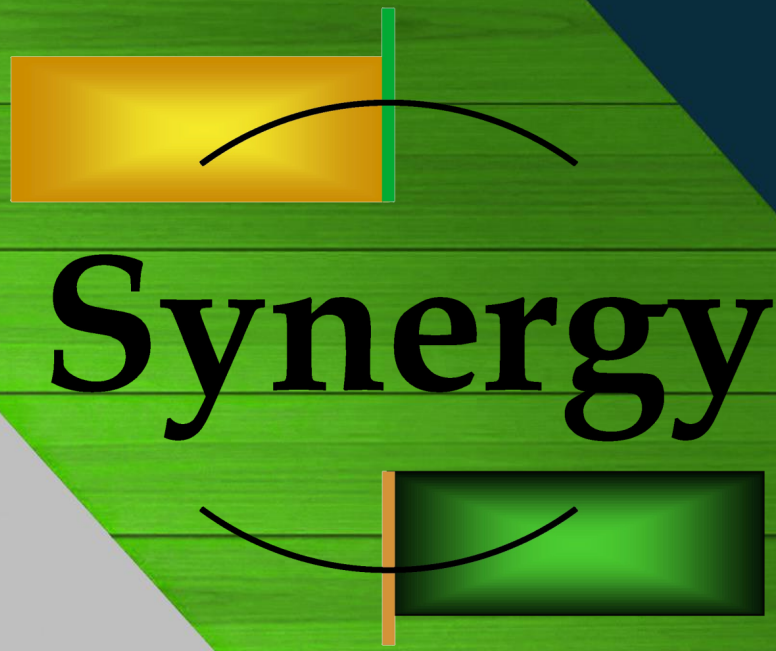
- Commissioning of a new facility
- Standard Preventive Maintenance Work During Facility Shutdown
- Annual Preventive Maintenance While Operational

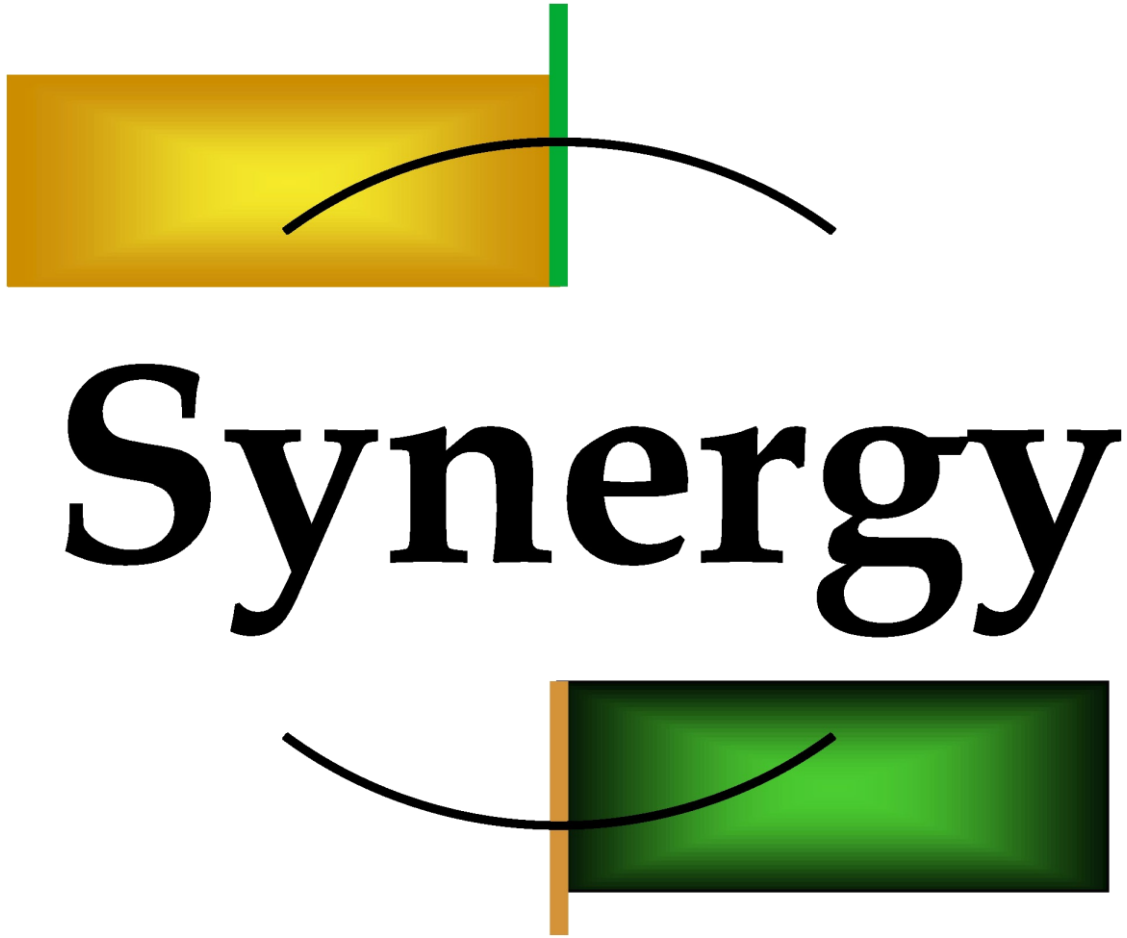


Synergy Gas Processing

Synergy Gas Processing offers a full line of industrial services

- Synergy has been in business for over 18 years
- 50+ Employees
- Over 400 years of combined Gas Compression and Refrigeration experience
- Provide and Design Manufactured Compression, Separation and Dehydration Systems and Equipment
- Provide System Engineering and Consulting
- Install and Pipe Gas Compression and Power Generation Plants
- System Commission or Assist in System Start Up. This includes Charging of Refrigerant
- Provide Preventative Maintenance, and 24/7 Service Support
- Full Compressor Rebuild and Parts Shop
- Over $800K of OEM Parts Availability
- Full Service and Training Programs
- Controls

Commissioning of a New Facility



Commissioning

Commissioning of a New Facility

Synergy

Commissioning Focus

Inspect Wiring on Equipment:

- Ensure all wiring is intact, securely connected, and compliant with safety standards.
- Look for loose connections, damaged insulation, or exposed wires.

Inspect Equipment is Properly Piped:

- Confirm that all piping is correctly routed, secured, and free from leaks.
- Verify that connections align with the design specifications.

Inspect Installation of Equipment to Pad:

- Check that equipment is properly mounted to its pad or foundation.
- Ensure alignment, levelness, and that vibration dampeners are installed as required.

Report Any Observed Issues:

- Document and communicate any discrepancies, malfunctions, or safety concerns immediately to the project team.

Synergy

Chiller (Glycol) System

Pre-Startup - Chiller:

Pressure Test Circuit:

- Conduct a pressure test to ensure the glycol circuit is leak-free and can handle the designated operating pressure.

Verify with Chiller Techs:

- Coordinate with chiller technicians to verify the proper operation of the system. Address any issues collaboratively.

Synergy

Compressor Skid

Commissioning of a New Facility

Compressor Checks

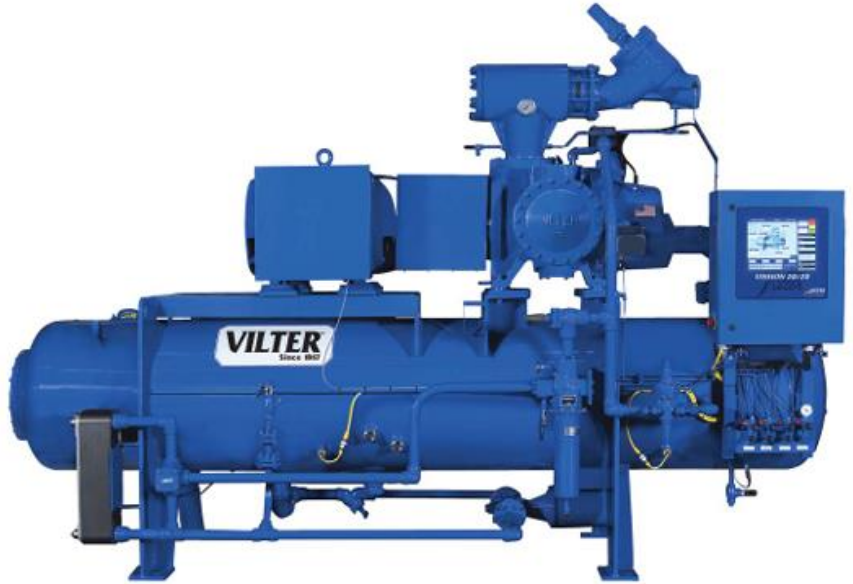
Verify Starter Settings:
- Check that motor starters are configured according to the manufacturer's specifications and the project's requirements.

Verify Pressure / Temp / PLC Panel:
- Confirm that pressure and temperature readings align with expected values. Validate the PLC panel settings and functionality.

Grease Motors:
- Apply the specified lubricant to motor bearings to ensure smooth operation.

Check Transmitters:
- Confirm that all transmitters are calibrated and providing accurate data.

Optional - Reciprocating Compressors:
- Perform the same checks for reciprocating compressors if applicable to the system.



Synergy

Compressor Skid

Commissioning of a New Facility

Compressor Oil Systems

Fill Oil:

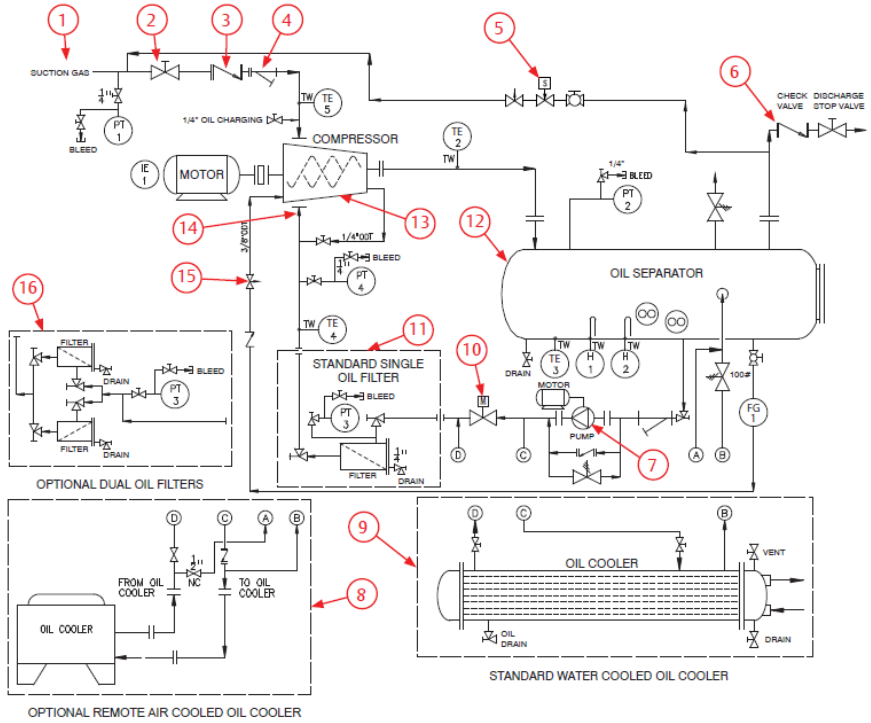
- Add the appropriate type and quantity of oil to the compressor. Ensure the oil is clean and meets the specifications.

Check Oil Cooling Circuit:

- Inspect the oil cooling system for proper operation and address any signs of leakage or blockages.

Test Oil Heaters on Separator:

- Verify that the oil heaters are functioning correctly to maintain the required oil temperature.



***Reciprocating Compressors:** Perform the same checks for reciprocating compressors if applicable to the system.

Synergy

Blower Skid

Commissioning of a New Facility

System Checks:

Check Wiring and Instruments:
- Inspect all electrical wiring and instrumentation for proper installation and functionality.

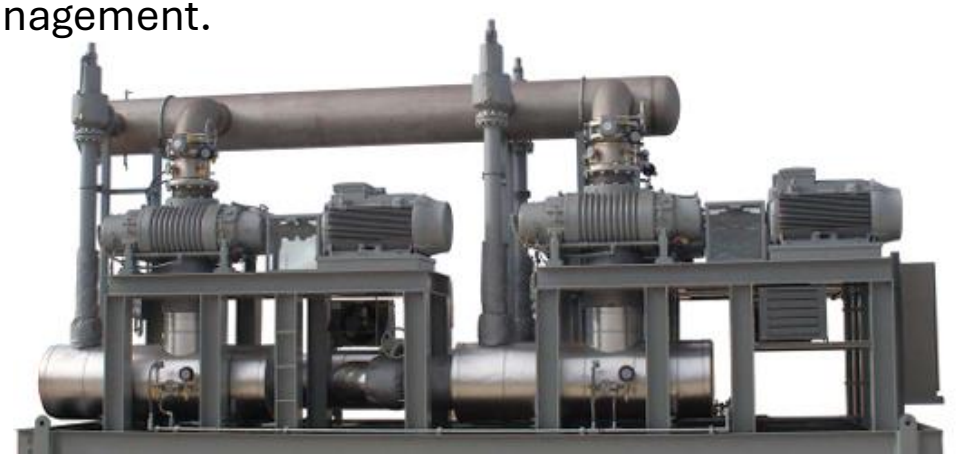
Test Blow with Gas/Air:
- Conduct a test blow using gas or air to ensure the blower skid is operating as intended.

Set Control Points if Given:
- Adjust control settings according to the provided parameters to optimize operation.

Level Stitches:
- Verify that the system is properly leveled to prevent operational inefficiencies.

Aftercooler Belts:
- Inspect and adjust aftercooler belts for correct tension and alignment.

Fan Blade Pitch / Louvers:
- Check and set the pitch of fan blades and ensure louver positions are optimal for airflow management.



Synergy

Benefits of Professional Commissioning

Why Choose Us for Commissioning?

Expertise:

- Decades of experience in industrial refrigeration.

Efficiency:

- Minimized time from setup to operation.

Reliability:

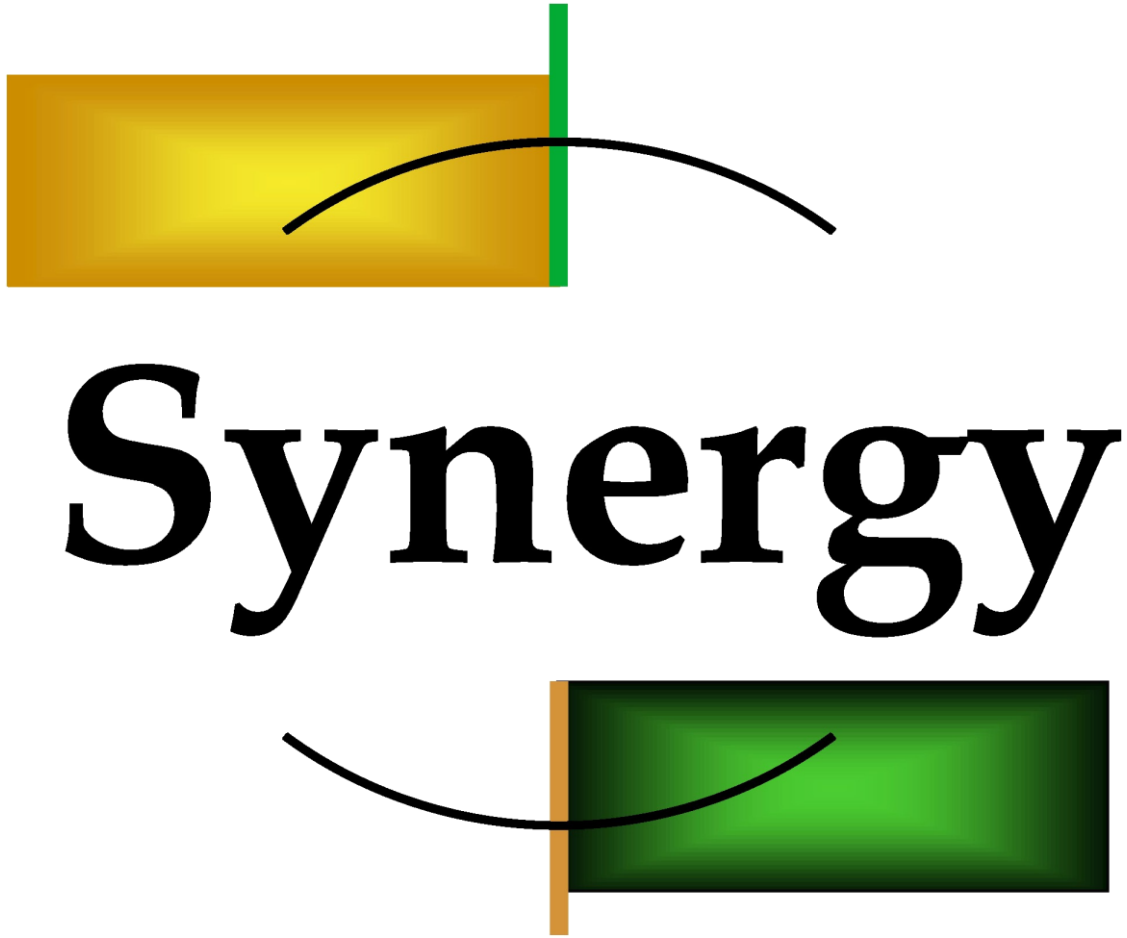
- Systems configured for optimal performance and safety.

Testimonial:

- “Synergy Refrigeration made our commissioning process effortless, and our systems have never performed better.”

Synergy

Standard Preventive Maintenance Work During Facility Shutdown



Blower Skid Maintenance

Standard Preventive Maintenance

Work During Facility Shutdown

- Check the unit and all piping for foreign material and clean if required.
- Inspect the flatness of the feet and alignment of the drive. Ensure feet are not bolted down in a bind to avoid housing distortion and internal rubbing. Misaligned V-drives can cause rotors to rub against the headplates, reducing unit efficiency.
- Check Alignment as misaligned couplings can also damage bearings.
- If the blower is V-belt driven, verify belt tension and alignment. Over-tensioned belts can lead to heavy bearing/shaft loads and premature failure.
- Ensure adequate drive guards are in place to protect operators from personal injury caused by incidental contact.
- Check the unit for proper lubrication. Verify that the oil level is correct—too little oil can ruin bearings and gears, while too much oil can cause overheating and damage.

Synergy

Blower Skid Maintenance

Standard Preventive Maintenance
Work During Facility Shutdown

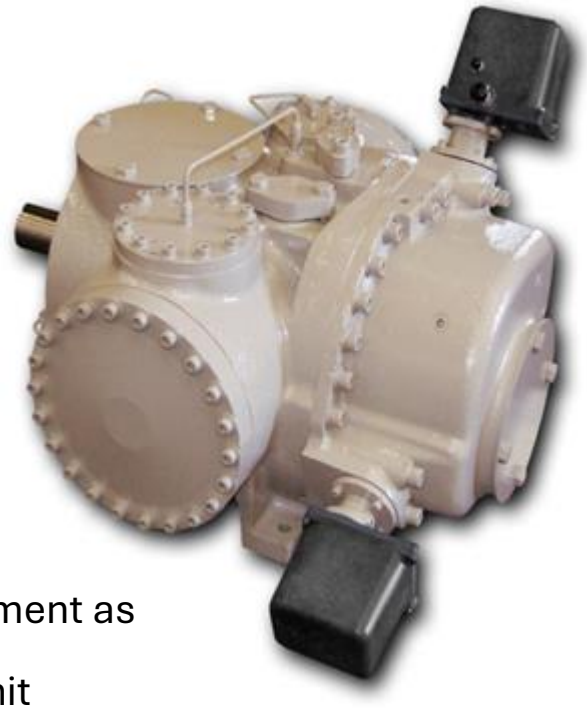
- Turn the drive shaft by hand to confirm that the rotors do not bind.
- “Jog” the unit with the motor a few times to confirm proper rotation direction and ensure it turns freely and smoothly.
- Start the unit and operate it for 15 minutes at no load. During this time, check for hot spots and other signs of interference.
- Apply the load and monitor the unit’s operation for one hour. Check frequently during the first day to ensure everything runs smoothly.
- If malfunctions occur, do not continue to operate the unit. Issues like knocking rotors can cause severe damage if not corrected.

Synergy

Compressor Maintenance

Standard Preventive Maintenance

Work During Facility Shutdown



Oil Circuit

- Oil Change: Replace oil based on oil analysis report or visual contamination.
- Oil Analysis: Sample at designated hours.
- Oil Filters: Prepare to replace when pressure drop reaches 7 to 8 PSI.
- Oil Strainer: Inspect at designated hours.

Package

- Coalescing Elements: Inspect at designated hours.
- Coalescing Drain Line: Inspect at the same intervals as coalescing elements.
- Suction Screen: Inspect at the same intervals as coalescing elements.
- Hot Alignment after Initial Startup: Perform hot alignment as needed.
- Check mounting bolts for compressor, motor, and unit

Control Calibration

- Transducers: Inspect/Calibrate at designated hours.
- RTDs (Resistance Temperature Detectors): Inspect/Calibrate at the same intervals as transducers.
- Slide Motors: Inspect/Calibrate at the same intervals as transducers.
- Check operation and general condition of the PLC and other electrical controls

Compressor

- Main Motor: Follow greasing instructions on motor nameplate.
- Inspect for Back Spin: Inspect at designated hours.
- Inspect Compressor: Inspect at the same intervals as back spin.
- Inspect for Leaks: Inspect at the same intervals as back spin.
- Bearings: Inspect at the same intervals as back spin.
- Check Alignment

Synergy

Oil Cooler

Standard Preventive Maintenance Work During Facility Shutdown

Inspect and Clean Tubes and Fins:

- During a facility shutdown, oil coolers can be thoroughly inspected for debris buildup or fouling, and the tubes and fins can be cleaned to improve heat transfer efficiency.

Check for Leaks and Damage:

- Technicians can pressure test oil coolers to detect leaks and inspect for physical damage or corrosion, ensuring reliable operation once the facility restarts.

Verify Flow and Performance:

- Flow rates and temperature differentials can be measured to confirm proper operation, and any necessary adjustments or repairs can be made to optimize the oil cooler's performance.

Synergy

Compressor Maintenance

HOURS	INSPECTION BASED ON WET SATURATED GAS	200	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,500	13,000	15,500	18,000
OIL CIRCUIT															
	Oil Change	Replace Oil Based On Oil Analysis Report or Visual Contamination													
	Oil Analysis (1)		S	S	S	S	S	S	S	S		S	S		S
	Oil Filters	Prepare to Replace when Pressure Drop Reaches 7 to 8 PSI													
	Oil Strainer	I	I		I			I			I			I	
PACKAGE															
	Coalescing Elements		I		I			I			I			I	
	Coalescing Drain Line	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Suction Screen	I	I		I			I			I			I	
	Hot Alignment after the Initial Start Up Hot Align									I				I	
CONTROL CALIBRATION															
	Transducers	I		I		I		I		I		I		I	
	RTD's	I		I		I		I		I		I		I	
	Slide Motors (3)	I		I		I		I		I		I		I	
COMPRESSOR	Main Motor	Follow Greasing Instructions on Motor Name Plate													
	Inspect for Back Spin	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Inspect Compressor							I						I	
	Inspect for Leaks	I		I		I		I		I		I		I	
	Bearings							I						I	
	Key: (I) Inspect / Calibrate (S) Sample.														

Standard Preventive Maintenance
Work During Facility Shutdown

Synergy

Aftercooler Maintenance

Standard Preventive Maintenance
Work During Facility Shutdown

Fan and Guard Monitoring:

- Inspect fans and guards to detect potential issues early.

Grease Lines and Bearings:

- Check grease lines and monitor bearings for smooth operation, ensuring adequate lubrication.

Fan Belts and Sheaves:

- Observe fan belts and sheaves for any signs of wear or misalignment that could affect performance.

Leak Detection:

- Check for any oil or gas leaks around the aftercooler and related components to maintain safety and prevent efficiency loss.

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Chiller Maintenance

Standard Preventive Maintenance Work During Facility Shutdown

Fluid System and Refrigeration Circuit PM Tasks

Fluid System:

- Check glycol leaks and monitor flow rates.
- Inspect and clean refrigerant liquid strainers.
- Change filter dryers and glycol/water filters.
- Test glycol concentration and pH levels.
- Inspect cooling tower loop for debris or scaling.
- Fully clean glycol lines and flush the system.
- Replace glycol filters and inspect heat exchanger plates.

Refrigeration Circuit:

- Monitor pressures, temperatures, and refrigerant flow.
- Inspect for refrigerant leaks using a detector.
- Verify operation of pressure relief valves and safety controls.
- Tighten valve packing or stem seals to prevent leaks.
- Perform a full leak test using pressure testing or vacuum.
- Replace pressure relief valves and test all safety shutdown systems.
- Inspect and clean evaporators and condensers.

Synergy

Chiller Maintenance

Standard Preventive Maintenance
Work During Facility Shutdown

Electrical and General Maintenance PM Tasks

Electrical System:

- Tighten electrical connections and inspect for corrosion.
- Test VFD operation, relays, and breakers under controlled conditions.
- Inspect control panel wiring and sensors.
- Listen for abnormal sounds, check oil levels, and monitor motor amp draw.

General Maintenance:

- Replace oil, oil filters, and clean the oil cooler.
- Inspect and replace worn gaskets or seals.
- Perform an inspection on compressor

Synergy

Scrubber Maintenance

Standard Preventive Maintenance
Work During Facility Shutdown

Draining Operation:

- Verify and clean the draining system if necessary to ensure readiness for restart.

High Pressure Scrubber:

- Inspect and clean the oil drain for high pressure scrubber to avoid buildup before reactivation.

Differential Pressure:

- Check oil drain for high pressure scrubber to avoid any blockages or buildup

Vane Cleaning:

- Remove and clean vane to ensure it is free from dirt or residues that could affect performance.

Coalescer Replacement:

- Replace scrubber coalescers to ensure efficient separation upon system startup.

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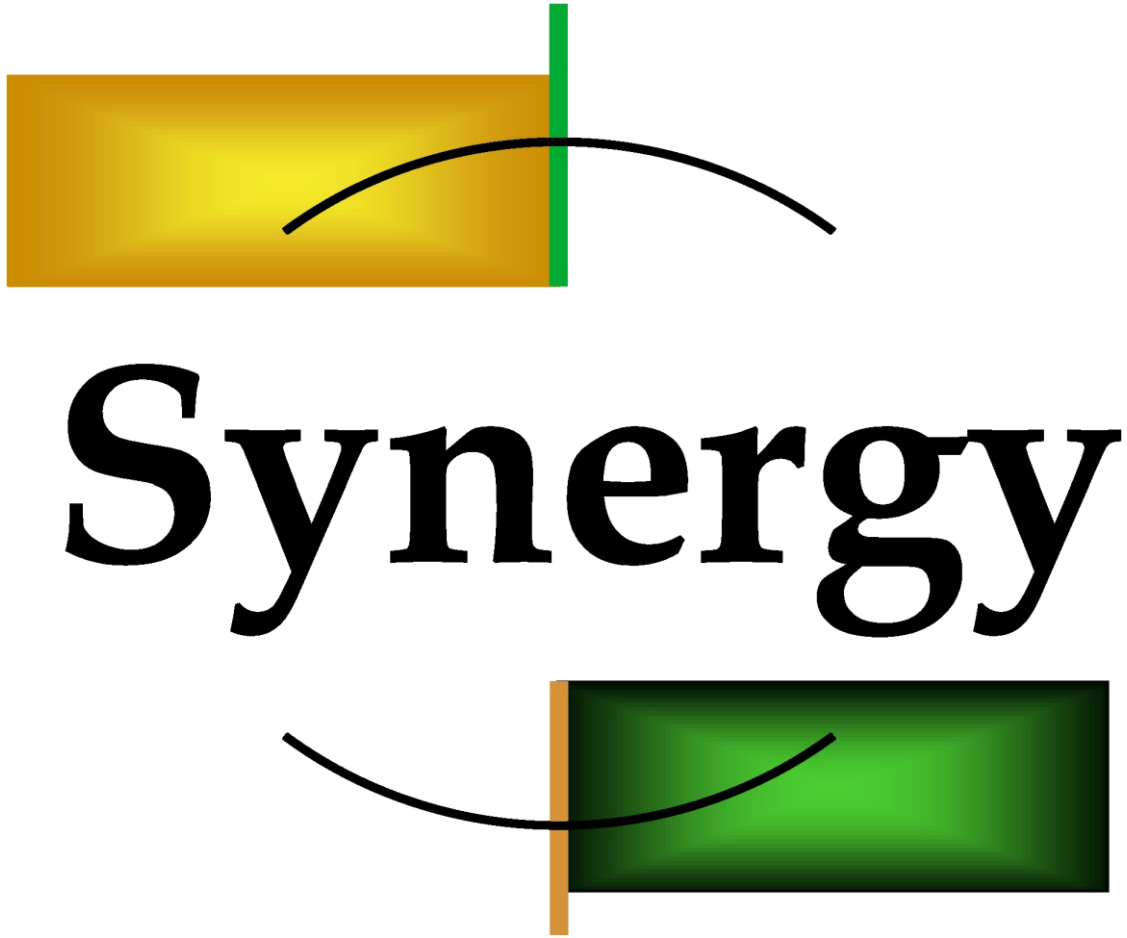
Annual Preventive Maintenance While Operational



Blower Skid

Annual Preventive Maintenance
While Operational

- Inspect the flatness of the feet and alignment of the drive. Ensure feet are not bolted down in a bind to avoid housing distortion and internal rubbing. Misaligned V-drives can cause rotors to rub against the headplates, reducing unit efficiency.

- If the blower is V-belt driven, verify belt tension and alignment. Over-tensioned belts can lead to heavy bearing/shaft loads and premature failure.

- Ensure adequate drive guards are in place to protect operators from personal injury caused by incidental contact.
- Apply the load and monitor the unit's operation for one hour. Check to ensure everything runs smoothly.

- If malfunctions occur, do not continue to operate the unit. Issues like knocking rotors can cause severe damage if not corrected.

Synergy

Compressor Maintenance

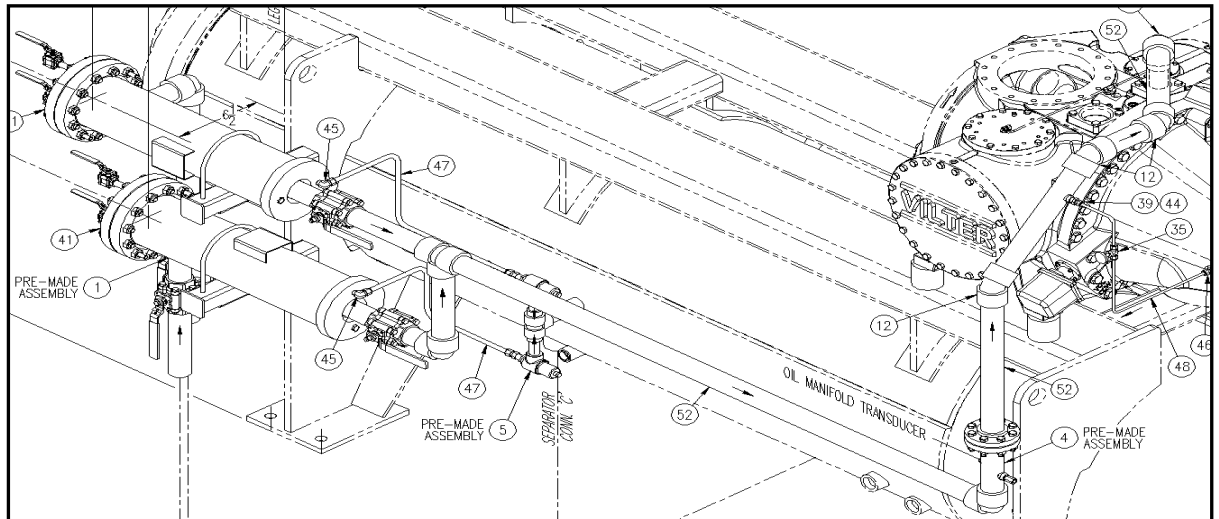
Annual Preventive Maintenance
While Operational

Oil Circuit
- Oil Analysis: Sample at designated hours.
- Oil Filters: Prepare to replace when pressure drop reaches 7 to 8 PSI.
- Oil Strainer: Inspect at designated hours.

Package
- Coalescing Elements: Inspect at designated hours.
- Coalescing Drain Line: Inspect at the same intervals as coalescing elements.
- Check mounting bolts for compressor, motor, and unit

Control Calibration
- Transducers: Inspect/Calibrate at designated hours.
- RTDs (Resistance Temperature Detectors): Inspect/Calibrate at the same intervals as transducers.
- Check operation and general condition of the PLC and other electrical controls

Compressor
- Main Motor: Follow greasing instructions on motor nameplate.
- Inspect for Leaks: Inspect at the same intervals as back spin.
- Check compressor for abnormal noises



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Oil Cooler

Standard Preventive Maintenance
Work During Facility Shutdown

Monitor Operating Temperatures:

- While the facility is running, technicians can use tools like infrared thermometers or FLIR cameras to monitor oil cooler temperatures, ensuring they are operating within acceptable ranges.

Check for Proper Airflow:

- Verify that there are no obstructions to airflow around the oil cooler and that fans or other cooling mechanisms are functioning efficiently.

Inspect for Visible Leaks:

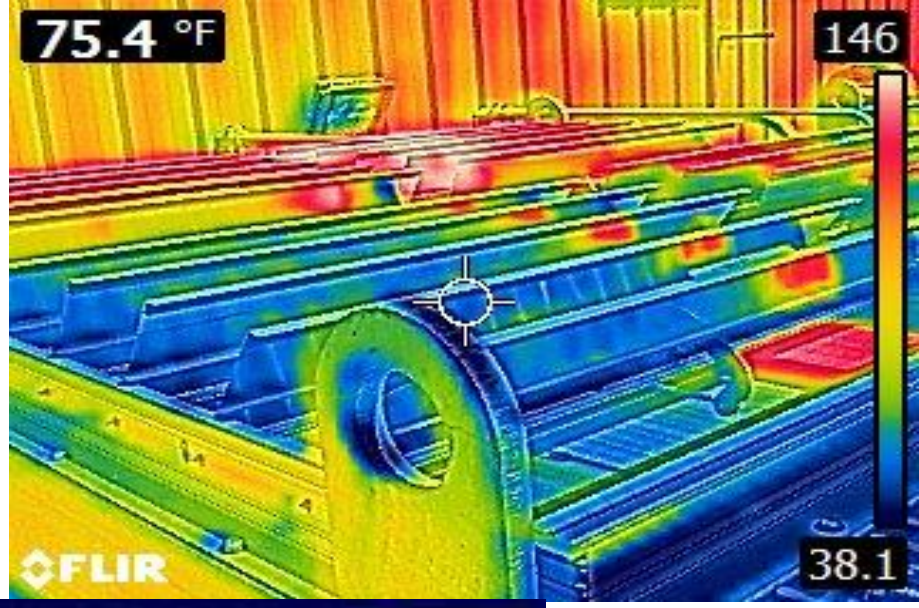
- Conduct visual inspections to identify any signs of oil leaks or seepage that may indicate a need for maintenance or repair without requiring a shutdown.

Synergy

Thermal Checks

Thermal Testing:

- FLIR technology allows technicians to detect heat anomalies and potential issues in equipment without shutting down the facility, ensuring uninterrupted operations. By identifying hotspots and irregular temperature patterns, it enables proactive maintenance and prevents costly failures.



Annual Preventive Maintenance While Operational

Synergy

Aftercooler Maintenance

Annual Preventive Maintenance While Operational

Fan and Guard Inspection:

- Check fans and guards for noise and vibration, ensuring smooth operation upon startup.

Grease Lines and Bearings:

- Check grease lines and grease bearings to ensure proper lubrication and prevent wear.

Fan Motor Amps:

- Monitor fan motor amps to ensure consistent electrical draw and avoid overloads.

Fan Belts and Sheaves:

- Inspect fan belts and sheaves for wear, adjust tension, or replace as needed to maintain proper fan operation.

Oil/Gas Leaks:

- Check for any oil or gas leaks to prevent potential safety hazards and ensure the system is leak-free before restart.

Synergy

Chiller Maintenance

Annual Preventive Maintenance While Operational

Fluid System and Refrigeration Circuit PM Tasks

Fluid System:

- Check for glycol leaks and monitor flow rates.
- Inspect and clean refrigerant liquid strainers.
- Change filter dryers and glycol/water filters as needed.
- Test glycol concentration and pH levels.
- Check cooling tower loop for debris or scaling.

Refrigeration Circuit:

- Monitor pressures, temperatures, and refrigerant flow.
- Inspect for refrigerant leaks using a detector.
- Verify operation of pressure relief valves and safety controls.
- Tighten valve packing or stem seals to prevent leaks.

Synergy

Chiller Maintenance

Annual Preventive Maintenance While Operational

Electrical, Compressor, and Heat Exchanger PM Tasks

Electrical System:

- Inspect control panel wiring and test sensors, switches, and alarms.
- Check motor amp draw and verify VFD operation (if applicable).

Compressor:

- Listen for abnormal sounds and check oil levels.
- Verify unloader and capacity control system functionality.

Heat Exchangers and General Maintenance:

- Monitor approach temperatures to detect fouling or scaling.
- Inspect insulation, clean condensate pans, and tighten fittings.
- Replace gaskets and ensure service ports are sealed.

Synergy

Scrubber Maintenance

Annual Preventive Maintenance While Operational

Draining Operation:

- Check proper draining operation to ensure fluid flows efficiently and consistently.

High Pressure Scrubber:

- Check oil drain for high pressure scrubber to avoid any blockages or buildup.

Differential Pressure:

- Inspect scrubber differential pressure gauges for proper calibration and possible blockages.

Vane Cleaning:

- Inspect and clean vane to ensure optimal airflow and separation efficiency.

Coalescer Replacement:

- Replace scrubber coalescers to ensure efficient separation.

Synergy

Thank you!

Synergy

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