

Ejector

Installation, Operation, Maintenance and Manual

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SECTION III - OPERATION

3.1 Startup

The ejector motive line should be disconnected as near as possible to the motive inlet and the lines blown clear. This is extremely important on new installations where weld slag and chips may be present and on units that have been idle where rust and scale particles could exist. These particles could easily plug the motive nozzle throats. If a strainer, separator and/or trap is present, they should be inspected and cleaned after the lines are blown clear.

If condensers are present, check to insure that the vapor outlet of the aftercondenser and condensate outlet of the separator is clear.

Twin element, two stage ejectors with inter/aftercondensers are generally equipped with relief valve(s). The relief valves are nominally set at 15 PSIG. If the operating procedures for startup or shutdown are not followed exactly, the ejectors could be exposed to full operating motive pressure and they are normally not designed to withstand this pressure. The relief valves protect the ejector in the event the motive steam is inadvertently turned on when the isolating valves are closed. The ejectors may be designed for the motive pressure if relief valves are not present, but it is suggested the outline drawing be checked for notes pertaining to this feature or consult the factory.

3.2 Shutdown

There are two procedures to be considered when shutting down:

Method A If it is desired to maintain the vacuum upstream of first stage ejector (an isolating valve has to be present at suction) rather than allowing pressure to rise to atmospheric pressure, the valves should be closed in the following order:

- 1)

4.3 Overloading Conditions

Overloading can be due either to excessive process loads, air in-leakage, and/or the load at a temperature higher than design. It must be determined if the source of the overload is upstream of the first stage ejector or within the ejector system. This is done by isolating the first stage ejector from the remainder of the vacuum system upstream. A blank-off plate inserted at the suction of first stage is the easiest method. (Note: Even if an isolating valve is present, a blank-off plate should be used since valves may leak.)

At zero load, the ejector will evacuate to shut-off pressures of approximate values shown below for various number of stages:

Single stage unit -----	50 mmHgA (may be unstable)
Two stage unit-----	4 to 10 mmHgA
Three stage unit -----	0.8 to 1.5 mmHgA
Four stage unit -----	0.1 to 0.2 mmHgA
Five stage unit-----	0.01 to 0.02 mmHgA
Six stage unit -----	0.001 to 0.003 mmHgA

The above shut-off pressures are only approximate and will vary with each particular ejector. However, if the blank-off test indicates the ejector is operating in a stable condition at its approximate shut-off pressure, then it can be assumed that the ejector most likely will operate satisfactorily along with its entire performance curve. If this is the case, further troubleshooting would then be required on the vacuum system or upstream of ejector.

If the shut-off pressure is not obtained or is unstable, then the troubleshooting should be confined to the ejector system. A hydrotest for checking air leakage is recommended, however, it should be verified that the system is designed to carry the extra pressure and weight of the water required to fill the system. There are other methods, such as a Halide leak detector, that are acceptable. Another method, while the system is operating and under vacuum, is to use ordinary shaving cream applied to all joints, etc. If a leak is present, it will suck the cream into the leaking area and is easily observed. If there are intercondensers present in the system, overloading of the downstream ejectors can occur due to low cooling fluid flow, high inlet cooling fluid temperature and/or fouling. Refer to Auxiliary Operation, Maintenance & Installation Manual for the type of condenser present.

SECTION V - OPERATOR'S MAINTENANCE

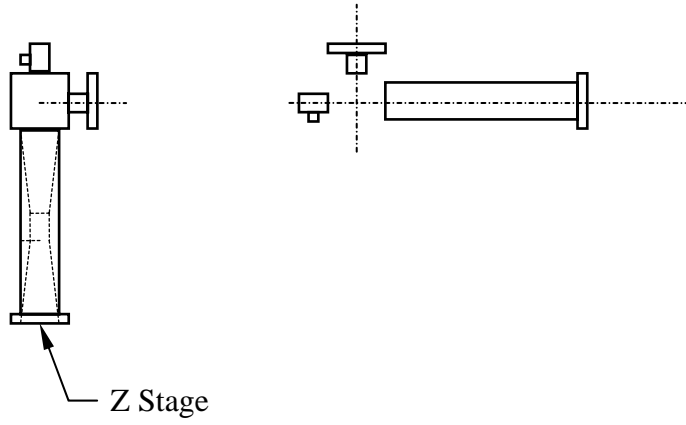
First 15 and 30 Days (for new installations) Blow out steam strainers while units are in operation.

Every 3 Months: Check steam pressure and other utilities.

Every 12 Months: Remove, clean, and inspect strainers if present. Check nozzle and

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Single Stage

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