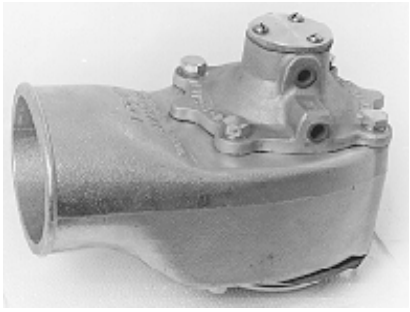
TECHTALK NO. 36
AVV3 SERIES VAPOUR VENTS



AVV3 SERIES VAPOUR VENT WITH SEQUENTIAL TOP

APPLICATION

Vapour vents are used as the means of preventing over- and under pressurisation of a compartment during closed loading and discharge operations.

Discharge and loading operations can be either vapour balance or non-vapour balanced. When non-vapour balanced, the vapour is vented to atmosphere during loading and air is allowed into the compartment during discharge.
During a vapour balanced operation the vapour is returned to the terminal based vapour system during loading. During discharge the vapour from the receiving tank is forced back into the compartment on the truck

Whether the operation is vapour balanced or not depends mainly on the regulations of each country.

REGULATIONS

Regulations for vapour vents focus mainly the size of the vent.

API1004 states “Connections from the compartments to the system must have a minimum cross-sectional area equivalent to that of a 3 inch (76.2 mm) pipe.”

IP Code of Practice (UK) states “The vapour vent valves installed in each compartment should be of sufficient capacity to deal with the maximum loading rate for a single arm”

OPERATION

When the air supply (70 kPa to 900 kPa) is activated, air pressure pushes the diaphragm down forcing the main poppet to open and vapour is ducted out of the tank via a 90mm nominal opening.
The diaphragm is completely isolated from the vapour by means if 2 Viton o-rings on the spindle and therefore a Buna diaphragm is used.
The poppet opens downward to eliminate the possibility of leakage from product surge.
This is one of the main advantages of the Liquip vapour vent over some competitors vapour vents.

VARIANTS

Below is a list of the letters, with their meanings, found in the part numbers for the AVV3 series vent
Vent body and top are aluminium; seals are Viton, unless otherwise stated

L	-	No Gauze
U	-	Gauze
V	-	Sequential Top
W	-	Through Holes, with gauze
AT	-	Aluminium Body, Teflon Main Seal and Gasket
RS	-	Stainless Steel Body, Tapered Seat, Teflon Main Seal and Gasket, no gauze, Through holes
E	-	OBSOLETE (was used to indicate through holes with gauze)

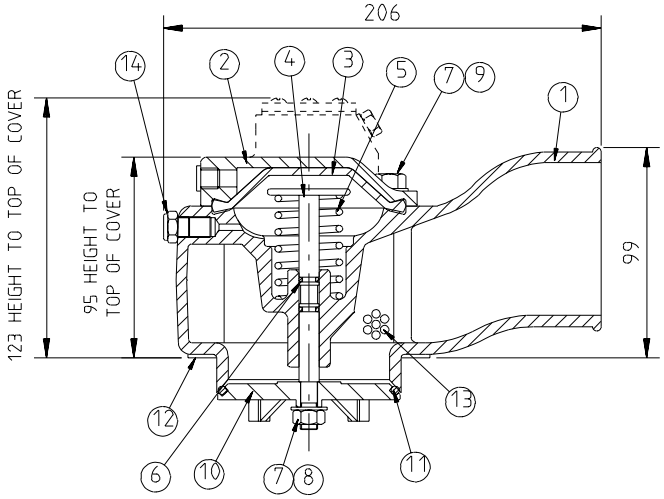
"L" and **"U"** indicate whether or not gauze is supplied with the vent, however not all part numbers have either an "L" or a "U".
The gauze acts as a flame arrester. It is a requirement to have a flame arrester in the vapour recovery line on the truck.
In Australia, where the vapour recovery hose is carried permanently on the truck, the gauze is not required in the vapour vent. Here gauze is fitted to the female vapour recovery coupler at the end of the hose.
In some countries gauze is a requirement as it helps prevent theft of product through the vent.

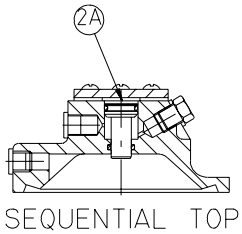
"V" indicates that the vent is supplied with a sequential top. Vapour vents without the "V" in the part number are supplied with a plain top.
Sequential means that the air signal is sent in series through the vapour vents.
When the main poppet on the first vapour vent has fully opened the pneumatic signal is allowed to pass through to the next vent. After the last vent is opened the signal flows back to a control box allowing the next step in the loading sequence to take place.
In some countries the signal is used to activate a pneumatic interlock in the truck plug. Without this signal the Overfill Protection Monitor will not give the permissive to load signal.

"W" indicates that the body of the vent has through holes. Vapour vent without the "W" in the part number have drilled and tapped holes in the bottom. The only exception to this rule is the AVV3RS.
Vapour vents with through holes are required when mounting the vent on a mounting flange with tapped holes (either blind or through holes).
This is always used when a vapour vent is mounted on the rollover coaming as access to the inside of the coaming is difficult.
This type is also used in the U.K. where the vents are always remote mounted.

OPTIONS

AVV3LZ	Plain top, tapped holes, no gauze
AVV3LVZ	Sequential top, tapped holes, no gauze
AVV3UZ	Plain top, tapped holes, with gauze
AVV3UVZ	Sequential top, tapped holes, with gauze
AVV3WZ	Plain top, through holes, with gauze
AVV3WVZ	Sequential top, through holes, with gauze
AVV3LAT	Plain top, tapped holes, no gauze, Teflon trim
AVV3LVAT	Sequential top, tapped holes, no gauze, aluminium body, Teflon trim
AVV3RS	Plain top, stainless steel body with tapered seat, stainless steel internal parts, Teflon trim, no gauze





* THESE PARTS VARY DEPENDING ON THE MODEL (SEE TABLE)

	ITEM	PART NO	DESCRIPTION	MATERIAL	QTY.
*	1	AVV3-1W	BODY (DRILLED HOLES)	ALUM.	1
*	1	AVV3L-1	BODY (CAST INSERTS)	ALUM	1
*	2	AVV3.0-2	TOP COVER	ALUM.	1
*	2A	AVV3R-5	TOP COVER ASSEMBLY (SEQUENTIAL)	ALUM	1
	3	3095	DIAPHRAGM	BUNA	1
	4	AVV3R-3	SPINDLE ASSEMBLY	ST.STEEL	1
	5	4401	SPRING	ST.STEEL	1
	6	0124	O'RING	VITON	2
*	7	0108	SPRING WASHER	M/S Z/P	4
*	7	0824	SPRING WASHER	ST. STEEL	4
*	8	0635	NUT HALF NYLOC	M/S Z/P	1
*	8	0801	NUT HALF NYLOC	ST. STEEL	1
*	9	3236	BOLT HEX HEAD	M/S Z/P	4
*	9	0011	SETSCREW HEX HEAD	M/S Z/P	4
*	9	0782	SETSCREW HEX HEAD	ST. STEEL	4
	10	AVV3R-2	POPPET VALVE	ALUM	1
*	11	4507	O'RING	VITON	1
*	11	2487	O'RING	TEFLON ENC.	1
*	12	3096	GASKET	NEO CORK	1
*	12	2477	GASKET	TEFLON ENC.	1
*	13	5650	ANTI-THEFT GAUZE	ST.STEEL	1
*	14	2280	EXHAUST SILENCER	BRASS	1

MOUNTING OPTIONS

The vents with the drilled and tapped mounting holes can be direct mounted on the VOH200, VOH400 and VOH700 Series manholes

All of the vapour vents can be mounted on a remote flange if required.

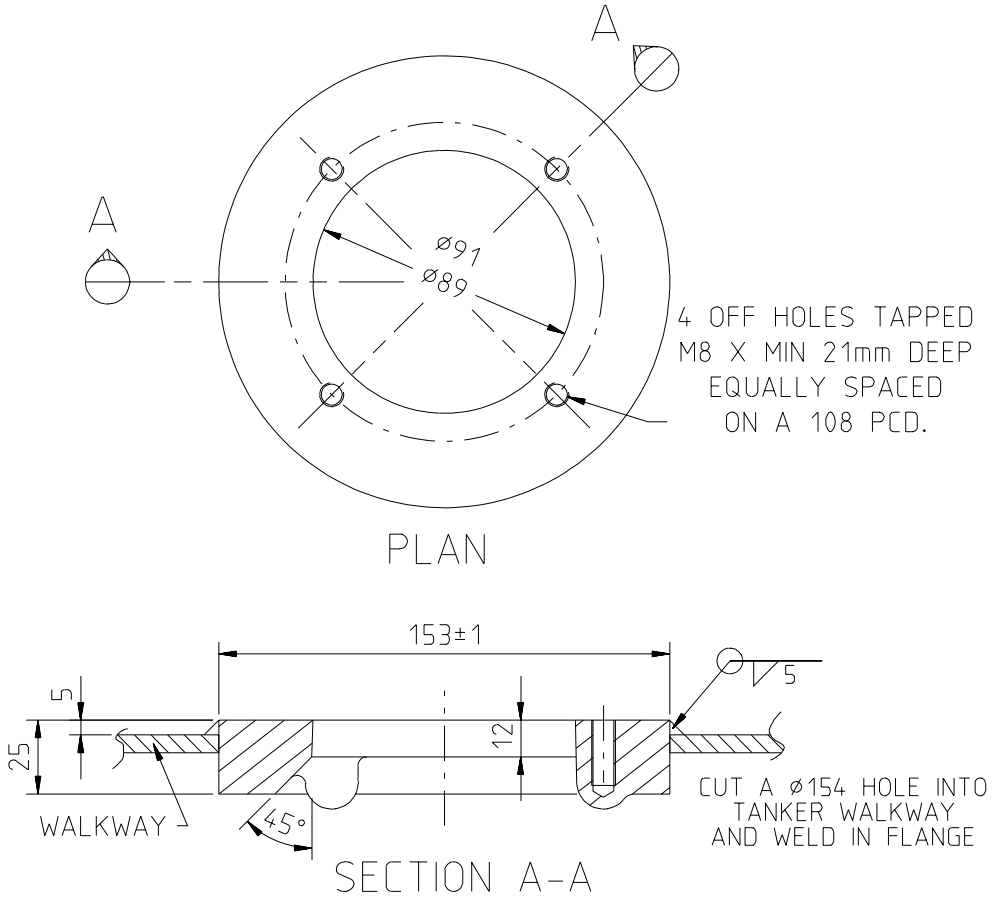
Flanges are available in aluminium, mild steel and stainless steel (304 grade).
The mounting holes are either drilled or drilled and tapped.

- An "L" in the part number indicates that the holes are drilled straight through.

- "U" indicates a flange with blind holes. The bore is tapered to allow a greater flow. This is necessary due to the thickness of the flange (25mm).
  The 25mm thickness is required to prevent rainwater on top of the tank coming in contact with the gasket creating a possible point for the ingress of water

Below is a list of the weld flanges with descriptions:

AVV3L-7	Aluminium, drilled through
AVV3L-8	Mild Steel, drilled through
AVV3L-9	Aluminium, drilled through and tapped
AVV3L-10	Mild Steel, drilled through and tapped
AVV3U-7	Aluminium, blind, tapped holes
AVV3U-8	Mild Steel, blind, tapped holes
AVV3.0-9	Stainless Steel, drilled through and tapped



RELATED PARTS

When the rollover coaming is used as a vapour collection line the vapour vents can be connected to the coaming by means of a vapour hose and connecting stub

VH3.5 BUNA VAPOUR HOSE

The stubs are welded to the coaming and are available in aluminium and mild steel.

The part numbers and descriptions are listed below:

VRB3.5-1	Aluminium, straight
VRB3.5-2	Mild Steel, straight
VRB3.5-3	Aluminium, 45 degree angle
VH3.5	Vapour Hose, Buna, 1 metre length

VRB-11 LOUVRE KIT

When straight vapour stubs are used the vapour enters the coaming at a 90 degree angle to the flow.
The 45 degree angled vapour stub has been developed to minimise the backpressure as the vapour enters the coaming.

Where vapour vents are used without a vapour recovery system being in place a louvre kit can be supplied to mount on the end of the vapour vent.
The louvre kit provides spark-arresting gauze, as free venting to atmosphere is not permitted.

The louvre kits are also used when a coaming vent valve is used. The coaming vent valve can be used when there is a failure in another part of the vapour recovery system or when there is non vapour balanced loading or discharge.

The louvre kits have 2 functions:
1. Spark arrester through the use of gauze
2. Weather protection

2 types of louvre kits are available. These are:

1. AVV3-12, polyurethane louvre with stainless steel gauze
2. VRB-11aluminium louvre with stainless steel gauze

AVV3-12 LOUVRE KIT

ADVANTAGES OF LIQUIP OVER COMPETITORS

- The AVV3 series vents are the cheapest air operated vents.

- The AVV3 series vents are the lightest air operated vents. (See comparison table below)

	LIQUIP	DRUM	EMCO	HAAR
COMP	1.8kg	2.2kg	2.6kg	2.7kg
COAMING	1.6kg	2.2kg	3.4kg	3.1kg

- The AVV3 series vents have fewer parts and are easier to service.

- The AVV3 series vents have a downward opening poppet, eliminating the possibility of leakage in the event of product surge.

The use of a diaphragm assembly for operation of the vent is the major contributing factor to the first 3 advantages listed above.
In the event of leakage of the diaphragm it is a simple and quick operation to remove the top cover and replace it. It is not necessary to remove the vapour vent from its location and therefore no vapour will be released into the atmosphere if the diaphragm is replaced.

NOTE: The vapour vents will continue to be supplied with a Buna diaphragm however the Buna diaphragm will no longer be sold as a spare part. Therefore if a diaphragm needs to be replaced the Viton GF diaphragm, 3095G, must be ordered.