

Ammonia Offers a Green Alternative

A-Gas Managing Director John Ormerod on how this natural refrigerant is growing in popularity due its low GWP, excellent thermodynamic properties and high efficiencies

Why Choose Ammonia?



**Natural
Refrigerant with
a Low GWP**

**Excellent
Thermodynamic
Qualities**

**Recognisable
Odour**

There are three telling reasons to choose ammonia as an alternative to more commonly used industrial refrigerants. First of all ammonia is a natural refrigerant which does not deplete the ozone layer, secondly it has excellent thermodynamic qualities and thirdly it has a recognisable odour which can be viewed as its greatest safety asset.

Ammonia has been used in the refrigeration industry for more than a century and its contribution to cooling has not gone unrecognised. But the latest raft of F-Gas Regulations, with the demise of high GWP (Global Warming Potential) refrigerants firmly in their sights, are now provoking an increase in popularity for this green refrigerant among engineers and end users. It is very much to its advantage that it doesn't have a GWP which places it conveniently beyond the reach of the F-Gas Regulations.

Contractors have long acknowledged that it is a hard-working refrigerant and one that offers good value for money but advances in technology mean that it can be used across a wider range of operating temperatures. This in turn is opening it up for use in an increasing number of different applications.

Ammonia is highly toxic and flammable in certain concentrations which means it does



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have to be handled with care and its application has to be looked at differently when compared to other industrial refrigerants.

That aside, it has been the number one choice for many industrial systems. In applying this, designers have looked to keep the ammonia aspect of the system away from people and manage the risk by doing so. But technology has moved on rapidly in this area in recent years and we are starting to see low-charge ammonia systems entering the market and widening its reach further.

Improvements in technology involving heat exchangers, compressor controls, low pressure receivers and the like, have allowed the charge size to be reduced to as small a quantity as possible – again lowering the risk.

Now a common sight, are small packaged ammonia systems sitting on roofs of buildings with secondary refrigerants like glycols employed to take care of the cooling aspect. In these instances, by placing the ammonia package on the roof, you have contained the risk quite nicely.

Ammonia has many applications in industrial facilities including meat, poultry, fish, dairy, ice cream, brewing and soft drink plants. It has also been successfully employed in large cold stores in the food processing industry where the scale and range of cooling enormous.

This new-found versatility has won ammonia more admirers. Improving technology and greater efficiencies have broadened the number of applications where it can be used to such an extent that some supermarkets have warmed to its potential.

Glycols are a secondary refrigerant familiar to many but times are a changing and even CO₂ has been used in cascade with ammonia.



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I have heard of an application in South Africa where ammonia and carbon dioxide have been combined for cooling at a convenience store. To my mind, if that doesn't highlight how ammonia has widened its appeal to end-users and signalled that it's a gas for the future, nothing will.



Ammonia has impressive thermodynamic properties and can be used at very low temperatures, in some instances down to -40°C , which makes it a special refrigerant. Its energy efficiency track record is good too and it has been proved that it can make a significant difference to electricity bills. Ammonia's distinct odour can be detected by the human nose even at very low concentrations and this is a helpful warning sign in the rare event that all is not as it should be.

For engineers it does require a slightly different skill set but for most competent contractors this is a bridge that they should be able to cross comfortably. In the main, the differences revolve around the need for steel pipe systems because of the added corrosion element and an increased emphasis on safety. I would recommend talking to your specialist training provider about this if you are looking to upskill.

For many years Ammonia was missing from the A-Gas product range but it has now been added to further develop our one stop shop offering. It is not an off-the-shelf product but it is an environmentally-friendly alternative to high GWP refrigerants with its great thermodynamic properties and impressive energy efficiencies.

I predict that the resurgence of ammonia as an environmentally-friendly alternative to HFC refrigerants will continue as the F-Gas Regulations tighten their grip on the industry and the Rwanda agreement point us towards a greener future.

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