Build Health International

PSA Cycle Pressure Check

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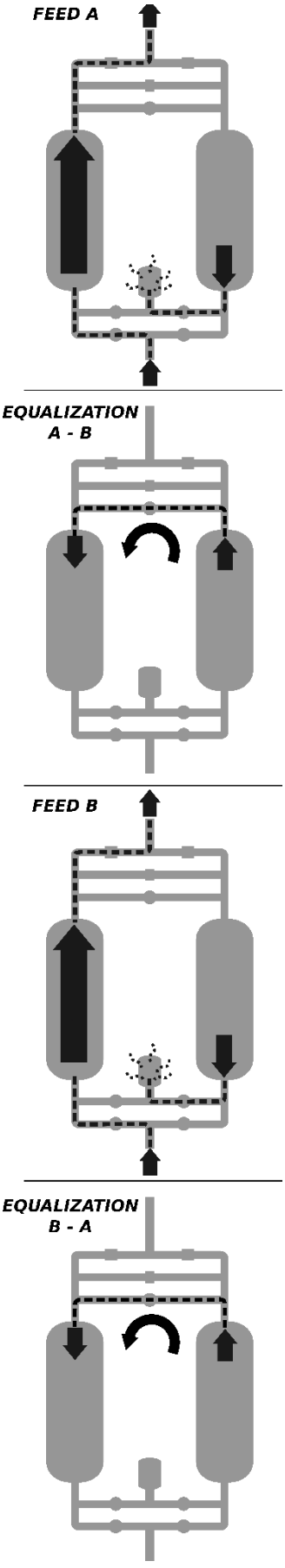
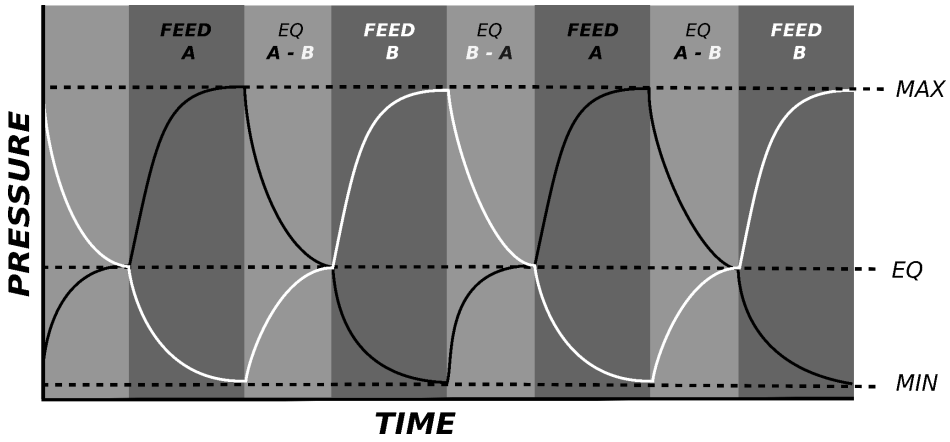
One of the best ways to diagnose what is wrong with a PSA plant is to observe the pressure in each sieve bed over one or more full cycles. Deviations from the normal cycle can reveal problems with valves, pressure regulators, and check valves, although diagnosing exactly which valve or regulator is at fault from pressure readings alone is challenging.

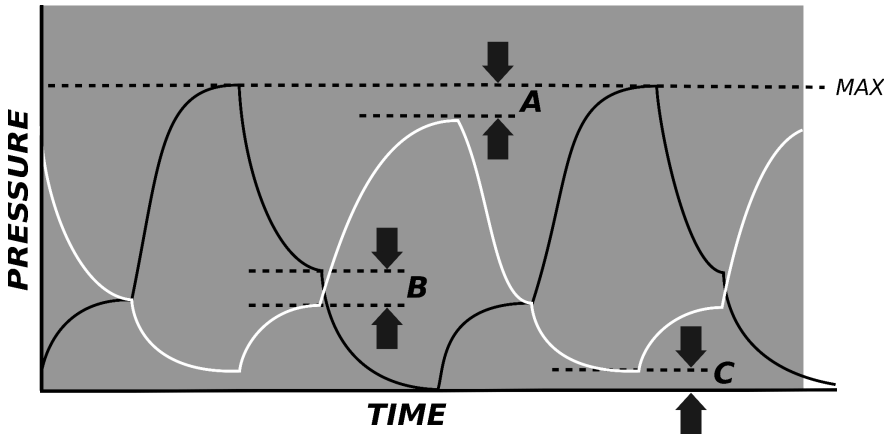


THE TYPICAL CYCLE



While the exact pressures and valve pattern of a PSA plant may vary by manufacturer and size, all PSA plants will follow a predictable cycle. Each bed will alternate between pressurizing and exhausting. Between pressurizing and exhausting the sieve beds will equalize pressure. Here the sieve beds will be connected and air from the sieve bed that is pressurized will flow into the sieve bed that has finished exhausting. Below we can see a graph of a typical pressure cycle for a PSA plant.

WHAT TO WATCH FOR



Some machines will have a screen showing a pressure graph like above, other machines will only show live readings on the screen, and some will simply have analog pressure gauges for the output of each sieve bed. In any case, we will want to observe the following in order of importance.

A. Maximum pressure reached in each sieve bed.
- Many manufacturers will list the pressure range that the sieve bed should reach when fully pressurized. Typically this is around 75 PSI ~5bar, but can vary substantially between manufacturers. Low pressure here could be caused by low supply pressure, bad feed air regulator, leaks, or bad feed valves.
- Regardless of the maximum pressure, both sieve beds should reach the same pressure. Unequal pressures could mean problems with check valves, bad feed or exhaust valve, leaks in supply manifolds.

B. Equalization pressure
- During equalization, both tanks should reach roughly the same pressure. This can be hard to see on analog gauges because the gauge needles may bounce around due to the sudden pressure changes, but ideally each sieve bed should start its pressurization cycle at roughly the same pressure. Problems equalizing are generally caused by the equalization valve.

C. Minimum pressure
- During exhaust most sieve beds will drop to near ambient pressure. Like the maximum pressure the minimum pressure should be the same in each bed. High or uneven minimum pressure may be caused by bad exhaust valves or mufflers.