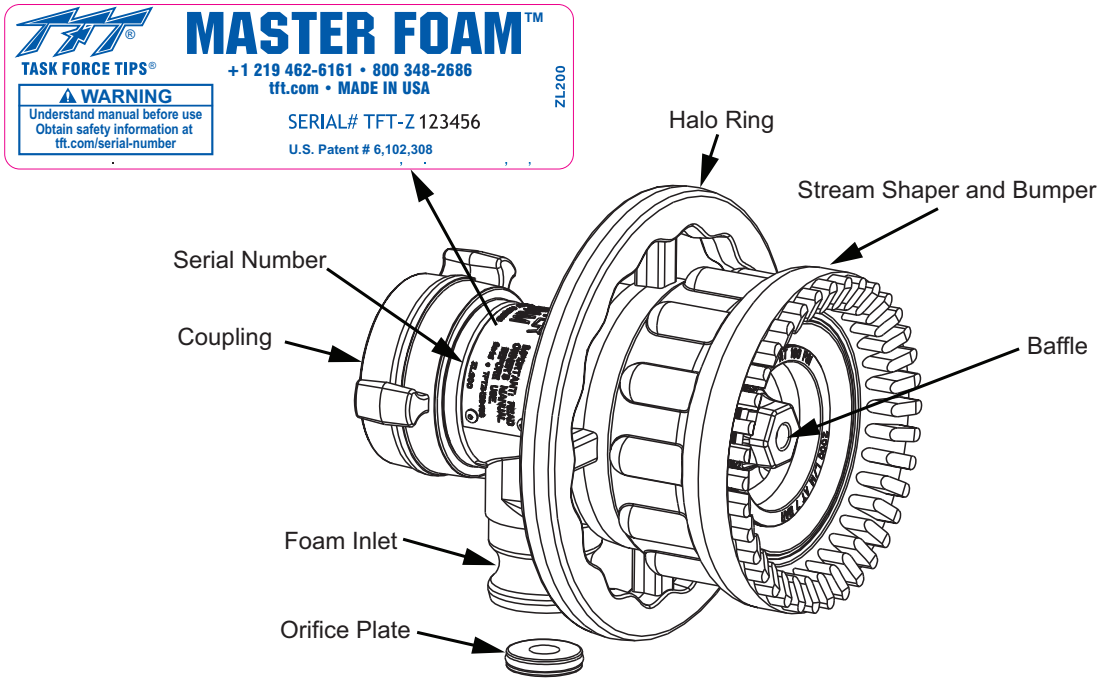

Figure 3.1A

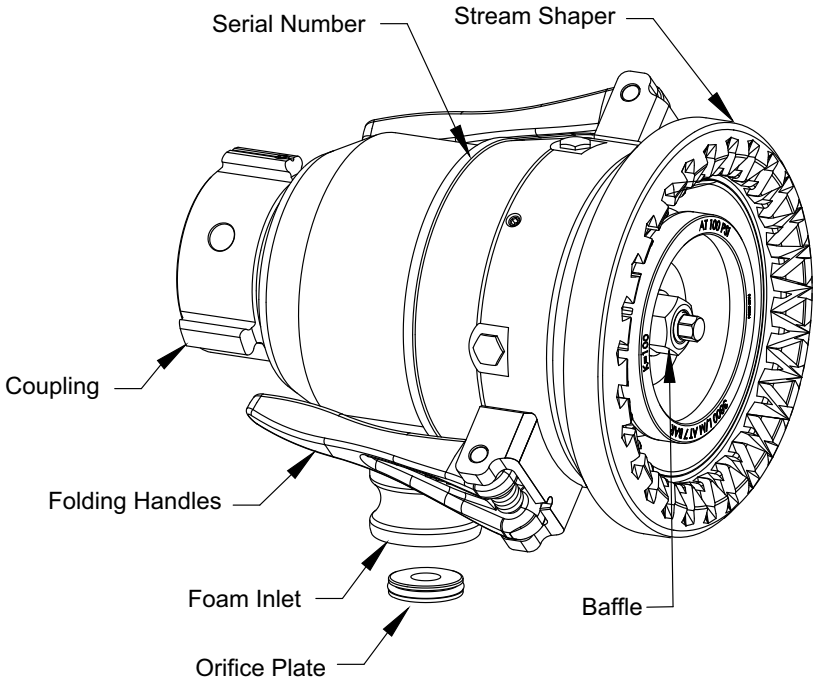

Figure 3.1B

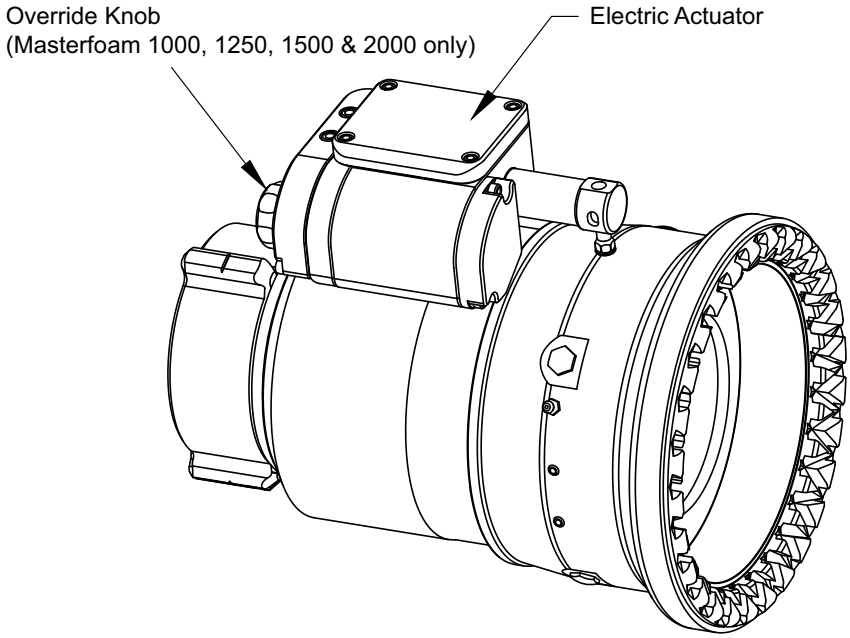

Figure 3.1C

3.2 MECHANICAL SPECIFICATIONS

Range	SMALL				MEDIUM		LARGE	
Nominal Flow	250 gpm 950 l/min	350 gpm 1325 l/min	500 gpm 1900 l/min	750 gpm 2900 l/min	1000 gpm 3800 l/min	1250 gpm 4800 l/min	1500 gpm 5700 l/min	2000 gpm 7600 l/min
Maximum Flow	306 gpm 1160 l/min	428 gpm 1620 l/min	612 gpm 2320 l/min	918 gpm 3475 l/min	1224 gpm 4630 l/min	1530 gpm 5790 l/min	1830 gpm 6930 l/min	2450 gpm 9270 l/min
Weight	7.3 lbs / 3.3 kg				16.9 lbs / 7.7 kg		23.0 lbs / 10.4 kg	
Nominal Operating Pressure	100 psi / 690 kPa / 7bar							
Maximum Operating Pressure	150 psi / 1034 kPa / 10.3bar							
Maximum Fog angle	90°							
Operating Temperatures	-40°F to 135°F -40°C to 57°C							
Materials used	Cast Aluminum, Aluminum 6000 series hard anodized MIL 8625 class 3 type 2, Stainless Steel 300 series, Nylon, Nitrile Rubber							

3.3 USE WITH SALT WATER

Use with salt water is permissible provided the equipment is thoroughly cleaned with fresh water after each use. The service life of the equipment may be shortened due to the effects of corrosion, and is not covered under warranty.

3.4 NOZZLE COUPLINGS

Master Foam nozzles in 250, 350, 500, 750, 1000, and 1250 gpm (950, 1325, 1900, 2900, and 4800 l/min) versions are available with a 2.5 inch coupling (NH, NPSH or BSP).

Master Foam nozzles in 1500 and 2000 gpm (5700 and 7600 l/min) versions have a 3.5” (NH) coupling as standard.

When tightening the coupling, make sure the foam inlet is pointing downward for ease of attaching the concentrate inlet hose.

⚠CAUTION **Mismatched or damaged waterway connections may cause equipment to leak or uncouple under pressure. Failure could result in injury. Equipment must be mated to matched connections.**

⚠CAUTION **Dissimilar metals coupled together can cause galvanic corrosion that can result in the inability to uncouple the connection, or complete loss of engagement over time. Failure could cause injury. Per NFPA 1962, if dissimilar metals are left coupled together, an anti-corrosive lubricant should be applied to the connection and the coupling should be disconnected and inspected at least quarterly.**

3.5 ELECTRIC INSTALLATION

Nozzles with electric stream shaper actuation are shipped with a wiring diagram (TFT item #LIM-040). Other documentation is available on request. ER nozzles are equipped with manual override in case of electrical power failure.

⚠WARNING **This device is not rated as ignition proof, explosion proof, or intrinsically safe. Use only in locations with adequate ventilation and no hazard of flammable vapor buildup.**

4.0 OPERATION

4.1 PATTERN CONTROL

The Master Foam’s spray pattern is adjustable from straight stream to a 90° wide fog.

On models with manual shapers turning the stream shaper clockwise (as seen from the operating position behind the nozzle) moves the shaper to the straight stream position. Turning the shaper counterclockwise will result in an increasingly wider pattern. Only 90° of rotation is required to go from wide fog to a straight stream.

On RC Master Foam nozzles, use the FOG and STRAIGHT STREAM buttons on the operator station to change the pattern.

Since the stream trim point varies with flow, the stream should be “trimmed” after establishing a steady flow. To properly trim the stream, first open to a narrow fog. Then close the stream to parallel to give maximum reach.

⚠WARNING **The nozzle reaction is greatest when the shaper is in the straight stream position. Sudden changes in pattern can cause changes in reaction, leading to loss of footing or an out of control nozzle. The nozzle operator must be prepared for a change in reaction as the pattern is changed.**

NOTICE **Turning the shaper further forward will cause stream crossover and reduce the reach of the nozzle.**

NOTICE **The widest pattern is useful for protection and cooling, but does not educt foam.**

4.2 FLUSHING DEBRIS

Debris in the water may get caught inside the nozzle. This trapped material will cause poor stream quality, shortened reach and reduced flow. To remove debris trapped in the nozzle:

1. Shut off flow to the nozzle.
2. Unscrew baffle using the appropriately sized socket for the nozzle flow range.
   A. SMALL - 1-1/8” (28mm)
   B. MEDIUM - 1” (26mm)
   C. LARGE - 1-1/4” (32mm)
3. Remove debris. Flow water to flush if necessary.
4. Reinstall baffle. Tighten to 30 lb-ft (40 N·m).

⚠WARNING **Large amounts or pieces of debris may be unflushable and can reduce the flow of the nozzle resulting in an ineffective flow. In the event of a blockage, it may be necessary to retreat to a safe area, uncouple the nozzle and remove debris.**

5.0 USE WITH FOAM

The nozzle may be used with foam solutions. Refer to fire service training by the Authority Having Jurisdiction (AHJ) for the proper use of foam.

⚠WARNING **For Class B fires, lack of foam or interruption in the foam stream can cause a break in the foam blanket and greatly increase the risk of injury or death. Follow procedures established by the AHJ for the specific fuel and conditions.**

⚠WARNING **Improper use of foam or using the wrong type of foam can result in illness, injury, or damage to the environment. Follow foam manufacturer’s instructions and fire service training as directed by the AHJ.**

5.1 FOAM ASPIRATING ATTACHMENTS

Multi-expansion or low expansion aspirating attachments may be used with nozzles to increase the expansion ratio. These foam tubes attach and detach quickly from the nozzle. As expansion ratio is increased, the reach of the nozzle will decrease due to the greater amount of bubbles in the stream and their ability to penetrate the air. Generally, the straight stream reach with foam is approximately 10% less than with water only. Actual results will vary based on brand of foam, hardness of water, temperature, etc. For specific information, see LIA-025 (MANUAL: Foam Attachments for TFT Nozzles).

5.2 CLEANING AFTER USE

After educting foam it is recommended that water be educted in through the concentrate hose and inlet. This will wash out foam concentrate residue in the hose, orifice plate, and nozzle passages. If not removed, any residue may dry and adversely affect the accuracy of proportioning.

5.3 SETTING FOAM PERCENTAGE

The foam percentage is controlled by an orifice plate that is installed in the nozzle at the mouth of the concentrate inlet. Depending on the nozzle chosen, the Master Foam comes with orifice plates for 0.5%, 1%, 3%, or 6%. Each orifice plate is marked with the percentage and nozzle flow rate. The flow rate on the orifice plate must match the flow rate marked on the nozzle's baffle.

The table gives the nominal rates of foam usage. Accuracy of proportioning is fairly insensitive to nozzle inlet pressure. The graph in Figure 5.3B gives expected percentages for various inlet pressures.

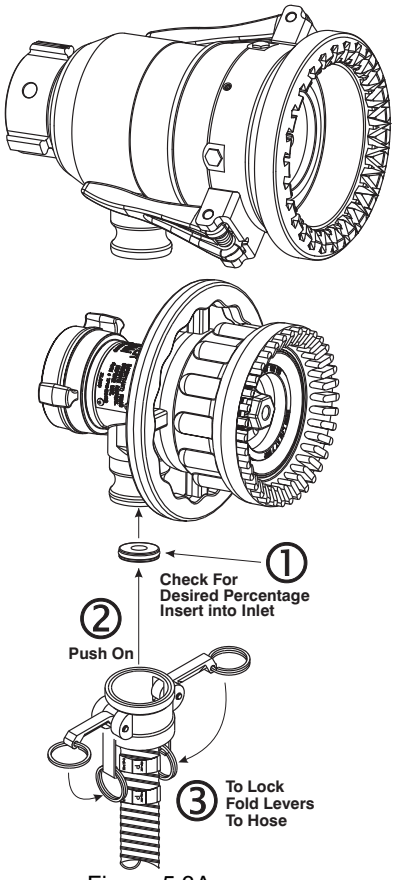

Figure 5.3A

To install the orifice plate in the nozzle, simply push it into the bore at the foam inlet on the nozzle. The orifice plate has an O-ring to hold it in place.

To remove the orifice plate, hook a small object (such as a screwdriver or Allen wrench) into the hole in the orifice plate and pull it out. Take care not to damage the orifice.

CONCENTRATE FLOW RATE IN GPM

WATER FLOW (GPM)	FOAM PERCENTAGE			
	0.5%	1%	3%	6%
250	1.3	2.5	7.7	16.0
250	1.8	3.5	11.0	22.0
500	2.5	5.1	15.0	32.0
750	3.8	7.6	23.0	48.0
1000	--	10.0	31.0	--
1250	--	13.0	39.0	--
1500	--	16.0	45.0	--
2000	--	20.0	60.0	--

EXAMPLE: 500 gpm of water at 3% uses 15.0 gpm of concentrate.

FLOW SHOWN ARE NOMINAL. ACTUAL RESULTS MAY VARY BASED ON BRAND AND CONDITION OF FOAM.

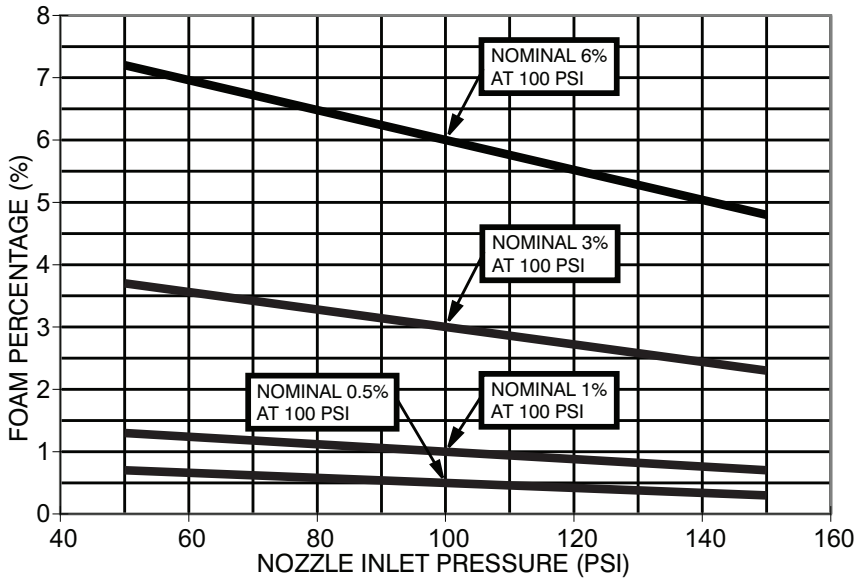

Figure 5.3B

5.3.3 ORIFICE PLATE CALIBRATION INFORMATION

In any eductor type system, the accuracy of proportioning depends on the viscosity of the foam concentrate. The orifice plates for the Master Foam nozzle have been calibrated at 70 degrees F as follows:

PERCENT 250, 350, 500, and 750 gpm Nozzles	**FOAM USED FOR CALIBRATION**
0.5% and 1%	Class A foam of 20 centipoise viscosity
3%	3M ATC 3 AR-AFFF product code ATC-603
6%	3M ATC-AFFF product code FC-600F
PERCENT 1000 and 1250 gpm Nozzles	**FOAM USED FOR CALIBRATION**
1%	Williams Thunderstorm ATC AR-AFFF FC-601A
3%	Williams Thunderstorm ATC AR-AFFF FC-601A
PERCENT 1500 and 2000 gpm Nozzles	**FOAM USED FOR CALIBRATION**
1%	National Universal Gold NFC420
3%	National Universal Gold NFC420

Table 5.3.3

6.0 FLOW CHARACTERISTICS

6.1 FIXED FLOW

Pressure on this graph is the nozzle inlet pressure. Losses through piping and monitor must be taken into account to deliver the desired pressure to the nozzle. Flow on the graph is the water flow entering the nozzle. Any foam educted adds to this flow.

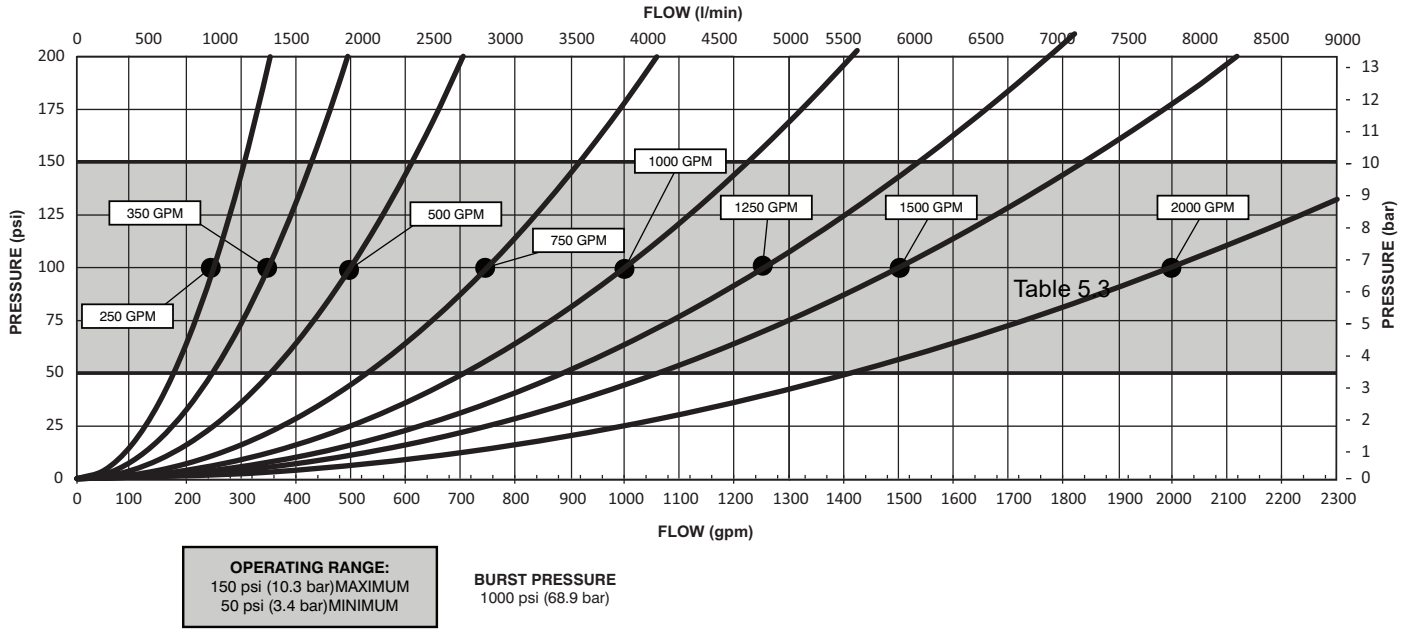

Figure 6.1A

6.2 REACH AND TRAJECTORY

⚠CAUTION **Dents or nicks in the nozzle tip can seriously affect the stream reach or pattern, which may increase the risk of injury due to exposure. Care must be taken to avoid dents or nicks in the nozzle tip.**

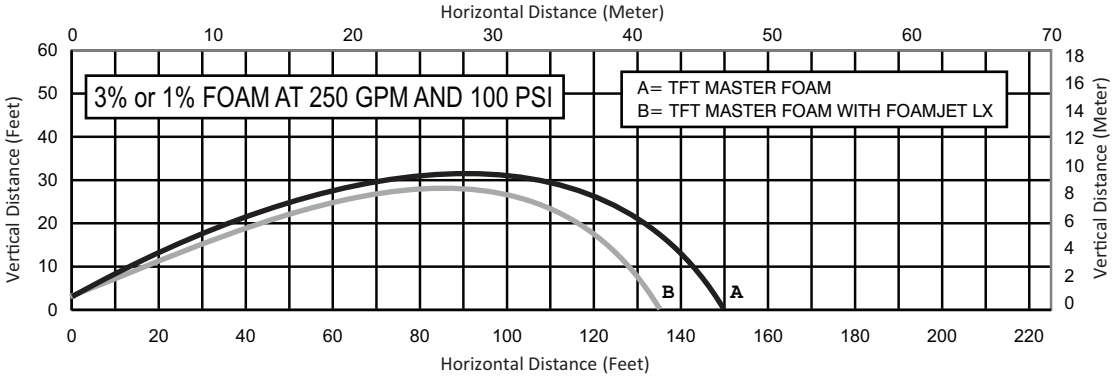

Figure 6.2A

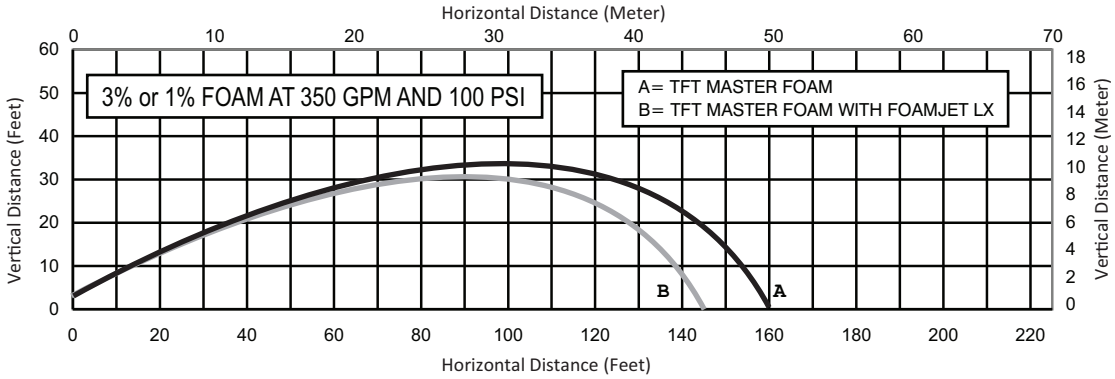

Figure 6.2B

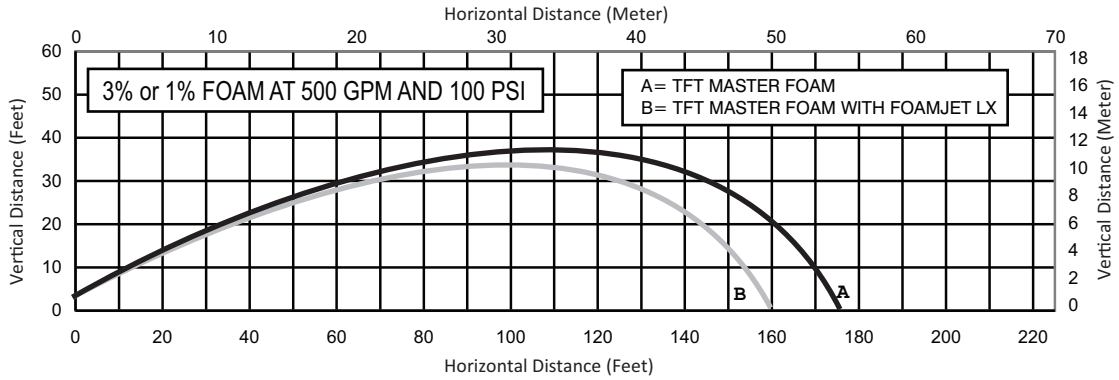

Figure 6.2C

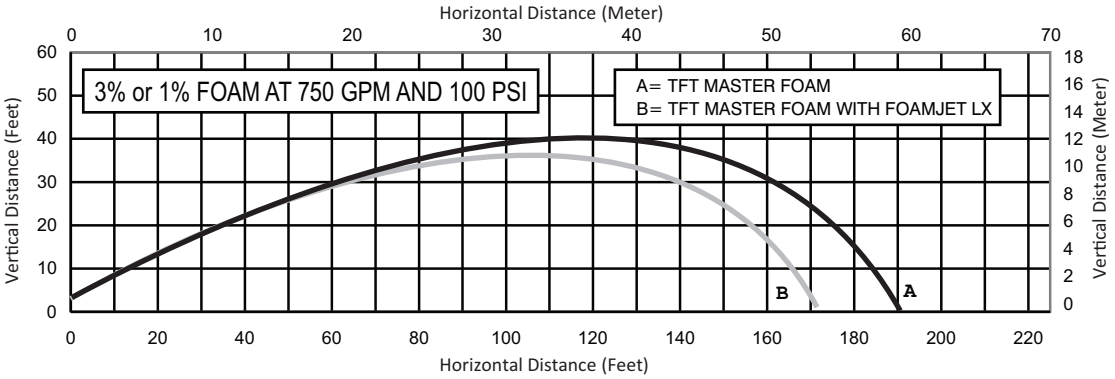

Figure 6.2D

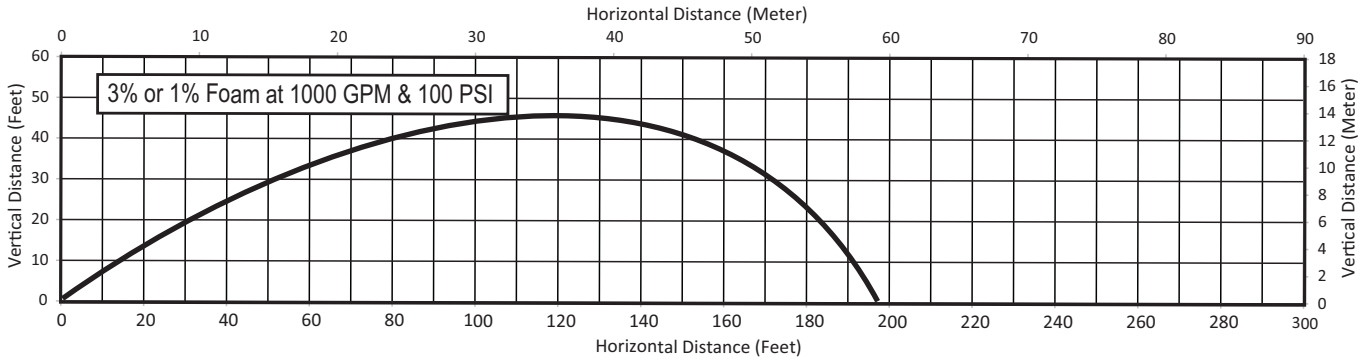

Figure 6.2E

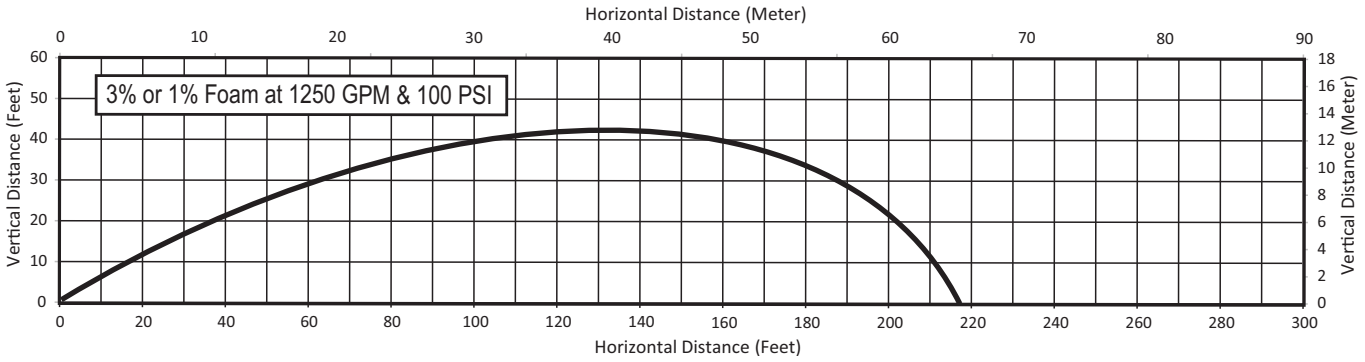

Figure 6.2F

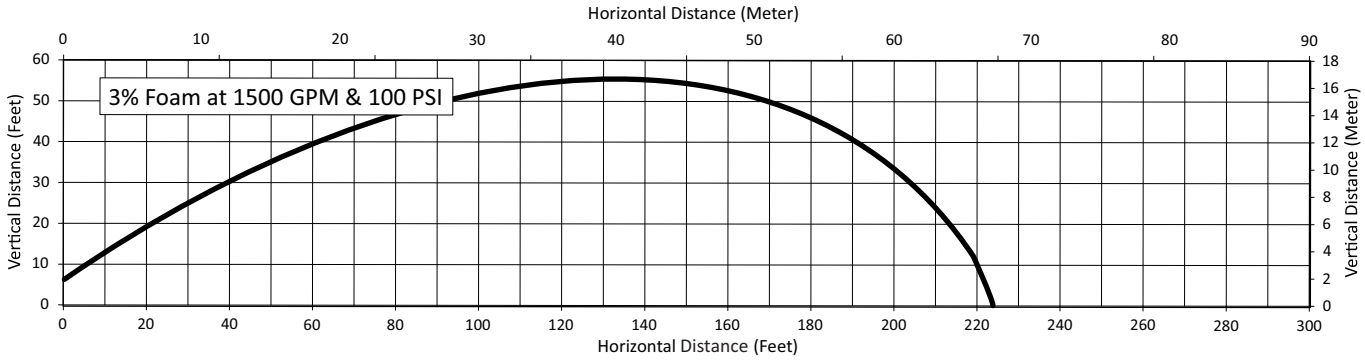

Figure 6.2G

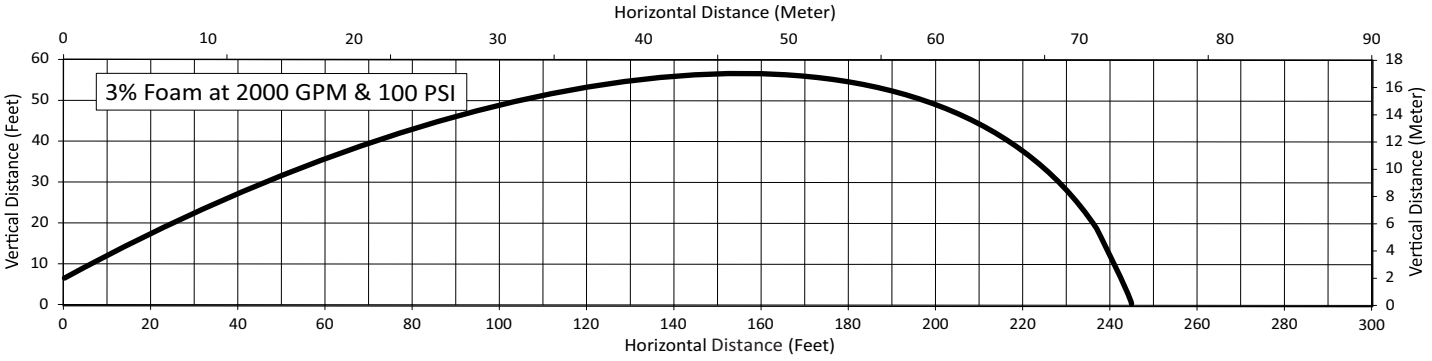

Figure 6.2H

Notes on trajectory graphs:

- Graphs show approximate effective stream trajectory at 30 degrees elevation in no wind conditions. Distance to last water drops approximately 10% farther.
- To estimate trajectories at elevations other than 30 degrees, refer to document LTT-135, available at tft.com.
- Trajectories shown are for water. The addition of foam is expected to decrease the reach by 10%.
- Tail or head winds of 20 MPH (30 KPH) may increase or decrease the range approximately 30%.

7.0 WARRANTY

Task Force Tips LLC, 3701 Innovation Way, Valparaiso, Indiana 46383-9327 USA (“TFT”) warrants to the original purchaser of its products (“equipment”), and to anyone to whom it is transferred, that the equipment shall be free from defects in material and workmanship during the five (5) year period from the date of purchase. TFT’s obligation under this warranty is specifically limited to replacing or repairing the equipment (or its parts) which are shown by TFT’s examination to be in a defective condition attributable to TFT. To qualify for this limited warranty, the claimant must return the equipment to TFT, at 3701 Innovation Way, Valparaiso, Indiana 46383-9327 USA, within a reasonable time after discovery of the defect. TFT will examine the equipment. If TFT determines that there is a defect attributable to it, TFT will correct the problem within a reasonable time. If the equipment is covered by this limited warranty, TFT will assume the expenses of repair.

If any defect attributable to TFT under this limited warranty cannot be reasonably cured by repair or replacement, TFT may elect to refund the purchase price of the equipment, less reasonable depreciation, in complete discharge of its obligations under this limited warranty. If TFT makes this election, claimant shall return the equipment to TFT free and clear of any liens and encumbrances.

This is a limited warranty. The original purchaser of the equipment, any person to whom it is transferred, and any person who is an intended or unintended beneficiary of the equipment, shall not be entitled to recover from TFT any consequential or incidental damages for injury to person and/or property resulting from any defective equipment manufactured or assembled by TFT.

It is agreed and understood that the price stated for the equipment is in part consideration for limiting TFT’s liability. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above may not apply to you.

TFT shall have no obligation under this limited warranty if the equipment is, or has been, misused or neglected (including failure to provide reasonable maintenance) or if there have been accidents to the equipment or if it has been repaired or altered by someone else.

THIS IS A LIMITED EXPRESS WARRANTY ONLY. TFT EXPRESSLY DISCLAIMS WITH RESPECT TO THE EQUIPMENT ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. THERE IS NO WARRANTY OF ANY NATURE MADE BY TFT BEYOND THAT STATED IN THIS DOCUMENT.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

8.0 MAINTENANCE

TFT products are designed and manufactured to be damage resistant and require minimal maintenance. However, as the primary firefighting tool upon which your life depends, it should be treated accordingly. To help prevent mechanical damage, do not drop or throw equipment.

8.1 FIELD LUBRICATION

All Task Force Tips nozzles are factory lubricated with high quality silicone grease. This lubricant has excellent wash out resistance, providing long term performance in firefighting nozzles. If your agency has unusually hard or sandy water, the moving parts of the nozzle may be affected. Foam agents and water additives contain soaps and chemicals that may break down the factory lubrication.

The moving parts of the nozzle should be checked on a regular basis for smooth and free operation, and for signs of damage. IF THE NOZZLE IS OPERATING CORRECTLY, THEN NO ADDITIONAL LUBRICANT IS NEEDED. Any nozzle that is not operating correctly should be immediately removed from service. The nozzle can be returned to the factory at any time for a complete checkup and re-lubrication with silicone grease.

The field use of Break Free CLP (spray or liquid) lubricant will help to temporarily restore the smooth and free operation of the nozzle. These lubricants do not have the washout resistance and long-term performance of the silicone grease. Once Break Free CLP is applied, re-application will be needed on a regular basis until the nozzle can be returned to the factory for a complete checkup and re-lubrication with silicone grease.

⚠CAUTION **Aerosol lubricants contain solvents that can swell O-Rings if applied in excess. The swelling can inhibit smooth operation of the moving parts. When used in moderation, as directed, the solvents quickly evaporate without adversely swelling the O-Rings.**

8.2 SERVICE TESTING

In accordance with NFPA 1962, equipment must be tested a minimum of annually. Units failing any part of this test must be removed from service, repaired and retested upon completion of the repair.

8.3 REPAIR

Factory service is available with repair time seldom exceeding one day in our facility. Factory serviced equipment is repaired by experienced technicians, wet tested to original specifications, and promptly returned. Any returns should include a note as to the nature of the problem and whom to reach in case of questions.

Repair parts and service procedures are available for those wishing to perform their own repairs. Task Force Tips assumes no liability for damage to equipment or injury to personnel that is a result of user service. Contact the factory or visit the web site at tft.com for parts lists, exploded views, test procedures and troubleshooting guides.

Performance tests shall be conducted on the equipment after a repair, or anytime a problem is reported to verify operation in accordance with TFT test procedures. Consult factory for the procedure that corresponds to the model and serial number of the equipment. Any equipment which fails the related test criteria should be removed from service immediately. Troubleshooting guides are available with each test procedure or equipment can be returned to the factory for service and testing.

⚠CAUTION **Any alterations to the product or its markings could diminish safety and constitutes a misuse of this product.**

NOTICE **All replacement parts must be obtained from the manufacturer to assure proper operation of the device.**

9.0 EXPLODED VIEWS AND PARTS LISTS

Exploded views and parts lists are available at tft.com/serial-number.

10.0 OPERATION AND INSPECTION CHECKLIST

BEFORE EACH USE, the nozzle must be inspected to this checklist:

1. There is no obvious damage such as missing, broken or loose parts, damaged labels etc.
2. Waterway is clear of obstructions
3. Coupling is tight and leak free
4. Gaskets are in good condition
5. Shaper turns freely and adjusts pattern through full range
6. Nozzle flow is adequate as indicated by pump pressure and nozzle reaction

BEFORE BEING PLACED BACK IN SERVICE, nozzles must be inspected to this checklist:

1. All controls and adjustments are operational
2. There are no broken or missing parts
3. There is no damage to the nozzle that could impair safe operation (e.g. dents, cracks, corrosion or other defects)
4. The thread gasket is in good condition
5. The waterway is clear of obstructions
6. Nozzle is clean and markings are legible
7. Coupling is retightened properly
8. Shaper is set to desired pattern

⚠WARNING **Equipment failing any part of the checklist is unsafe for use and must have the problem corrected before use or being placed back into service. Operating equipment that has failed the checklist is a misuse of this equipment.**