

Sample Ammonia Process Question Set

<https://www.industrydocs.org/pha.html>

| Sequence | Category | Question | Consequence/Hazard |
|----------|--------------------|--|--|
| 1.1 | Generic Compressor | What if there is no pressure relief valve [hereafter "SRV" for "Safety Relief Valve"] on this equipment? | An overpressure condition exists and there is no SRV. This causes a leak or rupture, resulting in a release. |
| 1.2 | Generic Compressor | What if the equipment's preventative maintenance [hereafter referred to as "PM"] program for SRVs is insufficient or non-existent? | An SRV's PM program is insufficient or non-existent. The SRV fails to perform as designed (e.g., SRV fails to lift at set pressure during an overpressure condition; SRV leaks; or SRV lifts below its set pressure). This results in a release. |
| 1.3 | Generic Compressor | What if the set pressure of the equipment SRV is more than the design pressure of the equipment? | Pressure rises above equipment design. The SRV does not lift because the set pressure is too high. The overpressure causes a leak/rupture, resulting in a release. |
| 1.4 | Generic Compressor | What if the SRV capacity is too low? | An overpressure condition exists. The SRV lifts but can not meet relief capacity demand. The overpressure causes a leak/rupture, resulting in a release. |
| 1.5 | Generic Compressor | What if the SRV opens below its set pressure? | Vibration, incorrect design, weakened SRV spring, failure of valve seat material, etc. causes SRV to lift below its set pressure, resulting in a release. |
| 1.6 | Generic Compressor | What if the SRV fails to lift at/above its set pressure? | An overpressure condition exists. The SRV fails to lift at its set pressure. The overpressure causes a leak/rupture, resulting in a release. |
| 1.7 | Generic Compressor | What if liquid accumulates in the SRV discharge piping? | Rain/condensate in piping corrodes SRV, accumulates on SRV, or freezes in piping. Corrosion causes premature lifting; accumulation on SRV causes overpressure and a leak/rupture; or ice blocks SRV discharge. This results in a release. |
| 1.8 | Generic Compressor | What if an SRV lifts and no follow up action is taken? | An SRV lifts below, at, or above its set pressure and relieves the system pressure. The SRV is not replaced to ensure proper re-seating. Later, the SRV leaks or lifts below its set pressure, resulting in a release. |
| 1.9 | Generic Compressor | What if there is a closed stop valve before/after an SRV? | A stop valve before/after an SRV is not secured open, and the valve is left shut after maintenance or inadvertently closed. An overpressure develops, causing a leak/rupture and resulting in a release. |
| 1.10 | Generic Compressor | What if an SRV discharges into piping/system that is not vented to atmosphere? | An SRV discharges into piping/system that is not vented to atmosphere. There is a rise in pressure downstream of the SRV. This causes a rise in the set point of the SRV. An overpressure develops, resulting in a leak/rupture and a release. |
| 1.11 | Generic Compressor | What if a sealing component (e.g., packing, O rings, mechanical seals, gaskets/flanges, etc.) fails? | A sealing component fails and a leak develops, resulting in a release. |
| 1.12 | Generic Compressor | What if a compressor discharge valve is closed? | A compressor discharge valve is closed. An overpressure condition develops. The overpressure lifts SRVs and/or causes an equipment leak/rupture, resulting in a release. |
| 1.13 | Generic Compressor | What if a compressor suction valve is closed? | A compressor suction valve is closed. Starved compressor overheats and fails one or more sealing components. Leaks develop in the equipment, resulting in a release. |
| 1.14 | Generic Compressor | What if there is insufficient flow of the cooling medium to the compressor? | Insufficient flow of cooling medium overheats compressor oil, mechanical seals, etc. The excessive heat fails one or more sealing components. Leaks develop on the equipment, resulting in a release. |
| 1.15 | Generic Compressor | What if the discharge check valve is in an open position and the compressor is not running? | A discharge check valve is open (e.g., stuck open, left in open position by mechanical lifting stem/jackscrew). Slugging occurs and damages compressor casing/sealing components, resulting in a release. |
| 1.16 | Generic Compressor | What if the compressor cut outs/safeties/interlocks are not periodically tested or inspected? | The compressor is equipped with cut outs/safeties/interlocks. The cut outs/safeties/interlocks are not periodically tested/inspected. The compressor does not shut down when an unsafe condition arises, resulting in a release. |
| 1.17 | Generic Compressor | What if compressor cut outs/safeties/interlocks are not designed to fail safe? | A cut out/safety/interlock fails. The operator does not detect the failure. An unsafe condition arises and the cut out/safety/interlock is unavailable because it has failed. This causes a leak/rupture, resulting in a release. |
| 1.18 | Generic Compressor | What if the compressor is inadequately lubricated? | The compressor is running. The lubrication system fails, such as a plugged filter, a stopped oil pump, or an oil loss. Compressor experiences accelerated mechanical wear. The sealing component fail, resulting in a release. |
| 1.19 | Generic Compressor | What if there are incomplete swing compressor cut outs/safeties/interlocks? | A compressor is piped to multiple suction systems. The compressor does not have cut outs/safeties/interlocks for all systems served. The compressor fails to shutdown during an emergency situation, resulting in a leak/rupture and a release. |
| 1.20 | Generic Compressor | What if plugs, caps, or blind flanges are missing on purge or drain valves? | A valve is inadvertently opened or leaks. There is no plug, caps, or blind flange, resulting in a release. |