

# Cool Flash

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## Editorial

March 2007....based our calendar, winter is almost gone, and we are almost entering the spring-season. But did we have a winter? Temperatures have been higher than normal. Which makes the appeared climate changes and warming of the planet, definitely a 'hot' item.

But as we missed a real new years edition, I do want to take the opportunity to thank all of you who have contributed to this Coolflash, directly via an article or comment, or indirectly, just for bringing up ideas, suggestions, or asking questions. Also in 2007, I hope to count on you all for your input and support to keep Coolflash an interesting medium for our customers, distributors and all our readers

Els Quintyn

## More about MPG

By Els Quintyn

Monopropylene glycol is, next to MEG, probably the 2<sup>nd</sup> most important base fluid for heat transfer fluids. It therefore deserves our attention :

### What is MPG?

Monopropylene glycol (C<sub>3</sub>H<sub>8</sub>O<sub>2</sub>), also known as 1,2-Propanediol belongs to the family of propylene glycols, together with dipropylene glycol (DPG) and tripropylene glycol (TPG). MPG is the largest volume propylene glycol within its family. They are all derivatives of propylene oxide (PO).

It is a colourless, odourless and slightly viscous product, is highly hygroscopic and miscible in all ratios with water.

### The production process of MPG

MPG is produced in a 2-step process : In a first step propylene oxide (PO) reacts, at a temperature of 115 – 140°C, with water into a mixture of MPG and DPG. The second step of the process is then the distillation and purification of this mixture and separates MPG from the other glycols. To limit the quantity of higher alcohols formed, the amount of water is controlled to favour the production of PG. The reaction can be accelerated by the use of acids or alkalis, but this makes the separation of the final product more difficult.

## The applications of MPG

An important application of MPG is in the production of unsaturated polyester resins, that are, in the end-use applications, applied in items such as water tanks, sailing boats, bath tubs, pipes... The manufacture of plasticizers and hydraulic fluids also consumes considerable quantities of MPG. Further, MPG is used in the manufacture of non-ionic detergents which are utilized in petroleum, sugar refining, paper making industry, but in the end also in cosmetics and liquid washing formulations. Also paints and coatings are a popular application for MPG.

We use MPG as a base fluid for our heat transfer fluids, with applications in airplane de-icers, chemical processing or food applicatons. MPG has interesting heat transfer properties, combined with a low toxicity. This is where the bigger part of the applications lay for MPG : a safer, less toxic alternative for MEG-based products.

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## From Arteco to Zitrec

*Joint-Venture. Initially founded in 1998 as a 50/50 Joint-Venture between Texaco and Elf Coolants, both mother companies have evolved in their organisation and structure. Arteco is today a 50/50 JV of Total and Chevron Corporation.*



## MPG (cont'd)

### MPG USP/EP Grade

A premium grade of MPG is the USP/EP quality. This grade is compliant to both the European and US Pharmacopoeia, and the requirements of the US Food Chemical Codex. Its manufacture and distribution are strictly controlled, using dedicated tanks and trucks. This grade specifically finds its applications in food-contact and pharmaceuticals applications, or cosmetics (e.g. shampoo).

### Toxicity and Safety

The U.S. Food and Drug Administration has given Propylene Glycol the same classification given to common products such as vinegar and table salt: Generally Recognized As Safe (GRAS). And in the USA, MPG has been cleared for Direct food use, which means it can be added to edible material, provided certain requirements are met. A typical application is the use of MPG as humectant in animal food. In Europe the product is approved by the European Pharmacopoeia for use in pharmaceuticals as an excipient (non-active ingredient). In Europe however, MPG is not recognized as a food additive. See table 1 for more details

### Supply and pricing of MPG

Main European players are BASF (GE), BP (GE), DOW (GE), Lyondell (NL, FR) and Repsol (SP). In US main players are Lyondell, Dow and Huntsman. ICIS pricing quotes monopropylene glycol in Europe, Asia-Pacific and USA. In Europe ICIS provides spot prices for MPG and feedstock prices for propylene and propylene oxide. Price assessments by ICIS are based on information supplied by market participants through the week, up to close of business on Friday.

Graph 1 : Price development NWE (ICIS basis)

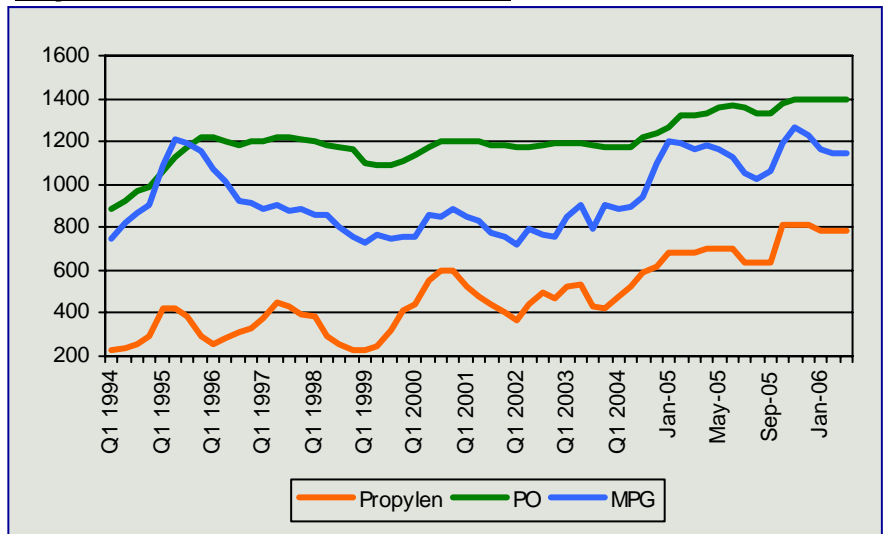


Table 1 : MPG USP/EP grade approvals

**In USA**, Monopropylene glycol USP/EP is :

- cleared for Direct food use (added to an edible material) when in compliance with any prescribed limitations, as Generally Recognised as Safe ( GRAS) under the following paragraphs: 21 CFR 184.1666 Propylene Glycol ; 21 CFR 582. 1666 Substances Generally Recognised As Safe (except in cat food) ; 21 CFR 582.4666
- cleared for Indirect food contact: 21 CFR 175.105 ; 75.300 ; 175.320 ; 176.170 ; 176.210 ; 177.1680 and 40 CFR 180.1001(c) (e) ; 182.99

**In EUROPE**, Monopropylene glycol USP/EP is

- **not** cleared as a general-purpose food grade product or direct food additive for human consumption.
- cleared however for use in food by the EC Council Directive No 95/2/EC on food additives other than colours and sweeteners.
- permitted for use as a permitted carrier and carrier solvent in colours, emulsifiers, antioxidants and enzymes at a maximum of 1 gram per kilogram by weight in the final food stuffs. Proposal to assign E-number E1520 to propane-1,2 diol await confirmation.
- cleared for indirect food contact under EC Council Directive 90/128/EEC of 23 February 1990 as amended through 96/11/EEC relating to plastic materials and articles intended to come into contact with foodstuffs.
- authorised as a Monomer or other starting Substance (section A). The PM/ REF Number is 23740 and 81840.

**In France**, Propylene glycol USP/ EP is

- included in the French Positive List: Order of 27 Oct 1975, as amended through Order of 15 June 1993, regarding approved chemical substances for use in cleaning agents that come into contact with foodstuffs.

**In Germany**, Propylene glycol USP/ EP is

- cleared for use in various applications. According to BgVV recommendations : Articles prepared from natural synthetic rubber, Acrylate and methacrylate block polymers, Cross- linked polyurethanes as adhesives layers for food-packaging materials, Articles based on polyurethanes, Linear Polyurethanes for paper coatings, Synthetic sausage skins



## Ireland's first Ice Dome now using Zitrec MC

By Paul Leyden (Total Fluid Solutions Ltd. Ireland)



December 2006 saw Ireland's first Olympic Sized Ice Rink was officially opened by the Irish Taoiseach Mr. Bertie Ahern T.D.

It is a hugely exciting development for Dundalk which is now home to the first Olympic sized ice-rink in this country. This was a major project with a total investment of over €6million. The Ice Dome is a chief attraction in its own right that has been warmly received by the local council and community alike. Between 20 and 25 jobs have been created here and these will be of tremendous benefit to the local area. This 220,000 square foot ice-skating development will also be hosting the International Ice Hockey Federation(IIHF) 2007 World Championships, Division 3 here this April.

The refrigeration equipment manufacturers for this project were Cimco Refrigeration. Cimco have installed over 4,500 ice surfaces worldwide, including 80% of the NHL facilities and 100% of the NBA facilities since 1990.

Cimco prescribed our Zitrec MC heat transfer fluid over many of our competitors products due to it's specialized performance and longevity within closed loop systems.

Cimco are very happy with the performance and the service provided by Total Fluid Solutions Ltd here in Ireland and would consider our company and products us for any future related projects. Zitrec MC has been supplied to the system for a -25celsius freeze protection and is also serving and protecting a heat recovery system for under-floor heating.

Please see [www.dundalkicedome.com](http://www.dundalkicedome.com) for additional details relating to the facility





# Engineering Tips & Tricks

By Tom Lansbergen

## Lifting Height of a pump

The term lifting height dates back to the times when pumps were mainly used for lifting water from a lower point to a higher point.

Under this situation there was a need to express the so called static pressure of the pump in meters lifting height. In other words, at its maximal power, how high can the pump lift a column of water is the question to be answered.

Supposing that height to be  $H$  and  $\Delta p$  the pressure the pump can generate, then with  $\rho$  being the density of the fluid and  $g$  the gravitational acceleration= $9.81\text{m/s}^2$  the pumping height can be calculated from:

$$H = \frac{\Delta p}{\rho g}$$

In the case that one were to calculate the pumping height for the same pressure generated by the pump of a liquid having a density of 20% higher than water, one would notice that the maximal lifting height is 17% less!

$$H_{brine} = \frac{H_{water}}{1.2}$$

This is clearly the case for brines such as Freezium and Zitrec S which have densities ranging from 1.1 to 1.3 kg/L.

## Pump dimensioning tips

The association of pump manufacturers in the USA "Hydraulic Institute" has published a nomogram for correcting hydraulic parameters and motor dimensioning of pumps in hydraulic systems. The nomogram can be used to obtain the values of coefficients called  $K_H$ ,  $K_Q$  and  $K_h$  with which the values determined for water need to be multiplied in order to account for different viscosities of the fluid that needs to be pumped.

You can find some great information on this subject on [www.pumps.org](http://www.pumps.org) and [www.pumpsystemsmatter.org](http://www.pumpsystemsmatter.org). On this site, the free download of PSIM software allows you to calculate system hydraulics and the correction factors described above.

## Readers corner

Do you have comments or feedback? Want to share experiences with other readers ... this is where you can do this. This is your corner! A selection of comments will be published here.

### Contact

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## Arteco implemented SAP in 2006.

By Geert De Waele, Plant & ERP Project Manager



You may not have been affected, but yes...Arteco implemented SAP in 2006!

When we decided in 2004 to change our whole ERP-system, implemented in 1999, to a new, more integrated one, we all knew that we had a lot of work ahead; especially because we decided to do it with our own resources, convinced that our own people have the best knowledge of our business processes.

A project team was put together, joining all departments, and we started writing on a blank white paper what we had at that moment and what we thought we would need to cover better our future developments. This resulted in a first deliverable : the famous “ERP-requirements list”, sent to several suppliers, offering different software packages that we estimated capable of covering our business processes. We received 9 offers for 3 different packages and we went through a double selection round via a “question and answering” session with all suppliers, which resulted in a shortlist of 3 suppliers, surprisingly... for 3 remaining software packages.

In order to make the right decision for our company, we asked the remaining suppliers to conduct a 1-day demo session, but not an ordinary one. We prepared real Arteco business scenarios that we sent them a few weeks ahead. Indeed, we wanted to challenge their capability of thinking our way in stead of showing a standard presentation of what their package could do. We also kept a few “last minute” changes for the day of the demo, because that’s what life is at Arteco : we want our ERP-system to be able to handle “urgent” orders for our valuable customers.

It was extremely interesting to see that all 3 suppliers had a different approach, each with their strengths and their weaknesses. Through a few more negotiations, we finally granted the order to a local Belgian partner (Delaware Consulting), who was offering SAP with a quite good match and flexible service towards our initial requirements.

From then on, the implementation started. And finally, 1<sup>st</sup> of June 2006 was the big day. We had a HTF-workshop that day, some of you will remember that. The ERP-project team was set to go, after a few sleepless nights, but convinced that we were all well prepared. So off we went, that Thursday morning. We admit, it was a bit crowded at the expedition desk in our plant that day and there was some waiting time to give the required documents to the driver, but we spent a marvelous day together, with an incredible team spirit and a driving will to succeed and to never let ourselves down.

Have we succeeded? Did we make the right choice? You, our customers, should be able to tell us. If things went smoothly and you were not too much embarrassed by new documents, late deliveries, wrong invoices,... I would say we did quite well. Now, 9 months later, I would be too simplistic saying that all problems are solved. But as it was 2 years ago on the 1<sup>st</sup> working day of January 2005, I know that a team of professionals, binding strengths to reach one goal, is capable of passing unexpected limits.

And staying COOL, well, that’s just a part of it...



# Agenda

- 15 Mar—16 Mar '07.  
Dankse Koledag  
Odense—Denmark
- 6 Mar - 10 Mar '07. ISH  
Frankfurt - Germany
- 13 Mar - 16 Mar '07.  
Climate World  
Russia — Moscow
- 24 Apr - 26 Apr '07  
Klimaatvak  
Gornichem—The Netherlands

## Caldic UK at RAC

*By Cliff Saunders, Caldic UK Ltd*

Arteco's UK distributor, Caldic UK Ltd, were exhibitors at the RAC 07 (refrigeration and air conditioning show) held recently at the N.E.C. Birmingham, to promote the Zitrec range of heat transfer fluids.

It was the first time Caldic UK Ltd have exhibited at this event so we had no idea what to expect or what the level of interest would be, being the "new kids on the block".

The show was well attended, especially on the 2<sup>nd</sup> day, by a mix of designers, engineers, specifiers, OEM's and end users of HTF's. The number of visits to our stand and the leads generated from them well surpassed our expectations and we have now made contact with some very significant potential customers, many of whom we would not have identified had we not been at the RAC07. The Zitrec name is now better known in the market and generating a good level of interest. A significant observation we made from the discussions with visitors to our stand is that many of them were not really aware of how the inhibitor packages in HTF's work and what they do. Therefore, when we explained the difference and benefits of the Zitrec OAT inhibitors and how they work, it really opened their eyes to the fact that they can extend the life and performance of their equipment, saving them money in the long run.



We now have to go away and follow up the many leads gained and convert them into buying customers and to prepare for RAC 09 which we intend exhibiting at again to build on the success of this year.

Overall, our attendance at the exhibition, supported by Arteco, was a thoroughly worthwhile experience and I am certain that a good level of business will directly result from us being there. A special thanks goes to Peter Bradley who gave us two days of his time to help on the stand and offer technical advice (and demonstrate the correct way to drink the Zitrec beer!).

## Distributor update : Arteco welcomes 3 new distributors

*By Tom Lansbergen*

We'd like to welcome Caldic UK, Brenntag France and Gas Servei in Spain to our distribution team for Heat Transfer Fluids! Both Caldic UK and Brenntag France are active in their countries as chemical distribution companies, but with the added value of being able to support customers that require more than just "a supplier" of products. In Arteco's business philosophy it is of extreme importance that the distributor can show a solid reputation and technical competence, but also a good logistical organisation. Both Caldic and Brenntag show an excellent track record on these subjects!

This is not different for Gas Servei, Spain's leading refrigerant gas supplier. Having a large number of depots and dedicated support for Arteco's Zitrec products, they are best placed to serve Spanish and Portuguese customers!

This cooperation with these 3 leading companies fit into the strategy of Arteco's HTF business development.

We'd like to wish Alberto, Cliff, Rodney, Fiona, John, Craig, Laurent, Frédéric, Lluís Jr.,.... good luck in their new business!



## Our distributors in Europe :

**For Denmark :**

Hecodan ApS  
Tel +45-4.826.24.07  
hecodan@hecodan.dk  
www.hecodan.dk

**For Belgium :**

Gasco België  
Tel +32-9.341.97.77  
info@gasco.be  
www.gasco-group.com

**For Sweden :**

Stainless Engineering AB  
Tel +46-8.541.335.41  
freezium-zitrec@stainlesengineering.se

**For the Netherlands :**

Gasco Nederland  
Tel +31-15.251.72.72  
gndelft@gasco.be  
www.gasco-group.com

**For United Kingdom :**

A-Gas (UK)Ltd  
Tel +44-1275.37.66.00  
ken.logan@agas.com  
www.agas.com

**For United Kingdom:**

Caldic UK, Ltd.  
Tel +44-1246.59.39.05  
C.ormsby@caldic.com  
www.caldic.com

**For Italy:**

Pietro Carini S.p.A  
Tel +39-2.72.56.01  
info@carini.it  
www.carini.it

**For France:**

Brenntag SA  
Tel +33-4.72.22.16.00  
fluide@brenntag.fr  
www.brenntag.fr

**For Spain:**

Gas Servei  
Tel +34-93.223.13.77  
gas-servei@gas-servei.com  
www.gas-servei.com

**For Germany:**

Gasco Deutschland  
Tel +49-2841 95306  
gdmoers@gasco.be  
www.gasco-group.com

**For Germany:**

Fragol  
Tel +49-208 300 02 63  
waermetraeger@fragol.de  
www.fragol.com

**For Denmark, Sweden, Norway :**

Brenntag Nordic - HTF-group  
Tel +46-33.23.18.80 (Sweden)  
Tel +47-69.10.25.00 (Norway)  
Tel +45-43.29.28.00 (Denmark)  
main@brenntag-nordic.com

**For Switzerland :**

Strub +Co AG  
Tel +41-62.758.22.22  
info@strub-lube.ch  
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**For Ireland:**

Total Fluid Solutions, Ltd.  
Tel +353-866.02.89.06  
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