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TECH TALK 010 VENTING OF ROAD TANKERS 02/05/1994

THE REQUIREMENTS FOR NORMAL VENTING OF ROAD TANKER COMPARTMENTS, THAT IS, THE SMALL PRESSURE AND VACUUM VENT, ARE COVERED IN AS 2809.2 - 1990 CLAUSE 2.3.5.

Liquip currently manufacture two models of pressure - vacuum vent, the PVV104 and PVV204.

"PVV104 is a thermal relief vent only and is not designed to allow for closed hatch filling. If this is required, order with two vents (only one fitted as standard) and if flow rate is greater than 500 l/min consult Liquip" (Extract from Liquip catalogue).

PVV204 Is a larger capacity vent and, dependent on the maximum allowable pressure and vacuum in the compartment, may be used up to 1,000 l/min.

Vapour Recovery Vent AVV3.0 provides the equivalent of a 75 mm dia hole and in most cases it is this vent which handles large inflow and outflow.

Pressurised compartments Are dangerous as caps or liquid can strike the driver as he removes fittings to dip.

How Can Compartments Pressurise?

- i. Loading with closed hatches at a rate too great for the vents in the compartment.

Could be due to.....

- No vapour vent being fitted.
- Vapour vent not open/hose end not open.
- Insufficient PVV venting fitted.

- ii. Partially full compartments "sloshing" and creating a temporary vapour pressure build up.

- iii. Faulty (sticky) pressure - vacuum vent.

Avoiding Compartment Pressure

- i. Above lists a lack of venting capacity as a cause.

This can be fixed by ensuring that:

- * Sufficient mechanical vents are fitted.
- * If vapour vents are fitted, standard procedure should be for them to be opened before dipping.
- * If a vapour recovery hose is fitted it should be opened, eg by connecting to the service station, before dipping. (If the vapour hose is left stowed and closed, pressure released via the tank top vapour vents may have nowhere to go).

All of these precautions are easy to adopt in the tank design and tanker operational procedures.



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ii. Above mentions sloshing of partially full compartments as a cause of pressure build up.

Any pressure build up in a compartment up to 15 kPa (2 psi) is retained by the pressure vent poppet. The only escape for pressure is via the 4 mm dia bleed hole to atmosphere.

This size is dictated by the Standard, AS 2809, and is a compromise between limiting pollution and allowing pressure to bleed away.

Tests have shown that an ullage space of 3,000 litres at 15 kPa takes almost 15 minutes to bleed down to atmospheric pressure through this small hole.

Even a normal ullage space in a full compartment of say 3,000 litres takes over a minute to drop to nil pressure.

It is this pressure build up, between atmospheric and 15 kPa, which is the danger as it can be present for a long time before decreasing to zero.

Liquip cannot change this aspect of vent design because it must comply with the standard.

Action Recommended For This Problem

Ensure vapour vents are opened first.

Fit two pressure-vacuum vents.

Fit Liquip bayonet-style dip cap which relieves pressure before releasing the catches.

Bayonet Style Dip

Developed by Liquip to make it easy and safe to relieve internal pressure. The Bayonet action means the cap has to be pressed downwards before it can be twisted and removed: the action of pressing downwards opens a poppet which drains off internal vapour pressure to atmosphere. Typically the action would be to press down the foot.

A new large "port-hole" dip tube top completes the protection by increasing the pressure equalising gauze area by a factor of eight times.

Order as DBC 80 Dip cap, bayonet type
DBA 80 Dip adaptor, bayonet type
DTM 80 Dip tube mandrel, gauzed

Attachments

Catalogue page PVV 104
Catalogue page PVV 204
Catalogue page or Design pages on DBA 80
DBC 80
DTM 80