

## Huntsman's large, low temperature refrigeration plant.



**BOC with their specialist refrigeration technology have been working on helping improve the performance of the Ethylene Refrigeration plant at the Huntsman site in Teesside. BOC's technology successfully stripped oil contamination from the refrigerant whilst the refrigeration system continued to operate normally at an evaporating temperature of  $-45^{\circ}\text{C}$ , which was below atmospheric pressure.**

Huntsman's Ethylene plant was suffering with poor condensing and rate loss due to a build up of Seal oil which had migrated from the refrigerant compressor into the process stream. The bulk of this oil was attributed to a breakdown of the integrity of the compressor labyrinth seals. An unknown quantity of oil was contaminating the refrigerant system.

In December 2004, BOC's refrigerants team was called in to carry out a rectification at the production facility. Andy Latham, Huntsman Plant Manager said, "We engaged BOC because they had the technology and the know-how to meet the challenge and turn it around quickly."

The refrigeration plant they worked on was a three stage, 12tonne R22 chiller system designed to cool ethylene from  $17^{\circ}\text{C}$  to  $-41^{\circ}\text{C}$ . The system contained a single flooded shell and tube evaporator (R22 shell side; ethylene tube side), a centrifugal compressor operating at approximately 1.2MW and an air-cooled condenser.

### **System Rectification**

The BOC team arrived on site with their highspeed proprietary high speed equipment, labour skilled technicians, vessels and transportation in order to carry out this refrigerant side oil reduction service. Whilst the chiller was running we pulled contaminated refrigerant from the evaporator and returned clean refrigerant to the evaporator. When they were shut down we sucked contaminated refrigerant from the evaporator and returned clean refrigerant to the receiver. The refrigerant was moved from the system receiver, through BOC's decontamination unit to the evaporator. The reverse operation was then set up; processing the refrigerant from the evaporator through the decontamination unit into the system receiver.

The refrigerant was cleaned and continuously re-circulated through the system at high velocity to flush the contaminants from the evaporators. In all, BOC's equipment had removed a total of 820 litres of oil from the system.

### **Outcome of System Rectification**

The technology has achieved an increase in plant efficiency. Andy Latham, Huntsman Plant Manager said: "*The technology for the recovery and cleaning of the system is without question. The quality of the returned refrigerant to the plant from the BOC equipment was excellent*".