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**TECH TALK 019**  
**VENTING CAPACITIES**  
**02/12/1995**

Some of the most commonly asked questions in relation to venting capacities are as follows:

**Question :** What is the venting capacity of a PVV ??? Vent ?

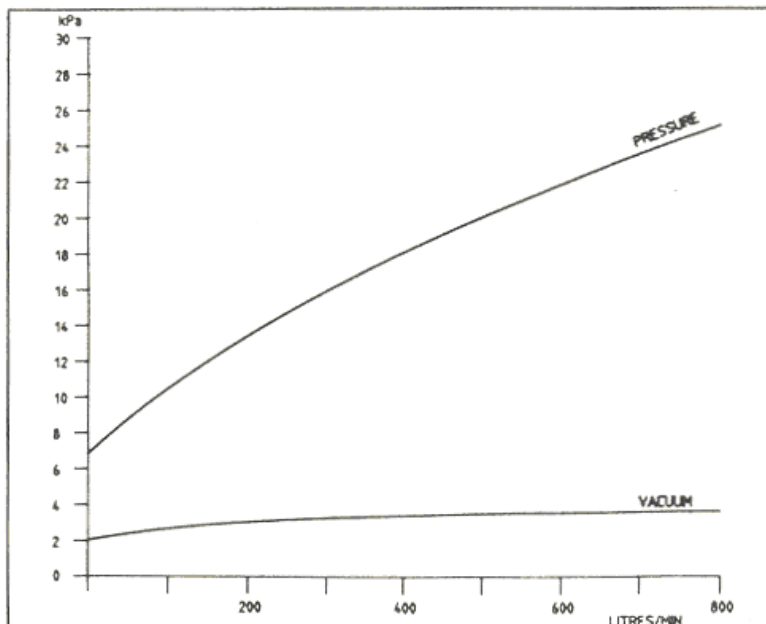
**Answer :** Any capacity at all, it depends on the pressure pushing it through (see equation)

**Question :** If a PVV204 is venting at 1000 litres per minute when loading how come I can only unload at about 200 litres per minute ?

**Answer :** How are you loading and unloading, gravity or pump discharge ?  
If pump, What pressure is the pump generating ?  
How large is the discharge opening ?

ie. Gravity only creates a limited vacuum and hence a limited venting rate. A pump on the other hand can force it !

Typical flow rates of a PVV204 are in the graph below



How fast a tank can load and unload does not depend on the vent but depends on the pressure & vacuum rating of the tank. Unfortunately no tank manufacturer will give these figures. The problems inevitably occurs whilst unloading as tanks generally can withstand greater pressure than vacuum



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Despite this we still have calls fairly regularly from customers stating that the PVV204 we have supplied them is not venting to the capacity that is stated in our literature. Likewise with our other vents also.

A good example of this was an inquiry we had in regard to vents that we had supplied to fit 2000 litre plastic chemical tanks. The tanks were fitted with our PVV204-ST vents and customer complained that tank sides were sucking in before vent was opening fully, his assumption was that our vent was not meeting with the venting capacity as stated in our catalogue.

The problem was that our vent was “*cracking*” at 3 kpa but it certainly was not opening to full capacity at 3 kpa.

This brings me to another point. There has been a little confusion between the “*cracking*” pressure and the maximum pressure which the vessel was designed to withstand. This was highlighted lately in relation to our PV2 type vents.

Our vents are designed to “*crack*” at the specified setting. That is when the poppet “*just*” lifts off the seat to allow pressure to dissipate.

When specifying vents for different applications always ascertain from the customer the maximum pressure and vacuum that the vessel is designed to withstand. Point out in particular that the settings set on our vents are the cracking pressure and definitely not the maximum operating pressure.

#### **Formula for capacity**

$$\text{Capacity} = 0.0575 \times d^2 \sqrt{\delta p} \text{ mt}^3 / \text{hour free air.}$$

Where : d is measured in mm

$\delta p$  = difference of pressures on both sides of vent in question.

If in any doubt please confer with our engineering dept.

## **VENT SETTINGS**

As you know the settings for our standard road tanker equipment are strictly governed by AS2809.2-1990 section 2.3.

Table 2.4 Vent design and operating pressures.

Table 2.5 minimum emergency vent capacity.

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In accordance with AS2809 all vents are fitted with spark arrester (gauze).



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Part No.	Description	Pressure Vent opens at	Vacuum Vent opens at
PVV104	pressure and vacuum vent (small)	15 kpa	3 kpa
PVV204	pressure and vacuum vent (large)	15 kpa	3 kpa
AVV3	air actuated vapour vent	n/a	7 kpa
VOH400	manhole incorporating 9" emergency vent	30 kpa	n/a
SH303/4	manhole incorporating SH303-3 emergency poppet	30 kpa	n/a

*Note: Our PVV104U and PVV204U have different spring settings to suit the regulations in the USA and UK. These regulations also apply in many Asian countries, for details see chart below which highlights our PVV104U.*

	USA	LIQUIP
<b>Emergency Venting* - Open at:</b>	Not less than 0.21 kg/cm <sup>2</sup>	0.23 kg/cm <sup>2</sup>
<b>Small Pressure Vent - Open at:</b>	Not more than 0.07 kg/cm <sup>2</sup>	0.07 kg/cm <sup>2</sup>
<b>Vacuum Vent- Open at:</b>	19 mm Hg	19 mm Hg
<b>Minimum Area in Pressure/Vacuum Vent:</b>	2.86 cm <sup>2</sup>	2.86 cm <sup>2</sup>

Note: Our AVV3UZ is same as AVV3LZ except for gauze fitted p/n 5650 which is solely fitted for security to prevent syphoning of fuel (see export catalogue page E35).

You will note from this chart kg/cm<sup>2</sup> which is just a different unit of measure in regard to pressure, for comparisons see equivalents below.

### PRESSURE EQUIVALENTS

KPA	100.0
lb/ in <sup>2</sup>	14.7
kg/cm <sup>2</sup>	1.0
Bar	1.0
Atmospheres	1.0
mBar	1000.0
mm Hg (mercury)	760.0 mm
Inches H <sub>2</sub> O (water)	406.0 inches