

TRAINING BULLETIN

LARGE DIAMETER AKRON 4-WAY VALVE

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This Training Bulletin will familiarize and instruct members in the use and maintenance of the large diameter 4-way hydrant valve (LDHV).

I. SPECIFICATIONS

The large diameter 4-way hydrant valve (LDHV) permits the first-in engine to lay a large diameter supply line directly from the hydrant to the fire and start pumping water. Later, if more pressure is required, a second engine can connect to the hydrant valve and augment the pressure without interrupting the flow.

The valve consists of a main body, or housing, that has two inlets and two outlets. Both inlets have winged lugs to allow the member laying the line to use either inlet. A sturdy handwheel is connected to a diverter located inside the main body. The diverter directs the flow of water at a 90-degree angle from the selected inlet to one of two outlets.

The main body, the valve cover, and the diverter are machined from aluminum.

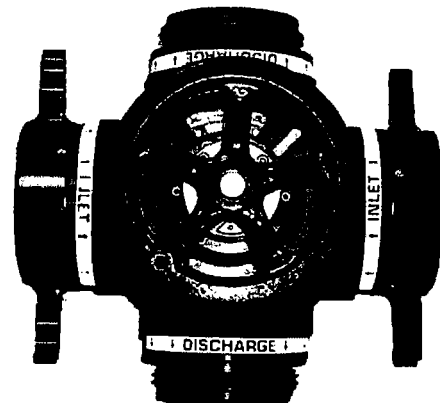
The handwheel operates the diverter within the body of the valve. The handwheel operates smoothly and does not require excessive manipulative effort during changeover, regardless of pressure.

Inlet and outlet size and description:

Inlets: 4" long handled female swivel inlet with NST threads
Outlets: 4" male fitting with NST threads

Weight and dimensions:

Weight: 35 lbs.
Length: 12 ³/₄" (male to male)
Width: 14" (female to female)
Height: 13 ¹/₂"



II. APPLICATION

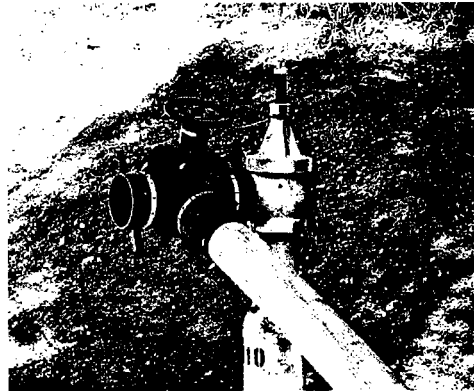
The LDHV is to be used by a single company when establishing a water supply from a pressurized hydrant, and in conjunction with 3½" or 4" supply hose.

Because of a significant obstruction potential while using the LDHV and the use of the 4" hose, the member laying the line must complete a hydrant "size-up" before committing to a particular outlet on the hydrant. Because of the kinking tendency of the 4" hose, it is no longer necessary or advisable to pull a large amount of slack hose around the hydrant. Procedures to be followed when encountering obstructions from any hydrant outlet will be addressed later in this Training Bulletin.

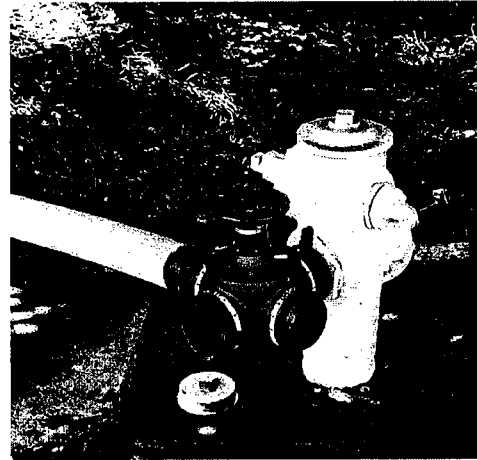
Hydrant operations using the LDHV

When laying-a-line from:

- **Single hydrant-** There are both 2½" and 4" single hydrants. On the 2½" single hydrant the outlet is to be captured using the 2½" to 4" winged increaser in conjunction with the LDHV. Select the proper 4" long handled female inlet on the LDHV so the supply line is pointing toward the engine's direction of travel. This will minimize kinks and the amount of hose in the street, which may obstruct the approach of the engine used to pump through the 4-way. As the next engine arrives to augment pressure, the Engineer is to connect an intake line to the unused male outlet of the LDHV. The Engineer will then attach a discharge line to the unused female inlet of the LDHV to complete the connections necessary for the augmentation. A 4" supply hose and/or 4" soft suction should be used for all connections when possible.



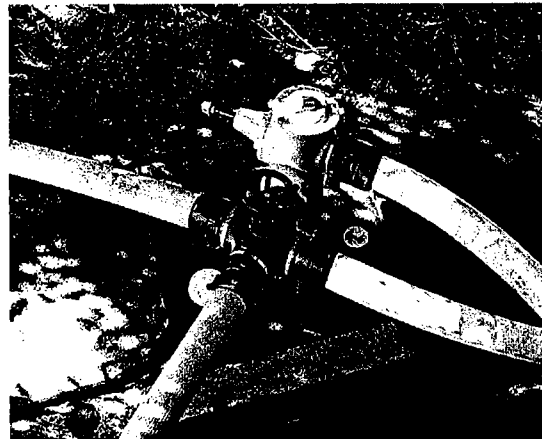
- **2½" by 4" hydrant-** the 4" outlet is to be captured attaching the LDHV directly to the hydrant. The 4" outlet is being utilized to maximize water flow from the inception of the hydrant operation. Select the proper 4" long handled female inlet on the LDHV so the supply line is pointing toward the engine's direction of travel.



As the next engine arrives to augment the pressure, the Engineer is to connect an intake line to the unused male outlet of the LDHV. The engineer will then attach a discharge line to the unused female inlet of the LDHV to complete the connections. When the situation dictates the necessity of a secondary supply, the secondary supply is to be taken directly from the 2½" outlet. When possible, the 4" supply hose and/or the 4" soft suctions should be used for all connections.

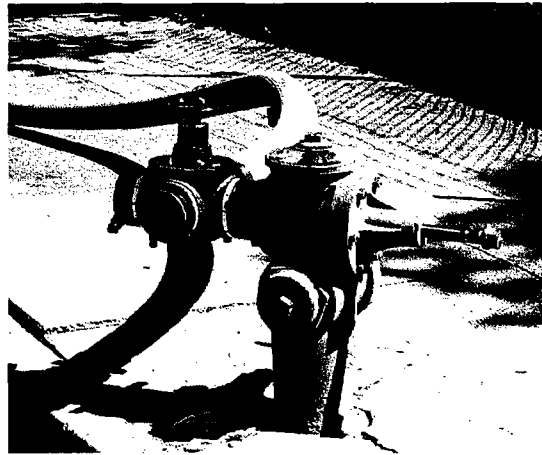


Complete initial hookup



Hookup with secondary supply

- Double 4" hydrant-** the outlet facing the fire is to be captured attaching the LDHV directly to the hydrant. As the next engine arrives to augment the pressure, the engineer is to connect an intake line to the unused male outlet of the LDHV to take initial suction. The Engineer will then attach a discharge line to the unused female inlet of the LDHV to complete the connections. When the situation dictates the necessity of a secondary supply, the secondary supply is to be taken directly from the other 4" outlet. When possible, the 4" supply hose and/or the 4" soft suctions should be used for all connections.



Note: If desired, the Engineer can open the "tank to pump" valve to allow some water to flow into the hose before changing the water flow with the LDHV. As stated earlier, the handwheel can be operated at high pressures, but it is recommended that it be transferred when the engine is at idle.

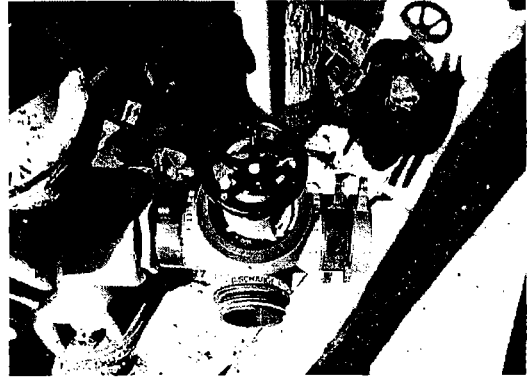
The following chart compares the engine pressure requirements for specific flows through 100' of 4" hose without the LDHV and with the LDHV. The friction loss noted in the bottom row is the friction loss caused by the LDHV and should be added to the friction loss calculation for the hose lay.

Test flow GPM	250	500	750	1000	1250	1500	1750	1900
EP W/O LDHV	59	94	100	114	134	173	180	213
EP with LDHV	59	98	104	120	141	182	190	230
FL with LDHV	0	4	4	6	7	9	10	17

III. CONSIDERATIONS

Obstructions:

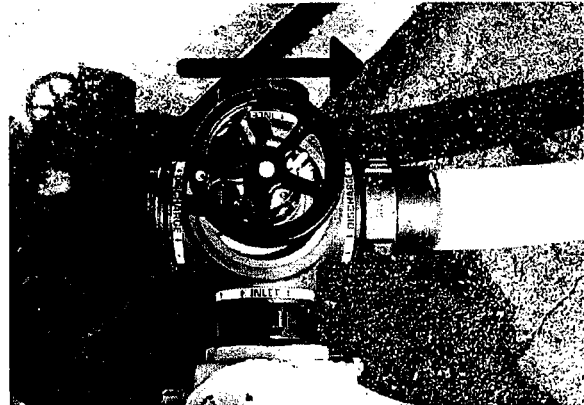
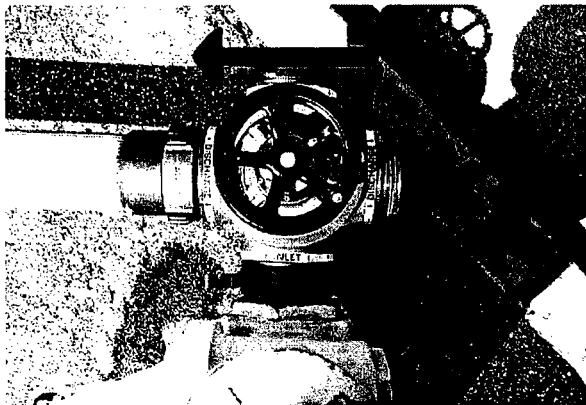
Because we no longer clear the 4-way from the hydrant and because we attach supply and discharge lines to all openings when augmenting the pressure through the LDHV, there has been an increase in the probability of companies encountering difficulty in making all of these connections due to obstructions (i.e., Sign posts, power poles, etc.).



As stated earlier, **it is imperative** that members complete a rapid "size-up" of the hydrant outlets to determine if an obstruction exists. It will be necessary for companies to train with the new LDHV to become proficient in understanding the clearance needs around hydrants. When a single hydrant is obstructed, one option is to use a bypass between the hydrant and the LDHV. At the present time, this can be achieved by using a section of 4" hose or 4" soft suction, with proper fittings.

Determining Direction of Flow:

The Department has modified all of the LDHV with winged lugs on both female inlets. This modification has the potential of causing confusion in determining the direction of water flow (the yellow indicator does not always indicate the correct direction of flow depending on which female inlet is being used). A visual check into the unused inlet or outlet in conjunction with the following procedure will eliminate any confusion.



While standing on the supply side of the LDHV, turn the handwheel in the direction of the supply line.

IV. TESTING

Prior to delivery, each LDHV was hydrostatically tested to 900 psi. At 900 psi, the LDHV showed no evidence of leakage, thread breakage, distortion or failure.

The Supply and Maintenance Division will conduct an inspection of the LDHV during the annual pump test.

The daily check of the LDHV is to turn the handwheel in both directions and inspect for any damage on the valve body. This same check should be completed after each use.

V. MAINTENANCE

The sealing system between ports (inlets and outlets) utilizes ultra high molecular weight plastic seats that seal the threads in the body from pressurized water in the valve. This precludes any need for lubrication.

The maintenance of the LDHV consists of keeping the valve free of dirt and debris, and handling the tool in a manner that prevents the abuse of this equipment.