



Gathering and Compression Weatherization Methods

The following weatherization methods have been provided as a supplemental guide/aid to the RRC Weatherization Practices Guidance Document issued in 2022. Its intent is to provide guidance towards gathering and compression weatherization common methods in all areas spanning across the state of Texas.

Wind Walls

Wind Walls (Breaks) – Overview

Wind Walls (Breaks) may be temporary or permanent structures/walls installed around compressor unit(s) to:

- Reduce wind chill impact on compressor(s)/equipment
- Keep dirt and dust out of compressor cooling fans during warmer weather conditions

Wind Walls may or may not fully enclose an area around the equipment. Operator may install wind wall on prevailing wind direction side for the lease equipment only.

Wind Walls may be:

- Permanent
- Temporary
 - Installed as and when required.
 - May be made of plywood or tarps erected around the equipment to minimize the impact of wind. When erected they should be able to withstand the velocity of the wind without impacting performance.

Wind Wall (Break) – Permanent



Wind Wall (Break) – Temporary



What to Look For – Permanent Wind Walls

Look For the following:

- Sturdy structures that can withstand strong winds
- Damage that may adversely impact performance particularly over extended periods

What to Look For – Temporary Wind Walls

Look for the following:

- Sturdy structures built with plywood
- Where tarps are used, look for fraying and damage to determine ability to withstand strong winds and perform as expected

- Openings should be in the leeward sides (opposite side from wind direction)

Reciprocating Compressors Liquid Dump Systems

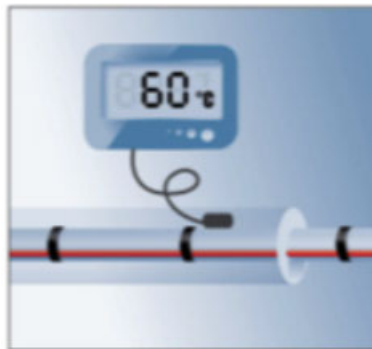
Tracing and Insulation of Liquid Discharge Lines

Tracing and Insulation - Liquid Discharge Lines from Scrubbers

Typically, where discharge lines are exposed during extreme cold, freeze offs are very likely. Where freeze offs occur, liquid buildup will occur in the inter-cooler scrubbers leading to compressor shutdown when level control trip points are exceeded.

Operators may trace and insulate such lines to prevent freezing in sections of the line where low liquid flows may allow liquid buildup.

When electric traced, available energized meters or temperature gauges may be available as shown below.



What to Look For

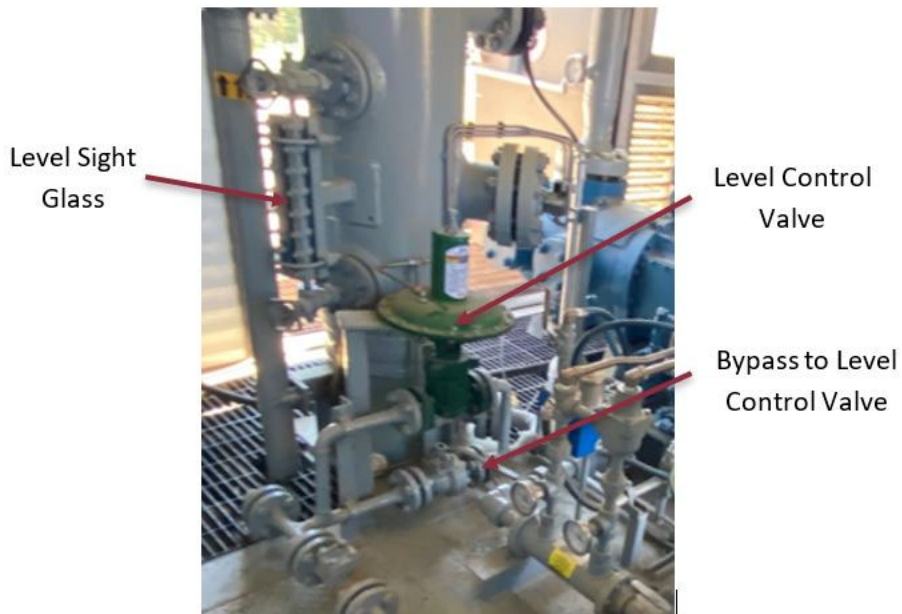
Look / Listen / Feel for the following:

- Electric heat trace in place - check for HT indicators
- Temperature indicators as per above
- Heat tracing and insulation in place on lower section of scrubbers up to and above the scrubber liquid level controller, along with exposed drain lines off scrubber(s)
 - Low points of the discharged line fully insulated at a minimum
- Feel / scan for temperature
- Listen for liquid flow along the line

Draining/Purging of Inter-stage Compressor Scrubber Drain Lines

Draining and Purging of Inter-Stage Scrubber Systems

Liquid removal is achieved by level control systems designed to remove liquid produced from the compression process. The figure below shows a level control system with associated controller bypass valve that may be used when the controller fails or is unable to deal with required liquid dumping volumes.



Draining of the liquids produced is critical for sustainable operation during extreme cold periods. Where there is inadequate weatherization protection, the potential for liquid buildup and compressor failure is high.

During periods of extreme cold, the field operator can use the bypass valve around a level control valve on a gas compressor scrubber to sweep liquids from piping during cold weather conditions to minimize freeze-up potential in interstage piping drain lines.

What to Look For

Look / Listen / Feel for the following:

- Look for bypass piping on the scrubber drain system and signs that its being used
 - Signs of valve use may include wear on valve handle
- Listen for liquid flows along the dump line
- Look at the liquid level in the scrubber's sight glass, i.e. is it moving

Electric Vs. Pneumatic Actuated Valves

Electric Actuated Valves

Electric actuated valves are less prone to freeze ups and failures during extreme cold periods. Electric actuators depend on a power source that may be vulnerable to extreme cold and must be protected to maintain sustainable operations.



Electric Actuated Valve



Battery
Storage

Electric Actuator Application on A Flow Control Choke at a Gas Wellhead

Note: Solar Panel and Battery Storage.

What to Look For

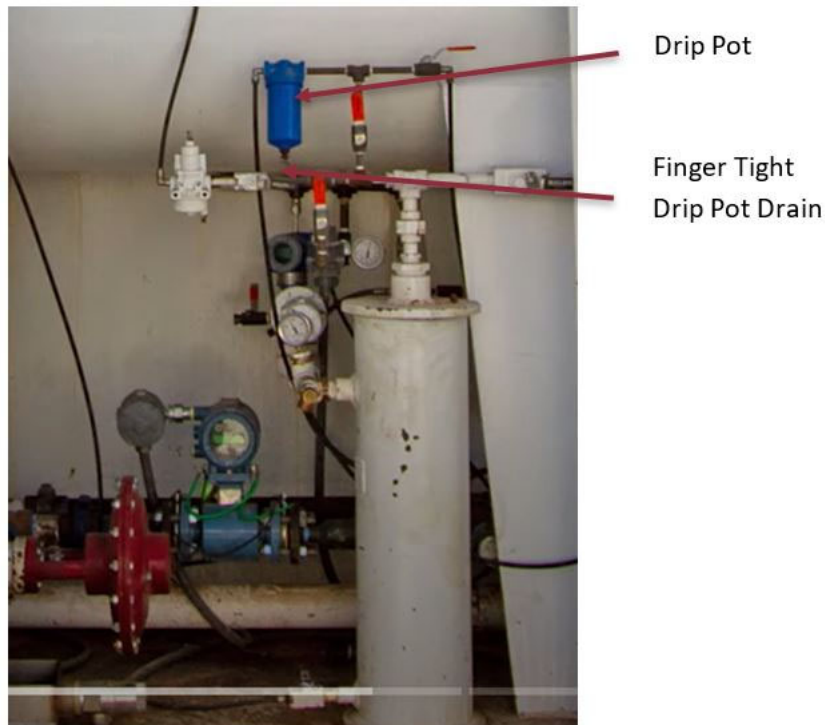
Look for the following:

- Electronic connections are secure and appear water tight
- Solar cells are clean, damage free and working
- Battery backup power sources are charged

Pneumatic Control Systems

Pneumatic control systems depend on the use of dry instrument air or natural gas to control process equipment in the field. On remote gas production sites, it is common to see the use of dried natural gas for instrument control. When instrument air or natural gas is used, maintaining dry streams for pneumatic control is essential. Heating systems and drip pots are used to help maintain dry gas or instrument air.

The figure below shows the application of a drip pot in maintaining dry natural gas to the red control valve in the system.



Red Valve - Pneumatic Control Valve

What to Look For

Look / Listen / Feel for the following:

- Look for signs that the drip pot is frequently drained
 - Liquid stains on the floor
 - Signs that the finger tight drip pot drain is being used
- Fuel gas from line heater heating coil is hot

- Scan the instrument air/gas line ... should be warm to the touch

Hot Lube Oil Systems - NG Compressor Start: Extreme Cold

Overview

Hot lube oil systems on natural gas systems are designed to achieve the following:

- Continually ready, heated lubrication, for quick startup of standby compressors
- Maintenance of compressor and engine temperature in extreme cold weather conditions
- Reduction of overall maintenance and elimination of damaging condensation in lubrication oil systems
- Gas compressor oil heating systems are designed for remote location applications
- Capabilities to handle the largest engine heating applications
- Pre-packaged, plate-mounted configuration which allows the heating system to be installed on a compressor skid for operator access

Samples of Lube Oil Heaters

The sample lube oil heater units pictured below continuously circulate heated oil throughout the oil sump or lubrication system, maintaining a uniform and consistent temperature to ensure oil viscosity remains at optimal levels for engine or compressor protection. Continuous lubrication of the compressor frame, bearings and crossheads with heated oil minimizes wear and tear, reducing overall maintenance.



What to Look For

Look / Listen / Feel for the following:

- Hot oil lube systems will be mounted on driver (engine) and compressor bases or directly adjacent units
- Piping/hoses in place to and from unit – connected
- Has this hot oil lube system unit been use?
- Look for maintenance service tags and decals on equipment
- If compressor on standby, check to see if hot oil lube system is working
 - Listen to hear if circulatory pump is running
 - Look for agitation in lube oil sump/feel/scan for temperature

Backup Power to Motor Control Center (MCC) / Controls

Overview

Onsite backup electrical systems use local generation at the facility site to provide power when the main utility is not available. Generally, these are diesel generators with an auto start in the event of loss of grid / primary power to the MCC. Some operators may have portable rentals on their respective locations.

Consider backup power for a minimum of 3- consecutive operating days.

Backup systems may consider the following:

- MCC Backup - Diesel Generator
- Electronic Controls - Wind powered, solar panels, battery packs, small portable gas/diesel power generators

Backup Power – MCC

Backup MCC power generally requires an auto start diesel powered generator designed to provide power to the site equipment - compressors, pumps and other related equipment. See sample generator in figure.



MCC Backup Power - What to Look For

Look for the following:

- Permanent or rental back-up power generation in place – normally situated close to MCC for the compressor facility
- Power cables tied into the MCC feed system
- Backup power generator readiness for operation
 - Diesel tank full
 - Auto start engaged
 - Breakers in right position
 - Block heater / Hot oil circulation on lubrication system
- PM records tags on generator
- Last tested – look for inspection records of test

- Operator checks of unit and frequency of tests

Backup Power - Control Systems

Control systems backup power generally consist of solar panels, wind turbines and battery packs for storage of power. Power is generally consumed from the battery pack that is maintained and charged by the solar panels or wind turbines. See sample solar panels and battery pack for receiving and storing charges.



What to Look For

Look for the following:

- Solar and wind power generating turbines supplies to battery packs
 - Functional connection cables
 - Functional battery pack charging system

Instrument Air Driers

Overview

Dry instrument air is critical for operating controls at a compressor station(s). Desiccant instrument air system and driers can achieve water dew point suppression of – 40 F and below.

Air Driers

The figure below shows commonly used instrument air desiccant driers.



What to Look For

Look for the following:

- Instrument air inlet filters in place on the system, in good working order and maintained (low differential pressure)
- Instrument air drier may have a fixed on-line water dew-point indicator on each drier outlet or combined header, to confirm air quality is in range (not wet – drier system is working)
- Operator may have PM Tag's posted on IA desiccant towers as to when the last desiccant tower media was changed out
 - Refer to picture below as an example of a PM Tag that would be completed and that posted on the instrument air drier assembly (see example picture of a PM Service Tag)



- Look at drain pots on the system and examine for usage
 - Water stains on the floor
 - Signs that the finger tight drip pot drain is being used