ics cool energy

REASONS WHY HFO REFRIGERANTS ARE A STRONG ALTERNATIVE TO NH3/AMMONIA

PILLAR 3 - MAINTENANCE

INTRODUCTION

When installing an industrial chiller in a food, beverage, or dairy setting, it is important to consider whether NH3 (Ammonia) is indeed the most appropriate refrigerant solution.

In food and beverage processes, it has been a traditional approach to have the cooling process applied by an "Industrial" cooling system, typically using ammonia as refrigerant. Some reasons are based on unconscious bias, some other reasons are the "natural" aspect of ammonia.

But now companies that need a mild freezing cooling system are increasingly turning to Hydrofluoroolefin refrigerants – known as HFOs – to improve sustainability, boost performance, and significantly reduce costs.

The ideal refrigerant for these sectors needs to be non-toxic, non-flammable, non-explosive, non-corrosive, not harmful to the environment, cheap and easy to produce / work with and have good thermodynamic properties. Luckily, HFOs meet this criterion. And simply put, HFO solutions are always lower cost versus NH3/ammonia.

HFO refrigerants are categorised as having zero ozone depletion (ODP) potential and low global warming potential (GWP) and R1234ze is a synthetic refrigerant, rather than a natural refrigerant like ammonia. Interestingly the GWP value of R1234ze is less than the GWP another natural refrigerant CO2 (being 1) and importantly R1234ze doesn't create TFA (trifluoroacetic acid and its salts).

Here we look at the aspect of maintenance.

ADDITIONAL STEPS REQUIRED TO MAINTAIN AN AMMONIA CHILLER

Whatever refrigerant your chiller uses it is important to regularly maintain it, as preventative measures can often decrease reactive measures. A planned preventative maintenance programme is an ideal way to manage this. However, with an ammonia system, and given its toxicity and hazard potential, certain additional requirements will be needed.

Some extra steps to avoid leaks, keep staff safe and mitigate risk are:

- Breathing apparatus
- PPE including full length overalls and ammonia grade gloves
- Chemical suits
- Detector to monitor ammonia levels
- Refrigerant detectors
- Emergency remote shutdown
- Ammonia warning signage
- Special housing or a bespoke room for the chiller with ventilation

On top of these, an ammonia chiller needs:

- To be checked more often than a HFO chiller (weekly/ monthly, rather than biannual or annual checks in HFO chillers)
- More rigorous operational maintenance, annual inspection and independent full inspection required
- Two people to be present when the system is opened due to safety and compliance
- A person(s) experienced specifically with ammonia carrying out any maintenance and checks

As with all chiller system maintenance, a qualified technician needs to check pressure and all set points, whilst also looking for breaks or damage to the refrigeration line, areas where any insulation has perished, making sure the compressor(s) are running within their usual operating conditions and checking there is the right amount of refrigerant in the system.

In a recent project at a dairy in the United Kingdom, the customer was initially very keen on ammonia, because of its high efficiency at very low temperatures. Our Sales Engineer presented the range of R1234ze HFO chillers – with less than 1 GWP, and the other benefits of HFOs. The customer was really interested in the fact they wouldn't need any special servicing, no health and risk assessments associated with it, and wouldn't require specially trained engineers specializing in ammonia / leak response due to the non-toxicity of HFOs, which was a deciding factor for them due to the proximity of the factory to a residential area.

Ammonia chillers will need major annual inspections of the system, compressors, pressure vessels, heat exchangers, pipework, pumps, safety devices, valve, electrical controls, electrical components and other items. This will be coupled with weekly, monthly and quarterly routine inspections. This needs to be clear and understood from the project inception and a detailed plan/ maintenance schedule put in place to capture all data, remind of relevant check by date and essentially keep the chiller running safely and securely.

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ICS COOL ENERGYS' APPROACH TO MAINTENANCE OF HFO CHILLERS

When something goes wrong with a chiller you don't have to search high and low for help. You want it fixed – correctly and as fast as possible. ICS Cool Energy has factory-trained technicians near you to service all ICS Cool Energy systems – as well as any other brand of process cooling and HVAC equipment. With continuing education and technology enabled remote support, ICS Cool Energy technicians have the know how to get your system back up and running.

If necessary, ICS Cool Energy also has temporary rental equipment so you can keep your process cooled effectively until your system is back up and running. Additionally, ICS Cool Energy Supply has all the ICS Cool Energy parts and accessories you need to perform your own repairs.

IN SUMMARY

Although ammonia has been used as a cost-efficient cooling medium for over 150 years in chillers and cooling applications at food, beverage, and dairy production sites, the science and modernisation behind other less toxic/safer/lower GWP refrigerants has developed hugely, not least in terms of the magnification and rise to prominence of HFO refrigerants in very recent times especially.

The door is firmly open for refrigerants like R1234ze to offer a perfect cooling alternative regardless of the process or application in question. Given that hydrofluorocarbons like R1234ze are environmentally friendly, non-toxic and with low GWP/ODP (Global Warming Potential / Ozone Depletion Potential), they make a great option for all process cooling requirements in all the aforementioned sectors and their associated industries.

Although service, maintenance and system care are important whatever type of chiller is used, with HFO plant there is not the same risk, worry, risk to health / life and need for emergency procedures should an accident occur.

7 REASONS TO CHOOSE AN ICS COOL ENERGY HFO CHILLER OVER AN AMMONIA CHILLER

- Cost effective solution
- Zero Toxicity
- Ease of maintenance and operation
- Low GWP
- Standardized range of products with fast customisation options
- Proven performance
- Compact footprint