	<b>Standard Operating Guideline – West Fargo Fire Department</b>		<b>09.007</b>
	Subject: Cascade Systems		
	Section: Misc		
	Date Authorized: 12/1/2019	Authorized by:	
Date Reviewed:	Chief Daniel Fuller		

**Intent**

The intent of this guideline is to establish standard procedures for operating the cascade systems

**References**

**Definitions**

*Compressed Air* – air under a greater pressure than one atmosphere (14.7 psi)

*Cascade System* – a high pressure compressed gas cylinder storage system used for refilling smaller gas cylinders

*Pounds per Square Inch (PSI)* – a measure of pressure

**Guideline**

1. The primary self-contained breathing apparatus (SCBA) bottle used by the department is the MSA 4500 bottle. The operating pressure of this bottle is 4,500 psi
2. The in-station cascade and compressor system at the Central Fire Station is a Mako Comp Air Station which utilizes two six thousand psi storage bottles, also referred to as banks.
3. In general, any air bottle should be filled slowly. Fast filling results in the bottle heating up, reducing the volume of air in the tank after it cools to ambient temperatures.
4. To prepare the system, follow these steps
  - a. Locate bank 1 and bank 2 dials, both should be full at 6,000 psi
  - b. Turn the two storage tanks on
  - c. Shut the line TO BANK 1 BANK 2
  - d. Shut BYPASS
  - e. Shut AUX FILL
5. Inspect the bottle to be filled
  - a. Ensure it is free of defects, cracks or damage
  - b. Follow the manufacturer’s directions on the tank for filling
6. When filling an air bottle using the cascade system at the Central Fire Station, follow these steps
  - a. Check BANK 1 and BANK 2 gauges. They should be at last 4,500 each
  - b. Open the door on the fill station by pushing down on the door, then tilt out
  - c. Place the air bottle in the tray, valve end up
  - d. Connect the fill hose
  - e. Close the relief valve on the fill hose (brass dial)
  - f. Open the fill hose valve

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- g. Open the air bottle valve
  - h. Close the door to the cascade system
  - i. Open the FROM BANK from the bank with the lowest pressure
  - j. Open the fill valve
  - k. Fill the air bottle slowly, until the desired pressure is achieved
  - l. Close the fill valve
  - m. Close the FROM BANK valve that was opened
  - n. Open the fill station door
  - o. Close the air bottle valve
  - p. Close the valve on the fill hose
  - q. Bleed the pressure using the relief valve on the fill valve (brass dial)
  - r. Disconnect the fill hose
  - s. Verify the pressure of the tank before placing into service
7. When filling from the mobile cascade on Rescue 74
- a. Check BANK 1 gauges. There are four, and one should be at least 4,500
  - b. Open the door on the fill station by lifting the blue safety bar and then pulling the handle out
  - c. Place the air bottle in the tray, valve end up
  - d. Connect the fill hose
  - e. Close the relief valve on the fill hose (brass dial)
  - f. Open the fill hose valve
  - g. Open the air bottle valve
  - h. Close the door to the cascade system
  - i. Open the FROM BANK from the bank with the lowest pressure
  - j. Open the fill valve
  - k. Fill the air bottle slowly, until the desired pressure is achieved
  - l. Close the fill valve
  - m. Close the FROM BANK valve that was opened
  - n. Open the fill station door
  - o. Close the air bottle valve
  - p. Close the valve on the fill hose
  - q. Bleed the pressure using the relief valve on the fill valve (brass dial)
  - r. Disconnect the fill hose
  - s. Verify the pressure of the tank before placing into service
8. To replenish the air in the storage cascade tanks on the Central Station cascade system, the compressor at the Central Fire Station should be used. To prepare the compressor for operation, follow these steps
- a. Check the oil on the compressor by inspecting the sight glass
  - b. Complete the checklist before operation
  - c. Open the TO BANK 1 and TO BANK 2 on the fill station

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- d. Press the POWER ON button on the compressor
  - e. Let the compressor run until the banks reach 6,000 psi. The compressor will stop automatically
  - f. Close the TO BANK 1 and TO BANK 2 valves on the fill station
9. To replenish the air in the cascade storage tanks on the Rescue 74 tanks, follow the same procedure to prepare the compressor, then
- a. Find the fill hose from the cascade room
  - b. Connect the fill hose into the auxiliary outlet on the fill station
  - c. Connect the other end of the fill hose to the auxiliary fill outlet on the mobile cascade on Rescue 74
  - d. Close the relief value on the fill hose
  - e. Open the fill hose valves
  - f. Open the system fill on the mobile cascade
  - g. Open the desired banks or banks to fill
  - h. Open auxiliary fill on the fill station
  - i. Open the bypass
  - j. Turn on the compressor
  - k. Fill each tank to 6,000 psi
  - l. Close the system fill on the mobile cascade
  - m. Close the auxiliary fill on the fill station
  - n. Close the bypass
  - o. Close the fill hose connections
  - p. Bleed the pressure with the pressure relief valve
  - q. Close BANK 1 and BANK 2 on the fill station
10. To replenish the air in the cascade storage tanks on the Ladder 76 tank, follow the same procedure to prepare the compressor, then
- a. Find the fill hose from the cascade room
  - b. Connect the fill hose into the auxiliary outlet on the fill station
  - c. Connect the other end of the fill hose to the auxiliary fill outlet on Ladder 76
  - d. Close the relief value on the fill hose
  - e. Open the fill hose valves
  - f. Open the system fill on Ladder 76
  - g. Open the desired banks or banks to fill
  - h. Open auxiliary fill on the fill station
  - i. Open the bypass
  - j. Turn on the compressor
  - k. Fill each tank to 6,000 psi
  - l. Close the system fill on the mobile cascade
  - m. Close the axillary fill on the fill station
  - n. Close the bypass

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- o. Close the fill hose connections
- p. Bleed the pressure with the pressure relief valve
- q. Close BANK 1 and BANK 2 on the fill station

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