



# PUMP OPERATIONS & HYDRAULIC REFERENCE



August 2021

## 200' PRE-CONNECT (FIRST)

- 200' 1 3/4" yellow Mercedes KrakenExo hose
- Elkhart XD 7/8" smooth bore
- NP = 50 psi
- GPM = 180
- **PDP = 100 psi**

## 200' PRE-CONNECT (SECOND)

- 200' 1 3/4" single color hose
- TFT Dual-Force automatic nozzle in **low pressure** setting
- NP = 50 psi
- GPM = 175
- **PDP = 100 psi**

## LEADER LINE

- 150' 1 3/4" attached to 500' 2 1/2" in static load with wye gate.
- Stretching beyond 400' of 2 1/2" (550' total) should only be done with caution.

### Primary / Attached Bundle

- 150' 1 3/4" single color hose
- Elkhart XD 7/8" smooth bore
- NP = 50 psi
- GPM = 185
- 150' 1 3/4" + 100' 2 1/2": **PDP = 90**
- 150' 1 3/4" + 200' 2 1/2": **PDP = 100**
- 150' 1 3/4" + 300' 2 1/2": **PDP = 105**
- 150' 1 3/4" + 400' 2 1/2": **PDP = 110**

### Both Bundles

- Second unattached bundle: 150' 1 3/4" single color hose with TFT Dual-Force automatic nozzle in **low pressure** setting
- GPM = 360 (180 gpm each line)
- (150' 1 3/4") x 2 + 100' 2 1/2": **PDP = 110**
- (150' 1 3/4") x 2 + 200' 2 1/2": **PDP = 130**
- (150' 1 3/4") x 2 + 300' 2 1/2": **PDP = 140**
- (150' 1 3/4") x 2 + 400' 2 1/2": **PDP = 160**

NP = nozzle pressure

PDP = pump discharge pressure

GPM = gallons per minute

## STANDPIPE HIGH RISE

- Elkhart XD stacked 1" and 1 1/8" smooth-bore tip nozzle without pistol grip.
- Three (3) 50-foot lengths of 2" hose packaged in the Denver Load configuration with designated hose straps.
- NP = 50 psi
- 1" tip with 100' of 2" hose
  - GPM = 220
  - **Standpipe pressure gauge = 60 psi**
- 1" tip with 150' of 2" hose
  - GPM = 220
  - **Standpipe pressure gauge = 70 psi**
- 1 1/8" tip with 100' of 2" hose
  - GPM = 270
  - **Standpipe pressure gauge = 60 psi**
- 1 1/8" tip with 150' of 2" hose
  - GPM = 270
  - **Standpipe pressure gauge = 80 psi**

If the standpipe is supplied by a fire pump, allow hydrant pressure to charge the standpipe. The supply engine shall remain at idle and make adjustments as needed per the request of the Forward D/O.

If supplying a dry standpipe or one supplied by domestic water pressure, supply it at 100 psi plus elevation (5psi /floor) as a starting point and adjust as needed per the request of the Forward D/O.

## AUTOMATIC SPRINKLER - FIRE DEPARTMENT CONNECTION

Automatic sprinkler systems (**not standpipe operations**) with 2 1/2" or 5" with (5psi /floor)  
**PDP = 150**

## DECK GUN / MONITOR NOZZLE

- NP = 80 psi
- **PDP = 90 psi**
- Tip size & gpm flow at 80 psi
  - 1 3/8", 500 gpm
  - 1 1/2", 596 gpm
  - 1 3/4", 813 gpm
  - 2", 1063 gpm

***This chart is for reference purposes only. Fires are dynamic and unique, and it is the responsibility of the driver / operator to determine safe and appropriate pump discharge pressures.***



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## 2½" SOLID STREAM ATTACK

- TFT stacked 1" and 1 1/8" smooth-bore tip nozzle without pistol grip attached to 500' 2½" in static load
- NP = 50 psi
- 1" tip with 200' of 2½"
  - GPM = 220
  - **PDP = 50 psi**
- 1 1/8" tip with 200' of 2½"
  - GPM = 265
  - **PDP = 50 psi**

## TFT BLITZFIRE

- 1" smoothbore
- NP = 80 psi
- GPM = 266
- **PDP = 130 psi (350', 2 ½" hose)**

## 2½" FOG STREAM NOZZLE

- TFT Dual-Force automatic nozzle in **low pressure** setting
- NP = 55 psi
- GPM = 95 - 225
- **PDP = 90 psi (350', 2 ½" hose)**

## BOOSTER REEL

- 200', 1" rubber hose on reel
- GPM = 40
- **PDP = 120 psi**

## FOAM OPERATIONS

Hydrocarbons - Class B foam at 3%

- Gasoline, kerosene, diesel

Polar Solvents - Class B foam at 6%

- Alcohols, acids, ketones
- Pressure at educator must be 200 psi
- Consider using 2½" line with reducer to reach educator to achieve 200 psi with lower friction loss
- Length from educator to nozzle must not exceed 150'
- GPM setting of nozzle must equal that of educator

## 5" SUPPLY (1,000 GPM), 50 PSI

### AT RECEIVING INTAKE

- |               |                |
|---------------|----------------|
| • 100'        | • 500'         |
| <b>PDP=58</b> | <b>PDP=98</b>  |
| • 200'        | • 600'         |
| <b>PDP=66</b> | <b>PDP=100</b> |
| • 300'        | • 700'         |
| <b>PDP=74</b> | <b>PDP=106</b> |
| • 400'        | • 800'         |
| <b>PDP=82</b> | <b>PDP=114</b> |

## 4" SUPPLY (1,000 GPM), 50 PSI AT

### RECEIVING INTAKE

- |                |                |
|----------------|----------------|
| • 100'         | • 500'         |
| <b>PDP=70</b>  | <b>PDP=150</b> |
| • 200'         | • 600'         |
| <b>PDP=90</b>  | <b>PDP=170</b> |
| • 300'         | • 700'         |
| <b>PDP=110</b> | <b>PDP=190</b> |
| • 400'         | • 800'         |
| <b>PDP=130</b> | <b>PDP=210</b> |

## LADDER OPERATIONS

Smooth Bore Stacked Tip

- NP = 80 psi
- **PDP = 130 psi**
- Tip size & gpm flow at 80 psi
  - 2", 1,000 gpm
  - 2 ¼", 1,347 gpm
  - 2 ½", 1,665 gpm

## FRICITION LOSS RULE OF THUMB

- 1¾" = 25 psi / 100' @ 175 gpm
- 2½" = 15 psi / 100' @ 250 gpm
- 4" = 20 psi / 100' @ 1,000 gpm
- 5" = 8 psi / 100' @ 1,000 gpm

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