Fognail Operations 1.1

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Task Skill Description and Detail

The fognail, when deployed in a timely and accurate manner on the fire ground, has the potential to halt fire growth, limit excessive property damage, and increase firefighter safety. The fognail can be implemented within a variety of applications and it is important that personnel understand when, where, and how the fognail should be deployed to ensure maximum effectiveness.

Understanding the Fognail:

- The fognail (figure 1) is a long slender nozzle that is equipped with a piercing tip that can be driven through walls, roofs, floors and window frames. The intent of the fognail is to introduce very fine water droplets into an atmosphere to control a fire without otherwise opening up the “container” and introducing unnecessary oxygen into the environment. In a sense, placing a fognail into a structure is comparable to a sprinkler head of a fire protection system but more efficient. Consideration should be made on how long the device is flowed. The device should be flowed until the fire suppressed, i.e. seam converted. Efforts should be made to continually monitor fire conditions and limit water damage if possible. It will need to be followed up with interior handlines, salvage and overhaul in order to achieve final fire control.

![Figure 1 – Fognail Design]
Two Fognail Types:

- LFRA employs two types of fognails that are designed for very different applications. Each fognail produces a unique stream that is intended for deployment to different, specific parts of a structure.

  - **Attack Fognail (Figure 2 and 3)**

    - The attack fognail is similar to a side wall sprinkler head. It produces a long, narrow stream of tiny water particles with the potential to reach up to 26 feet. The stream produced by the attack fognail more closely resembles that of a traditional fog nozzle or “power cone” stream. The attack fognail combines the benefits of maximum absorption of heat from small water droplets with stream reach. These characteristics make the attack fognail ideal for exterior attack on a room and contents fire, attic fire attack from the gable end of a structure, or attic attack from the soffit portion of a structure.

![Figure 2 – Attack Fognail Stream](image1)

![Figure 3 – Attack Fognail Tip](image2)
• **Restrictor Fognail (Figure 4 and 5)**

  - The restrictor fognail produces a shallow, wide stream of tiny water droplets capable of reaching a width of up to 33 feet. The stream produced by the restrictor fognail resembles that of a pendant or upright sprinkler head. Because of this unique stream shape, the restrictor fognail is best utilized in an attic fire attack from the roof deck or ceiling, a basement fire attack through the ceiling, or in a very confined space (wall, crawl space, etc.).

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**Fognail Equipment:**

- Each LFRA **engine** shall be equipped with the following equipment for fognail operations (*figure 6*):
  - (1) Attack Fognail (white)
  - (1) Restrictor Fognail (red)
  - (2) 100’ 1” hose packs (Horseshoe)
  - (1) Gated Wye (Preconnected to attack nail pack)

*Figure 6 – Fognail Equipment (Engine)*
Each 100’ 1” fogtain hose pack on LFRA engines shall be loaded into a horseshoe load and preconnected to the fogtain nozzle. The attack fogtain hose pack shall be preconnected to the gated wye on the female end of the hose (see below – figure 7). The male coupling (fogtain connection) must be placed at the center of the horseshoe.

![Figure 7 – Completed Fogtain Pack - Engine](image)

Each LFRA aerial truck shall be equipped with the following equipment for fogtain operations (figure 8): ***Note: Fogtain hose on aerial apparatus are to remain in rolls.

- (2) Attack Fogtain (white)
- (2) Restrictor Fogtain (red)
- (4) 100’ 1” hose pack (Rolled)
- (1) Fogtain Hammer

![Figure 8 – Fogtain Equipment (Aerial Truck)](image)
Fognail Deployment (Tactical Level):

- Attic Fires

  - Gable Attack: The attack fognail can be deployed to an attic fire using multiple tactics. When available, the attack fognail may be placed in the gable end of a building by placing it through the siding or utilizing a gable vent (Figure 9). The stream reach of the attack fognail has the ability to reach a large amount of attic space potentially involved in fire from this position.

  - Soffit Attack: Another possibility when dealing with an attic fire is to utilize an attack fognail through the soffit portion of the structure. When conducting a soffit attack, it is essential that an angle is used to direct water toward the peak of the roof within the attic (Figure 10). If the firefighter is able to insert the fog nail at an angle parallel to the roof deck, this is generally ideal.
Attic Fires (Continued)

- **Roof Attack**: Another tactic that may be applied to an attic fire is the fognail attack through the roof deck (*Figure 11*). To perform this operation, a firefighter will utilize the restrictor fognail and incert it directly through the roof deck and into the attic space. The ideal element about this attack method is that it virtually places an overhead sprinkler system into the attic space to control the fire. The majority of roof decks are very similar in the sense that other than shingles and the deck itself, there is very little material to impede attic access with the fognail.

- **Ceiling Attack (Interior)**: Under certain circumstances, it may be necessary to utilize the restrictor fognail from the interior of the structure. In this case, the attic space would be accessed from below through the ceiling. This tactic is not ideal because of the barriers that may exist when attempting to access the attic space. Void spaces, insulation, etc. may have the potential to block the water stream from reaching the attic space. This tactic may be utilized if gable, soffit, and roof access points are not available.

- **Combination Attack**: Due to attic construction and/or fire involvement, combining the attack methods described above may be necessary for fire control (*Figure 12*). Portions of the attic may not be accessible with a certain attack method and fognail location may be adjusted until a positive change in fire condition occurs.
• **Vent Limited Fires**

  - The fognail may be the ideal tactic to apply toward a vent-limited room and contents fire. When the contents of a structure are on fire and no windows or doors are open to the outside of the building, the fire has the potential to be vent limited. This means that the fire does not have enough oxygen to be progressive and continue to consume the fuels within the structure at a rapid pace. If the building is opened up by the fire department for suppression, the fire has the potential to grow based on the introduction of supplemental oxygen. When applying the fognail to a vent-limited fire, water is introduced into the container’s atmosphere without introducing additional air. This allows massive amounts of heat to be absorbed by the expanding steam. The fognail attack must then be followed up by interior attack lines to gain fire control. It is essential that the container is vented as soon as the fire becomes suppressed. Heat and combustion products will then be released from the container resulting in increased visibility for crews working inside (attack, search, overhaul).

  - When applying the fognail to a vent limited room and contents fire, the attack fognail will be the tool of choice in most circumstances. There are a variety of locations that the fognail can be driven through the siding of the building, however, one of the best options will be near or through a window frame (Figure 13). By inserting the fognail near a window, it allows crews to ensure the fognail has entered the environment as well as visually monitor change in fire conditions produced by the fognail.

• **Basement Fires**

  - When applying the fognail to a basement fire, tactics will often be very consistent with tactics applied to a vent limited room and contents fire (see above). When possible, the window frame should be utilized for fognail insertion below grade. Multiple attack points may be necessary to access the extent of the basement that is involved in fire.

![Figure 13 – Vent Limited Attack Options](image-url)
Fognail Deployment (Task Level):

**Fognail Supply Line Deployment:** In order to place a fognail into operation, a hose line must be stretched to supply the fognail with water (*figure 14*). There are several hose line options on LFRA engines that can be employed for fognail supply. The bumper line, perhaps, is the most favorable and quickest line available to supply the fognail or if the apparatus is close enough, connecting the wye directly to the pump discharge. When necessary, the yellow, or alley line may also be appropriate. If possible, consider avoiding using the green line due to use and applications of our G-Force nozzle.

*Figure 14: Firefighter selects and pulls appropriate line for fognail supply*
• Once pulled, the firefighter must remove the nozzle or gasner from the supply line and attach the one-inch fognail pack with the gated wye. The firefighter should ensure that the gated wye is closed to prevent the fognail pack from being charged prematurely.

***Note: If the restrictor fog nail pack is to be deployed, the gated wye must be removed from the attack fognail pack and transferred to the restrictor before connecting to the supply line.
• As soon as the fognail pack is attached, the firefighter must call for the line to be charged. This ensures that water is immediately available at the gated wye when the fognail is in place (figure 17).

Figure 17 - Supply Line Charged to the Gated Wye
Placing the Fognail: Once the line designated to supply the fognail has been deployed, it is time to place the fognail into the structure. Whether the fognail is to be placed into the siding, roof, or window frame of the building, the procedure to insert the fognail is essentially the same.

- The firefighter must first take the time to flake out the one-inch fognail pack prior to charging the hose (figure 18). This step is crucial to preventing hose entanglement later, especially once multiple fognails come into play.

*Figure 18 - Firefighter flakes out the one inch horseshoe load*
Prior to inserting the fognail into the structure, the firefighter must first size up the deployment site. Windows, heat signatures, and smoke can all aid in selecting the specific location in which to insert the fognail. When inserting the fognail for a room and contents fire, placement within the top 1/3 of the wall is a best practice in order to avoid furniture and other fixtures. The firefighter must first make an initial hole in the siding or roof, this can be done by utilizing the pick end of the fognail hammer (figure 19). Once the initial hole is made, the fognail tip can be placed into the hole and the fognail driven into the structure using the flathead side of the hammer (figure 20).

***Note: If the firefighter faces any resistance when driving the fognail into the structure, they must remove the fognail and choose a different spot. If the fognail is forced it will bend or break!
The drill and bit can be employed as an alternative to the hammer when placing the fognail into a structure. Though potentially more time consuming, the drill allows the fognail to be placed with great accuracy. In addition, the drill gives the firefighter an option to utilize the window frame as an insertion point for the fognail. When drilling the wall, the firefighter must visualize structural components that may act as an obstruction. Enough space must be given between a window and the insertion point to avoid running into window framing (Figure 21). When drilling the window frame, the firefighter must choose a wide enough portion that will accommodate the entire hole and allow clearance from the glass (Figure 22).
**Placing the Fognail for Gable Attack:** When placing the attack fognail for gable attack, the ladder should be situated to the side of the deployment site. Charging the fognail prior to climbing the ladder prevents multiple trips up and down the ladder. This also allows for a timely, single person deployment of the fognail (*Figure 21*).

- The fognail should be placed as high as possible in the gable end of the structure (*figure 22*), if the building type does not allow for fognail insertion through the siding, a gable attic vent may be utilized.

*Figure 21 - The hose is charged prior to climbing the ladder*

*Figure 22 - The firefighter places the fognail as high as possible in the gable end of the structure*

***Note: The attack fognail is the primary choice for a gable end attic attack***
Placing the Fognail for Soffit Attack: When placing the attack fognail for a soffit attack, the ladder should be situated just below, or off to the side of the target location. Some soffits may be difficult to access for fognail attack and alternative options may be ideal.

- When inserting the attack fognail into the soffit, the firefighter should attempt to match the insertion angle with the roof deck as much as possible (Figure 23). This allows for the most efficient stream coverage within the attic space. The firefighter must also place the fognail as close as possible to the building while still remaining in the soffit. This ensures that the fognail makes it into the attic space rather than into a void space.
Placing the Fognail for Roof Attack (Ground Ladders): When utilizing the roof deck for fognail attack on an attic fire, a roof ladder can be utilized in order to manage risk. The extension ladder and roof ladder should be placed in conjunction with the fognail being deployed.

- When placing a restrictor fognail into the roof deck of a structure, the thermal imager must be relied heavily upon. The officer incharge of the operation must take the time to scan the roof with a thermal imager in order to ensure accuracy when placing the fognail (Figure 24). When a significant heat signature is identified, the fognail should be placed at the highest point possible directly above the signature in order to capture the entire space potentially involved in fire (Figure 25).

*Figure 24: The officer scans the roof for heat signatures in order to determine fognail placement*  
*Figure 25: The firefighter places the restrictor fognail as high as possible near the peak of the roof*

***Note: The restrictor fognail is the primary choice for a roof attack***
Placing the Fognail for Roof Attack (Aerial Ladder): When utilizing an aerial ladder for fognail deployment to the roof, the ladder/platform should be utilized as much as possible in order to maximize safety within the operation.

- When placing the restrictor fognail in the roof deck from an aerial device, the hose must remain in a rolled position for deployment. Once the aerial is in position, the hose must be rolled down the roof deck toward the ground level so that it can be hooked up for supply (Figure 26). The fognail can then be driven through the roof deck and charged in the same manner as previously described (Figure 27). Every effort should be made to insert the fognail while remaining on the aerial platform or ladder.

Figure 26: Firefighter rolls the fognail hose down the roof deck where it will be connected to a supply line below

Figure 27: Firefighter inserts the fognail into the roof deck while remaining on the aerial platform
REFERENCES

- IFSTA Essentials of Fire Fighting and Fire Department Operations, 5th Edition
- IFSTA Pumping and Aerial Apparatus Driver/ Operator Handbook, 3rd Edition
- LFRA Fognail Presentation: V:\Fire\Training