ATR
Industrial Commercial Refrigeration

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Golden Bay Refrigeration Ltd
Takaka

Att Mr Frank Van Grunsven

Re Glycol as a Refrigerant through DX Milk Silos & Double bank Plate coolers

Dear Frank,
Good to catch up the other day & as discussed please find the details why we have moved away from Glycol as a chilling medium in a dairy shed situation, as you know we as a company have used a lot of Glycol over the years especially in our large industrial chillers which we use in industrial situations, we still use a lot of it Glycol & it is still a good secondary chilling medium if used correctly & in the right situation/application.

However, for some reason the on-farm Dairy industry have decided that it is a good idea to use Glycol as secondary chilling through the Milk pre-cooler plate heat exchangers & the Milk silos. For some reason, various companies seem to think that Glycol will fix the chilling problems on farms. The first thing that any client needs to know that under the new Milk cooling regulations, M.P.I & the milk companies are trying to get away from Glycol this is because of several reasons,

1) Milk contamination risk
2) Risk to Product
3) Reliability

The Dairy system supply companies & several refrigeration companies for some reason seem to still push Glycol as a Refrigerant & still convince Farmers that it's a good idea, however they need to actually tell the farmers the truth about Glycol & under the new Regulations it won't work, the two main reasons are as follows & also the reasons why

- The Milk system must run at a Higher pressure than the Glycol circuit
- The Glycol must have a Flow & cut out safety device if a leak occurs

In Refrigeration, we work simply on Pressure & Temperature, In dairy we also work on a flow medium, in simple terms if the Milk system pressure is higher than the Glycol circuit then you will lose the thermal contact & simply not chill the milk as the pressure drop is to great across the plate pack.
Secondly the only way to cut the Glycol circuit out if a leak occurs is either by a float switch in the Glycol ice storage ball tank (which if this happens then by the time it acted the Glycol contamination has already happened) or by installing turbidity meters in the Milk circuit which are extremely expensive.
Another fault that we have been finding is that companies have been pumping Glycol around the DX base pads etc of Milk silos, this will simply not work, there are two main reasons why this is not recommended,

1) Fonterra have let this happen on occasions in the past as a general operating condition, however due to several extreme failures there are now avoiding this, the only way Fonterra will let this happen is that the Client or farmer will need to sign a declaration that all contamination costs & clean-up will be at the Farmers cost, to give an example, I have a silo at the Moment that has been put onto a farm which had been running Glycol through the base pads, This silo had been taken from this farm due to no longer needed & installed onto my

clients farm, we have installed a Unit onto this silo, on commissioning we could not get any performance from the system, after several operational tests we have discovered that the internal DX pads have been contaminated. This silo is now effectively scrap, we are working with Fonterra on this now, the potential cost to the original farmer that put Glycol through it could be as high as $ 55,000 dollars if Fonterra decide the silo will need replacing, I'm sure most farms in this economic climate would not like this cost! The original Refrigeration Company that the Farmer used has simply walked away & as the farm had signed the declaration he unfortunately is in the firing line!

2) Milk silo DX cooling pads are not designed for pumped Glycol, the pads are designed for DX Refrigerant with a pressure drop of 25-35kpa, if glycol is pump through the pad the pressure drop is only 3-5kpa, the thermal conductivity of Stainless will not let the Vat respirate at that pressure drop, hence no cooling will take place. Therefore, we do not hook Glycol to DX silos.

On a secondary note another reason why I will not recommend or use Glycol is pure contamination risk, the main reason is as follows, Glycol is a Alcohol based product due to the propylene / Ethelene content, Alcohol is an antiseptic, this is a major cause for concern, If Glycol leaks into the milk system & under the correct conditions this alcohol will react with certain bacteria in the Milk & form a penicillin derivative, I'm sure every farmer Knows what happens if they contaminate a tanker with penicillin milk!!

As a company, I have never used Glycol in a dairy situation & never will! we use general water chillers & also ice banks, these are most probably the best & simplest way to chill milk, we now use these extensively in the dairy industry & we have now also started to use these in our industrial plants, we are getting extremely good results with energy efficiently & simplicity.

I can give you as much information as you would like on these & several client testimonials on the performances of ice banks, these will certainly encourage you to explore this option.

I hope that this letter gives some insight why I think Glycol shouldn't be used in a Farm dairy situation, however every Contract & job needs to be looked on in an individual basis which I will leave up to you.

If you require any Further Information, please don't hesitate to contact me in anyway.

Yours faithfully

Andrew Turner
Refrigeration Systems Manager
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