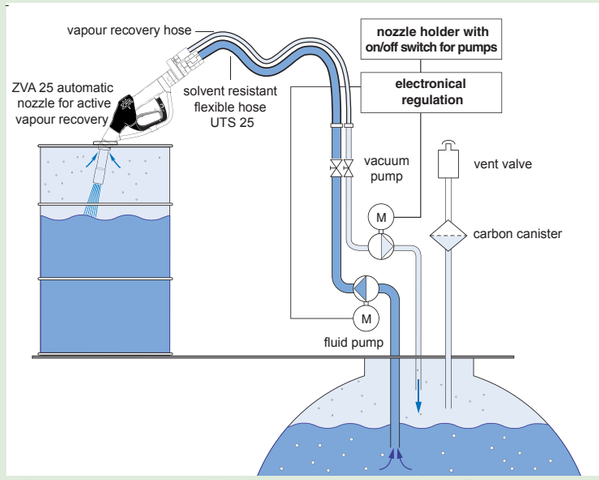

active vapour recovery of solvents in receptables from 5-1000 Litres

(picture to the right): eight of fifty different filling points

What - no Fumes?

Active Vapour Recovery for the Filling of Solvents - a Case Study

Achim Aehle

For the filling of canisters and small containers with solvents, employees must be protected from harmful vapours. The problem for the operating company: there are almost no standard solutions.

When building a new extension storage and filling plant for solvents, a German distributor of chemicals had to decide on measures to reduce emmisions.

In several countries, storage and filling plants for flammable and dangerous goods are subject to approval by official bodies – depending on the nature and amount of the stored media.

Often, measures to avoid or reduce emmisions are prescribed – e.g. vapour balance systems: vapours escaping from the filler opening during the filling process are returned to the storage tank.

In the Chemical Industry there are many methods to avoid emmisions during the transfer and filling of fluids. Apart from 'vapour balance' these are:

- overlaying the fluid with inert gas,
- sucking back the vapours with subsequent
  - cleaning with active carbon filters
  - flaring
  - Re-liquefaction or
  - bacterial conversion.

Once the decision for a vapour recovery system is taken, the question arises: what is the best way to suck back the vapours when canisters, drums or IBC are being filled?

So far, hose assemblies are mostly connected gas-tight to the receptacles, using special couplings. The various filler opening designs and dimensions have to be considered - this is a drawback for flexibility.

Furthermore, a gravimetric measurement (scales) of the filled amount is not possible.

There are also systems with large overhead vent stacks above the filler openings. These not only suck back vapour but also large amounts of excess air, hence the subsequent treatment of the recovered vapour / air mix must be correspondingly large. This is a cost disadvantage.

Alternative:
The Principle from the Petrol Station...

In most European countries, vapour recovery regulations are effective at the forecourt.

Nozzles for the refuelling of motor vehicles have a vapour suction spout, hoses have an inner vapour line (coaxial). The fuel vapours emmitting during the refuelling process are sucked in by a vacuum pump in the dispenser, back to the storage tank. The quantity of returned vapour is proportional to the amount filled.

... for the Filling of Solvents.

For many years, the company CG Chemikalien in Hannover/Germany efficiently uses gravimetrical measurement and automatic nozzles for their filling plant.

For a new add-on plant, CG wanted to stay with this successful principle, whilst combining it with a state of the art vapour recovery system, as it is already in use worldwide for vehicle refuelling . It had to be considered that the required flow rates were 130 l/min (4 times the usual flowrate on forecourt). In addition, the components had to be chemically resistant to solvents.

In cooperation with ELAFLEX Germany, the leading European supplier of vapour recovery nozzles and hoses, engineers from CG Chemicalien developed a suitable vapour recovery system.

It consists of an automatic cut-off nozzle type 'ZVA 25 GR', a hose assembly type 'UTS' with product hose and smaller vapour hose, a liquid ring vacuum pump with regulation, and a side channel pump for the fluid.

The flowrate of both vacuum and fluid pump are matched. The vacuum pump sucks the vapour back via the vapour hose and the vapour suction spout of the nozzle and returns it to the storage tank. In case of excess vapours within the storage tank, the vent line is equipped with a carbon filter for cleaning.

The underground storage tanks are filled with railcar and road tankers. During the filling process, the vapours are balanced back to the tanker without a pump.

Advantages

With the described 'active' vapour recovery system for filling of solvents, standard filler openings can be left untouched. No adapters are necessary. The nozzle spout is inserted without needing a fixed connection. Due to the 'open' interface no special gas-tight adapter connections which are prone to wear are necessary – and the filling can be done economically and with flexibility.

A gravimetrical measurement of the filled amount is possible.

The handling of the ZVA 25 GR nozzles is simple and can be compared to a system without vapour recovery. For the operator there are no additional tasks or requirements.

The vacuum and fluid pumps chosen for this solution are solvent resistant standard centrifugal pumps. No extraordinary maintenance or service are required.

Since its inauguration, the storage plant and filling operation of CG Chemicals runs trouble-free, to the complete satisfaction of the operator.

INFO **CG Chemikalien (Chemicals) GmbH & Co. KG**

CG Chemicals was founded 1962 in Laatzen near Hannover. As family owned, medium-sized company, CG developed to a highly productive Chemical Distributor.

Today, CG operates its operations on a surface of more than 40.000 square metres and has available storage capacity of approximately 2.000 pallets for bulk goods and a tank volume of approximately 4.200 cubic metres for acids, alkalis and solvents.

The case study concerns a part of the plant in which 50 solvents are stored in 16 partly multi-chambered underground storage tanks.

ELAFLEX
Hamburg / Germany

www
www.elaflex.de

Achim Aehle, Technical Manager of ELAFLEX - Gummi Ehlers GmbH, Hamburg / Germany