



CIRRUS[®] VEC system. Vapor emission control application.



Installation of two CIRRUS[®] M150 units and a CIRRUS[®] TM100 tank module to recover hydrocarbons

Reference installation

Equipment: CIRRUS[®] M150, CIRRUS[®] TM100
Customer: Conoco JET Nordic AB, Strömstad, Sweden
(Subsidiary of Conoco Inc., USA)

Background

Conoco JET Nordic AB operates a chain of numerous filling stations throughout Sweden. In the port of Strömstad, Conoco JET owns a gasoline storage depot, designed to store up to 58,000 m³ of gasoline.

When the gasoline is pumped into the 10 to 15 tank trucks daily destined for distribution to filling stations, the air inside the truck tanks is naturally forced out. Conoco JET is obliged by Swedish emission regulations to recover these gasoline fumes and thus prevent their escape into the atmosphere.

Solution

Conoco JET subsequently learned that Linde's CIRRUS[®] vapor emission control system was an optimal way to effectively prevent the release of gasoline fumes into the environment. The system efficiently condenses volatile organic compounds (VOCs) from process gases using liquid nitrogen as coolant. The equipment best suited to the job at hand, according to Linde, was the CIRRUS[®] M150 module, which was designed to provide flexible, compact, and efficient process gas treatment. The gasoline is condensed at below minus 100 °C and recycled.

An ingenious innovation at the depot has been the addition of a telephone with PIN code, so that truck drivers can call ahead some 20 minutes before arriving to activate the system. Since the system thus starts up only when needed, no unnecessary nitrogen consumption takes place.

Installation

Less than a year after the depot was completed, Linde installed a pre-assembled, pretested CIRRUS[®] M150 module at the Conoco JET depot. Within one year, as traffic subsequently increased and demand rose, arrangements were quickly made to install a second module to work alongside the first. Both units thereafter continued to run smoothly as expected.

Process description

Cryogenic-based CIRRUS® vapor emission control systems represent a total approach to preventing or minimising the release of volatile organic compounds into the atmosphere. The conversion of VOCs to liquid through condensation is typically greater than 99%. Because the condensed recovered VOCs are not contaminated in any way by the process itself, they can be easily recycled. And, because the system uses only liquid nitrogen – which can either be vented off as a gas directly into the atmosphere with no detrimental effect to the environment, or used elsewhere on-site – it is all highly environment-friendly.

Beneficial features

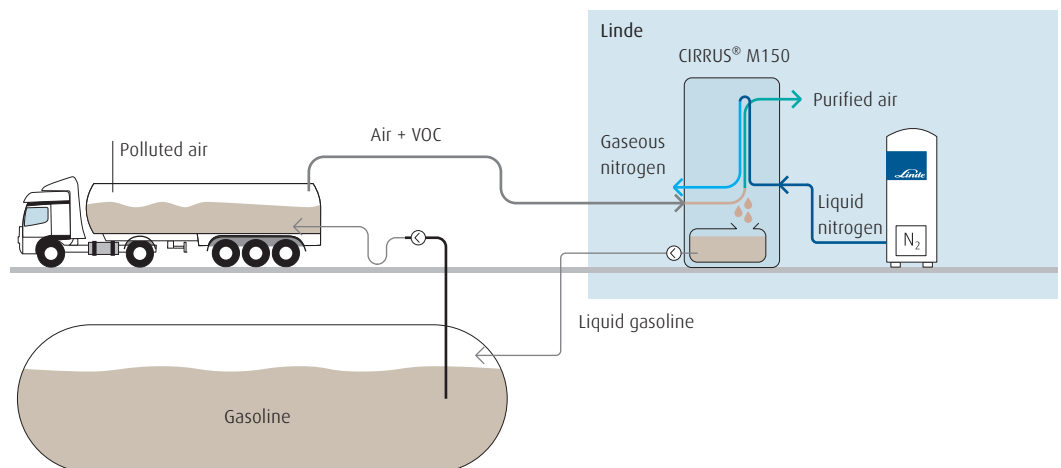
For demanding vapor emission control conditions, Linde offers complete package solutions for the application at hand. For Conoco JET Nordic AB, this proved to be in the form of the CIRRUS® VEC modular system, which is optimally designed for:

- Simplicity
- Compactness
- Flexibility
- Nitrogen economy
- Service

Design data and operating results

Carrier gas: Nitrogen – air
 VOCs: Various hydrocarbons in gasoline
 Maximum flow: 240 Nm³/h
 Normal flow: 200 Nm³/h
 Purification degree: 99%
 Condensation temperature: -105 °C
 Pressure: Atmospheric pressure

Schematic diagram of the CIRRUS® M150 installation at Conoco JET Nordic AB



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