

The Cold Facts

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RSC News...

We are pleased to announce that Robby Jap has been promoted to the position of Senior Engineer and Special Projects Manager. Robby will remain headquartered at the Columbus office.

We are also proud to report that Ron Odom has joined RSC as Director of Engineering. Ron is a mechanical engineer and brings many years of management and design, installation and construction experience to the RSC team. Ron's industry knowledge and construction savvy will be another great resource for our clients.

Mundane, But Important, Stuff!!

As we carry out the scheduled, as well as the emergency tasks demanded by our jobs, sometimes we overlook items that are only performed occasionally. One such item is draining oil from our ammonia refrigeration systems.

This should be routine, but tends to get neglected because it simply doesn't seem important, or perhaps because oil draining can be a difficult, dangerous and tedious job that we tend to put off until later. But ignore draining the oil from your refrigeration system and you could easily be facing an emergency situation.

Let's review some basic principles relating to oil in refrigeration systems:

Oil is a lubricant for the bearings and other close tolerance surfaces of the compressor. It assists in heat removal from the internals of the compressor and it helps to stop the discharge gas from blowing back to the suction side of screw compressors.

Oil is necessary in refrigeration compressors, but a problem in other parts of the system. Oil isn't intended to be in evaporators, piping or accumulators. Just like pipe insulation keeps the outside surface of the pipe from picking up heat from ambient conditions, oil insulates the inside pipe surface from the refrigerant, reducing its heat transfer characteristics.

Oil can even fill or clog the circuits of an evaporator. Therefore, oil in evaporators makes them less efficient or even inoperative.

When oil fills control valves, or when it becomes cold and thick in control valves, it can prevent the valves from operating normally. Oil in the system piping can restrict the flow of refrigerant to and from the evaporators. Enough oil in a liquid pump and it will stop pumping the refrigerant properly. If allowed to collect in an accumulator or recirculator, oil displaces volume normally used for the surge of refrigerant, causing a high level in an accumulator.

Any one of these conditions can cause a liquid or oil slug to enter the suction of a compressor, resulting in compressor damage and even complete failure. The place for the oil is in the compressor and oil separator, and not in the other system components.

Most industrial ammonia refrigeration systems have oil drain pots connected to the bottom of suction accumulators, liquid recirculators, flooded surge drums and other vessels. Several things must happen to allow the oil drain pot to work properly. Oil must flow from the larger vessel into the oil drain pot. Refrigerant must be allowed to boil out of the oil in the oil drain pot and return to the larger vessel. The collected oil must then be manually drained to allow space for more refrigerant and oil to flow in and the cycle repeated until all the oil is removed from the vessel.

Normally the disappearance of ice, frost or sweating from the oil pot is an indication the oil drain pot is full of oil, fairly free of refrigerant and in need of draining. This is not always the case. It could mean there is nothing in the oil drain pot, or the oil pot is full of trapped liquid refrigerant. In any case, if the oil drain pot is losing its frost or ice coating it means the oil drain pot needs attention.

Several things can go wrong with oil drain pots. One of the worse conditions could be trapped liquid refrigerant. This condition could be very dangerous, and corrective action should be taken immediately. Restriction of the flow of oil from the accumulator into the oil pot is another. This is a difficult situation to troubleshoot and correct. Generally, there is some oil circulating or settling out in the system, and if it isn't collecting at the oil pots, it will eventually cause problems elsewhere.

There could be too much turbulence in the accumulator to allow the oil to settle. The

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Important Stuff!!

oil outlet from the accumulator could be blocked by debris, ice or other contaminants. Perhaps the oil will only flow into the oil pot when the suction pressure is raised during a pump-down or other system stoppage. If this is the case, the oil must be drained during every opportunity that presents itself. Perhaps scheduled stoppages of the refrigeration system are necessary to allow the oil to flow and settle into and out of the bottom of accumulators.

There are recommended guidelines and training videos for oil draining procedures, published by IAR and other organizations, that can be used to help develop safe oil draining procedures for your system. Draining oil from ammonia refrigeration systems is a potentially dangerous process and should only be performed by properly trained personnel. Here's a short review of some important oil draining points.

An oil log should be the primary guide for oil draining. The log should include how much oil has been added to the system (compressors) and how much has been removed. In a fully charged operating system, the oil removed should equal the amount added. If large quantities of oil are being added, the cause for the excessive oil carryover from the compressors should be corrected immediately.

Before beginning to drain oil, be familiar with:

- The exact oil draining procedure for that part of the system;
- Emergency response procedures;

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- Location of the nearest eyewash/shower station;
- Location of all valves that would be required to isolate the oil pot in the event of a problem;
- Ammonia first aid procedures;
- Lockout/tag procedures.

Wear proper safety apparel including, but not limited to:

- Elbow-length rubber gloves;
- Splash goggles;
- Face shield.

Have on hand at a minimum:

- Full face type NH₃ gas mask;
- Eye wash bottle;
- Pipe wrench;
- Clean bucket to drain oil into.

If the system operates in a negative pressure, raise the oil pot pressure to a positive value. Pressure in the oil drain pot must be above atmosphere before draining is attempted.

Never isolate oil drain pots that are not equipped with a safety pressure relief valve. Note: It is

recommended that all oil drain pots have properly sized safety pressure relief devices even though they are not always required to be coded vessels.

Check the ventilation fan in the area where the oil is being drained. Do not proceed until they are operating.

Remain in position at the oil pot and keep a vigilant watch for the duration of the draining process.

Never apply direct heat to the oil drain pot to speed up the draining process.

Properly dispose of the drained oil according to established procedures and in accordance with all applicable codes.

If water and/or other contaminants are observed draining with the waste oil, they must be identified and corrective action taken.

Oil draining may be boring, but it is a very important and necessary part of ammonia refrigeration system maintenance.

It's Just This Simple...

"Customers don't care how big you are. They don't care about organizational charts or how many divisions you have. They want the person standing in front of them to be able to solve their problem."

—Vernon Loucks Jr.

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