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Product ; **FLOATING SUCTIONS.**

Floating suction arms are an extension the loading arm product group.

They are used specifically in tanks.

The purpose of these suction systems is to provide the cleanest product to be drawn from a tank without the added use of filtration. ie. drawing product from near the top of the tank.

Generally the product withdrawn from a tank needing a floating suction system will be aviation fuel , eg Jet A1, however in some cases diesel tanks may employ this method.

Why Floating Suctions ?

Tanks by their design and location are likely to be contaminated by the ambient surrounds.

Contamination will find it's way into the tank.

- **Surface Contamination.**

Dust and dirt particles carried in the air stream will find their way into the tank. This will be through the vents or similar.

This contaminant will float. Therefore it is important that the product drawn from the tank be from below the surface where it will be free of floating contaminant.

Aviation systems will include filtration for a greater purity of product so some contaminant sucked in will be trapped. This contaminant if sucked up by the pump will reduce the effective working life of the filters. More frequent filter change outs are costly when the problem can be greatly reduced.

- **Water is another contaminant which must be avoided when drawing product from the tank.**

This water found in the tank is a result of condensation forming on the inner tank walls when the temperature drops. This will happen over night. The condensed water will collect at the bottom of the tank , below the product.

Procedures are used to drain this water frequently. However to be better secured from water being sucked into the system the suction head is positioned so as to draw at a given distance from the liquid level ,hence the term “floating suction”.

- **Sediment is the next contaminant. That dust and dirt discussed earlier will over time sink to the bottom of the tank. As for the provision to draw from the near bottom with water so too will the system be protected from this sediment.**

From the points outlined here it is evident that suction of the product must be a fixed distance from the liquid level ,near the top and not draw off the bottom of the tank.

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Floating Suctions examples.

The examples attached show different tank types and suitable Floating Suction systems.

Designing Floating Suctions.

There are some very important criteria that must be considered when designing a system. Whatever the product is, all the components used must be compatible with that product. Diesel does not cause as much concern as does aviation fuel.

- They must always drain down, so there are no air traps when first filling the tank.
- The suction stub must never suck air when at the top of it's stroke.
- At the top of it's stroke there must be no chance of it falling over and jamming.
- Foam filled floats or floats that can be pressure tested insitu must be used. The latter floats must have provision to be pressurised while attached to the arm as a maintenance feature.
- A formula to calculate the float size and / or type is used to correctly select the float.
- Special consideration must be given to long arms. These may require bracing or other strengthening methods.
- Where tanks are protected with internal coatings like those used for aviation fuel , Delrin bump stops must be included. Not only must the contact through level drops be considered but also vibration which may come from the pump.
- Aviation fuel (Jet A1) systems should be made from aluminium components. Grease nipples must be removed from the swivels and replaced with SS plugs.
- Aviation fuel systems will require the swivel grease to be removed and replaced with aviation lube.
- Brass nipple holders need to be nickel plated for aviation fuel .
- Swivels connected to the pipes should be by way of flanges to allow easy removal and replacement. Use stainless steel fasteners for JetA-1.
- Swivels need to be made to facilitate easy removal and replacement from the tank through an access port or manhole.
- A lifting cable (of suitable material) must be attached to the arm to overcome "stiction" .
- The suction stub must always draw product from below the surface and above the floor of the tank.
- An anti vortex type suction head must be fitted to the suction arm, on sizes over 100 mm pipe diameter.

All quotes and designs must be approved or prepared by the Engineering Department. These systems if incorrectly specified and supplied are costly to rectify. Getting it right first time is paramount.

Floating Suctions can be designed for most liquid storage tanks in our industry.

Before ordering it is important to specify the liquid that will be sucked, it's flow, the tank style (horizontal or vertical) , diameter and height or length of the tank and any possible obstruction that may get in the way of the floating suction arm like centre roof supports in large tanks. The position of the outlet pipe on the tank needs to be known.