Cool Flash

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EDITORIAL

Although August-temperatures have been lower than July, we cannot say the same for our Belgian political climate. It dates already back from June 13 we went to the election offices, and a government still needs to be formed. But Belgium is a complex structure of communities, counties and provinces! The subsidization of solar panels is just one example to demonstrate this: 1/ Federal government provides a tax-reduction up to 40% of the total cost for the placement of solar panels. 2/ The Flemish government support the production of electricity produced via solar panel in the form of 'green-power certificates'. And 3/ local cities or provinces also give extra bonuses for the placement of solar panels. Makes you wonder why not every house in Belgium today has solar panels on its roof! We're looking out for some more sunny times ahead of us.... Enjoy reading this Coolflash!

IN THIS EDITION :

Brenntag NV — Our distributor in Belgium

By Lieven Quidousse (Product Manager, Brenntag NV)

Brenntag N.V. is a part of the Brenntag group, which operates worldwide in excess of 300 locations with more than 11,000 people in 64 countries. The core business of Brenntag involves distribution of a full-line portfolio of chemicals and providing value-added services such as product mixing, formulation and inventory management, as well as technical services and support.

Brenntag N.V. is market leader in chemical distribution in Belgium. Our headquarters are located in Deerlijk. Brenntag has also a warehouse in Mouscron and an export office in Antwerp. As an important link between the producers and the industrial end users, daily more than 205 people are at the customer's service for any chemical they need. Brenntag sells as well industrial chemicals (acids, lyes, solvents, process chemicals, Air1®-AdBlue®) as specialty chemicals. The specialty chemicals division is active in water treatment, food, feed, pharma, cleaning, polymer, cosmetics, lubricants and coating industry.

Brenntag coolant sales team: (from left to right) Jurgen Vanden Bon, Toni Gentile, Nabila Taguema, Lieven Quidousse, Johan De Smijtere, Louis Bertels, Solange Coucke

Brenntag started his cooperation with Arteco mid June 2009. Brenntag has a solid position on the Belgian market. This position is obtained due to an effective production and logistic set-up, a wide range of HTF products, a dedicated sales force and a strong back-up from the management.

Brenntag sells the full Zitrec product range of monoethylene, monopropylene and salt based products,

From Arteco to Zitrec

REACh is still very much on everybody's agenda with the first registration deadline of Dec 1st, 2010 coming up. And following the preparation for the registration dossiers, we start to see here and there the first implications : Based on newly gathered information, some chemicals are receiving a different, more severe classification. And some suppliers are even redrawing completely from the registration process.

Brenntag NV — Our distributor in Belgium (cont'd)

By Lieven Quidousse (Product Manager, Brenntag NV)

depending on the customer's technical needs. The Belgian HTF team consists of 5 regional sales representatives and myself, Lieven Quidousse (product manager maintenance).

Next to this range Brenntag also sells coolants under Brenntag the brandnames BS Coolant and Longlife Coolant for automotive applications through our Air1® sales team.

We assist our customers in making the best product choice and provide them with the required engineering data. The right choice of a coolant with the appropriate corrosion inhibitors is very important. The cost of a production stop or revisions of the cooling system at the customer's site is many times larger than the initial product cost.

For foodgrade applications, we have the Zitrec FC, which is fully NSF-certified. This is important to us, as we are very active in the food industry, which requires more and more safe and approved products in their cooling systems. "

With a continued good support from Arteco, we are convinced to increase our market share in the years to come.

Danske Køledage 4.-5. March in Odense (Denmark) *By Jens Brandt (Brenntag Nordic)*

This exhibition is a combined exhibition with local suppliers to the Danish refrigerant market, as well as a seminar with various presentations on current issues. This year CO_2 was once again in focus, however also presentations about secondary refrigerants were on the agenda.
Brenntag Nordic offers a full range of refrigerants; Ammonia, HFC, CO_2, formiates and glycol both MEG and MPG based.
This year Brenntag focussed on promoting Zitrec FC.
A gimmick with Belgian beer from Troubadour labelled with the Zitrec logo, was of great interest and many customers went home with a bottle, while Brenntag got a potential customer.

We see a growing interest and awareness on safety issues on secondary refrigerants for food and pharma application. There were good discussions with customers, counselling engineers and end-users and we expect increased demand for Zitrec FC.

In general the refrigerant business is affected by the lower activity level in the construction branch, nevertheless there were also a lot of positive signs for the near future.

Installation Fluid Monitoring

By Steven Poppe

Heat transfer systems (existing and new ones) contain a heat transfer fluid which is designated to transport heat or cold. During the heat exchange process, the fluid is thermally charged and at the same time the fluid needs to protect the system against corrosion. Thermal charge, metallurgy and system aeration are some important installation characteristics, which determine how the heat transfer fluid quality evolves.

Extremely important is to know the condition of the installation before a heat transfer fluid (Zitrec) is introduced in the system. The system has to be clean, or must be cleaned before entering a fresh heat transfer fluid. The effectiveness of the cleaning process must be determined by the analysis of a reference sample, or "0" sample. Typical analysis of the reference sample is the contamination level determination by ICP (Inductively Coupled Plasma, a method used to determine metal elements or typical contaminations from other fluids). In the next months the end-users can easily check some fluid parameters by themselves: appearance, deposit formation, particle formation, but also pH determination. The pH can be checked with simple pH strips.

Depending on the severity of the application, it is advised to do more extensive testing on regular basis. The Ghent laboratory has a fully equipped laboratory with test methods specifically developed for analyzing and monitoring the Zitrec fluids. Most important techniques are:

- pH: detection of corrosion, glycol oxidation
- Glycol concentration: detection of water evaporation (freezing point control) and indirect inhibitor content
- ICP (Inductively Coupled Plasma): detection of corrosion elements and contaminations
- HPLC (High Pressure Liquid Chromatography): detection of carboxylate inhibitors
- IC (Ion chromatography) : detection of corrosive anions and contaminations (water quality)

On request, a fluid monitoring program could be set-up based on all of the described analysis, or a combination of one or more parameters. Analysis will reveal the sample condition which could be correlated with system conditions. It also indicates if and when it is advised to drain the system.

Example of a possible fluid monitoring program:

Point in time	Analysis
Just after fill with Zitrec	pH, concentration, ICP, HPLC, IC (full check-up)
Year 1	pH, concentration
Year 2	pH, concentration, ICP
Year 3	pH, concentration
Year 4	pH, concentration, IC
Year 5	pH, concentration, ICP, HPLC, IC (full check-up)

Heat transfer fluids in comparison – Part 2

By Tom Lansbergen

Last time, we learned that volumetric heat capacity of the fluid is one of the aspects one needs to look into when designing a system. One interesting conclusion from this point of view was that in general salts offer much better volumetric heat capacity than glycols do, and particularly $CaCl_2$ systems at low temperatures are best replaced by organic salts such as Zitrec S as this offers better volumetric heat capacity ánd significantly improved corrosion protection.

Another aspect that needs examining is **heat conductivity** of the fluid.

Heat Conductivity

A real life situation in secondary systems is that heat (Q) needs to be transferred from a medium (refrigerant gas, air, food product,…) through a metal wall of a heat exchanger to the heat transfer fluid. An example of this is a cooler in a storage room which needs to keep temperature below a certain limit. The opposite sense of heat flow is also possible. In this case the fluid transfers heat from itself through a metal wall to the outside (air, water, …).

The most common application can be seen in a centralized air conditioning system. In such a system the cooling water is pumped to the coolers in each space and returned to a central unit which expels heat through a big ventilator to the outside air.

The metal referred to may be a plate heat exchanger or a tubular heat exchanger (copper or aluminium coil, …)

The heat flow or transport of heat from one place to another, can be done in multiple ways. One of these ways is by conduction, another way is convection. Conduction is especially important when there is laminar flow of the liquid. At low temperatures, conduction will be the only mode to exchange heat as convection will be very limited.

By mere temperature difference there will automatically be an exchange of heat between the two media on either side of the metal wall. The higher the temperature difference, the more heat can be exchanged.

However, the conductivity of the wall is of equal importance.

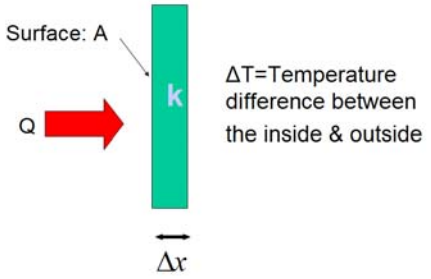
In other words, the wall being in many cases a thermally good conductor, then the heat transfer fluid is the limiting factor.

The better the fluid conducts, the less the temperature difference can be to exchange the same amount of heat.

In many systems however the temperature difference is controlled, and set to e.g. =5°C. With a conductive heat transfer fluid, this means more heat can be taken up per unit of time.

This can be seen from the Fouriers' law of thermal conductivity :

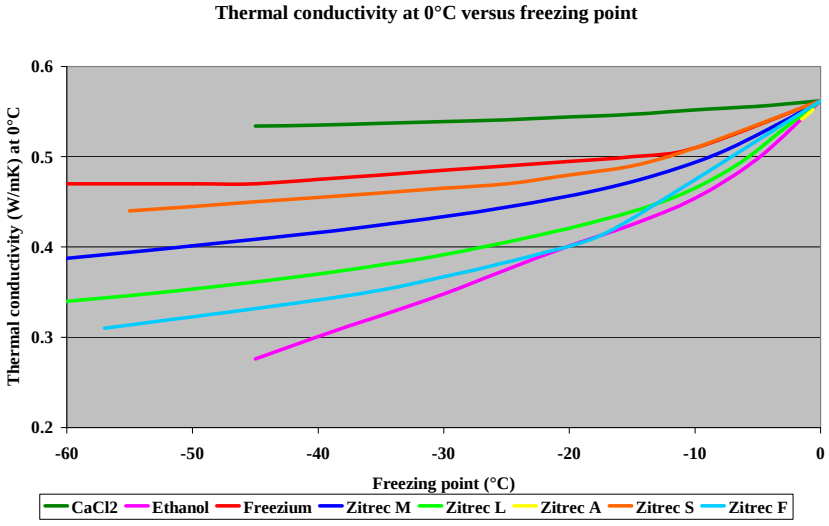
$$\frac{Q}{A} = q = -k.\left(\frac{\Delta T}{\Delta x}\right)$$



$\frac{Q}{A}$	the heat conducted per m²
ΔT	the temperature difference (e.g. 5°C)
Δx	the thickness of the material under review
k	material constant called "conductivity"

In secondary systems, there will be 2 materials to consider: the metal wall and the fluid.

When one would assume and being constant for a given installation, then the k determines how much heat can be conducted per m² of the fluid/wall combination.



The higher k, the better. Let's now look at a graph representing the k's for HTFs:

On the x-axis one can select a heat transfer fluid: at -40°C freeze protection, the conductivity of ethanol is much less than Zitrec F (food grade propylene glycol), Zitrec L (industrial MPG), …, Freezium.

$CaCl_2$ has the best thermal conductivity at low temperatures. In general, the conclusion can be drawn that salts (mineral or organic) are among the best thermal conductive fluids (Zitrec S, Freezium), followed by the group of glycols in which the ethylene glycols are more conductive etc.

Valves for use in secondary systems

By Tom Lansbergen

One of the most important components in any secondary systems are the valves. Different valve functions can be distinguished: there are valves which control flow through sections of the circuit, who control flow speed or do both, and there are those that control flow direction. Still many others exist such as safety valves but we will look into the active components in a secondary cooling system here.

In terms of types of valves there are:

- ball valves
- globe valves
- gate valves
- butterfly valves
- others: plug valves, diaphragm valves, backpressure valves, …

Figure 1 — ball valves

Valves can be either manually operated either remotely through actuators, controlled through a PLC or other equipment. They need to be reliable, and its reliability mainly depends on their quality (material, valve seat).

It is therefore crucial not to have any solid residue coming from corrosion of other parts of the system interfere with the reliability of the valve.

Figure 2 — butterfly valves

It is commonly seen that corrosion products may build up around the valve seat area thus blocking full closure of the valve or the valve is closed with force and thus damaging the valve seat.

In the case of ball valves, dirt or crystals may become lodged in between the ball and the valve housing.

For secondary systems using brines the valve seat is often made from Teflon or inert material. Stainless steel or higly alloyed, wear resistant steels are also used.

Figure 4 — globe valve

Figure 3 — gate valves control flow into a section

It is quite rare to see corrosion inside the valve but it does happen. In case it occurs, this is usually caused by corrosion deposits onto less alloyed or less noble metal parts.

Another type of damage that can be seen is cavitation damage. This is caused by a partly open valve through which the fluid can still pass, but creates areas of underpressure. At these areas, the fluid may easily boil due to the underpressure/temperature combination and cause vapour bubbles to be generated. These bubbles then collapse where pressure is higher and mechanically damage the valve, or components further in the circuit.

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Zitrec Heat transfer fluids