

Anti-icing and Deicing Nozzles

INSTRUCTIONS FOR 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 personnel for aircraft deicing and anti-icing operations. 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 ground support crew and maintenance personnel with the operation, servicing, and safety procedures associated with TFT ice-control nozzles. This manual should be kept available to all operating and maintenance personnel.

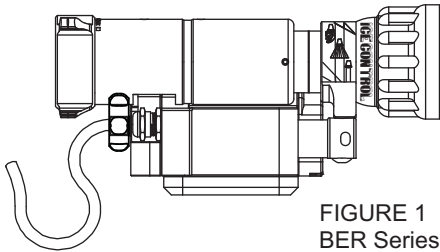


FIGURE 1
 BER Series

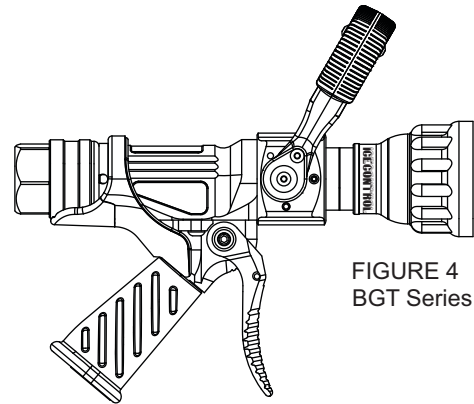


FIGURE 4
 BGT Series

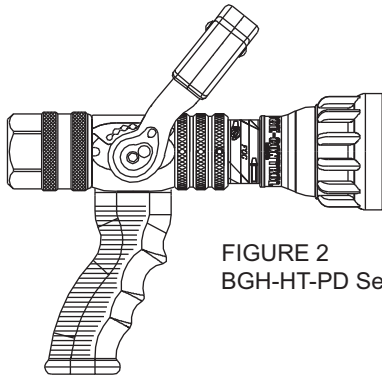


FIGURE 2
 BGH-HT-PD Series

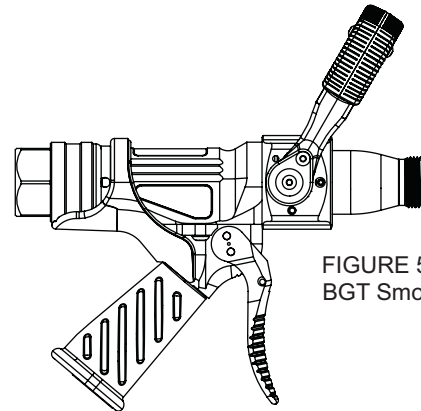


FIGURE 5
 BGT Smoothbore Series

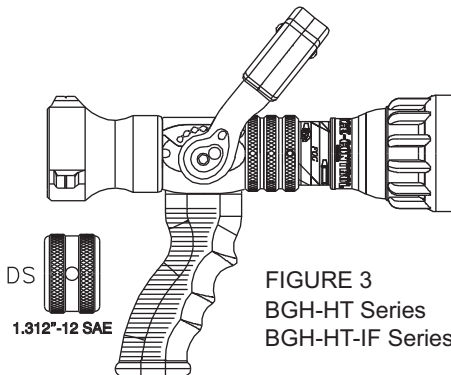


FIGURE 3
 BGH-HT Series
 BGH-HT-IF Series

DS
 1.312"-12 SAE

NOTICE

These nozzles, while regularly used for fire fighting, have been modified to meet the needs of the individual aviation customers by their specifications and requirements. As modified fire fighting nozzles, Task Force Tips relies on these specifications presented by the users, and does not independently test, confirm, or warrant, the suitability of any particular nozzle for an application. It is the responsibility of the end user to specify the flows, pressures, and configurations to meet their requirement and application.

TABLE OF CONTENTS

- 1.0 MEANING OF SAFETY SIGNAL WORDS
- 2.0 SAFETY
- 3.0 GENERAL INFORMATION
 - 3.1 VARIOUS MODELS AND TERMS
 - 3.2 SPECIFICATIONS
 - 3.2.1 ANTI-ICING NOZZLES - FOR USE WITH ANTI-ICING FLUIDS
 - 3.2.2 DEICING NOZZLES - FOR USE WITH DEICING FLUIDS
 - 3.2.3 COMBINATION NOZZLES - FOR USE WITH ANTI-ICING AND DEICING FLUIDS
 - 3.3 NOZZLE COUPLINGS
- 4.0 FLOW CHARACTERISTICS
 - 4.4 REACH, TRAJECTORY, AND REACTION FORCE
 - 4.4.1 ANTI-ICING NOZZLES
 - 4.4.2 DEICING NOZZLES
 - 4.4.3 ELECTRIC REMOTE NOZZLES
- 5.0 NOZZLE CONTROLS
 - 5.1 FLOW CONTROL
 - 5.1.1 LEVER-TYPE FLOW CONTROL (SLIDE VALVE)
 - 5.1.2 IMPULSE TRIGGER FLOW CONTROL
 - 5.1.2.1 IMPULSE TRIGGER LOCK
 - 5.1.2.2 IMPULSE FLOW CONTROL SPEED ADJUSTMENT
 - 5.1.2.3 NORMAL OPERATING POSITION
 - 5.1.3 SETTING THE FIXED HANDLE POSITION
 - 5.1.4 ELECTRIC REMOTE NOZZLES
 - 5.2 PATTERN CONTROL
 - 5.2.1 MANUAL PATTERN CONTROL
 - 5.2.2 ELECTRIC PATTERN CONTROL
 - 5.3 FLUSH CONTROL
 - 5.3.1 MANUAL NOZZLE FLUSHING
 - 5.3.2 ELECTRIC REMOTE FLUSHING
- 6.0 USE OF ICE-CONTROL NOZZLES
- 7.0 WARRANTY
- 8.0 MAINTENANCE
 - 8.1 FIELD LUBRICATION
 - 8.2 LUBRICATION PROCEDURE
 - 8.3 IMPULSE TRIGGER VALVE LUBRICATION
 - 8.4 REPAIR
- 9.0 EXPLODED VIEWS AND PARTS LISTS
- 10.0 OPERATION AND INSPECTION CHECKLIST

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 on 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.

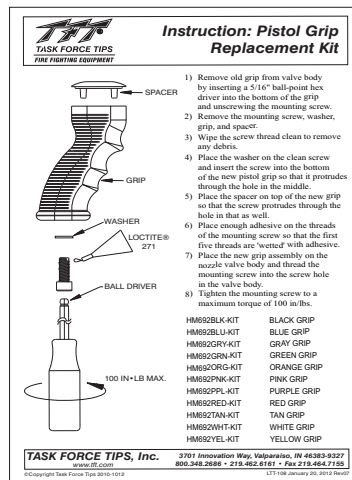
Fire and Emergency Manufacturers and Service Association, Inc.
PO Box 147, Lynnfield, MA 01940 • www.FEMSA.org

FEMSA

© 2020 FEMSA. All Rights Reserved.

SUPPORTING MATERIALS

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







LTT-108








Instruction: Pistol Grip Replacement Kit

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 indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE is used to address practices not related to physical injury.

2.0 SAFETY

	An inadequate supply of nozzle pressure and/or flow will cause an ineffective stream and can result in incomplete removal or incomplete protection from the build-up of ice on flight surfaces which may lead to injury, death, or loss of property.
	This equipment is intended for use by trained personnel for ice control of aircraft exterior surfaces. 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.
	Failure to restrain nozzle reaction can cause injury from loss of footing and/or stream protection. Opening and closing other nozzles, hose line kinks, changes in pump settings, nozzle pattern, or flushing will cause changes in nozzle reaction. Nozzle operator must always be prepared in the event of these changes.
	If nozzle gets out of control while flowing, violent whipping motion will occur. Serious injury or death could result. Retreat from the nozzle immediately. Do not attempt to regain control of nozzle while flowing.
	Ice-control fluid streams are capable of injury and damage. Heated streams can cling to and burn unprotected flesh and eyes. Do not direct fluid stream or allow splash to cause injury to persons or property.
	Breathing ice-control fluid fumes can be hazardous to your health. Consult fluid manufacturer's safety guidelines.
	To prevent mechanical damage, do not drop or throw equipment.

3.0 GENERAL INFORMATION

Task Force Tips ice-control nozzles have been specifically designed to apply water, glycol, or water/glycol based ice-control fluids to aircraft exterior surfaces at fluid temperatures up to 210° F (99° C). The proper use of deicing agents aids ground support professionals in the removal of ice from aircraft fuselage, landing gear, and wing surfaces. The proper use of anti-icing agents aids ground support professionals in their efforts to prevent ice and snow from adhering to the wings of aircraft. This may extend holdover times. These nozzles are only part of a complete ice-control system. Suitability of a particular nozzle for applying deicing or anti-icing fluids must be determined by the end user of the nozzle.

Hand Held Automatic ice-control nozzles feature:

- Automatic Pressure Control for optimum reach.
- Slide-Type valve with heat resistant EPDM seat - The valve design controls the flow through the nozzle while minimizing turbulence that causes shear and degradation of Anti-icing fluids.
- Pattern Control - This nozzle features a “toothless” bumper to reduce turbulence and can be easily adjusted for any desired spray pattern between a straight stream or wide spray position.
- One-Twist Flushing - Easily flushable while flowing to clear trapped debris.
- Pistol Grip - (BGH models only). The pistol grip and flow control handle are insulated to protect the operator from the high temperatures generated by heated fluids passing through the nozzle.
- Trigger nozzle - (BGT models only). The trigger type control valve pistol grip, valve body and stationary top handle are insulated to protect the operator from the high temperatures generated by heated fluids passing through the nozzle.

Hand Held Smoothbore ice-control nozzles feature:

- 1.0” NPSH threaded outlet to accept a smoothbore tip.
- Slide-Type valve with heat resistant EPDM seat - The valve design controls the flow through the nozzle while minimizing turbulence that causes shear and degradation of Anti-icing fluids.
- Trigger nozzle - (BGT models only). The trigger type control valve pistol grip, valve body and stationary top handle are insulated to protect the operator from the high temperatures generated by heated fluids passing through the nozzle.

The Society of Automotive Engineers (SAE) Committee G-12E, Subcommittee Aircraft Ground Equipment, has accepted the following color-coding for deicing and anti-icing fluids.

- Deicing Fluids - Red with Yellow Stripe
- Anti-icing Fluids - Green with Yellow Stripe

Deicing Nozzle models with pistol grips are shipped with a Red with Yellow Stripe pistol grip installed.

Trigger Deicing Nozzle is shipped with TFT Part# HM625-RED (1) & HM625-YEL (1) handle covers - installed.

Anti-icing Nozzle models with pistol grips are shipped with a Green with Yellow Stripe pistol grip installed.

Trigger Anti-icing Nozzle is shipped with TFT Part# HM625-GRN (1) & HM625-YEL (1) handle covers - installed.

Combination De/Anti-icing Nozzle models with pistol grip are shipped with a black pistol grip installed and two pistol grips with the above color coding are included with each nozzle. Trigger Combination De/Anti icing Nozzle models are shipped with black handle covers installed and handle covers with the above color coding are included with each nozzle. It is the responsibility of the end user agency to install the correct color coded pistol grip for the application where the nozzle is utilized.

Electric remote control ice-control nozzles feature:

- Automatic Pressure Control for optimum reach.
- Pattern Control- Electrically operated pattern adjustment, features a “toothless” bumper to reduce turbulence, and can be easily adjusted for any desired spray pattern between a straight stream or wide spray position.
- Sealed electric motor with easy to use manual override.
- Flush - Easily flushable while flowing to clear trapped debris.
- Swivel connecting coupling for ease of installation.

3.1 VARIOUS MODELS AND TERMS

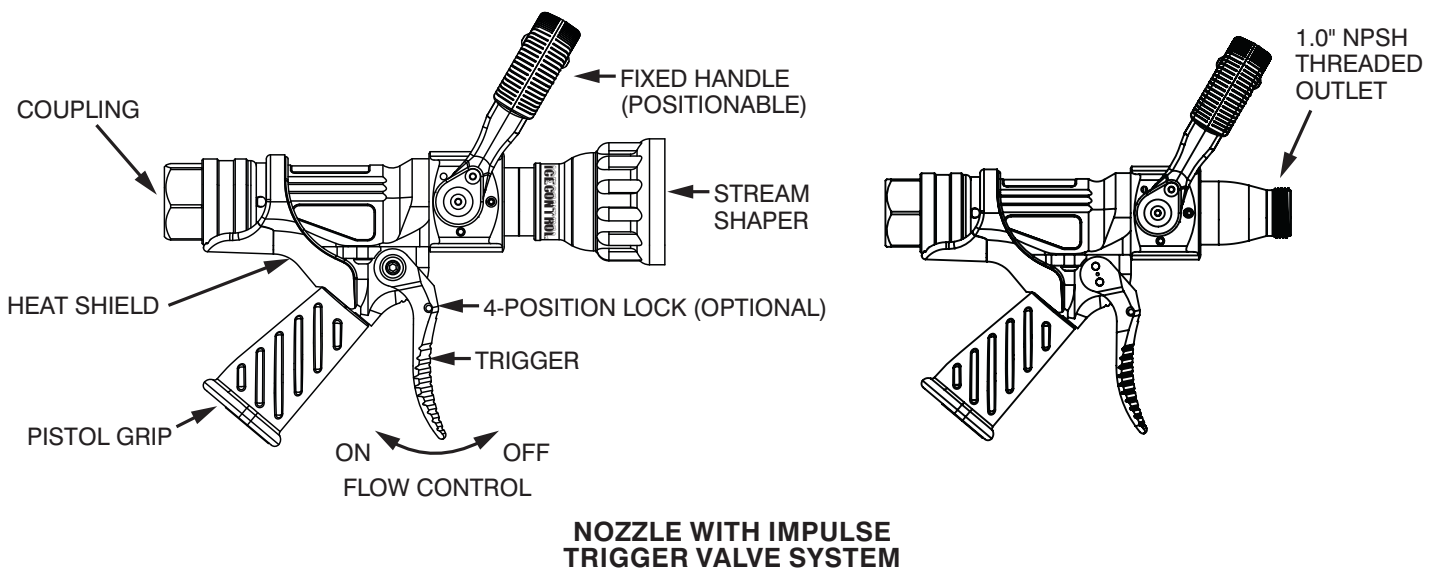
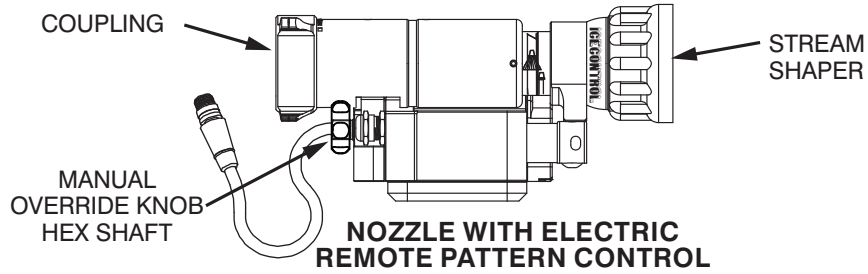
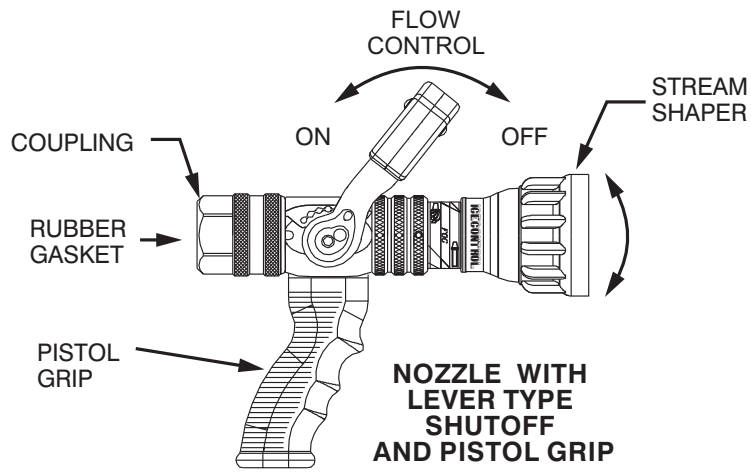


Figure 3.1

3.2 SPECIFICATIONS

3.2.1 ANTI-ICING NOZZLES - FOR USE WITH ANTI-ICING FLUIDS

MODEL	FLOW RANGE (4)***	NOMINAL (5) PRESSURE	STANDARD COUPLING	VALVED	PATTERN CONTROL	FIGURE # (ON COVER)
BGH-HT75-PD	10-60 gpm*** 38-227 l/min***	75 psi 5 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2
BGH-HT50-DS	10-60 gpm*** 38-227 l/min***	50 psi 3 bar	1.312"-12 SAE	YES VALVED	MANUAL TWIST	3
BGH-HT50-PD	10-60 gpm*** 38-227 l/min***	50 psi 3 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2

***CAN BE USED FOR ANTI-ICING FLUIDS WHEN OPERATED BETWEEN 20-30 gpm
(4) CONVERSION - 1 gpm = 3.785 l/min - (5) CONVERSION - 1 psi = 0.067 bar

Table 3.2.1

3.2.2 DEICING NOZZLES - FOR USE WITH DEICING FLUIDS

MODEL	FLOW RANGE (4)	NOMINAL (5) PRESSURE	STANDARD COUPLING	VALVED	PATTERN CONTROL	FIGURE # (ON COVER)
BER-HT150	10-60 gpm 38-227 l/min	150 psi 10 bar	1.5"-9 NH	NO	ELECTRIC (12-24VDC)	1
BGH-HT100-PD	10-60 gpm 38-227 l/min	100 psi 7 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2
BGH-HT150-PD	10-60 gpm 38-227 l/min	150 psi 10 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2
BGH-HT1503PD	20-25 gpm 76-95 l/min	150 psi 10 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2
BGT-HT1503PD	20-25 gpm 76-95 l/min	150 psi 10 bar	1.0"-11.5 NPT	YES TRIGGER	MANUAL TWIST	4

Table 3.2.2

3.2.3 COMBINATION NOZZLES - FOR USE WITH ANTI-ICING AND DEICING FLUIDS

Use the low flow fixed gallonage setting for anti-icing with anti-icing fluids.

Use the high flow automatic pressure setting for deicing with deicing fluids.

MODEL	ANTI-ICING SETTING (4,5)***	DEICING SETTING (4,5)	STANDARD COUPLING	VALVED	PATTERN CONTROL	FIGURE # (COVER)
BER-HT120	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 120 psi 303 l/min @ 8 bar	1.5"-9 NH	NO	ELECTRIC (12-24VDC)	1
BER-HT1501	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 150 psi 303 l/min @ 10 bar	1.5"-9 NH	NO	ELECTRIC (12-24VDC)	1
BER-HT1502	20 gpm @ 50 psi 76 l/min @ 3 bar	40 gpm @ 150 psi 151 l/min @ 10 bar	1.5"-9 NH	NO	ELECTRIC (12-24VDC)	1
BERP-HT120*	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 120 psi 303 l/min @ 8 bar	1.5"-9 NH	NO	ELECTRIC (12-24VDC) 6-PIN CABLE CONNECTION	1
BGH-HT120-PD	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 120 psi 303 l/min @ 8 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2
BGT-HT120-PD	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 120 psi 303 l/min @ 8 bar	1.0"-11.5 NPT	YES TRIGGER	MANUAL TWIST	4
BGT-HTSB-PD	SMOOTHBORE SIZE DEPENDENT	SMOOTHBORE SIZE DEPENDENT	1.5"-11.5 NPT	YES TRIGGER	N/A	5
BGH-HT120-IF	20 gpm @ 50 psi 76 l/min @ 3 bar	80 gpm @ 120 psi 303 l/min @ 8 bar	1.5"-11.5 NPSH	YES VALVED	MANUAL TWIST	3
BGH-HT1502PD	20 gpm @ 50 psi 76 l/min @ 3 bar	40 gpm @ 150 psi 151 l/min @ 10 bar	1.0"-11.5 NPT	YES VALVED	MANUAL TWIST	2

* BERP-HT120 includes electrical plug connection for Task Force Tips, Tornado monitors only.

***CAN BE USED FOR ANTI-ICING FLUIDS WHEN OPERATED BETWEEN 20-30 gpm
(4) CONVERSION - 1 gpm = 3.785 l/min - (5) CONVERSION - 1 psi = 0.067 bar

Table 3.2.3

3.3 NOZZLE COUPLINGS



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.



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.

4.0 FLOW CHARACTERISTICS

Friction pressure losses may vary due to differences in hoses/piping construction resulting in flows different than those shown. Flows can be calculated using conventional hydraulics.

These flow curves are for reference only. User must determine suitability of the stream for the particular purpose for which it is being used. Such factors as fluid/water ratio, manufacturer of fluid, fluid temperature and equipment used to supply fluid to the nozzle may produce variation from the flows and pressures shown.

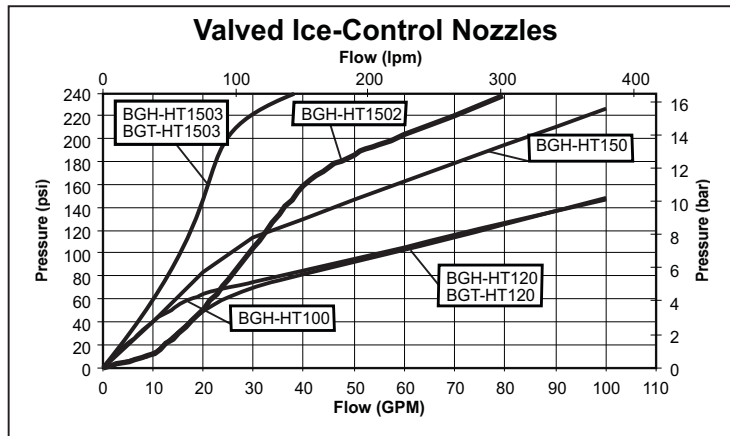


Figure 4.0A

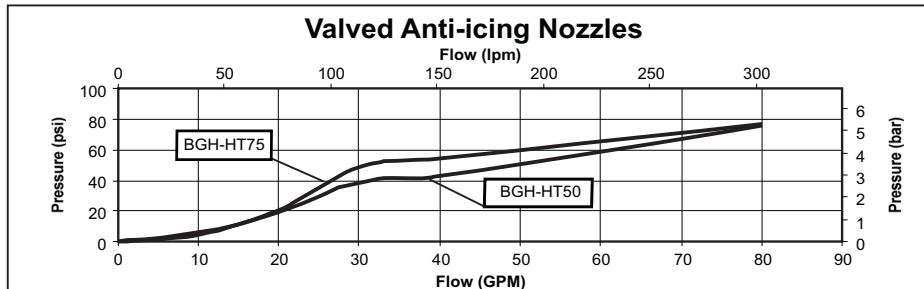


Figure 4.0B

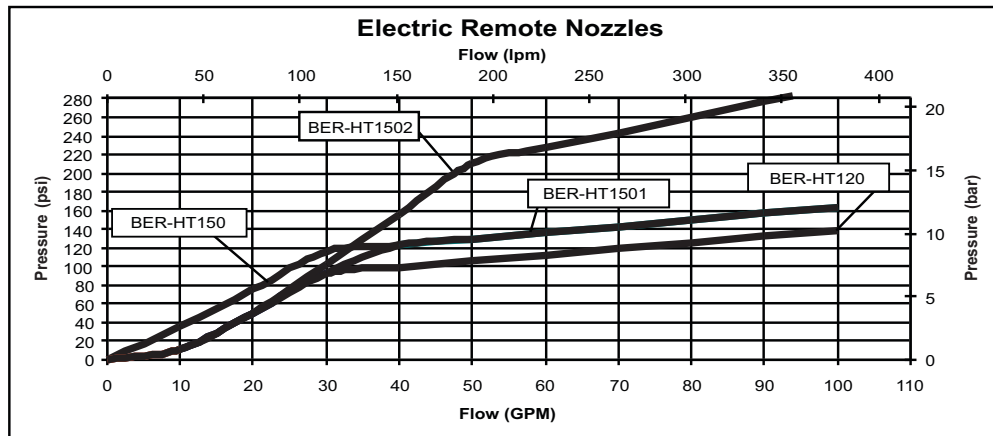


Figure 4.0C

4.4 REACH, TRAJECTORY, AND REACTION FORCE

These trajectories, reach and reaction numbers are provided for reference. All data based on 30 degree nozzle discharge angle, in straight stream setting. Actual trajectories, reach and reactions may vary with wind conditions, fluid type, fluid/water ratio, fluid temperature, pressure and flow at the nozzle. It is the operator's responsibility to determine that the system provides adequate reach for the intended purpose.



Ice control nozzles operate at high pressures. Direct impingement of the stream at right angles to some aircraft surfaces may cause deformation or damage. User should direct stream at shallow angles to sensitive surfaces.

4.4.1 ANTI-ICING NOZZLES

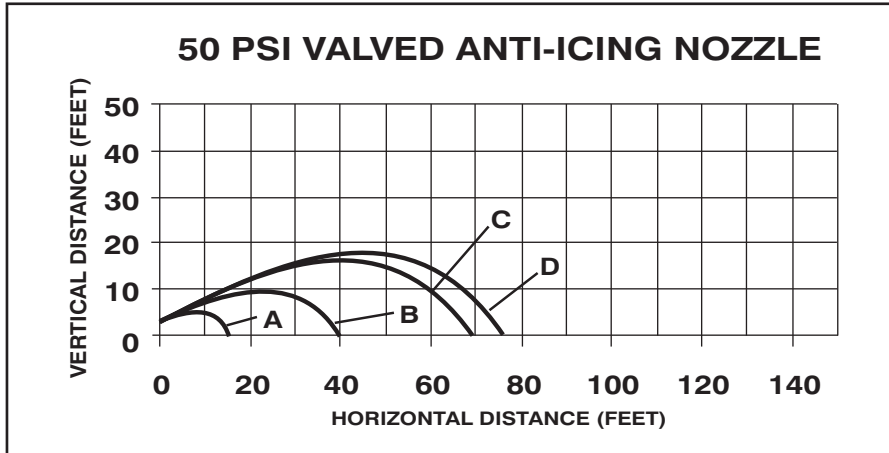


Figure 4.4.1A

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	10	19	1
B	20	45	4
C	30	60	9
D	40	64	13

CURVE	LPM FLOW	KGf/CM ² INLET PRESSURE	KGf REACTION
A	38	1.3	.5
B	76	3.1	2.1
C	110	4.1	4.5
D	150	4.4	6.3

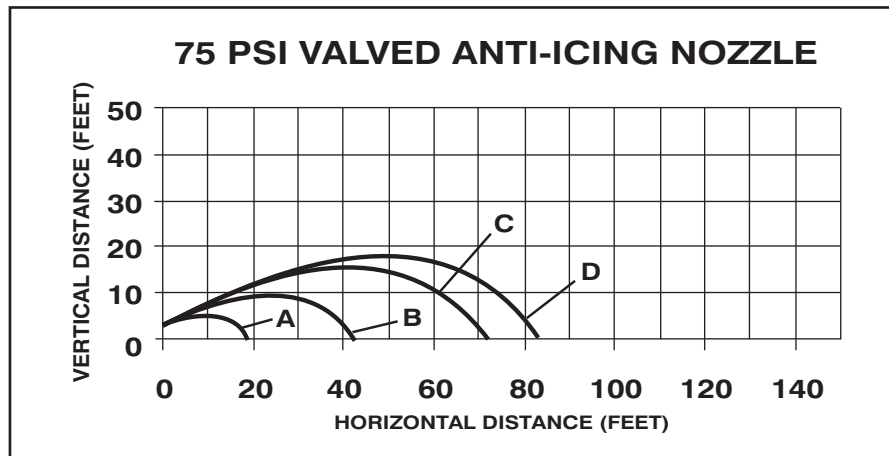


Figure 4.4.1B

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	10	5	1
B	20	21	5
C	30	49	11
D	40	55	15

CURVE	LPM FLOW	KGf/CM ² INLET PRESSURE	KGf REACTION
A	38	.3	.5
B	76	1.4	2.2
C	110	3.4	5.0
D	150	3.8	7.1

4.4.2 DEICING NOZZLES

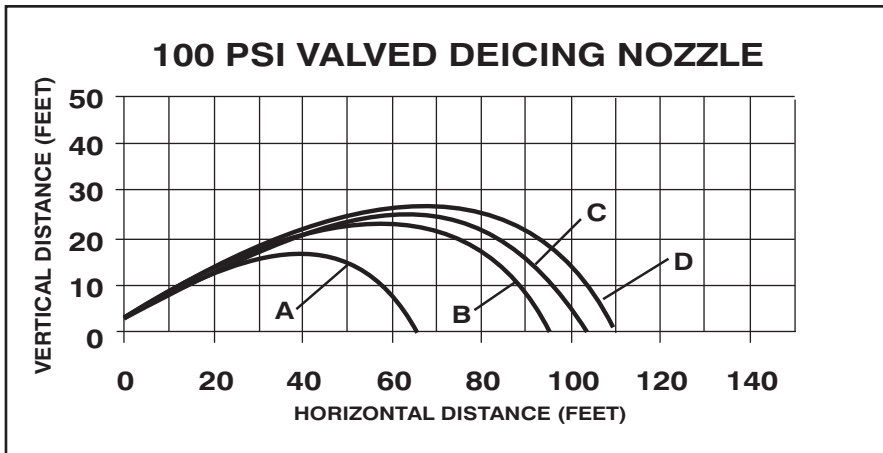


Figure 4.4.2A

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	20	64	8
B	40	85	19
C	50	95	25
D	60	100	31

CURVE	LPM FLOW	KGf/CM ² INLET PRESSURE	KGf REACTION
A	76	4.4	3.8
B	150	5.9	8.8
C	190	6.6	12
D	230	6.9	15

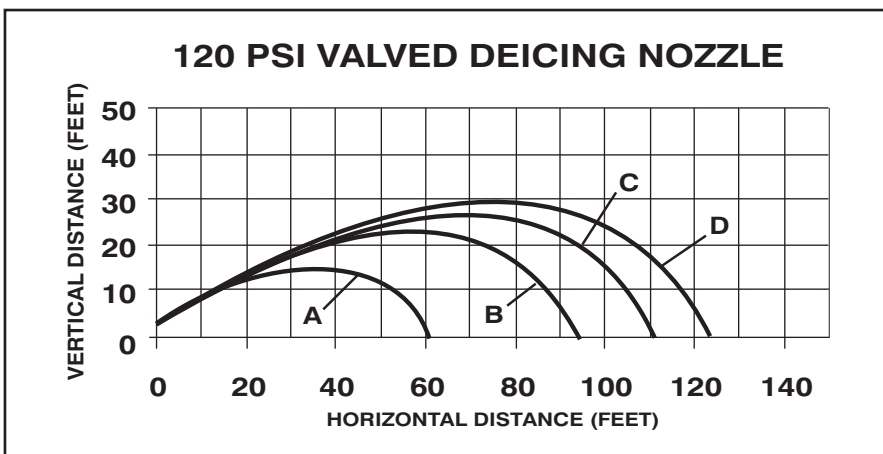


Figure 4.4.2B

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	20	50	7
B	40	81	18
C	60	105	31
D	80	120	44

CURVE	LPM FLOW	KGf/CM ² INLET PRESSURE	KGf REACTION
A	76	3.4	3.4
B	150	5.6	8.6
C	230	7.2	15
D	300	8.3	21

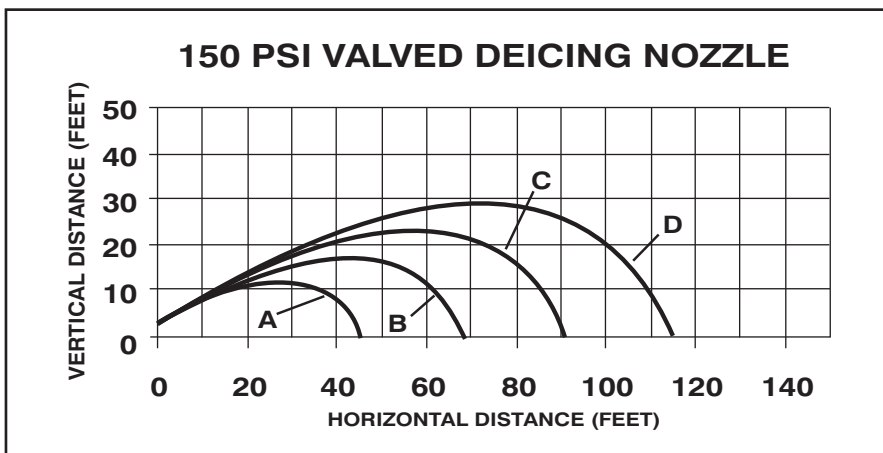


Figure 4.4.2C

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	10	40	3
B	20	83	9
C	30	114	16
D	50	150	31

CURVE	LPM FLOW	KGf/CM ² INLET PRESSURE	KGf REACTION
A	38	2.8	1.5
B	76	5.7	4.3
C	110	7.9	7.6
D	190	10	15

4.4.3 ELECTRIC REMOTE NOZZLES

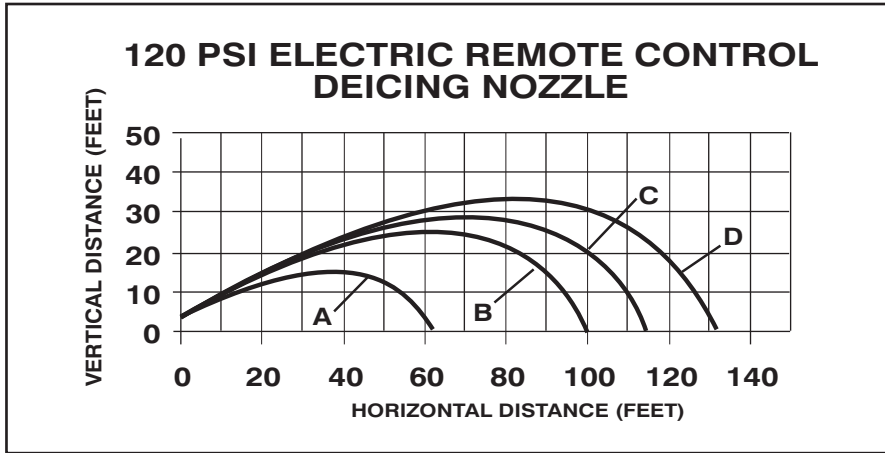


Figure 4.4.3A

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	20	50	7
B	40	93	19
C	60	106	31
D	80	120	44

CURVE	LPM FLOW	KGF/CM ² INLET PRESSURE	KGF REACTION
A	76	3.4	3.4
B	150	6.4	9.2
C	230	7.3	15
D	300	8.3	21

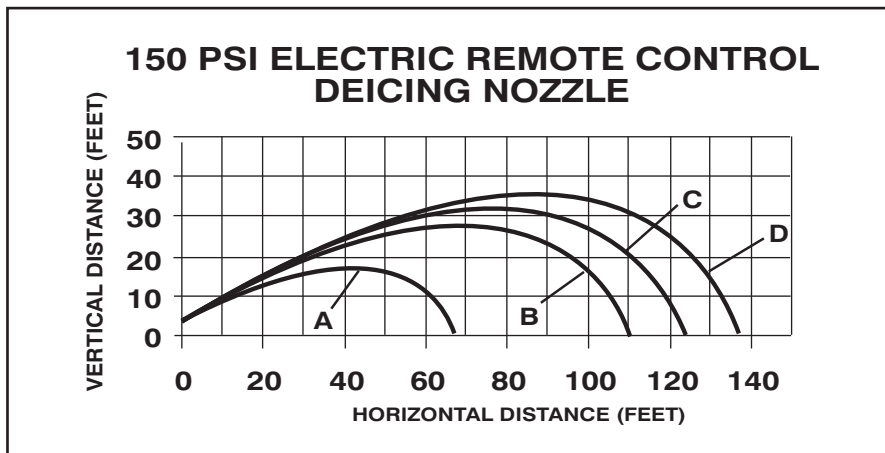


Figure 4.4.3B

CURVE	GPM FLOW	PSI INLET PRESSURE	LBS REACTION
A	20	74	9
B	40	123	22
C	60	136	35
D	80	150	49

CURVE	LPM FLOW	KGF/CM ² INLET PRESSURE	KGF REACTION
A	76	5.1	4.1
B	150	8.5	11
C	230	9.4	17
D	300	10	23

5.0 NOZZLE CONTROLS

NOTICE

Control valves must be opened slowly to eliminate unnecessary strain on the hose and couplings, and reduce pressure surges.

NOTICE

Nozzles attached to an in-service hose shall be stored in the off position.

5.1 FLOW CONTROL

5.1.1 LEVER-TYPE FLOW CONTROL (SLIDE VALVE)

On models with a lever type shutoff handle the nozzle is shut off when the handle is fully forward. The valve handle has six detent flow positions. These detent positions allow the nozzle operator to regulate the fluid flow of the nozzle depending on the need or what can be safely and effectively handled.

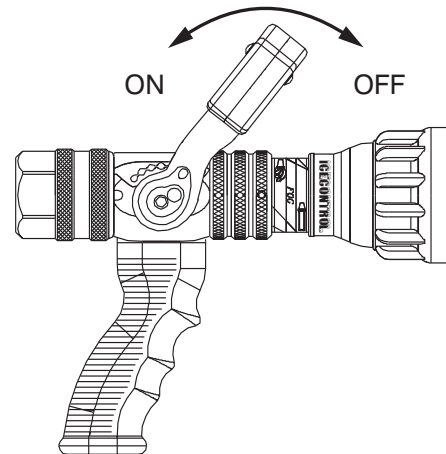
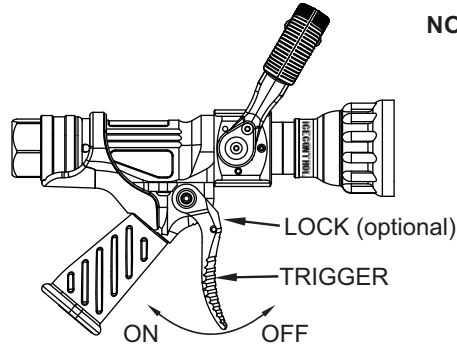


Figure 5.1.1

5.1.2 IMPULSE TRIGGER FLOW CONTROL



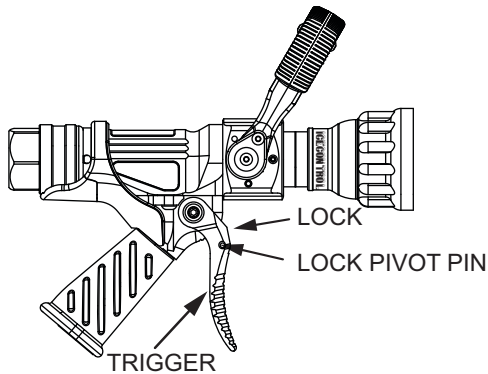
NOTE: THE TRIGGER RETURNS TO OFF IF NOT HELD OR LOCKED

Figure 5.1.2

WARNING

Releasing grip on a nozzle while flowing will result in an out of control nozzle. Serious injury or death could result. Do not attempt to regain control of a nozzle while flowing.

5.1.2.1 IMPULSE TRIGGER LOCK



Use an 1/8" (3mm) punch to push out pin and remove lock if the lock is not desired.

Figure 5.1.2.1

To Lock: Push on the lock while pulling back the trigger to engage one of the four locked positions.

To Unlock: Pull back slightly on the trigger without any pressure on the lock. The spring loaded lock should automatically move to the unlocked position.

WARNING

When the trigger lock is engaged, the nozzle will not shut off if dropped. Always shut off the nozzle before releasing the pistol grip to avoid injury from an out of control nozzle.

5.1.2.2 IMPULSE FLOW CONTROL SPEED ADJUSTMENT

The IMPULSE valve contains a slow close mechanism to prevent the nozzle from slamming off if the trigger is suddenly released. The closing speed is set at the factory to be slow enough to reduce water hammer, ("water hammer" is always present in any valve when it is shut off. The slow close mechanism will reduce this but cannot eliminate it completely) but fast enough to reduce the potential danger of hose whipping from a dropped nozzle. The closing speed may be adjusted as shown.

Do not unscrew the adjuster past the end of the hand grip (to unscrew it too far could result in the loss of dampening fluid.)

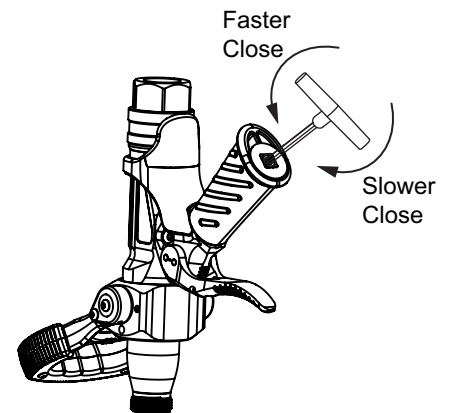


Figure 5.1.2.2

WARNING

A closing time that is too slow increases the risk of an out of control nozzle. Loss of control could result in injury or death. Use caution when adjusting the closing speed, always verify performance after adjustment, and ensure that all adjustments are made by qualified personnel under the direction of the AHJ.

WARNING

A closing time that is too quick increases the risk of water hammer from a suddenly released trigger valve. Loss of control or a burst hose could result in injury or death. Use caution when adjusting the closing speed, always verify performance after adjustment, and ensure that all adjustments are made by qualified personnel under the direction of the AHJ.

5.1.2.3 NORMAL OPERATING POSITION

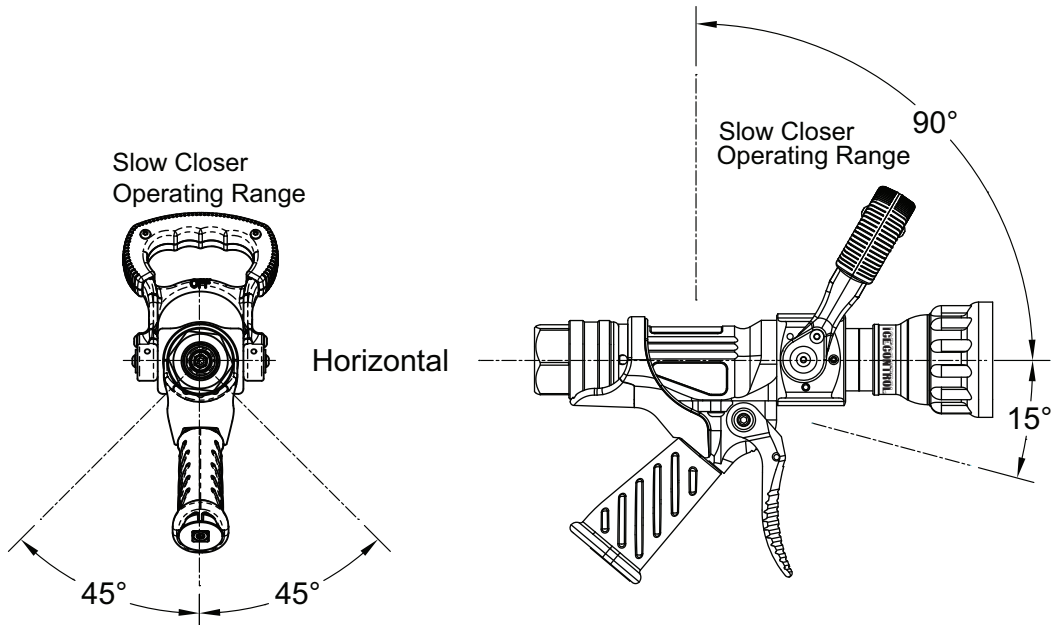


Figure 5.1.2.3



Quickly releasing the trigger outside normal operating orientation will likely cause faster valve shut off, increasing risk of a burst hose. This could result in injury. Slowly release the trigger when operating outside of the nozzle's normal orientation.

5.1.3 SETTING THE FIXED HANDLE POSITION

The fixed handle may be used to counteract nozzle reaction forces, but it does not control flow since it is not part of the valve. The handle can be set into any of three positions based on user preference.

To set the handle position:

1. Remove the upper 10-32 button head screws located on both sides of the handle using 1/8" hex key.
2. Position the handle into the desired position. Apply Loctite 242 (blue) to the screws. Tighten securely.

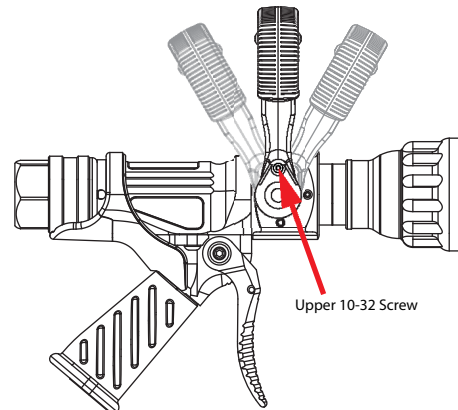


Figure 5.1.3

5.1.4 ELECTRIC REMOTE NOZZLES

On models with electric remote control of the shaper there is no built-in flow control. Flow control must be provided for elsewhere in the system.

5.2 PATTERN CONTROL



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.



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.

5.2.1 MANUAL PATTERN CONTROL

TFT nozzles have full pattern control from straight stream to wide fog. Turning the stream shaper clockwise (as seen from the operating position behind the nozzle) moves the shaper to the straight stream position, and the eventually to OFF. Turning the shaper counterclockwise will result in an increasingly wider pattern.

5.2.2 ELECTRIC PATTERN CONTROL

On models that use an electric pattern control, a continuously variable pattern from narrow to wide is available by operating the electric actuator according to the directions supplied with the actuator control panel. Extending the SHAPER outwards, as seen from behind the nozzle, moves the SHAPER to the straight stream position. Retracting the SHAPER inwards will result in an increasingly wider pattern. The actuator detects the motor current rise at each end of its stroke and stops the motor instantly, thus making limit switches unnecessary. Manual override is possible by using the external knob or hex head to drive the motor shaft. Turning the shaft counterclockwise, as seen from the operating position behind the nozzle, extends the SHAPER towards the straight stream position. Turning the knob clockwise retracts the SHAPER toward the wide spray position. If a 5/16" hex wrench is used, do not force the shaft further after it stops firmly at each end of stroke. Exceeding 40 in-lb (4.5 N·m) will damage the actuator.



Electric remote nozzle has finger pinch points. Keep fingers away from nozzle when using electric control.

5.3 FLUSH CONTROL

Small debris passes through the debris screen (if so equipped) and may get caught inside the nozzle. This trapped material will cause poor stream quality, shortened reach, and reduced flow. To remove small debris, the nozzle may be flushed by the following methods.



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.



Heated ice-control fluids are capable of causing burns. Direct stream away from personnel when flushing as hot fluid may splash to the ground under the nozzle.



Operating the nozzle in the flush position will flow increased volumes of fluid. Operate in the flush position only when necessary and only for a short amount of time to prevent fluid waste.

5.3.1 MANUAL NOZZLE FLUSHING

- While still flowing, rotate the shaper counterclockwise (as viewed from behind the nozzle) to the flush position. (increased resistance will be felt on the SHAPER as the nozzle goes into flush) This will open the nozzle allowing debris to pass through.
- During flush the nozzle reaction will decrease as the pattern becomes wider and the pressure drops. The nozzle operator must be prepared for an increase of nozzle reaction when returning the nozzle from the flush position to retain control of the nozzle.
- Rotate the shaper out of flush to continue normal operations.

5.3.2 ELECTRIC REMOTE FLUSHING

- While still flowing, retract the SHAPER backwards past the wide spray position (as viewed from behind the nozzle) until it reaches its stop. This will open the nozzle allowing debris to pass through.
- When the debris has been flushed out, extend the SHAPER outwards until it is out of flush as determined by the markings on the barrel and the force of the stream to continue normal operation.
- During flush, the nozzle will lose much of its reaction force and reach as the pressure drops.
- Flushing may also be accomplished in the manual override mode of operation by moving past the wide spray position.

6.0 USE OF ICE-CONTROL NOZZLES

IT IS THE RESPONSIBILITY OF THE GROUND CREW MANAGEMENT TO DETERMINE PHYSICAL CAPABILITIES AND SUITABILITY FOR AN INDIVIDUAL'S USE OF THIS EQUIPMENT.

The methods used in applying ice-control fluids to aircraft are the responsibility of the agency performing the ice-control fluid application. Many factors contribute to the proper control of ice on an aircraft. The nozzle is only one part of a complete ice control system.

Flow, pressure at the nozzle, fluid temperature, type of fluid, method of application, outside air temperature, precipitation, aircraft surface temperature and other factors must be taken into account when dealing with ice conditions. The proper methods must be determined by each agency for their particular conditions.

Where a nozzle is listed as Anti-icing capable, flow and pressure must be controlled within the rating of the nozzle to minimize shearing degradation of the fluid.

▲ WARNING

Discharge of anti-icing fluids from nozzles at flows greater than 50 GPM or pressures greater than 85 psi may result in degradation of the fluid and render it ineffective in preventing a buildup of ice on aircraft surfaces prior to takeoff. Consult fluid manufacturer's recommended guidelines.

NOTICE

Using fluids above the rated temperature can cause premature degradation of nozzle components and is considered a misuse of the product. Do not exceed rated fluid temperature at the nozzle.

NOTICE

Use of saltwater in this equipment is not permissible and will lead to a shortened service life.

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

Task Force Tip's Ice-Control Nozzles are designed and manufactured to be damage resistant and require minimal maintenance. However, as the primary fluid application tool upon which aircraft ice-control depends, they should be treated accordingly.

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. 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 LUBRICATION PROCEDURE

PART ONE - COUPLING DOWN

Position the nozzle at a 45-degree angle with the COUPLING end down. CLOSE the valve handle and set the pattern to STRAIGHT STREAM. Then spray a short burst into these areas:

#1 FRONT PATTERN CONTROL SEAL

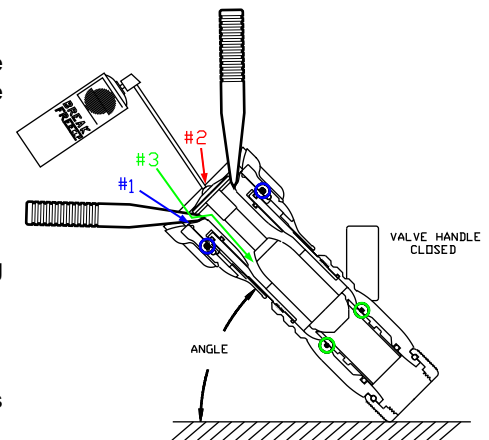
Spray between the pattern control and the barrel.

#2 PRESSURE CONTROL UNIT

Place check sticks behind baffle while shaper is in flush. Cycle baffle in and out using check sticks several times to work lubrication into O-rings.

#3 FRONT SLIDER SEAL

- Rotate shaper into FLUSH position.
- Spray down the front end of the nozzle to dribble lubricant into the clearances between the shaper and the valve body.



While holding nozzle at the angle, wait 30 seconds for the lubricant to penetrate into the clearances. Cycle the valve handle and rotate the shaper from straight stream to full flush several times, and then proceed to the next section.

PART TWO - COUPLING UP

Position the nozzle at a 45-degree angle with the BUMPER end down. OPEN the valve handle and set the pattern to FLUSH. Spray a short burst in these areas:

#4 REAR SHAPER SEAL

Spray down the clearance between the label and the shaper guide.

#5 PRESSURE CONTROL UNIT

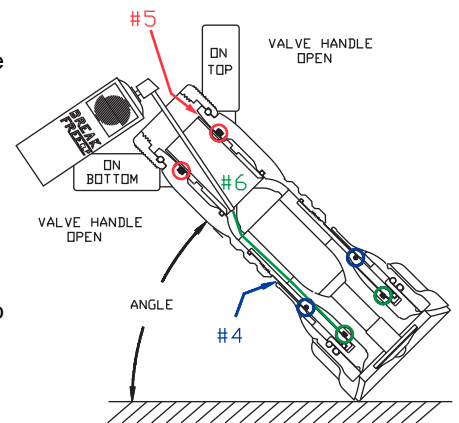
Spray into the clearance between the slider and the valve body.

#6 FRONT SLIDER SEAL

- With the handle on the top, spray down into the nozzle. The aerosol extension tip will help direct the spray into clearances leading to the O-Ring.
- Rotate nozzle so the valve is on the bottom and spray another short burst.

#7 DETENTS IN THE HANDLE

Spray a small amount on the detent followers located in the handle.



While holding nozzle at the angle, wait 30 seconds, then cycle the valve handle several times. Rotate the pattern control from straight stream to full flush several times. The pattern control should move freely and easily. The barrel cone should move forward to within 1/16" of the baffle before the shaper reaches straight stream position. Wipe off excess lubricant.

IF THIS PROCEDURE DOES NOT RESTORE SMOOTH AND FREE OPERATION OF ALL THE MOVING PARTS, FACTORY SERVICE IS NEEDED. • 24-HOUR HOT LINE — 800-348-2686 • www.tft.com

8.3 IMPULSE TRIGGER VALVE LUBRICATION

1. Insert tube from BreakFree into drain hole in pistol grip.
2. With nozzle upside down spray a 2 second burst into the pistol grip. Holding a rag around the tube here can help keep excess BreakFree from the outside of the nozzle.
3. Keep nozzle upside down for at least 10 seconds to allow the BreakFree to flow into the valve area.
4. Check for smooth and free operation of the trigger. Repeat a second time if needed.

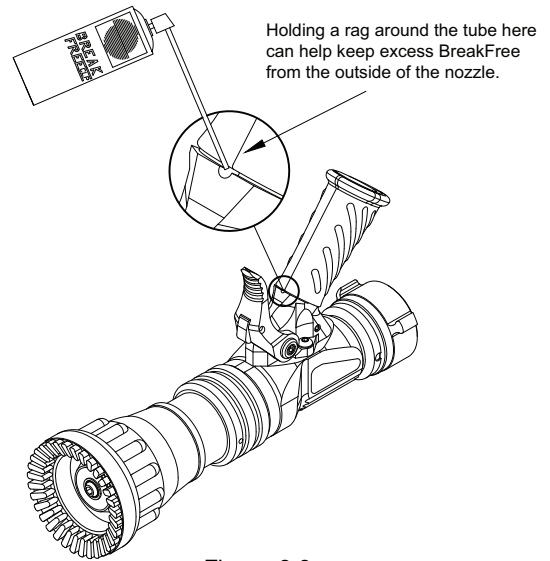


Figure 8.3

IF THIS PROCEDURE DOES NOT RESTORE SMOOTH OPERATION OF THE IMPULSE TRIGGER SYSTEM, THEN FACTORY SERVICE IS NEEDED. • 24-HOUR HOT LINE — 800-348-2686 • tft.com

8.4 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.

WARNING

Service technicians bear responsibility for ensuring use of appropriate protective clothing and equipment. The chosen protective clothing and equipment must provide protection from potential hazards users may encounter while servicing equipment. Requirements for protective clothing and equipment are determined by the Authority Having Jurisdiction (AHJ).

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.

This page intentionally left blank.

10.0 OPERATION AND INSPECTION CHECKLIST

Nozzle must be inspected periodically as mandated by the AHJ for proper operation and function according to this checklist.

On models with a hand or trigger operated valve:

1. There is no obvious damage such as missing, broken or loose parts, damaged labels, etc.
2. Coupling is tight and leak free.
3. Valve operates freely through full range of settings.
4. Trigger lock holds trigger open. (if so equipped)
5. "OFF" position does fully shut off and flow stops.
6. Nozzle flow is adequate as indicated by pump pressure and nozzle reaction.
7. Shaper turns freely and adjusts pattern through full range.
8. Shaper turns into full flush and out of full flush with normal flow and pressure restored.

On models with an electric remote control:

1. There is no obvious damage such as missing, broken or loose parts, damaged labels, frayed or cracked wiring, etc.
2. Coupling is tight and leak free.
3. Nozzle flow is adequate as indicated by pump pressure and nozzle reach.
4. Shaper moves freely and adjusts pattern through full range by electric and manual control.
5. Shaper moves into full flush and out of full flush with normal flow and pressure restored by electric and manual control.
6. Electric remote actuator mountings are tight.
7. Manual override controls operate freely and through full range of motion.



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.