



# NITROSource NEWS 02

JULY 2019

## NITROSource News Issue 2

I hope you enjoyed reading the 1st edition of NITROSource News and it contained information that was informative and useful to you?

This 2nd edition focuses on quite a popular and much discussed market sector – brewing.

One of the main questions surrounding the suitability of Parker NITROSource and MIDIGAS PSA nitrogen generators for brewing applications is the gas purity.

Often, brewers are reluctant to change from liquid or cylinder purity nitrogen, with inherent very low oxygen content of between 5ppm to 20ppm, for fear of increasing their end products dissolved oxygen level.

The amount of oxygen that can be dissolved, even when in contact with the ambient level of 20.9% in air, is in the region of 10ppm. Using nitrogen at 0.5% purity reduces the solubility levels to below 0.4ppm.



## St Austell Brewery

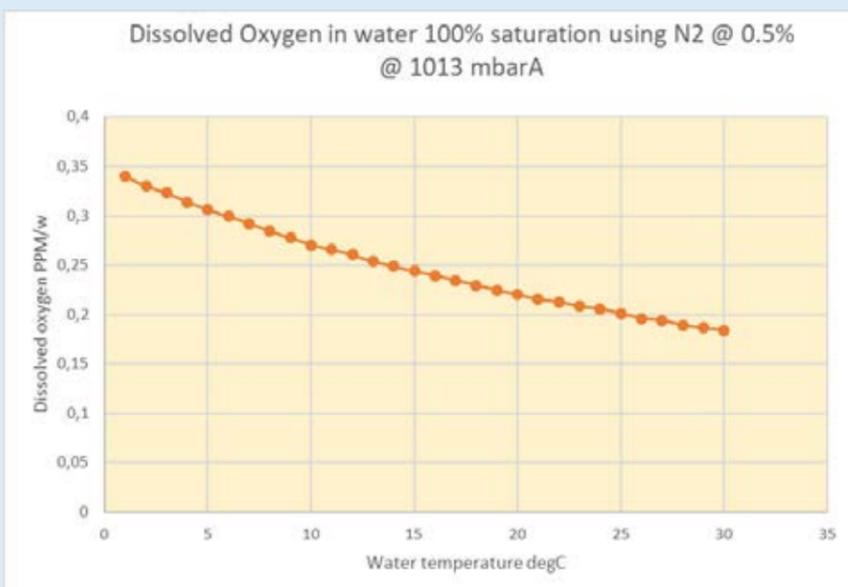
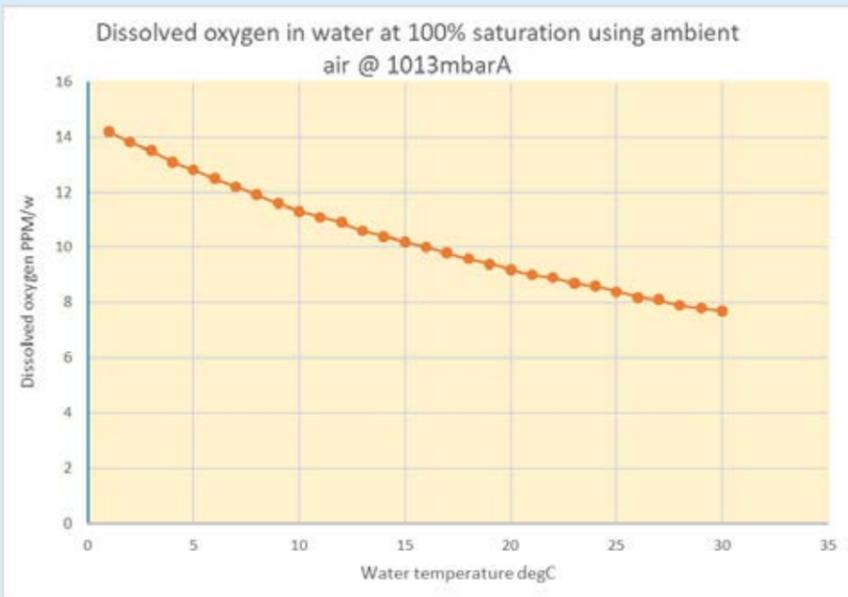
**Three generations of Parker nitrogen systems prove reliability, suitability and customer satisfaction!**

Our first success story for brewing dates back to early 2000 in the UK when St. Austell Brewery one of Cornwall's oldest breweries, established in 1851, decided to investigate the use of gas generation to replace their liquid nitrogen supply.

Nitrogen is used throughout the brewing process to prevent dissolved oxygen

from contact with ambient air, spoiling the beer. It is mainly used for blanketing racking tanks, product transfer, and keging.

As well as the increasing cost of their liquid nitrogen supply, St Austell were worried about late deliveries, running out of gas and the possible resultant product spoilage.



Based towards the very south west tip of England and on a steep incline, deliveries in bad weather, especially during the winter, were of concern.

In depth discussions ensued with St. Austell's head brewer and a target gas purity of 0.5% was agreed upon. For those of you that may remember the early range of nitrogen generators produced by then donnick hunter, an N2MAX108 was selected and installed.

This unit operated very successfully, until in 2008, the brewery underwent a £7.3 million GBP expansion to increase their beer production rate to 12,000 litres per hour.

The whole project was handled by Microdat, one of the UK's leading manufacturers of keg and cask packaging equipment.

To cope with the increased inert gas demand and based on the N2MAX's flawless performance, a Parker MAXGAS108 was selected complete with DME compressed air pre-treatment and OIL-X EVOLUTION filters for the additional requirements.

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Racking tanks.

In 2016 St. Austell underwent even further expansion and this time the NITROSource N2-80P with DME060 pre-treatment package was installed.

One of the areas St. Austell investigated, with the abundance of low cost nitrogen, was where it could replace CO<sub>2</sub>. Using it for head space blanketing in racking tanks was deemed very useful.

St. Austell advised that a key advantage of using nitrogen in place of CO<sub>2</sub>, apart from the obvious cost and environmental savings, is with clean in place operations. [CIP].

Usually caustic solutions such as sodium hydroxide are used to clean and sterilise

pipe-work and vessels. In the presence of CO<sub>2</sub>, sodium hydroxide forms sodium carbonate and sodium bicarbonate, thus negating its sterilising potential and preventing the expensive cleaning agent from being re-used.

This means that to clean pipe-work and vessels, the CO<sub>2</sub> needs to be purged or vented, letting in air, but then equipment will no longer be under inert conditions.

Using nitrogen as the blanketing gas means that it can be left in place during the cleaning process and everything remains inert. It can also be used to purge after cleaning.

## How we won

There were quite a few key objectives that needed to be considered.

The first was proving cost savings and reliability compared to the existing liquid supply. This was achieved by providing and discussing total cost of ownership calculations with comparisons to gas company invoices over several years production.

Also important was that an uninterrupted supply of low cost generated nitrogen could now be considered to replace CO<sub>2</sub> in certain applications, saving money and an important environmental plus point.

Having experienced late or missed deliveries during very bad weather, although not common, had caused serious issues in the past. On-site generation greatly reduced reliance on gas company supplies and production down time.

Probably the most difficult issue to overcome, with one of our first installations in a brewery application, was the question of gas purity with regards to oxygen content.

With a strong desire to reduce reliance on the incumbent gas company, and based on their very experience head brewers backing, St. Austell were prepared to relax their nitrogen purity specification to 0.5% in the knowledge that the Parker modular system could be upgraded if necessary to a higher purity.

The progression from N2MAX108 to MAXGAS108 and more recently N2-80P was a little easier. St. Austell had experienced all the benefits of on-site generation through Parker, operating faultlessly @ 0.5% without any detrimental effect on the finished product. Once this winning combination was established, tried, tested and trusted, there was no reason for them to change to anyone else.



## Thatchers Cider

Cider is a beverage produce by fermenting apple juice with yeast to turn the naturally occurring sugars into alcohol.

English orchards in the counties of Somerset, Herefordshire, Devon, Cornwall, Kent, Norfolk and Suffolk, produce some of the finest cider apple varieties in the world.

One of the most well know manufacturers is Thatchers Cider, based in Sanford, North Somerset, where they have been making cider since 1904.

Fermentation of the apple juice with yeast takes about eight days from where it is transferred to racking tanks to separate the yeast from the cider, before being matured in oak vats for around six weeks.

Thatchers have 11 oak vats, each over 150 years old and standing 30 feet tall (9.2 metres). They were hand crafted by skilled Coopers and each one took the

wood from at least three, fully grown, English oak trees! The largest vat holds approximately 135,500 pints of cider – (77,000 litres or 20,341 US Gal.). The aged oak helps give the cider, Thatchers distinctive and characteristic flavour.

Traditionally Thatchers had used CO<sub>2</sub> for all their cider production processes but rising costs and unreliable deliveries were becoming more of a concern.

Parker UK supported local distributor, A W Sterne, to approach Thatchers with a proposal to replace CO<sub>2</sub> in certain areas of the production process with generated nitrogen gas.

We were able to demonstrate that changing from CO<sub>2</sub> for purging, pressure padding and blanketing in the storage and racking tanks along with product transfer, would save Thatchers up to 70% from their current CO<sub>2</sub> costs per annum.

A NITROSource N2-65PBLV along with CDAS75-HL and Oil-X EVOLUTION pre-treatment package was duly installed to provide the required nitrogen gas flow.

## How we won

We were competing against a modular nitrogen generator manufacturer based in Scotland – Peak Industrial Ltd.

We were able to demonstrate prior experience over many years with breweries such as St. Austell along with the superior energy saving features of the NITROSource generator and CDAS pre-treatment package. This gave the customer confidence that they would purchase a proven system with zero risk and local support.

Unlike NITROSource and MIDIGAS, the Peak iFlow range of nitrogen generators doesn't have independent 3rd party certification of food grade nitrogen delivery and materials of construction compliance.

It also doesn't have off-gas by-pass, requiring manual intervention to correct, if a purity problem occurred. This was unacceptable to Thatchers.



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## Porterhouse Brewery, Ireland

Cousins, Oliver Hughes and Liam LaHart, the founders of Porterhouse Brewing Company, opened their first brewery back in 1983 named "Harty's Brewery".

Their dream was to not only produce beer but to open their own, independent brew pub, to sell their craft beers. That happened in Dublin back in 1996, but sceptics said it would only last 6 months.

In 2000, Oliver and Liam, along with head brewer and new part owner Peter Mosley, needed to expand to cope with demand. They opened the Porterhouse Brewery in Blanchardstown, Dublin, Ireland.

Having used cylinders of nitrogen for their smaller scale production, the cost, handling and monitoring issues started to become a problem for them. This is where Parker's distributor for Ireland, Dalco Nitrogen Systems, stepped in with a skid packaged nitrogen generation system.

Space was tight in the new brewery for additional equipment such as a nitrogen system, so Dalco engineered an N2MAX108 custom package that could be located on top of an internal structure out of the way of the production area.

Demand for Porterhouse beers increased dramatically, with exports to Singapore, most of Europe and USA, with Italy being one of the biggest European importers.

2016 saw the start of construction for a new larger brewery, that opened in 2018. Again, John Daly of Dalco was involved in specifying and supplying a NITROSource nitrogen generator package to take over from the 16-year old N2MAX108 nitrogen generator.

On a recent visit I spoke with head brewer, Peter Mosley, to try and find out a little more about their use of nitrogen.

They use it for purging tanks and vessels to remove ambient air, as well as for direct injection into their nitrogenated stouts and beers.

Peter went on to explain that he had "saved €100,000's of Euros by replacing what would have been CO<sub>2</sub> for this purging application with generated nitrogen gas".

The selection of a new NITROSource package from Dalco was easy as "the previous system had operated for over 15 years and had not given one day of trouble".

Today, Porterhouse has four pubs in Dublin, one in London's famous Covent Garden and Fraunces Tavern, the oldest building in Manhattan, New York, USA.

In 1998 and again in 2012 their Plain Porter won "Best Stout in The World" award.



Yours truly speaking with head brewer, Peter Mosley (in the shorts), during a recent visit to the Porterhouse Brewery in Dublin.

NITROSource skid package installed in Porterhouse Brewery.

## How dry is Parker generated nitrogen gas?

Questions that I often get asked are – "Is the gas from a NITROSource as dry as liquid nitrogen?" or "What is our generated gas pressure dew point?"

During the development of the NITROSource PSA generator, Paul Chambers, our very long standing and experienced research and development engineer, carried out some testing using a calibrated hygrometer. He's passed the results on to me so that I can finally answer this with a definitive value. This table details the results.

NITROSource PSA - Average Moisture Content in Nitrogen Gas Output Flow with standard desiccant dried - 40°C inlet air					
Nitrogen Outlet Pressure	Pressure Dew Point °C	ppm (V)	ppm (W)	Absolute Humidity g/m <sup>3</sup>	Relative Humidity % @ 20 °C
1bar(a)	-85.0	0.535	0.344	0.0004	0.0023
1bar(g)	-80.9	0.517	0.332	0.0008	0.0044
2bar(g)	-78.5	0.500	0.322	0.0011	0.0064
3bar(g)	-76.7	0.492	0.317	0.0015	0.0084
4bar(g)	-75.3	0.485	0.312	0.0018	0.0104
5bar(g)	-74.1	0.482	0.310	0.0021	0.0124
6bar(g)	-73.1	0.478	0.307	0.0025	0.0142
7bar(g)	-72.2	0.475	0.306	0.0028	0.0163
8bar(g)	-71.5	0.467	0.300	0.0031	0.0179
9bar(g)	-70.8	0.463	0.298	0.0034	0.0198
10bar(g)	-70.1	0.465	0.299	0.0038	0.0219
11bar(g)	-69.5	0.463	0.298	0.0041	0.0238
12bar(g)	-69.0	0.458	0.295	0.0044	0.0255

Conversion source – Michell Instruments UK - humidity calculator  
NITROSource PSA measured ADP range -75 °C to -100 °C. Average ADP -85 °C

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## NITROSource / MIDIGAS feature focus

In the first issue, the off-gas by-pass system was featured. Since then some interesting information has been uncovered that can further enhance the value this feature might support.

Nitrogen gas used for food and beverage applications, including brewing, is generally classed as a food additive under European regulations and given an "E" number – E941.



Parker NITROSource's integral oxygen analyser (fitted as standard) measures output gas purity as per the EIGA recommendations. Additionally, 4-20mA outputs or the MODBUS connection allow for remote oxygen indication and data logging, providing complete traceability.

## The European Industrial Gases Association, EIGA, has published a document –

### SAFE DESIGN AND OPERATION OF ON-SITE NITROGEN GENERATORS FOR FOOD USE

Doc 194/15

What is EIGA? -

“EIGA”: European Industrial Gases Association - AISBL

The European Industrial Gases Association, EIGA, is a safety and technically oriented organization representing the majority of European and a number of non-European companies producing and distributing industrial, medical and food gases.

EIGA also initiates the development of appropriate standards and provides standardization bodies with technological expertise.

In the above document EIGA state -

**“At least one continuously on-line residual oxygen analyser shall be installed in the generated nitrogen gas stream to ensure the end-user’s product quality and traceability requirements.**

**In the event that the on-line instrumentation detects the produced nitrogen stream to be out of specification range for oxygen, this nitrogen stream shall be vented.”**

NITROSource and MIDIGAS, have an integral oxygen analyser to measure the residual oxygen content in the generated gas stream, if it is ‘out of specification’ the off-gas by-pass system prevents any ‘out of specification’ gas from entering the application and vents it. These are fitted as standard.

This is exactly as specified by EIGA for the operation of a nitrogen gas generator for food applications.

If a competitor’s nitrogen generator doesn’t have an oxygen analyser in the system linked to an automatic off-gas vent system then it doesn’t comply.

Research has shown that many of our competitors charge extra for these features, or with specific regards to the off-gas by-pass system, don’t have this option at all!

## New brochure available

To coincide with this newsletter focussing on brewing, Parker have published a new brochure for NITROSource featuring applications in the brewing industry.

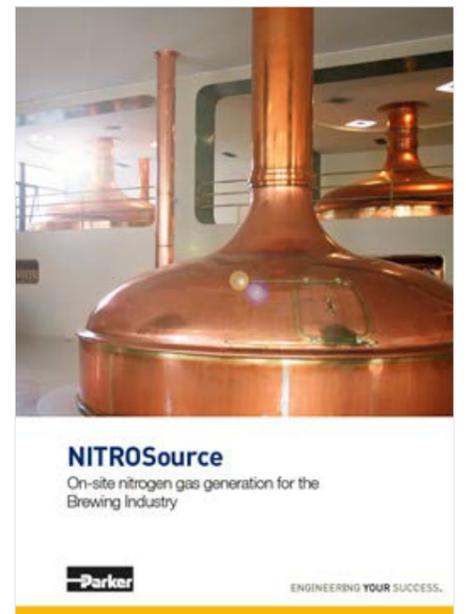
The brochure highlights some of the key applications within the brewing industry. How CO<sub>2</sub> can be replaced with nitrogen in clean in place processes along with the advantages of using Parker NITROSource over conventional methods of supply such as cylinder gas and bulk liquid.

Download it using these links

[English >>](#)

[German >>](#)

[Italian >>](#)



## Request for application articles and gas generation material

Hopefully the second issue has been of interest to you? To continue to produce this publication we need input from our colleagues and distributors.

I am pleased to announce that the first distributor to contribute a story, outside of the UK and Ireland, is Alen Tomić from Fering Fit, Croatia.

His laser cutting application will feature in the next publication, thanks Alen for your support!

Please email me or call me with any details you have on nitrogen applications or interesting facts.

I just need the basics and can help develop an article from working with you further.

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Thanks for reading

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