

**CompressedAirFoam.com**

# CAF System Design

Advanced System Operator Knowledge



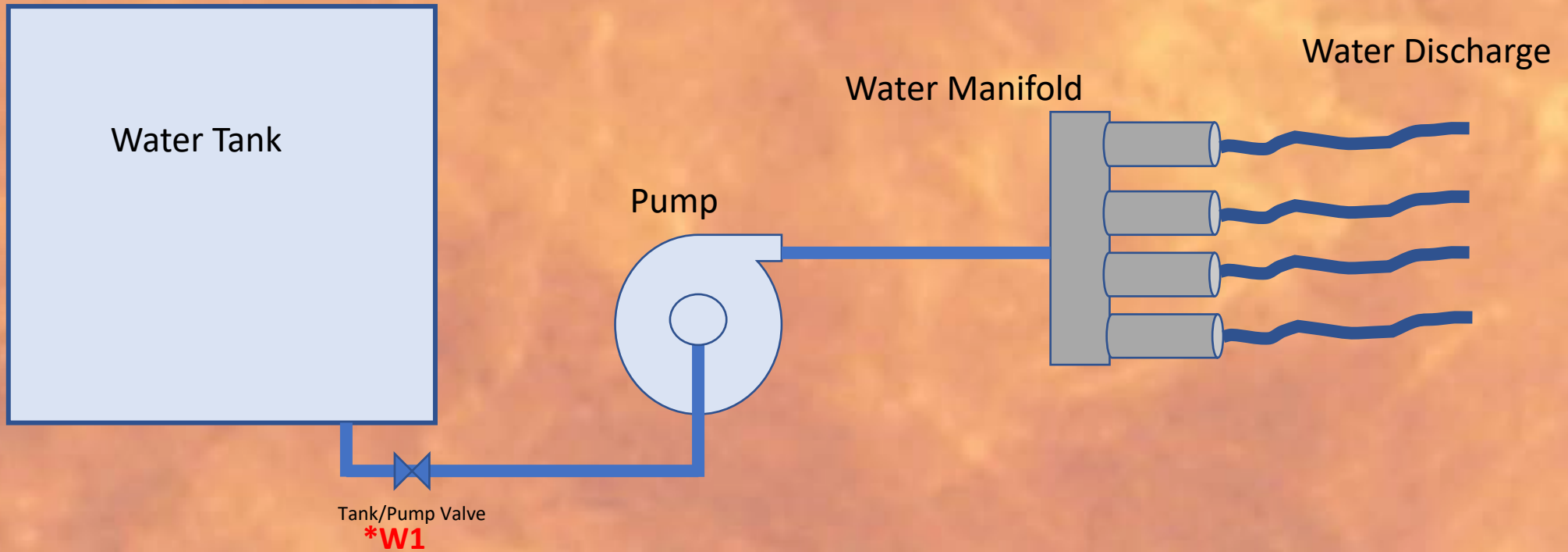
# CAF System Design

- The FOAMula for CAF = Water (W) + Concentrate (Con) = Solution (Sol) + Air (A) + Agitation (A) (Agitation for CAF is in the fire hose)
- A CAF system is a MIXING MACHINE
- Made up of 3 separate Systems
- The Pump – adds the WATER – W
- The Proportioner – adds the CONCENTRATE – Con
- The Compressor – Adds the AIR – A
- Combine the three (3) ingredients (W + Con = Sol + A) and then agitate it – voila, you have made FOAM. In this case, using Compressed Air makes – COMPRESSED AIR FOAM (CAF)!!!

# Overview

- These Diagrams are simple in nature for ease in comprehension
- They cover the majority (but not all) components that may exist
- The Failure Points cover the most common (but not all) possible failures.
- Insure familiarity with the Trouble Shooting Guide under the Site's Maint Menu for detail diagnostics.
- The Failure Points indicate the needed operator's knowledge to prevent firefighter injuries and serious system damage.
- Learn each system separate – then put them together.

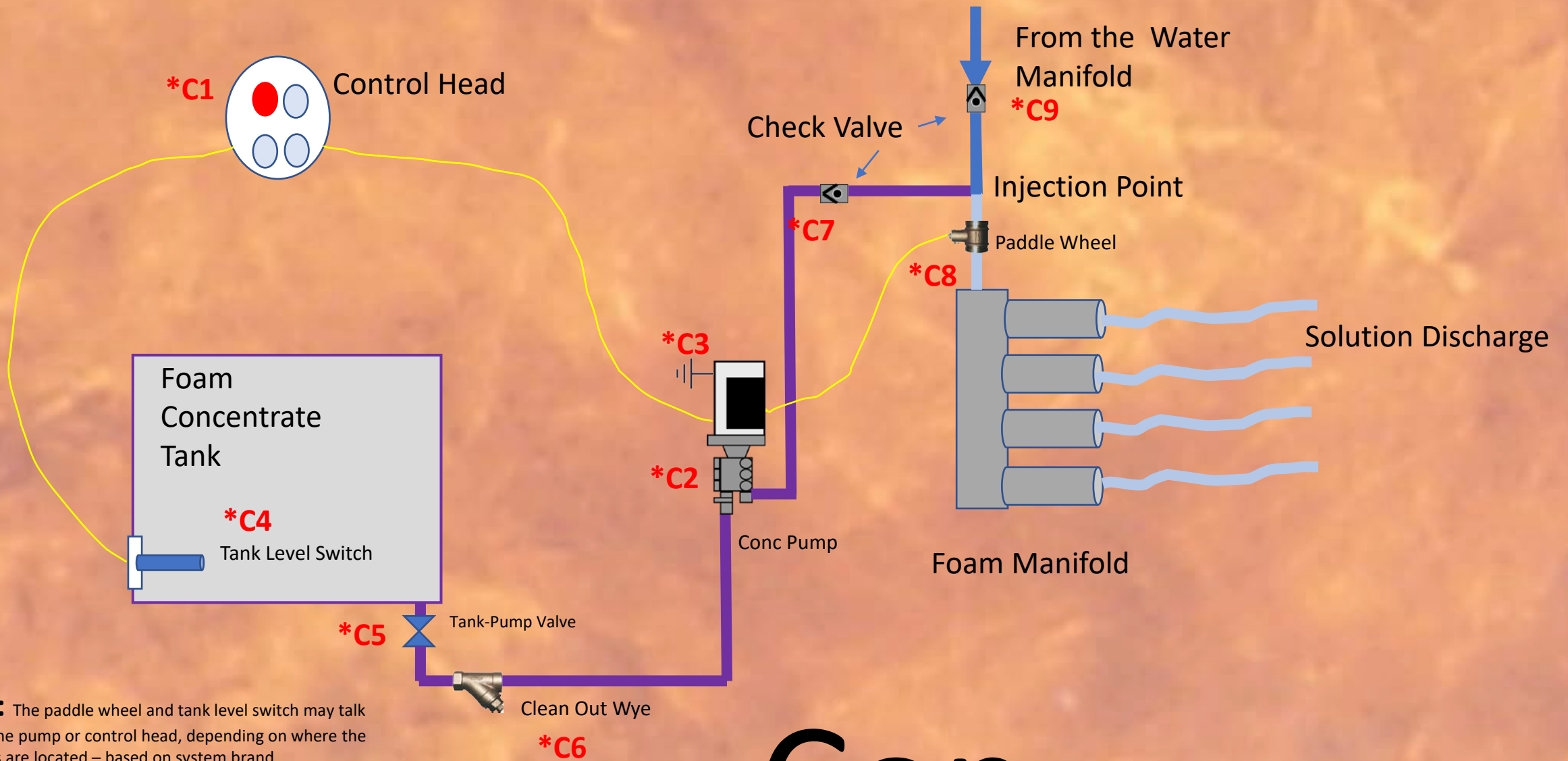




**W** - Water

**\*Common Failures**

\*W1 –Tank Valve – No Water - Not Open - Operator Error



**NOTE:** The paddle wheel and tank level switch may talk either to the pump or control head, depending on where the electronics are located – based on system brand.

**\*C#** - Common Failure Points – Listed on Next Page

# Con - Concentrate

- **\*CONCENTRATE SYSTEM COMMON FAILURES**

- Almost all the failures in the Concentrate Proportioning system result in no foam.
  - Air and water will not mix in the hose without concentrate – the result is called SLUG FLOW (a violent shaking of the nozzle)

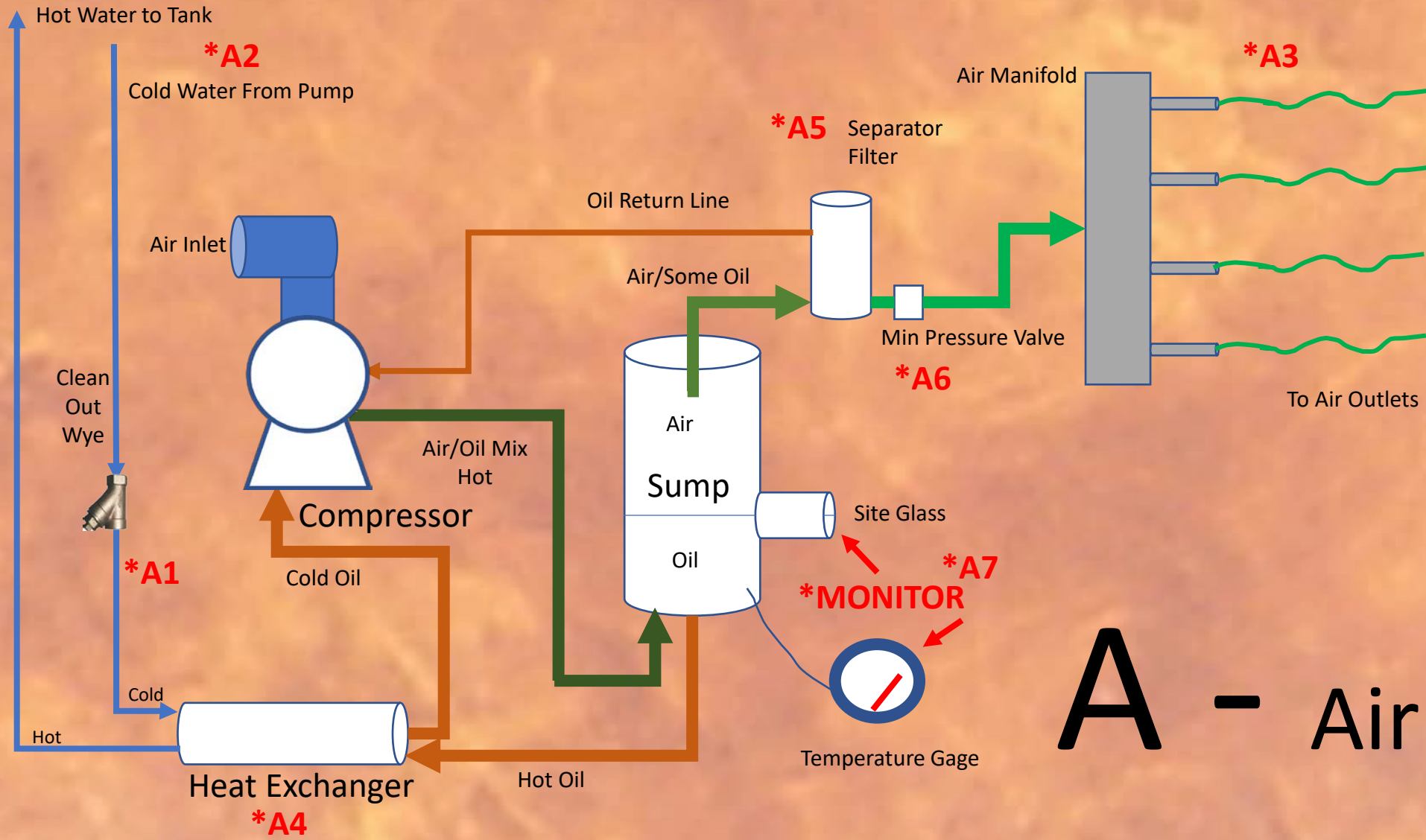
- **PUMP NOT RUNNING**

- **\*C1** - Very Common Operator Error – Push the **RED** button
- **\*C2** - Pump Not Running after inactivity – Occasional Operator Error
  - Failure to exercise the machine. Concentrate dries out and gums up the pump. Periodically exercise the system.
- **\*C3** - No System Power or Pump won't run – Rare
  - Maintenance Issue – check the system ground.

- **NO FOAM**

- **\*C4** - Tank Level – low/empty - Rare
  - Operator Failed to check the level - Rare.
  - Caused by Heavy Use – check the tank level often during long operations – Rare.
- **\*C5** - Tank/Pump Valve Closed – Operator Error – failed to check the system – Rare.
- **\*C6** - Plugged Wye – from debris in Concentrate Tank – Rare
- **\*C7** - Foam Check Valve Sticks
  - Could be from inactivity – Operator Error – Rare – exercise the system
  - Could be worn out/failure – requires maintenance/replacement
- **\*C8** - Paddle Wheel Fails – Rare
  - No GPM flow showing on gauge – requires maintenance/replacement
- **\*C9** - Foam in the Water Tank - Rare
  - Could be a failure of the water check valve – requires maintenance/replacement. These check valves can fail in 2-4 yrs. Check periodically.





See Typical Discharge Valve Set Page 9

**A - Air**

- **\*AIR SYSTEM COMMON FAILURES**

- **SYSTEM OVERHEATS**

- **\*A1** – Clean Out Wye Plugged – Very Common - Operator Error – Clean Out the Wye
- **\*A2** – Water Tank is Empty – Rare – Monitor Tank Level during extended operations.

- **WATER IN THE OIL – The level is above the site glass – might be milky white during air flow operations.**

- **\*A3** – Possible Air Outlet Check Valve Failure – Rare – Monitor the Site Glass during operations.
- **\*A4** – Possible Heat Exchanger Failure due to Freezing – Rare – Operator Error if not drained during freezing weather.

- **LOW HYDRAULIC OIL – The level is below the site glass**

- **\*A5** – possible cause – Separator Filter Failure – Oil has left the system - Oil passes through to the hose line or air only outlet.
  - Detected by NO Oil on the site glass or feeling oil on the hand during the regular system warm up test.

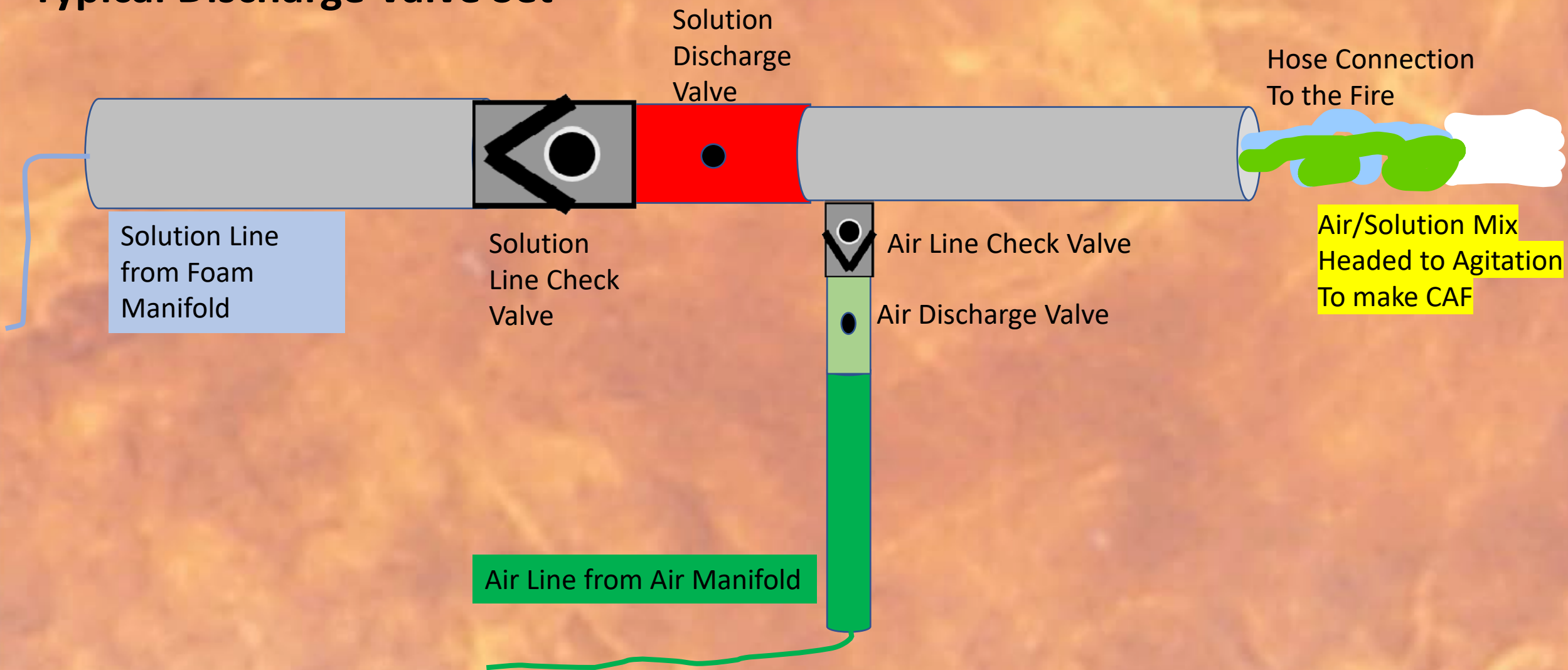
- **NO AIR**

- **\*A6** – If the system seems to be running fine, but no air comes out of the hose or air only outlet, it may indicate the minimum Pressure Valve is stuck. This is common if the system is not warmed up on periodic system checks – Operator Error. Requires maintenance.

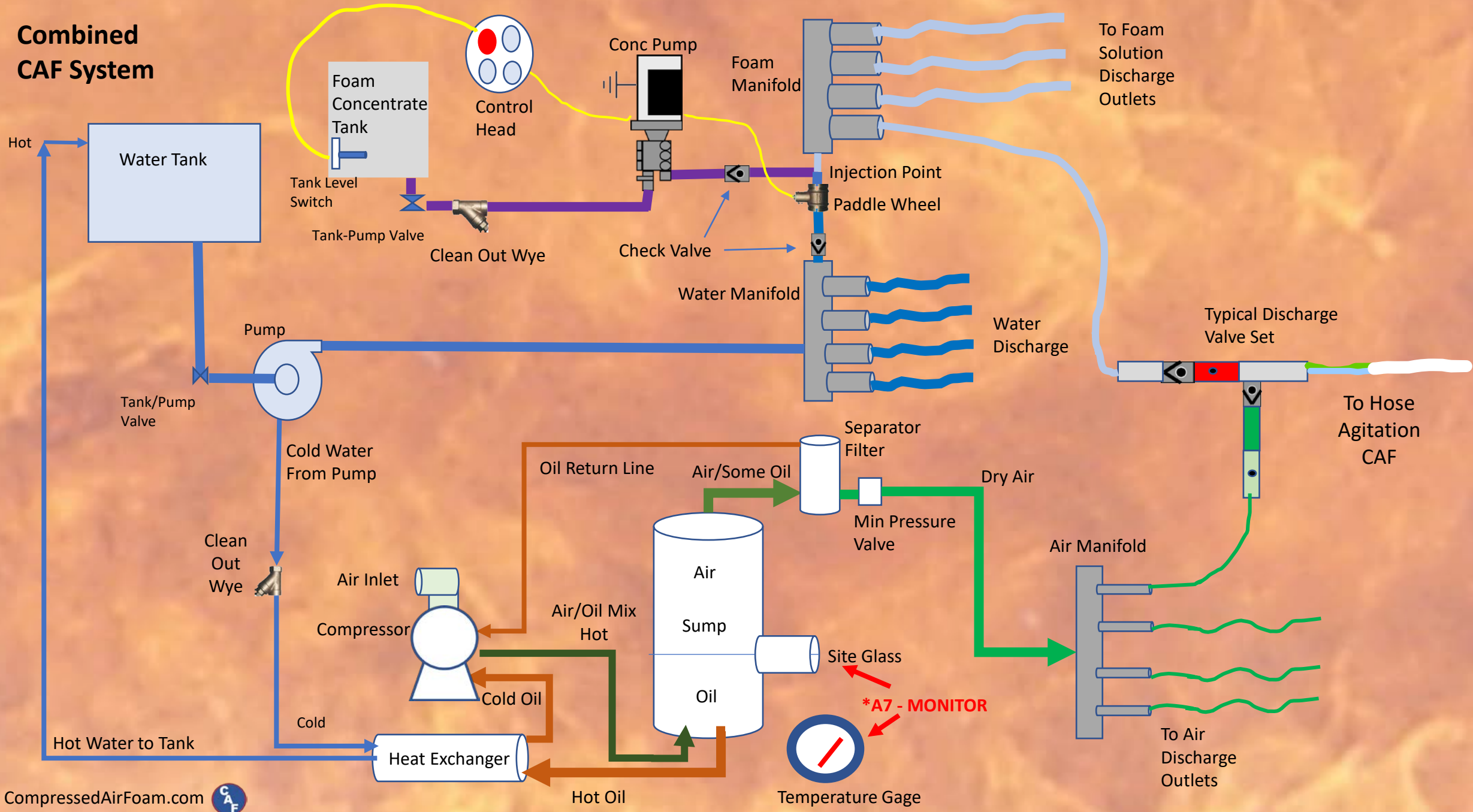
- **\*A7 – Remember – Water in the oil, no oil, or too hot oil can lead to catastrophic system failures. Monitor the sight glass and oil temperature at all times during prolonged system operations.**



# Typical Discharge Valve Set



# Combined CAF System



# Recommendation

- Print the Diagram
- Compare it to your Agency's System
- Develop a new diagram based on your Agency's Exact System
- Use your created diagram for in house instruction



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