# LARGE CALIBER STREAMS

## 1. LARGE CALIBER STREAM OVERVIEW

1.1 A Large Caliber Stream (LCS) is a fire stream that delivers 350 gpm of water flow or more. They can be ground based (New Yorker multiversal, Blitzfire Oscillating Monitor), engine apparatus based (deckpipe), or applied through an elevated position (tower ladder or aerial ladder pipe).

1.2 The versatility and increased flow rates of LCS can dramatically impact operations. At fast-moving fires, early use of LCS can limit fire growth and spread.

1.3 Only the Incident Commander may order the use of LCS, which may be the first arriving officer. This includes the first arriving engine using its apparatus deckpipe.

## 2. SUPPLYING LCS

2.1 Whenever possible, an engine company supplying LCS should be dedicated to that task and not engaged in supplying handlines.

2.2 LCS should be supplied with the largest available hoselines. Most commonly, this will be 3 ½" hose.

**Note:** The Blitzfire Oscillating Monitor should only be supplied with a 2 ½" hoseline.

2.3 Engine companies supplying a LCS may require additional augmentation, especially when in-line pumping is used. This can be accomplished through the use of a 2 ½" single gate attached to a hydrant for the purpose of possible self-augmentation.

## 3. LCS OPERATIONS

3.1 If LCS use is ordered after units are operating within a building, all operating forces must be notified, and time permitted for their safe withdrawal to unexposed positions. Confirmation of their safe withdrawal will be verified by way of a Roll Call and all officers should be prepared to account for the members of their company.

3.2 As an additional safety measure, the LCS should be quickly swept through the building without stopping at any window or other opening to serve as a warning to any members left in the area of operation.

3.3 LCS use requires strict adherence to operating procedures to avoid serious injury or unnecessary property damage. LCS can cause structural stress when driven into building components and may dislodge building materials, turning them into dangerous projectiles. Additionally, water accumulation can add significant weight to a building and can precipitate structural collapse.

3.4 LCS can entrain large amounts of air into a structure with stream application. The effect of air movement resulting from LCS use must be considered by the IC and operating members as conditions may deteriorate in remote areas of the building.

## 4. NEW YORKER MULTIVERSAL

Figure 1

4.1 The New Yorker Multiversal (Figure 1) is carried by all engine companies and has a two-piece design:

4.1.1 The top section contains the tips, stream shaper, lock, and wheel.

4.1.2 The base section contains the folding legs, attachment points, pins, and supply connections.

4.2 The multiversal is equipped with three stacked tips (1 ¼", 1 ½" and 2")

4.2.1 When the 1 ¼" tip is used, it will flow roughly 465 GPM with 100 psi at the tip.

4.2.2 When the 1 ½" tip is used, it will flow roughly 560 GPM with 70 psi at the tip. When supplied with 100 psi at the tip, it will flow roughly 660 GPM.

4.2.3 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

4.3 Assembling the Multiversal

4.3.1 Extend the three leg supports and the place the base section on the ground. The front leg (with safety chain attached) points in the direction of operation.

4.3.2 Attach the top section to the base section by placing the top section on top of the base section and inserting the two locking plungers fully, one on either side of the appliance.

4.4 Securing the Multiversal

4.4.1 Due to the significant back pressures caused by the nozzle reaction, the multiversal must be secured to ensure a safe operation.

4.4.2 The primary means of securing the multiversal is the proper placement of the supply hose. All hose supplying the multiversal should be brought straight back from the appliance for 15 feet. This configuration of hose will effectively absorb the nozzle reaction and prevent lateral movement of the multiversal.

4.4.3 An additional measure to prevent backward movement of the multiversal is to secure it in position with a utility rope. The following procedure should be used before the supply hose is attached:

A. Before attaching the supply hose, place the middle of the rope on top of the supply connection (Figure 2).

B. Bring the two sides of the rope around the supply connection and up between the two inlets.

C. Bring the two sides of the rope up over the connection and bring each side forward to the large leg of the ground base on each side of the front leg. Make a half hitch on each of these two legs (Figure 3).

D. Bring the rest of each end of the rope forward and secure each end to a substantial object which is forward and at an angle to the multiversal, using a clove hitch and binder on the taut part of the rope.

Figure 2

Figure 3

4.4.4 If there is no substantial object readily available in the area, the supply hose itself can be used as a substantial object. This is done by looping the supply hose in front of the multiversal and tying the rope to it. The supply hose should be laid straight back for 15 feet before it is looped in front of the multiversal.

4.4.5 Additionally, the safety chain can be secured to a substantial object, if one is close enough. The safety chain alone should never be relied on to secure this appliance.

4.5 Supplying the Multiversal

4.5.1 The multiversal is equipped with two 3” female connections.

4.5.2 The multiversal should be supplied with two supply lines whenever possible, though it can be operated when supplied with only one line.

4.5.3 The multiversal should be supplied with the largest size hose available. Generally, this is 3 ½” hose, though it is possible to supply it with 2 ½” hose.

4.5.4 The maximum allowable pressure supplied to the appliance base is 200 psi.

4.6 Operating the Multiversal

4.6.1 Do not move the multiversal or the 15 feet of supply hose while it is in operation.

4.6.2 The multiversal can rotate horizontally 90 degrees in each direction.

4.6.3 The vertical range of the nozzle is from 15 degrees below the horizontal to 90 degrees above the horizontal. The elevation is adjusted by the operating wheel.

4.6.4 There is a safety stop at 35 degrees above the horizontal. To operate below 35 degrees, release the safety stop by pulling up the release pin**.**

## 5. APPARATUS DECKPIPE

Figure 4

5.1 The apparatus deckpipe is permanently affixed to engine apparatus and supplied directly by a 3-inch pipe from the pump (Figure 4).

5.2 The deckpipe has 4 stacked tips (2 ½”, 2 ¼”, 2”, 1 ½”).

5.2.1 When the 1 ½” tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

5.2.2 When the 2” tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

5.2.3 The maximum flow of 2,000 GPM is reached when the 2 ½” tip is supplied with 116 psi.

5.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.

5.4 Deckpipe Operations

5.4.1 In situations where fast water on a rapidly expanding fire is required, the IC may consider using the engine deckpipe for a quick knock-down. This may be the first arriving officer.

5.4.2 Prolonged usage of the deckpipe LCS may necessitate augmentation, especially when in-line pumping. An engine company using a LCS should attach 2 ½ gate to the hydrant for possible self-augmentation.

## 6. AERIAL LADDER PIPE

Figure 5

6.1 The Aerial Ladder Pipe (Figure 5) is carried by all aerial ladder apparatus. It is comprised of a nozzle attachment, two halyards to control the direction of the stream, and a Siamese connection used to supply the appliance.

6.2 The ladder pipe has a 1 ½" tip that will flow roughly 660 GPM with 100 psi at the tip.

6.3 The nozzle attachment is equipped with a movable tip section and has a 3" female coupling. It is manually attached to the top two rungs of aerial ladder fly section.

6.4 The direction of the stream is controlled by the halyard attachments, which connect to the moveable portion of the nozzle attachment and are operated by a member standing at ground level.

6.5 Aerial ladder companies carry two lengths (100 feet) of 3 ½ hose (Figure 6) that are maintained connected to each other. The male coupling is maintained connected to the ladder pipe (Figure 7) and the female coupling is maintained connected to the outlet of a 3-inch gated Siamese connection. Also carried are two halyards and reels, which are kept in a designated area on the apparatus.

Figure 6


Figure 7

6.6 Aerial Ladder Pipe Operations

6.6.1 To put the ladder pipe in operation, members of the ladder company will attach the ladder pipe (with 3 ½" hose connected) to the first two rungs of the aerial ladder. The 3 ½" hose is secured with a hose strap just below the ladder pipe coupling. The hose strap should be attached to the first rung of the top sliding section of the ladder.

6.6.2 Once the ladder pipe is attached to the ladder (Figure 8), the two halyards are connected to the ladder pipe as follows:

A. One halyard clip is attached to the ladder pipe handle.

B. One halyard clip is attached to the collar of the ladder pipe (Figure 9).

Figure 8

Figure 9

6.6.3 The halyard reels are placed on the ground (Figure 10) near the tip of the aerial. One ladder company member holds the ends of both halyards, using them to control the vertical movement of the ladder pipe stream. This member should stand on the same side of the aerial ladder as the ladder pipe handle (which is to the right of the ladder, when facing the tip from the turntable) (Figure 11). This will allow for smooth operation of the halyard. If operating the halyard near the aerial tip is not possible (or is a safety hazard), the halyard can also be operated from the area near the turntable.

Figure 10


Figure 11

6.6.4 After the ladder pipe is attached to the ladder, the Siamese connection is placed near the rear of the apparatus. Water supply to the ladder pipe is controlled using the single gate attached to the Siamese connection.

6.6.5 The Siamese connection is supplied with 3 ½" hose, which is stretched from an engine apparatus and connected near the rear of the aerial ladder. Two supply sources are recommended to prevent undue stress on the aerial ladder in the event a sudden loss of water occurs.

6.6.6 The ladder pipe should be supplied with roughly 110 psi, plus 5 psi for every 10 feet in elevation. When operating at the maximum elevation of 80 feet, the Siamese should be supplied with roughly 150 psi.

6.6.7 When in operation, the angle of the aerial ladder should not exceed 70 degrees. At the maximum operating angle of 70 degrees, the maximum elevation of the ladder pipe will be 80 feet.

6.6.8 While the ladder pipe is in operation, the vertical movement of the stream is controlled using the halyard. The horizontal movement is controlled by moving the turntable. The halyard is most easily operated from a position near the tip of the aerial. However, depending on the position of the ladder, it may be necessary to operate from near the turntable to ensure a position of safety.

## 7. TOWER LADDERS


Figure 12

7.1 All tower ladder apparatus in the FDNY are equipped with a basket-based monitor capable of delivering a large caliber stream when supplied by an engine company (Figure 12).

7.2 The tower ladder monitor has 2 stacked tips (2", 1 ½"). A fog tip may also be attached to the monitor.

7.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

7.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

7.2.3 The maximum solid stream flow of roughly 1,200 GPM is reached when the 2" tip is supplied with 100 psi**.**

7.2.4 When the Akron Turbomaster fog tip is used, the flow can be up to 1,250 GPM.

7.3 Suppling the Tower Ladder

7.3.1 Generally, only one source at the base of the tower ladder should be used.

A. A Satellite Water Unit is the best source of supply if available.

B. When supplied with 3 ½" hose, ensure the male end is stretched to the gated inlet.

C. 200 – 250 psi is the recommended pressure at the gated inlet.

7.3.2 Water flow is controlled by the supply pumper

A. The gated inlet at the TL should not be used to control water flow.

B. Water should always be shut down at the supply pumper.

7.3.3 Refer to *Tower Ladder Operations* for more information.

## 8. BLITZFIRE OSCILLATING MONITOR

Figure 13

8.1 The Blitzfire Oscillating Monitor is a compact portable monitor that is carried only by the following specialized units:

8.1.1 Satellite Engine Companies

8.1.2 Foam Tanker Engine Companies

8.1.3 Haz-Mat Technician Engine Companies

8.1.4 Haz-Mat Company 1

8.2 The inlet and the outlet of the Blitzfire are both equipped with 2 ½" threads. There is one 2 ½" supply inlet which should be supplied with only one 2 ½" hoseline.

8.3 The maximum pressure to be supplied to the Blitzfire is 175 psi.

8.4 The Blitzfire comes supplied with its own Max-Force Dual Pressure fog tip. This is the only tip that may be used on the Blitzfire for exterior water stream application.

8.5 The fog tip can flow approximately 500 GPM at its maximum pressure of 175 psi.

8.5.1 The fog pattern ranges from straight stream to a 120-degree fog pattern.

8.5.2 The fog tip may be switched from a standard mode of 100 psi to a low-pressure mode of 55 psi.

8.5.3 The fog tip may also be used to apply finished firefighting foam.

8.6 The Akron 500 GPM foam nozzle may also be used with the Blitzfire to apply foam.

8.7 The Blitzfire has the following range of motion:

8.7.1 The vertical range is approximately from 10 degrees to 45 degrees.

8.7.2 The horizontal range is 20 degrees from center in either direction.

8.7.3 It also has an oscillation feature providing an automatic horizontal sweep of either 20, 30, or 40 degrees.

8.7.4 A minimum flow of 175 gpm is required for proper oscillation.

8.7.5 The speed of oscillation is a function of the flow rate.

8.8 The Blitzfire has a flow control handle that can be used to control water flow and act as a safety shut-off feature. The handle is closed when pushed fully forward and open when pulled back. The flow control handle also has 6 flow positions, allowing the water flow (gpm) to be regulated at different positions.

8.9 The flow control handle also has a safety shut-off valve. The safety shut-off valve will automatically shut off the monitor's water flow if the monitor starts to move sideways. Once the safety shut-off is tripped, the flow control handle will automatically move to the fully closed position. To resume operations, push the handle fully forward to ensure the safety shut-off valve has been reset.

8.10 If the monitor is positioned on a sloped surface, the safety mechanism may activate preventing the flow control handle from remaining open. This can happen because it appears the monitoring is moving. If this occurs, the flow control handle will have to be manually held open by a firefighter. In these situations, it is dangerous to attempt to utilize utility rope, webbing or any other device to hold the flow control handle open.

8.11 When in operation, the Blitzfire should only be secured using the tie down strap. The loop end of the strap will be secured to an anchor point and the hook will be snapped into the hole at the front of the Blitzfire. This is the safest method to secure the monitor because if the monitor slides, its travel is limited by the length of the strap.