VENDOR :
PROJECT :
CUSTOMER :

CADABCO LTD

VAPOR RECOVERY SYSTEM

VAPOUR RECOVERY UNIT

SIZING INFORMATIONS

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Design Basis for a VRU

The following data are required for a proper design of a VRU.

a) The peak throughput

The peak throughput is required to calculate the pressure drop over the entire vapour collection system including the VRU. In principle the pressure available at the vapour coupler of the truck (the EU Guideline indicates 55 mbarg) should be sufficient to transport the vapours through the vapour arm, the flame arrestors, the vapour line and the VRU.

The peak throughput depends on the number of loading arms connected simultaneously at all loading spots.

For a 2 spot terminal this can be 8.

For a 10 spot terminal this is usually not more than 20.

The figure is specific for each terminal and should be agreed

with the terminal operator.

b) The throughput per cycle (=truck turn around time)

The amount of vapour generated by the loading of trucks per cycle is equal to the sum of the truck capacities loaded simultaneously.

If the average truck capacity is 35 m^3 and the number of loading spots is 4,

the maximum vapour throughput per cycle is 4x 35 = 140 m^3.

This value determines the volume of activated carbon in the beds.

c) The throughput per 4 hours period

The intensity of loading on a terminal is not constant.

Usually there is a peak activity in the morning and another in the afternoon.

The activated carbon beds act as buffers. They can store peak volumes of hydrocarbons during high loading, which can be regenerated during low loading periods.

This is why the required size of the vacuum system is based on a 4-hour period.

The total mass of hydrocarbons loaded in four hours will be regenerated from the carbon beds over a period of 4 hours, even if peaks as high as 200% of the average 4-hour load occur.

d) The throughput per day

If the terminal activity is relatively low in the afternoon, the vacuum system can even be more reduced due to fact that the beds will be over regenerated, creating even a larger buffer.

To determine this adjustment factor the daily throughput and the terminal opening hours are required.

If the loading profile of a terminal is not available, CADABCO is able to determine such a profile from her experience in co-operation with the client.

e) The vapour concentration

The vapour concentration depends strongly on the implementation of phase 2 of the EU Directive.

This means the vapour circuit including the recovery of the vapours at the service station is completely closed. The concentration of the vapour above the gasoline liquid level of the ground tank at the service station will in this case amount to approx. 40 Vol. %.

The vapour space above the diesel tanks contains almost no hydrocarbons.

In case mixed loading of gasoline and diesel, the concentration of the vapours arriving at the terminal will be less.

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End User :	
Contact Name :	
Email :	
Phone :	

Terminal Name :	
Location :	
Country :	

Type of application		Yes / No
	Truck bottom loading	
	Truck Top loading	
	Rail car top loading	
	Marine barge loading	
	Storage Tank	
	Balancing System	

Product list	Product	Yearly throughput

Peak throughput (m3/h)	
Truck (loading) turnaround time (mn)	
Throughput per cycle (m3)	
Throughput per 4 yours (m3)	
Throughput per day (m3)	
Vapour concentration (%vol)	

*if the datas are note available please fill in the tables in the next pages

Truck bottom loading	Number of loading bays	

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	Number of loading arms per bay	
	Max number of arms connected simultaneously per bay	
	Max flowrate per arm	
	Truck turn around time	
	Average truck capacity	
	Gasoline / Diesel ratio	

Truck top loading	Number of loading bays	
	Number of loading position per bay	
	Max flowrate per arm	
	Truck turn around time	
	Average truck capacity	

Railcar loading Estacade	Maximum number of railcars loaded simultaneously	
	Max flowrate per arm	
	Maximum pumping capacity	
	Total filling time per train	
	Average railcar capacity	

Railcar loading On-spot	Maximum number of railcars loaded simultaneously	
	Max flowrate per arm	
	Maximum pumping capacity	
	Total filling time per railcar	
	Average railcar capacity	
	Number of railcar per train	
	Total filling time per train	

Marine or Barge loading	Maximum number of vessels loaded simultaneously	
	Max flowrate per vessel	

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	Vessel size	
	Total filling time per vessel	

Storage tanks	Number of tanks connected	
	Total filling rate of the tanks	
	Filling time of the tanks	
	Total tank volume	
	Average level in the tanks	