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TOPIC #12: 1-3/4" NOZZLES

This topic includes the following nozzles:

- Task Force Tip (only used on trash line)
- Vindicator
- 7/8 or 15/16 Smooth Bore
- Chief 250gpm @ 50 psi
- Chief 200gpm @ 75 psi

TASK FORCE TIP (TFT) (see figure #1):

DO NOT USE ON FIRE ATTACK LINES

The most distinctive feature of the TFT is a spring operated automatic pressure control device. This device enables the nozzle to deliver the same reach at varying pressures by restricting GPM. The pressure control device is a spring that creates no restriction at pressures above approximately 100 p.s.i. Between approximately 75 p.s.i. and 100 p.s.i. the path for water flow is partially open, maintaining stream reach. Below about 75 p.s.i. of nozzle pressure the nozzle spring seems to fully close preventing any flow.



Figure 1

The nozzle WILL shut off at low pressures.

These nozzles are equipped with a pistol grip for ease of handling and most (NOT ALL) have a shut-off that may be used independently with a smooth bore tip, if the nozzle head is removed (see figures 2 and 3 below). A 7/8" Smoothbore tip may be attached to the nozzle shutoff to operate as a smooth bore nozzle on a 1-3/4" fire line. This procedure can be used to recover water flow, should water flow problems occur. If there is a low pressure situation or poor flow, the nozzle may be shut down, the TFT tip removed and a smooth bore attached to provide adequate flow. (It is recommended that Company Officers carry a 7/8" or 15/16" smooth bore tip with them in their coat pocket).



7/8" Tip added to shut-off



Break-apart design of some TFTs allows for attachment of smooth bore tips or extension of fire lines

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The TFT tip can also be removed and more hose can be added to the shut-off bale to extend a fire line with another nozzle placed on the end of the extended line. This doesn't require the FAO to stop the water and allows for faster extension of fire lines.

Caution: Use this procedure only in extreme circumstances, and remove the in-line shut off as soon as possible. Serious problems could arise should the team trying to get water out of the line doesn't know or remember the extra shutoff.

NOZZLE PRESSURE: This nozzle has a pressure control device that maintains N.P. at about 100 p.s.i. provided enough water is supplied to the nozzle for the pressure control device to operate.

GPM: Testing shows that this nozzle will flow between 100 and 175 GPM at reasonable nozzle pressures.

STREAM: The TFT is a variable stream nozzle. It can be used as a fog stream and/or a straight stream nozzle.

APPLICATION: This nozzle is for use only with 1-3/4" lines.

FLUSH: Flushing the TFT can be accomplished by turning the stream adjuster all the way to the left (counterclockwise). This nozzle should be flushed often, and can be flushed anytime the spring mechanism needs to be by-passed.

**PUMPING
GUIDELINES:** See Pump Chart

FOAM: This nozzle can be used to apply non-aspirated foam with the TFT Foam Adapter. This set up produces low expansion AFFF. The TFT should not be used in foam operations without the aspirator tip, as it will produce poor quality foam. (see figure 4)



TFT Nozzle with TFT Foam Aspirator Tip attached. The TFT should not be used in foam operations without the aspirator tip as it will produce poor quality foam.

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DO NOT USE ON FIRE ATTACK LINES

VINDICATOR "HEAVY ATTACK" NOZZLE
(see figure #5):

The Vindicator breaks the stream up, while still leaving a relatively large opening for water to pass through. It has large opening for air entry that also contributes to its usefulness as a multi-purpose nozzle for standard water delivery and also for making foam.



Figure 5

The nozzle WILL NOT shut off at low pressures. This nozzle must be clean and well maintained to be effective. Dirt, debris, and water deposit build up can prevent adequate water flow, however, the nozzle can pass large pieces of debris and is not subject to blockage of pressure control mechanisms to the point of total failure of water flow.

This nozzle is equipped with a pistol grip for ease of handling and has a break apart nozzle tip. The Vindicator tip can be removed and more hose can be added to the shut-off bale to extend a fire line with another nozzle placed on the end of the extended line. This doesn't require the FAO to stop the water and allows for faster extension of fire lines. **Caution:** Use this procedure only in extreme circumstances, and remove the in-line shut off as soon as possible. Serious problems could arise should the team trying to get water out of the line doesn't know or remember the extra shutoff.

NOZZLE PRESSURE: 50-PSI NP provides a good combination of flow, handling and resistance to kinking in common situations

PRECAUTION: Too low Nozzle Pressure can contribute to line kinking. The Vindicator is vulnerable to this because, unlike the TFT, this nozzle can be operated at low NP. Any fire line providing low nozzle pressure has proportionally little resistance to kinking. Because of this, no fire line should be operated with a NP below 25-psi except in extraordinary circumstances.

GPM: Capable of easily producing between 150 and 250 g.p.m. through 1-3/4" hose without excessive nozzle pressures. When pumping through 2-1/2" this nozzle is capable of

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producing between 300 and 400 g.p.m. without excessive nozzle or pull back pressure.

APPLICATION: The vindicator can be used for 1-3/4" and 2-1/2" lines.

STREAM: Broken, aspirated nozzle stream. Breaks the water into large droplets for improved heat absorption and extinguishing capability. Its function is similar to the function of a smooth bore nozzle.

FLUSH: No need to flush.

**PUMPING
GUIDELINES:** See Pump Chart

FOAM: Works well with foam discharged from foam pumper. No special attachments needed to make foam. Due to its increased GPM delivery, the Vindicator will not work with portable in-line eductors.

NOTES:

1. Vindicator has increased mobility and decreased backpressure for similar flow rates. Lines can be advanced while flowing large quantities.
2. No moving parts. No company maintenance needed other than periodic cleaning.
3. Can be attached to a 2-1/2" Play pipe and provide higher flows during defensive operations providing between 300 and 400 GPP through 2-1/2" hose.
4. Flows relatively large quantities similar to those produced by a smooth bore nozzle with a 1-1/8" tip yet have increased heat absorption capability due to droplet size."
5. Provides continuous water flow if kinks develop in the hose line as long as some water reaches the nozzle.

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SMOOTH BORE TIPS – 7/8” or 15/16”

(See Figure #6):

A 7/8” or 15/16” smooth bore tip may be attached to the nozzle shutoff to operate as a smooth bore nozzle on a 1-3/4” fire line.

Some companies’ carry an 1-3/4” pre-connect with a smooth bore tip attached. This is recommended to offer the most versatility to the engine company crew.



Figure #6
7/8" Tip added to shut-off

NOZZLE PRESSURE: 50-PSI NP provides a good combination of flow, handling and resistance to kinking in common situations

PRECAUTION: Too low Nozzle Pressure can contribute to line kinking. The smooth bore is vulnerable to this because, unlike the TFT, these nozzles can be operated at low NP. Any fire line providing low nozzle pressure has proportionally little resistance to kinking. Because of this, no fire line should be operated with a np below 25-psi except in extraordinary circumstances.

GPM: Capable of easily producing between 150 and 250 g.p.m. through 1-3/4" hose without excessive nozzle pressures.

APPLICATION: The 7/8” and 15/16” smooth bore tips are used on 1-3/4” hose lines.

STREAM: Solid stream. Provides constant water flow at any nozzle pressure and provides good reach and penetration.

FLUSH: No need to flush.

**PUMPING
GUIDELINES:** See Pump Chart

FOAM: Not Applicable with Foam Operations

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New 2019 Version of Elkhart Chief Nozzle

- Longer for better stream production (tighter)
- Rubber stopper on top for protection of tip
- Same flows as shorter 15/16" tip on pump chart

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Chief 200gpm @ 75 PSI (BLUE TIP)

The Chief 200/75 is a standard, variable stream nozzle that can be used either in a straight or a fog stream. It is designed to flow 200 g.p.m. at 75 psi. nozzle pressure, hence the name 200/75. It has a blue bumper distinguishing it from the 250/50 orange bumpered chief nozzle for the 2.5" lines. It has a slightly increased reaction force when compared to the Vindicator, especially on the first moment of opening the bail.

The nozzle WILL NOT shut off at low pressures. This nozzle must be clean and well maintained to be effective. Dirt, debris, and water deposit build up can prevent adequate water flow; however, the nozzle can pass pieces of debris and is not subject to blockage of pressure control mechanisms to the point of total failure of water flow.

This nozzle is equipped with a pistol grip for ease of handling and has a break apart nozzle tip. When the blue nozzle tip is removed a 1" smooth bore slug is exposed on the shut off that can be utilized in the field. It is important to notify the FAO when switching to the smooth bore so that the pressure can be reduced accordingly. The 200/75 tip can be removed and more hose can be added to the shut-off bale to extend a fire line with another nozzle placed on the end of the extended line. This doesn't require the FAO to stop the water and allows for faster extension of fire lines. **Caution:** Use this procedure only in extreme circumstances, and remove the in-line shut off as soon as possible. Serious problems could arise should the team trying to get water out of the line doesn't know or remember the extra shutoff.

NOZZLE PRESSURE: 75-PSI NP provides a good combination of flow, handling and resistance to kinking in common situations

PRECAUTION: Too low Nozzle Pressure can contribute to line kinking. Any fire line providing low nozzle pressure has proportionally little resistance to kinking. Because of this,

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no fire line should be operated with a NP below 25-psi except in extraordinary circumstances.

GPM: Produces 200 g.p.m. at 75 psi NP.

APPLICATION: The Chief 200/75 is designed for 1.75" lines.

STREAM: Variable from fog to straight stream

FLUSH: Flush by rotating fully left past the fog pattern setting

**PUMPING
GUIDELINES:** See Pump Chart

FOAM: Works well with foam discharged from foam pumbers. No special attachments needed to make foam.

NOTES:

6. The Chief 200/75 has increased mobility and decreased backpressure for similar flow rates. Lines can be advanced while flowing large quantities.
7. No company maintenance needed other than periodic cleaning and flushing.
8. Provides continuous water flow if kinks develop in the hose line as long as some water reaches the nozzle.
9. The bale is designed to open with water pressure and causes a momentary jump in pull-back pressure. Open slowly and be aware of the jump.

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New 2019 Version of Elkhart Chief Nozzle

- Some are Blue and Some are Orange
- Break Apart – No Internal Smooth Bore
- Better Shut-Off
- Tip Locks in Smooth Bore Mode
- Both 200 gpm @ 75 PSI (look at head)
- Metal Teeth
- Pump same as old version of 200gpm/75 psi Blue Chief (150psi on 5 lengths of 1-3/4")

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ELKHART CHIEF NOZZLE (see figure #7):

The Chief is a standard variable stream nozzle that can be used in either a straight stream or fog stream. It flows water very similar to the Vindicator; however it has the option of variability of stream and increased reach. It does have a slightly increased reaction force as compared to the Vindicator.



The nozzle WILL NOT shut off at low pressures. This nozzle must be clean and well maintained to be effective.

This nozzle is equipped with a pistol grip for ease of handling and has a break apart nozzle tip. The Chief tip can be removed and more hose can be added to the shut-off bale to extend a fire line with another nozzle placed on the end of the extended line. This doesn't require the FAO to stop the water and allows for faster extension of fire lines.

Caution: Use this procedure only in extreme circumstances, and remove the in-line shut off as soon as possible. Serious problems could arise should the team trying to get water out of the line doesn't know or remember the extra shutoff.

The tip can also be removed, leaving a shutoff in which a smooth bore 7/8 or 15/16" tip can be placed. (figure 8)



Figure 8

NOZZLE PRESSURE: 50-PSI NP provides a good combination of flow, handling and resistance to kinking in common situations

PRECAUTION: Too low Nozzle Pressure can contribute to line kinking. The Chief Nozzle is vulnerable to this because, unlike the TFT, this nozzle can be operated at low NP. Any fire line providing low nozzle pressure has proportionally little resistance to kinking. Because of this, no fire line should be operated with a NP below 25-psi except in extraordinary circumstances.

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To distinguish from old Chief nozzles the tip is stamped 250 / 50 as indicated on this picture.



- GPM:** Capable of easily producing between 150 and 250 g.p.m. through 1-3/4" hose without excessive nozzle pressures. When pumping through 2-1/2" this nozzle is capable of producing between 300 and 400 g.p.m. without excessive nozzle or pull back pressure.
- APPLICATION:** The Chief can be used for 1-3/4" and 2-1/2" lines.
- STREAM:** Variable Stream. Same GPM (constant flow) in straight or fog stream. Head to the right is straight stream, to the left is fog stream
- FLUSH:** Flush without shutting down by turning nozzle head to the left.
- PUMPING
GUIDELINES:** See Pump Chart
- FOAM:** Will not produce adequate foam without proper induction tip applied to the nozzle. At this time the CFD will not use the Chief nozzle for foam operations on engine companies.

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NOTES:

1. Chief has increased mobility and decreased backpressure for similar flow rates. Lines can be advanced while flowing large quantities.
2. Limited moving parts. No company maintenance needed other than periodic cleaning.
3. Can be attached to a 2-1/2" Play pipe and provide higher flows during defensive operations providing between 300 and 400 GPP through
 - i. 2-1/2" hose.
4. Flows relatively large quantities similar to those produced by a smooth bore nozzle with a 1-1/8" tip yet have increased heat absorption capability due to droplet size."
5. Provides continuous water flow if kinks develop in the hose line as long as some water reaches the nozzle.
6. Just as indicated with the Vindicator. It will flow more water. If working at a fire without a hydrant for "continuous" 2-3 minutes you can deplete the water in your tank more rapidly than with the TFT nozzle.