

Twister® and Bubble Cup® Nozzles

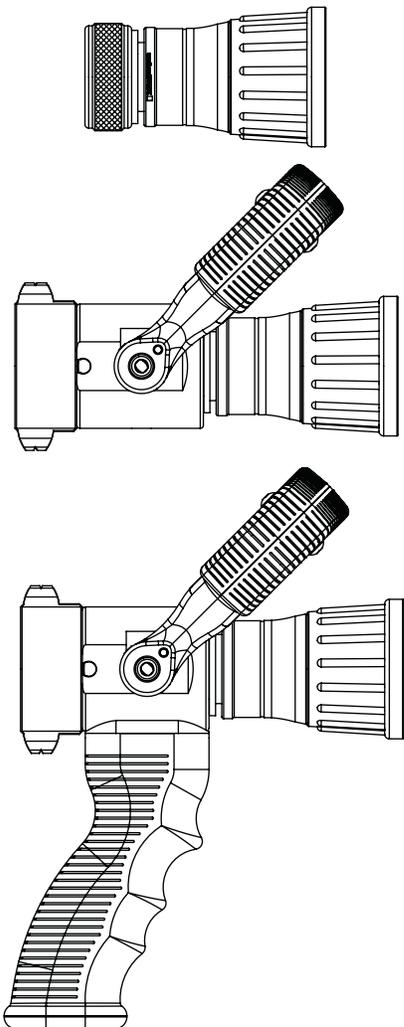
INSTRUCTIONS FOR OPERATION, AND MAINTENANCE

WARNING

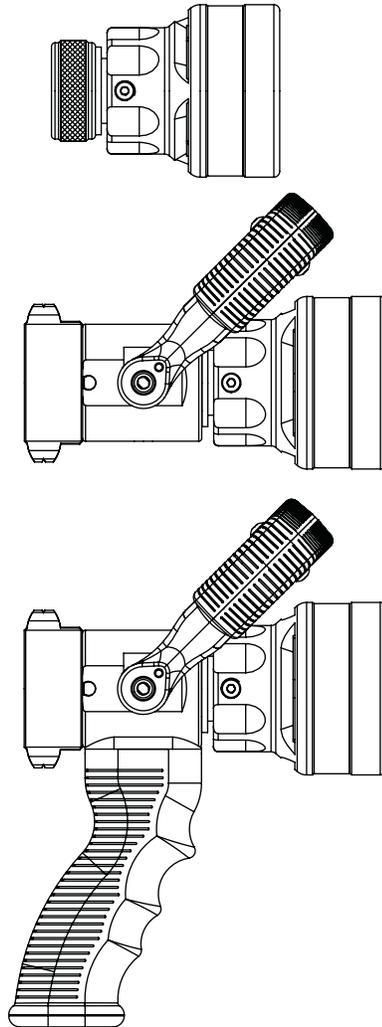
Understand manual before use. Operation of this device without understanding the manual and receiving proper training is a misuse of this equipment. Obtain safety information at tft.com/serial-number.

This equipment is intended for use by trained and qualified 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.



Twister Series



Bubble Cup Series

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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 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.

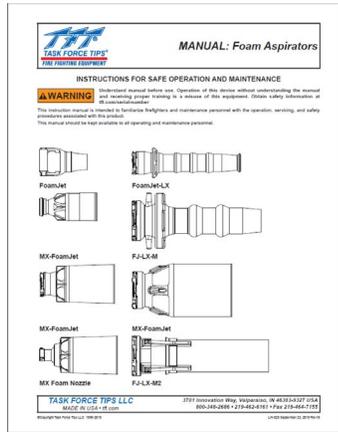


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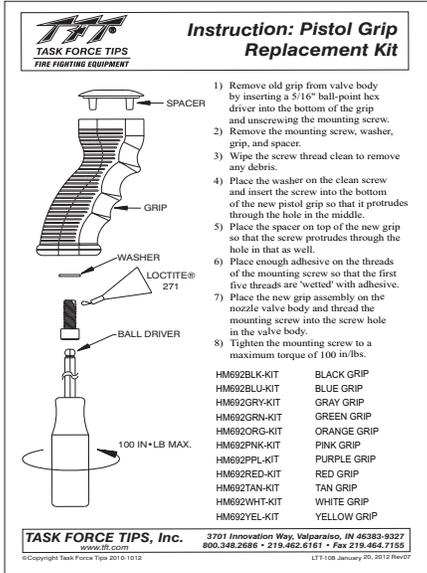
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SUPPORTING MATERIALS

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



LIA-025
Manual: Foam Aspirators



LTT-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 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.



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.



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.



Failure to restrain nozzle reaction can cause firefighter 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.



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.



The stream exiting a nozzle is 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.



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

3.0 GENERAL INFORMATION

This manual describes nozzles calibrated at 100 psi (7 bar). Contact the factory for data specific to models that operate with metric flow calibrations. Task Force Tips Twister and Bubble Cup nozzles are economical, lightweight, and dependable. Their rugged construction is compatible with the use of fresh water as well as firefighting foam solutions. Other important operating features include:

- Quick-acting pattern control from straight stream to wide fog
- Quick-change rear valve seat
- TFT's 5-year warranty and unsurpassed customer service

3.1 VARIOUS MODELS AND TERMS

SERIES	MODEL	STANDARD COUPLING SIZE	GALLONAGE SETTINGS (gpm @ 100 psi)
*C	TWISTER	3/4" GHT	10, 24
D	TWISTER or BUBBLE CUP	1.0" NH	10, 24
D	TWISTER or BUBBLE CUP	1.0" NH	10, 40
F	TWISTER or BUBBLE CUP	1-1/2" NH	20, 60
F	TWISTER or BUBBLE CUP	1-1/2" NH	20, 95
F	TWISTER or BUBBLE CUP	1-1/2" NH	95 Single Gallonage Only

*C series Twister is available in a tip-only nozzle configuration only.

D and F series Twister and Bubble Cups are available in tip-only, ball valve, or ball valve with pistol grip configurations.

Table 3.1

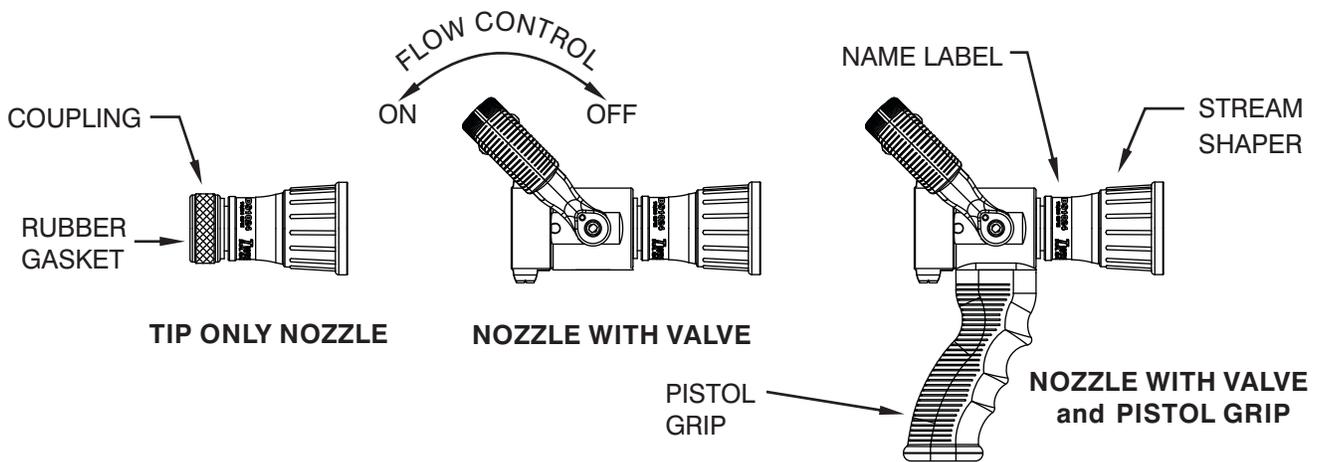


Figure 3.1

3.2 SPECIFICATIONS

Maximum nozzle inlet pressure with valve shut off*	Twister 300 psi	20 bar
	Bubble Cup 300 psi	20 bar
Operating temperature of fluid	33 to 120°F	1 to 50°C
Storage temperature range of fluid	-40 to 150°F	-40 to 65°C
Materials used	Aluminum 6000 series hard anodized MIL 8625 class 3 type 2, stainless steel 300 series, nylon 6-6, nitrile rubber	
*Consult factory for higher pressure applications		

Table 3.2

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

NH (National Hose) threads are standard on all nozzles. Other threads such as NPSH (National Pipe Straight Hose) may be specified at time of order.



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 1930, 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

At each flow setting, the nozzle is set to a predetermined fixed orifice. Relationship of flow and nozzle pressure at each setting is shown below. Contact the factory or visit the website (www.tft.com) for range and trajectory data.

The charts in this document give specific examples of pump pressure and flow for various hoses and lengths. Losses may vary due to differences in hose construction resulting in flows different than shown. For situations or lengths of hose not listed on the chart, approximate flows can be calculated using conventional hydraulics.

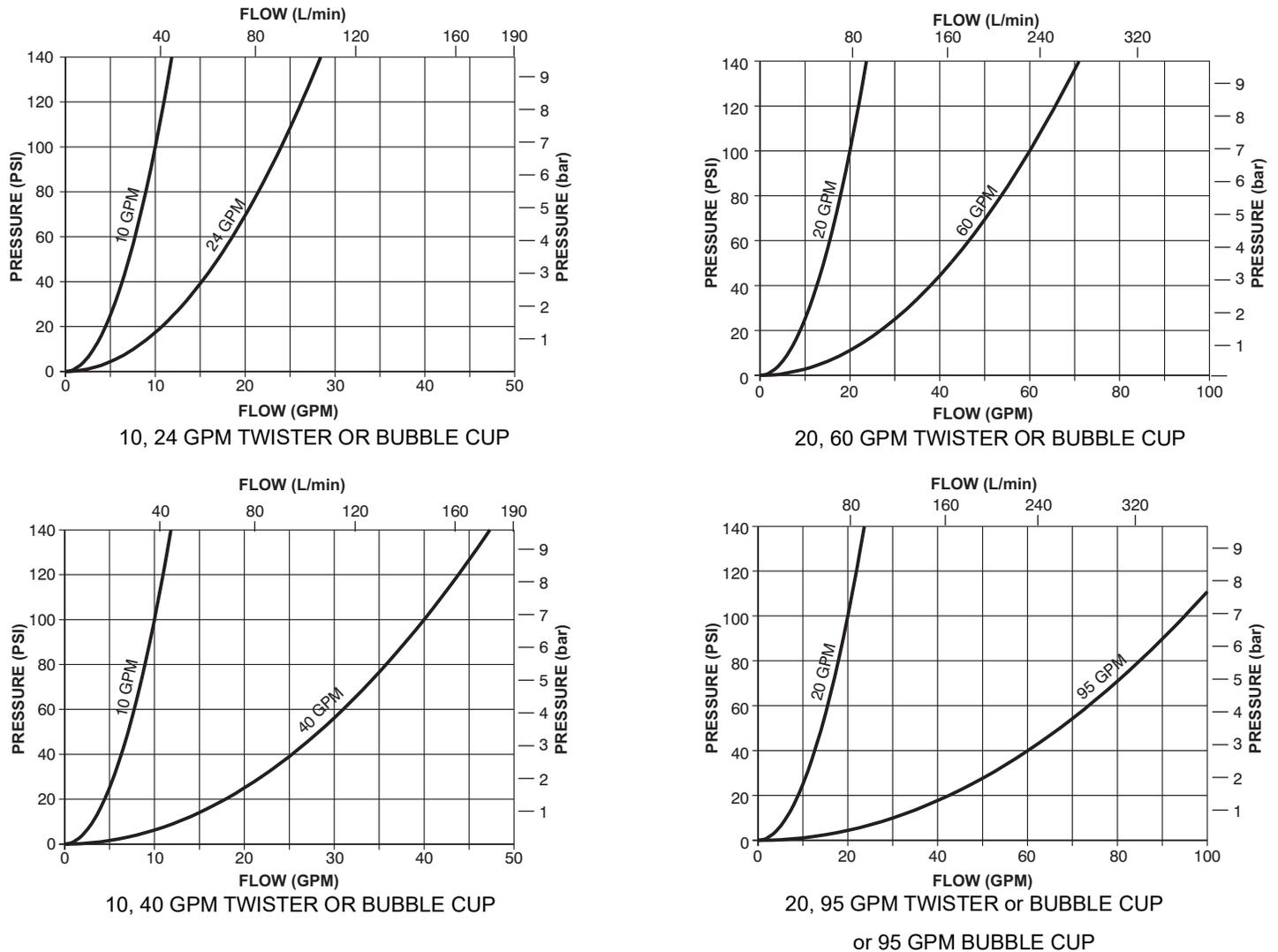


Figure 4.0

5.0 FLOW CHARTS
5.1 STANDARD

3/4" HOSE

FLOW SETTING	100 ft			200 ft			300 ft		
	10	24	40	10	24	40	10	24	40
PUMP PRESSURE (psi) 50	7	13	17	6	11	13	6	10	11
100	9	19	24	9	16	19	9	14	16
150	12	23	29	11	20	23	11	17	20
200	13	27	34	13	23	27	12	20	23
250	15	30	38	14	25	30	14	22	25
300	16	33	42	16	28	33	15	24	28
350	18	35	45	17	30	35	16	26	30
400	19	38	48	18	32	38	17	28	32
450	20	40	51	19	34	40	18	30	34
500	21	42	54	20	36	42	19	32	36
550	22	44	56	21	37	44	20	33	37
600	23	46	59	22	39	46	21	35	39

1" HOSE

FLOW SETTING	100 ft			200 ft			300 ft		
	10	24	40	10	24	40	10	24	40
PUMP PRESSURE (psi) 50	7	16	25	7	16	23	7	15	22
100	10	23	36	10	22	33	10	21	31
150	12	28	44	12	27	40	12	26	37
200	14	33	51	14	31	47	14	30	43
250	16	36	57	16	35	52	15	34	48
300	17	40	62	17	38	57	17	37	53
350	19	43	67	18	41	62	18	40	57
400	20	46	72	20	44	66	20	43	61
450	21	49	76	21	47	70	21	45	65
500	22	51	80	22	50	74	22	48	68
550	23	54	84	23	52	77	23	50	72
600	24	56	88	24	54	81	24	52	75

1-1/2" HOSE

FLOW SETTING	150 ft			200 ft			250 ft		
	20	60	95	20	60	95	20	60	95
PUMP PRESSURE (psi) 50	14	40	58	14	39	56	14	38	54
75	17	49	71	17	48	69	17	47	66
100	20	56	82	20	55	79	20	54	76
125	22	63	92	22	62	89	22	61	85
150	24	69	101	24	68	97	24	67	94
175	26	75	109	26	73	105	26	72	101
200	28	80	117	28	78	112	28	77	108
225	30	85	124	30	83	119	30	82	115
250	31	89	130	31	88	125	31	86	121

1-3/4" HOSE

FLOW SETTING	150 ft			200 ft			250 ft		
	20	60	95	20	60	95	20	60	95
PUMP PRESSURE (psi) 50	14	41	61	14	40	59	14	40	58
75	17	50	75	17	49	73	17	49	71
100	20	58	86	20	57	84	20	56	82
125	22	64	96	22	64	94	22	63	91
150	24	71	106	24	70	103	24	69	100
175	26	76	114	26	75	111	26	74	108
200	28	82	122	28	80	119	28	79	116
225	30	86	129	30	85	126	30	84	123
250	31	91	136	31	90	133	31	89	129

Table 5.1

- Number in each box is flow in gallons per minute.
- Actual flows may vary with brand and condition of hose.
- Flows are approximate and do not account for losses in preconnected piping or changes in elevation.

5.2 METRIC

19mm HOSE	PUMP PRESSURE (bar)	FLOW SETTING	30 Meters			60 Meters			90 Meters		
			10	24	40	10	24	40	10	24	40
	3.5	25	50	65	25	40	50	25	40	40	
	7	35	70	90	35	60	70	35	55	60	
	10	45	85	110	40	75	85	40	65	75	
	14	50	100	130	50	85	100	45	75	85	
	17	55	115	145	55	95	115	55	85	95	
	21	60	125	160	60	105	125	55	90	105	
	24	70	130	170	65	115	130	60	100	115	
	28	70	145	180	70	120	145	65	105	120	
	31	75	150	195	70	130	150	70	115	130	
	34	80	160	205	75	135	160	70	120	135	
	38	85	165	210	80	140	165	75	125	140	
	41	85	175	225	85	150	175	80	130	150	

25mm HOSE	PUMP PRESSURE (bar)	FLOW SETTING	30 Meters			60 Meters			90 Meters		
			10	24	40	10	24	40	10	24	40
	3.5	25	60	95	25	60	85	25	55	85	
	7	40	85	135	40	85	125	40	80	115	
	10	45	105	165	45	100	150	45	100	140	
	14	55	125	195	55	115	180	55	115	165	
	17	60	135	215	60	130	195	55	130	180	
	21	65	150	235	65	145	215	65	140	200	
	24	70	165	255	70	155	235	70	150	215	
	28	75	175	275	75	165	250	75	165	230	
	31	80	185	290	80	180	265	80	170	245	
	34	85	195	305	85	190	280	85	180	255	
	38	85	205	320	85	195	290	85	190	275	
	41	90	210	335	90	205	305	90	195	285	

38mm HOSE	PUMP PRESSURE (bar)	FLOW SETTING	45 Meters			60 Meters			75 Meters		
			20	60	95	20	60	95	20	60	95
	3.5	55	150	220	55	150	210	55	145	205	
	5.2	65	185	270	65	180	260	65	180	250	
	7	75	210	310	75	210	300	75	205	290	
	8.6	85	240	350	85	235	335	85	230	320	
	10	90	260	380	90	255	365	90	255	355	
	12	100	285	415	100	275	395	100	275	380	
	14	105	305	445	105	295	425	105	290	410	
	15.5	115	320	470	115	315	450	115	310	435	
	17	115	335	490	115	335	475	115	325	460	

45mm HOSE	PUMP PRESSURE (bar)	FLOW SETTING	45 Meters			60 Meters			75 Meters		
			20	60	95	20	60	95	20	60	95
	3.5	55	155	230	55	150	225	55	150	220	
	5.2	65	190	285	65	185	275	65	185	270	
	7	75	220	325	75	215	320	75	210	310	
	8.6	85	240	365	85	240	355	85	240	345	
	10	90	270	400	90	265	390	90	260	380	
	12	100	290	430	100	285	420	100	280	410	
	14	105	310	460	105	305	450	105	300	440	
	15.5	115	325	490	115	320	475	115	320	465	
	17	115	345	515	115	340	505	115	335	490	

Table 5.2

- Number in each box is flow in liters per minute.
- Actual flows may vary with brand and condition of hose.
- Flows are approximate and do not account for losses in preconnected piping or changes in elevation.
- 1 bar = 100 kPa

6.0 NOZZLE CONTROLS

6.1 FLOW CONTROL

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.

6.1.1 LEVER TYPE FLOW CONTROL (BALL VALVE)

Models with a ball valve are shut off when the valve handle is fully forward. Pulling back on the handle opens the valve. TFT recommends the use of a pistol grip for easier handling. For additional stress reduction, a hose rope or strap may also be used. This permits more effective use and ease of advancement, while minimizing strain and fatigue.

NOTICE

In partially open positions, a ball valve will cause turbulence and adversely affect stream quality.

6.1.2 TIP ONLY NOZZLES

Twister and Bubble Cup Tip Only nozzles have a twist shut off valve contained within the nozzle.

6.2 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 eventually to OFF. Turning the shaper counterclockwise will result in an increasingly wider pattern.

Since the stream trim point varies with flow, the stream should be “trimmed” after changing the flow to obtain the straightest and farthest reaching stream. To properly trim the stream, first open the pattern to narrow fog. Then close the stream to parallel to give maximum reach. Turning the shaper further forward will cause stream crossover and reduce the effective reach of the nozzle.

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.

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.

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.

6.3 BUBBLE CUP NOZZLES

The Bubble Cup nozzle is capable of producing aspirated foam as well as conventional straight stream and wide protective fog patterns. The Bubble Cup functions just like the Twister nozzle when the aspirating sleeve is in the retracted position.

To use the aspirating feature of the Bubble Cup, slide the aspirating sleeve portion of the nozzle forward. Rotation of the shaper while the sleeve is extended provides the nozzle operator control of reach and aspiration. If an immediate wide protective fog pattern is needed, the sleeve can be retracted instantly to its regular position.

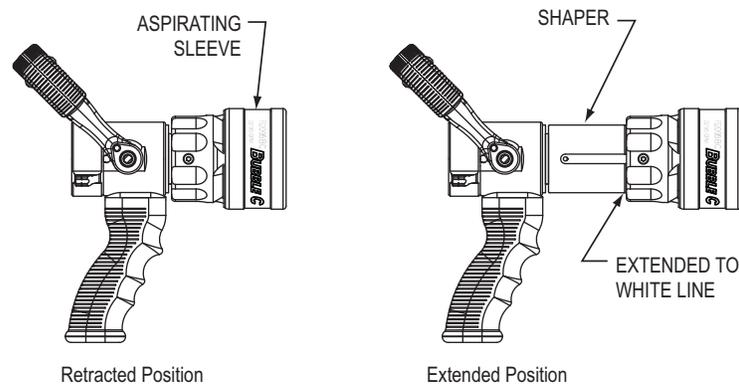


Figure 6.3

7.0 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.



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.



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.



Use of compressed air foam (CAF) with hand held nozzles can cause sudden surges in nozzle reaction force resulting in risk of injury or death from loss of footing or hose whipping. Be prepared for sudden changes in nozzle reaction caused by:

- **Slug loading (Loss of foam concentrate sends slugs of air and water into the nozzle)**
- **Sudden release of built-up pressure in the hose when opening a nozzle**

7.1 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).

8.0 COLOR CODED HANDLE COVER AND PISTOL GRIPS

Nozzles with lever type valve handles are supplied with black valve handle covers and pistol grips. The handle covers and pistol grips are available from TFT in various colors for those departments wishing to color code the nozzle to the discharge controls.

Handle covers are replaceable by removing the four screws that hold the handle covers in place. Use a 3/32" hex key when removing and replacing screws. Pistol grip is replaceable by following TFT instruction sheet LTT-108.

For standardization NFPA 1900 recommends the following color code scheme:

Preconnect #1 or Jump Line	Orange	Other Colors Available:
Preconnect #2	Red	- Gray
Preconnect #3	Yellow	- Pink
Preconnect #4	White	- Purple
Preconnect #5	Blue	- Tan
Preconnect #6	Black	
Preconnect #7	Green	
Foam Lines	Red w/ White Border (Red/White)	

9.0 WARRANTY

Go to tft.com for all warranty information.

10.0 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.

10.1 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.



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.

10.2 SERVICE TESTING

In accordance with NFPA 1930, 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.

10.3 REPAIR

Factory service is available. Factory serviced equipment is repaired by experienced technicians, wet tested to original specifications, and promptly returned. Call TFT service department at 1-800-348-2686 to troubleshoot and, if needed, directions for return. A return for service form can also be obtained at tft.com/Support/Returning-an-Item-for-Service.

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.



It is the responsibility of service technicians to ensure the 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).



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



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

11.0 EXPLODED VIEWS AND PARTS LISTS

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

12.0 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. Valve operates freely through full range and regulates flow
5. "OFF" position shuts off fully and flow is stopped
6. Nozzle flow is adequate as indicated by pump pressure and nozzle reaction
7. Shaper turns freely and adjusts pattern through full range
8. Nozzle smoothly moves into full flush and out of flush with normal flow and pressure restored
9. Shaper detent (if so equipped) operates smoothly and positively.

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

1. All controls and adjustments are operational
2. Shut off valve (if so equipped) closes off the flow completely
3. There are no broken or missing parts
4. There is no damage to the nozzle that could impair safe operation (e.g. dents, cracks, corrosion or other defects)
5. The thread gasket is in good condition
6. The waterway is clear of obstructions
7. Nozzle is clean and markings are legible
8. Coupling is tightened properly
9. Shaper is set to desired pattern
10. Shutoff handle (if so equipped) is stored in the OFF position



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.