

# REFRIGERATION REVIEW

## THERMOSYPHON OIL COOLING

For many years I had been intrigued with the idea of using thermosyphon oil cooling for refrigerant installations using screw compressors. Thermosyphon oil cooling offers a viable alternative for effectively cooling oil, through the use of the gravity/hydraulic effect of two-phase refrigerant flow through an oil heat exchanger. This would eliminate the need for secondary fluid circulating pumps, maintaining and cleaning of heat exchangers, and would preclude mixing liquid refrigerant (in injection systems) with lubricating oils during the compression process.

While I was interested in the concept, I knew of no such installations in the United States and had only heard indirectly of thermosyphon installations in Europe. At IIAR's annual technical sessions in Sarasota, Florida, in 1983, I had lunch with Birger Grinneby of Stal Refrigeration Corporation. We discussed the technical applications to thermosyphon systems he had seen in Europe.

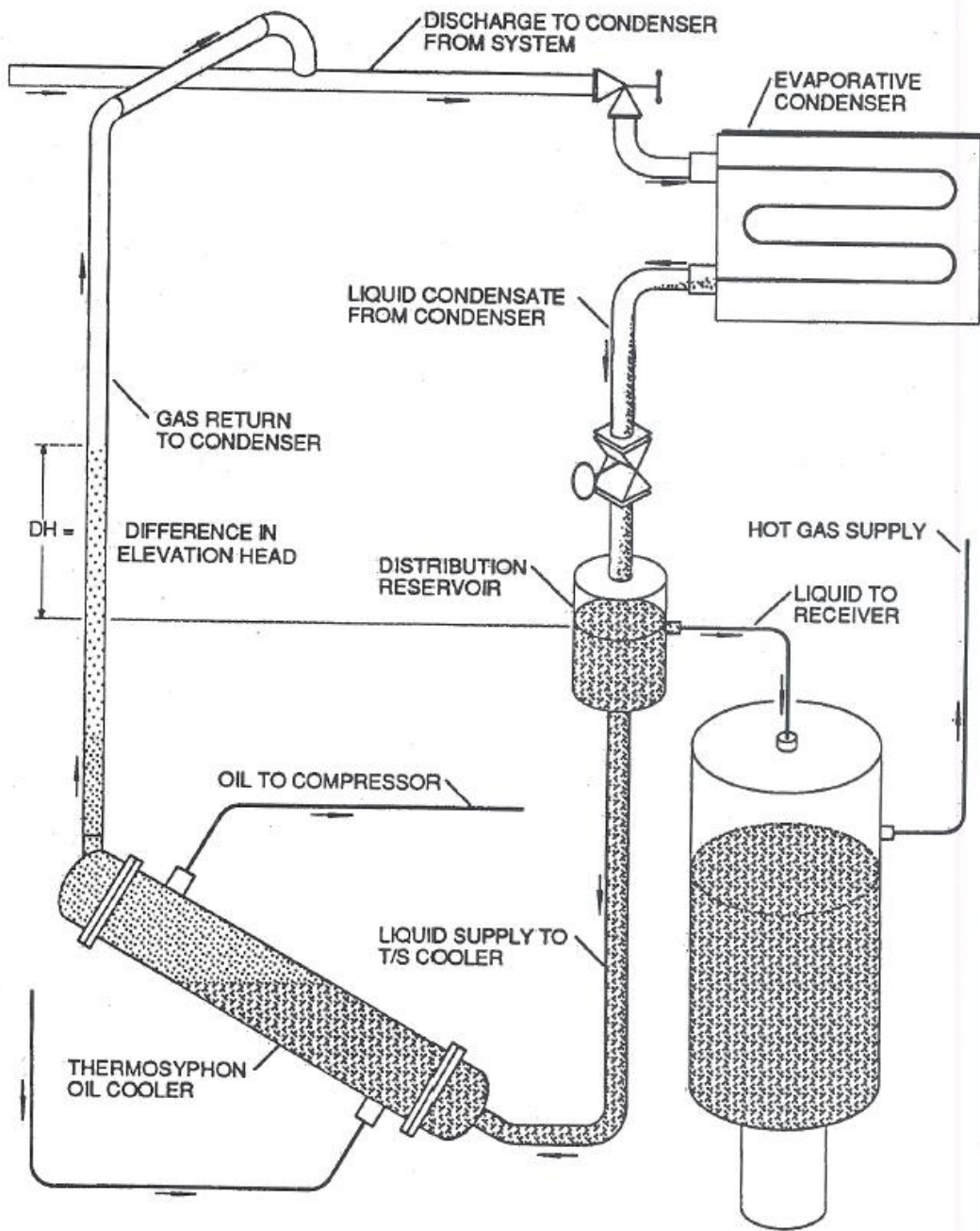
With this information, and with further brainstorming with Peter Spellar, then President of Frick Company (who now manufactures one of the better thermosyphon heat exchangers), I designed a thermosyphon oil cooling system for a new installation later that year. During the installation of the early systems, I was told by no less than six contractors and a number of compressor manufacturer engineers that the thermosyphon systems I designed would not work. It has been particularly rewarding to see the systems installed and working very well.

Borrowing from some of my father's horse sense, who had been installing discharge oil scrubbers/desuperheaters – which basically was designed like an

intercooler booster “dipstick” which bubbles the gas under a bath of liquid ammonia. With the liquid being supplied from the rooftop mounted condensers’ condensate return line, enough hydraulic head is provided to operate the solenoid valve to maintain the liquid level in the desuperheater. An Amot valve was suggested to control the pressure, but as I pointed out, there isn’t enough pressure differential to operate the Amot valve, and if the oil cooling got too cold, out of limits of the compressor, well, then the factory would just have to set it a little lower – which happened, and they did!

The first thermosyphon compressor was installed in a machinery room in Attalla, Alabama, and is shown in the photo below.

This discussion will be continued in the next article, as the thermosyphon systems have evolved significantly since the first installation.



Typical Thermosyphon Oil Cooling System



First Thermosyphon Oil Cooling System Installed -- Attalla, AL