THERMO*JET*® G 3000 SERIES

The Ultimate Way To Degasify Compressor Seal Oils

FEATURES

- Electric Heater
- Type 300 Series Stainless Steel Construction
- Proprietary Dual-Stage Jet Mixer
- Particulate Filtration to ISO 13/10
- Mounting Feet and Lifting Eyes
- Enclosed Cabinet Design with Hinged Door for Easy Access
- 2 Close-Coupled Gear Pumps Driven by Single Motor
- Process Flow Rate at 180 GPH (680 lph)
- Streamlined Instrumentation with Panel Mounted Gauges
- Accessible, Reliable Level Control Valve
- CSA Listed for Class I Division 2 Groups B/C/D T4
- Available in Various International Voltages
- Certified to ATEX-CAT3

BENEFITS

- No Waste Oil Disposal
- Flash Point & Viscosity Return to Normal
- No Gases Exhausted to Atmosphere
- No EPA Penalties For Emissions
- No Need to Retrofit Expensive Dry Gas Seals
- No Explosive Safety Hazard
- No Machinery Failures Due to Poor Quality Oil
- Greatly Reduces New Oil Purchases

GASES REMOVED

Acetylene	Dimethylbutane	Methyl Chloride
Ammonia	Dimethylpentane	Methyl Butane
Benzene	Dimethylpropane	Methylcyclopropane
Butadiene	Ethane	Methylcyclopentane
Butane	Ethylene	Methylpentane
Butene	Hexane	Methylpropane
Butenyne	Hexene	Methylpropene
Butyne	Hydrogen Sulfide	Pentadiene
Carbon Dioxide	Hydrogen Cyanide	Pentane
Carbontetrafluoride	Hydrogen Chloride	Pentene
Cyclobutane	Isoprene	Propadiene
Cyclohexane	Methane	Propane
Cyclopropane	Methanol	Propylene
Cyclopentane	Methyl Bromide	Propyne

LSC Lubrication Systems Company

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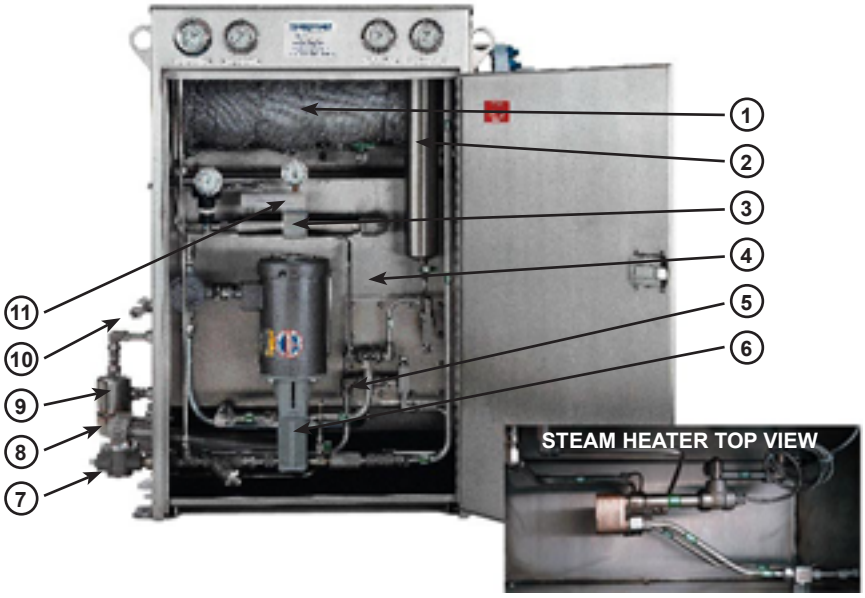


LEGEND

1. 12KW Oil Heater
2. Filter
3. Dual-stage Jet Mixer
4. Separation Tank
5. Level Controller
6. Oil Pump & Motor
7. Oil In/Out & Sight Glass
8. Condensate Purifier Assembly
9. Condensate Trap
10. Gas Vent to Flare System
11. Nitrogen Supply Manifold

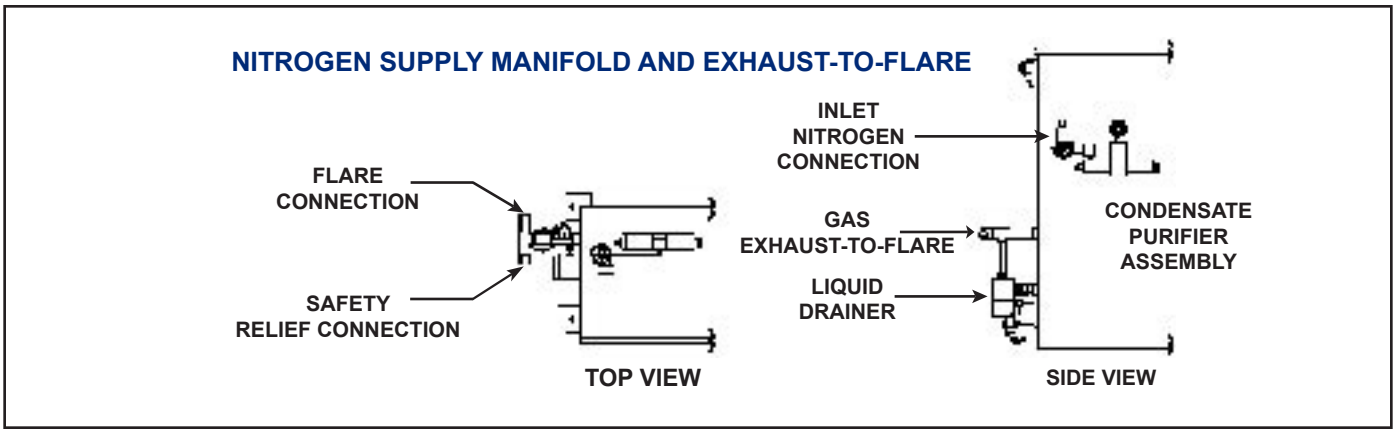
HOW ENVIRONMENTALLY CLEAN DEGASSING WORKS

When using the THERMO*JET* ® Oil Purifier to degasify compressor seal oils in the hydrocarbon processing industry, it is necessary to use an inert gas such as nitrogen instead of air as the stripping gas. The THERMO*JET* ® Jet Mixer on G Series units is equipped with a Nitrogen Supply Manifold which includes a gas regulator and gauges to control the pressure to the precise amount required.

The combination of the nitrogen pressure and the total mass of gases entering the system via the contaminated oil is sufficient to force all the gases to exhaust into a typical process plant flare header system operating at 0 to 10 PSIG.

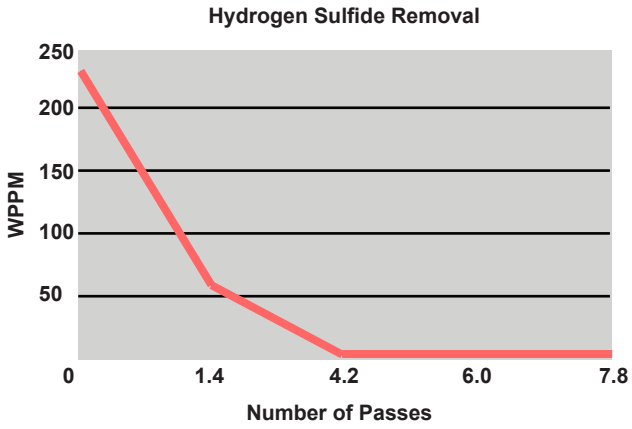
During plant upset conditions when the flare header pressure may rise above 10 PSIG, a back pressure valve will close, to isolate the THERMO*JET*® from the flare system. The unit will continue to operate while a slight pressure builds in the separation tank. In the unlikely event that the separation tank pressure would rise above 10 PSIG, it will relieve through a pressure safety relief valve which may be vented to atmosphere or back to the oil reservoir during the brief upset periods. The safety valve precludes the potential for over-pressuring the separation tank.

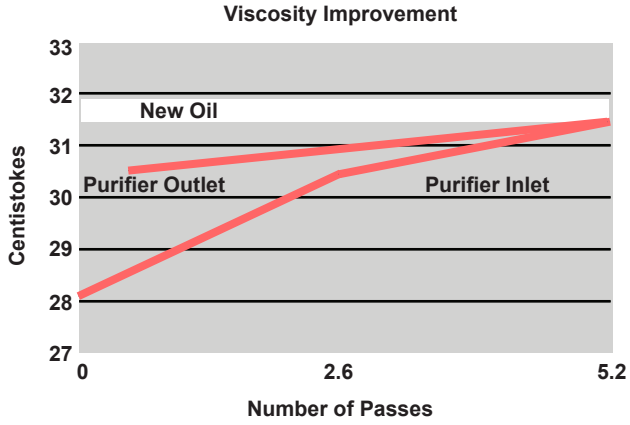
To accommodate any condensate removed by the THERMO*JET*®, a liquid drainer is furnished to route the condensate to a Condensate Purifier Assembly. This device absorbs 100% of all liquid hydrocarbons, and permits only clean water to discharge onto the ground or into a clean sewer system.

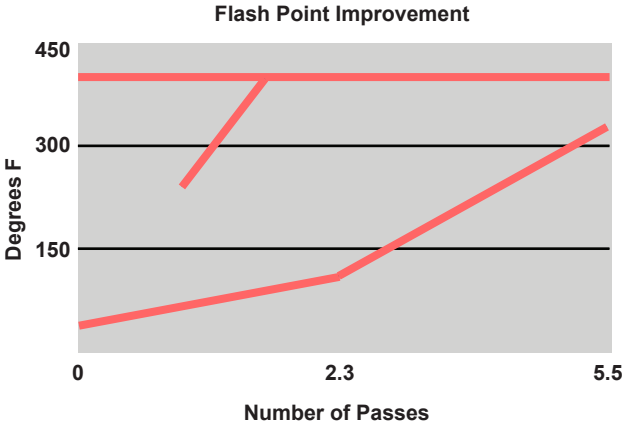


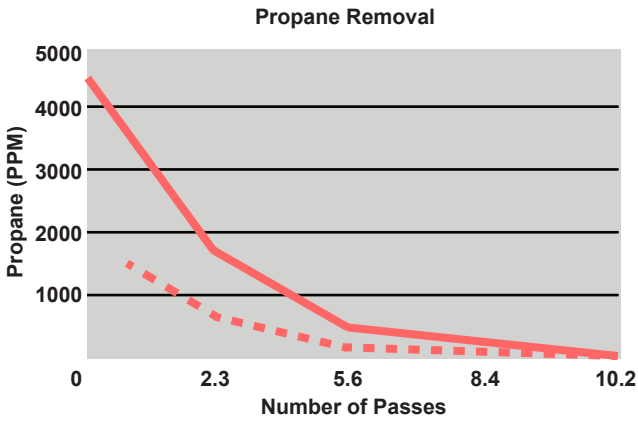
THERMO*JET*® Oil Purifier DEGASIFICATION PERFORMANCE

The high performance of THERMOJET® Oil Purifiers in degassing compressor seal oil systems in refineries and petrochemical plants has been proven in numerous applications. Of particular concern in this application is the removal of lethal hydrogen sulfide gas and light hydrocarbons which depress viscosity and cause metal-to-metal contact/wear on internal machinery surfaces. Also of concern is depressed seal oil flash points to the extent that, many times, a safety hazard is created.









THERMO*JET*® Case History

U.S. East Coast Refinery

A U.S. East Coast Refinery operates four hydrogen recycle compressors at 1,500 PSI which have a design seal oil leakage rate of three drums per day. Prior to the installation of an oil purifier, this entire oil volume was discarded due to gas contamination and the resulting deterioration of flash point and viscosity. With the THERMO*JET*® technology, these physical properties are being maintained at new oil levels.

This refinery is achieving savings of over $150K/year just on new oil and labor cost.

Gulf Coast Refinery

A centrifugal compressor located on a hydrocracker unit in a large Gulf Coast Refinery is leaking over 300 gallons per day of hydrogen contaminated seal oil. Prior to installation of the ThermoJet®, this reservoir was continually having fresh oil added and then contaminated oil drained, so as to maintain a safe flash point. Cost for this operation was over $1500 per day which did not include the disposal cost of the contaminated seal oil.

With the installation of the ThermoJet®, oil usage has plummeted, the flash point is stable and the hydrogen gas is safely disposed into the flare system. The Refinery's payback on their investment in the THERM*JET*® was within two months.

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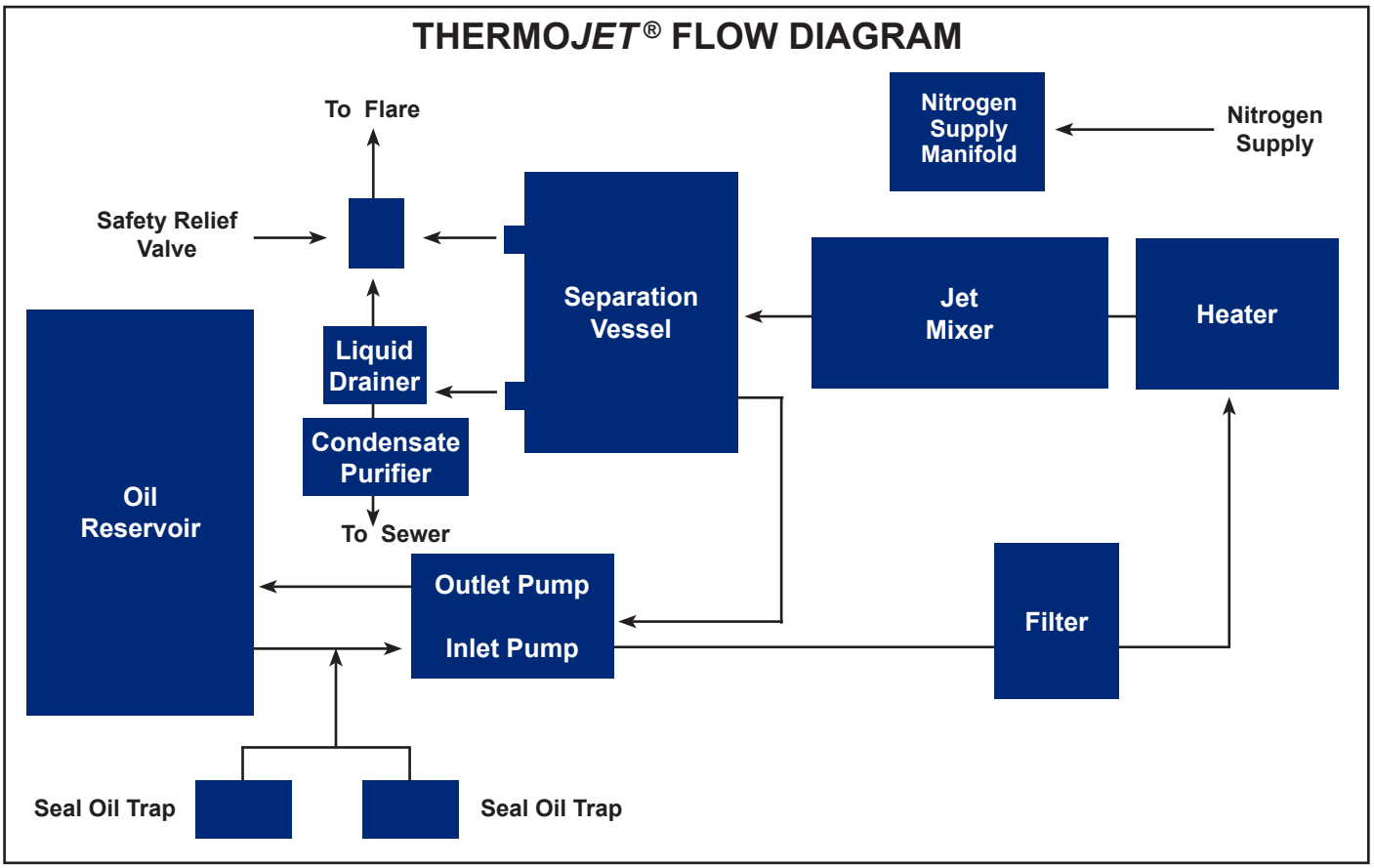
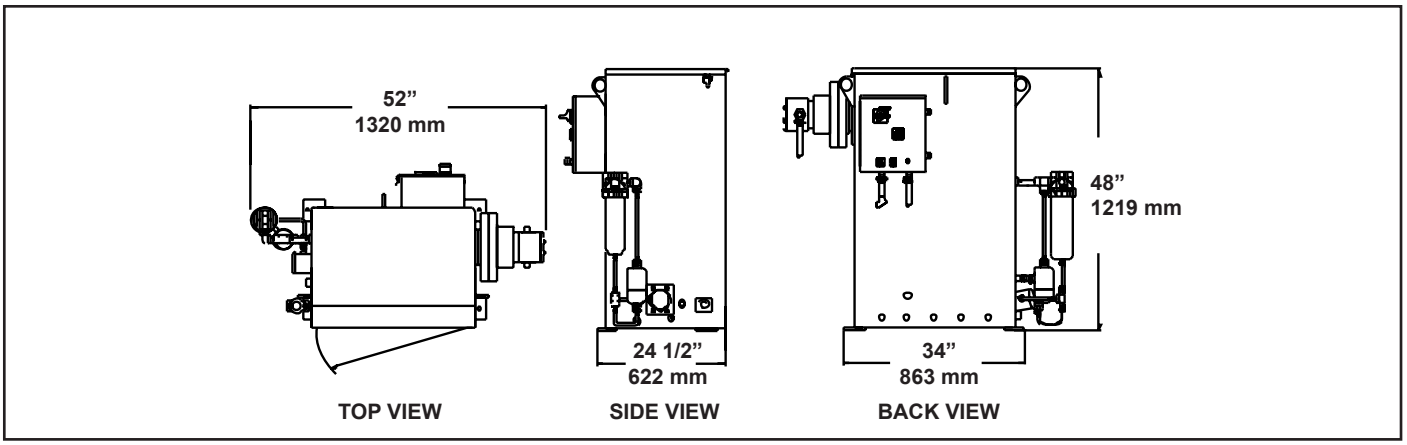
Process Description

In degassing operation the THERMOJET® Oil Purifier takes a small part of its feed directly from the compressor seal oil traps while recirculating the lube/seal oil reservoir on a continuous basis. In this method of installation the contaminating gases are greatly diluted and purification performance is enhanced as a result.

The inlet pump draws oil from both sources simultaneously through a flow indicator and Y-strainer. A filter removes dirt, wear particles and corrosion products. The oil temperature is elevated by a heater. Downstream of the heater, nitrogen (or other inert gas) is regulated from the plant's supply into a dual-stage Jet Mixer where the contaminating gases are forcibly stripped from the oil.

The degasified oil collects in a level-controlled separation vessel while the contaminating gases and vapors are forced out of the system under low pressure to the plant's flare system. Any condensate present collects in an automatic liquid drainer and condensate purifier which may be routed to a clean sewer. The outlet pump returns the oil from the separation vessel to the lube/seal oil reservoir.





APPLICATION BULLETIN...

Gas Compressor
Industry - Refining & Petrochemical

Case History:
A refiner in Northeastern USA was experiencing very high gas compressor seal oil leakage which forced the customer to drain and refill at the rate of three drums per shift. The investment in a G series THERMO*JET*® was recovered in less than one month based only on eliminating the seal oil losses.

THERMO*JET*® *Oil Purifiers Greatly Reduce Oil Losses on Gas Compressor Seal Oil Systems.*

Excessive Leakage from Wet Gas Seals Can be a Large Cost:
A centrifugal compressor with a seal oil system may run for several years with only modest amounts of seal oil being purged to maintain proper flash point and viscosity. However, seal leakage eventually increases and high purge rates are needed to maintain viscosity and flash point to protect the compressor from severe damage. Losses of 2.10 gallon/hour (1 barrel per day) are not unusual. The degassing systems on these compressors are not designed to handle this excessive leakage. Moreover, shutting down the compressor to promptly replace the leaking seal is usually not practical.

The Solution:
LSC offers its unique “G” Series THERMO*JET*® Oil Purifier that continuously removes the gas contamination from seal oil. This unit employs a patented jet mixing device to thoroughly mix the oil with inert gas (nitrogen) and to exhaust the resulting hydrocarbon/ nitrogen mixture to the are system. The THERMO*JET*® is effective in removing light hydrocarbons up to the boiling point of benzene as well as other gases such as hydrogen sulfide and hydrogen chloride.

Installation Options:
The optimum use of the THERMO*JET*® is to dedicate it to one compressor system. It continuously receives sour oil from the seal oil trap and supplements it with oil from the seal feed tank to satisfy the 180 gallons/hour pump ow rate. This continuous operation keeps flash point and viscosity at safe levels even at high seal leakage rates. Seal oil is recovered, the labor cost to constantly refill the seal oil tank is eliminated and the compressor is protected from the risk of inadequate lubrication.

Some clients prefer to install a dedicated batch tank and transfer sour oil to that tank to be purified by the THERMO*JET*®. The advantage of this set-up is that more than one compressor can be serviced. However, a lot of labor cost is expended transferring oil. In either case, LSC can work with you to develop a clear justification for a “G” series THERMO*JET*®.

LSC Lubrication Systems Company
THE RIGHT CHOICE

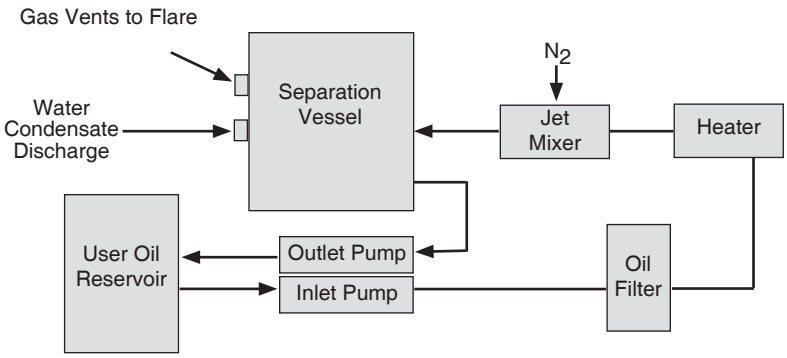
APPLICATION BULLETIN...

THERMO*JET*® Oil Purifiers Greatly Reduce Oil Losses on Gas Compressor Seal Oil Systems

Example of Economics for THERMO*JET*®:
Even with modest seal oil purge rates of only 26-40 gallons/day, the investment in a G series THERMO*JET*® should be recovered within one year of operation. Below is an example for a location in Southeast Asia losing 26 gallons per day.

Economic Imputs	
Cost of seal oil	US$5.75/gallon
Hourly rate for manpower to drain and refill seal oil tank	$15/ hour
Time to carry out lubricant	12 hours/ week
Electric Power cost	$.07/ KWH
Annual Savings	
Reduced Seal Oil Consumption	$54,750
Reduced manpower to drain and refill seal oil tank	$9,360
Operating Cost	
Electricity (average of 8 KW/ hr	$4,905
Nitrogen Cost)	$5,000
Filters for THERMO*Jet*®	$200
Annual Losses without THERMO*Jet*®	$54,000
Payback Period (pre-tax basis)	9-10 months

THERMO*JET*® G Series Flow Diagram



Recommendation:
Let an LSC sales technical representative review this application with you and help you develop the economi and technical analysis needed to eliminate seal oil losses and reduce the risk of failure on your major process gas compressors.

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FOR ADDITIONAL INFORMATION:

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