

BIP[®] technology

setting the standard for Experis[®] high purity gases

“The slightest contamination could compromise our isotope measurements or damage our equipment. BIP[®] technology has enabled us to balance our technical demands with cost constraints.”

Cyril GIRARDIN
Engineer, INRA, France



➤ **With BIP® technology, you'll be in a league of your own**

Belonging to our Experis® range of ultra-pure gases and gas calibration mixtures designed to suit the most stringent requirements of laboratories and industries, **BIP® gases** guarantee you the highest levels of **purity**. Ultra low impurity levels **secure** the accuracy of your results, giving you peace of mind so you are free to concentrate on your business.

- **Purity**
- **Consistency**
- **Convenience**
- **Cost savings**
- **Performance enhancement**



➤ **Pure genius, from the inside out**

The patented BIP® technology system is a self-contained purification system consisting of a specially designed valve and purifier bed. The BIP® system purifies gas at high pressure to achieve lower levels of impurities just before it leaves the cylinder.

- **Lowest levels of impurity guaranteed**
- **As low as <10 ppb total hydrocarbons, < 10 ppb O₂ and < 20 ppb H₂O**
- **No more hassle and cost associated with external purifiers**

➤ **More than gas, it is an insurance**

The patented BIP® technology features an automatic shut-off valve making it impossible for a rogue cylinder to be delivered and connected. Though minimal, the risks associated with gas contamination are serious and costly – business critical results become unreliable or late, production delays are incurred, not to mention all the hassle and cost. BIP® technology provides insurance against such risks.

- **No rogue cylinders**

But don't take our word for it...

It's a success that's widely recognised. BIP® technology received the Queens Award for Innovation in the UK in 2004 and is used by thousands of customers in Europe, including the top five manufacturers of analytical equipment as well as the national laboratories of seven European countries.

...just ask our customers!

"The new BIP® cylinder technology from Air Products has demonstrated the potential for cost savings up to 70% in the FAME (fatty acid methyl ester) analysis system."

Dr. A Edge, Laboratory of the Government Chemist (LGC), UK.

BIP® Helium puts Einstein's theory to the test!

Albert Einstein may be widely regarded as the genius of the twentieth century. But some features of his famous Theory of Relativity have yet to be challenged. NASA and Stanford University (California) are running an experiment, known as Gravity Probe B. It will test two extraordinary, but unverified, predictions of Einstein's general theory of relativity. The theory predicts that space and time are distorted by the presence of massive objects, like the Earth.

To test those predictions, the Gravity Probe B effort launched a satellite containing four gyroscopes into an orbit 400 miles (640 kilometers) directly over the poles. So free are the gyroscopes from disturbance that they provide an almost perfect space-time reference system. Air Products is supplying both gaseous and liquid helium for the experiment. The gaseous helium, in our proprietary BIP® cylinder technology, spins the gyroscopes. It has to be incredibly low in particles and molecular impurities, so that no species will freeze out in space and stop the gyroscopes from spinning.

Dr Chris Gray, Science and Engineering Associate who worked on the Gravity B project, was confident in the quality of the BIP® helium that filled the in-flight pressure bottles. He had proven that the CO₂, O₂, and particles were at the levels he wanted them, straight from the BIP® cylinder.



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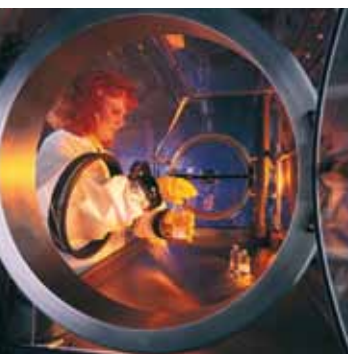
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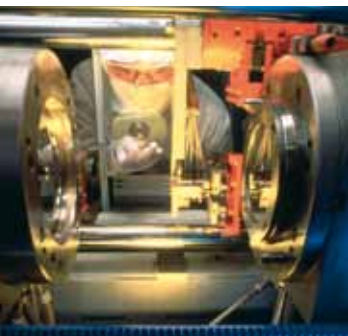
"In our business, we cannot afford any production stops... with BIP® technology we now have an insurance on product consistency for each single cylinder we use, from the first to the last molecule."

Willem van Wijk,
Production Manager from Alcontrol Laboratories BV Nederland.

BIP® gases for analytical applications



BIP® gases for glove boxes



BIP® gases for CD/DVD production

➤ **Minimum impurity for maximum peace of mind**

In a competitive and regulated market, industries are under constant pressure to increase productivity, optimize their process and improve quality while minimizing pollution and costs. Legislation and tough competition have resulted in increased demand for ever more accurate and reliable analyses of a wide range of complex chemical compounds.

Just think: with less impurities in the gases you use, you're bound to have a head start in the race.

Make the most of the BIP® technological breakthrough; BIP® gases have impurity levels as low as 10ppb total hydrocarbons, 10ppb oxygen and 20ppb moisture, meaning BIP® gases deliver the lowest level of impurities available anywhere. **BIP® gases have become the analytical standard** for all applications requiring high purity gases with consistently low levels of impurities: gas chromatography, inerting, high quality welding and many others.



BIP® gases for high-technology welding

➤ BIP® technology for high-tech applications

Specialist analytical and industrial applications require an assurance of gas purity at the point of use.

That's why we invented BIP® technology for Experis® gases, setting the standard for highly demanding applications.

- Purity
- Accuracy
- Stability
- Peace of mind

“We dramatically improved the performance of our glove boxes with increased lifetime of the catalyst and reduced regeneration downtime. We wouldn't recommend anything other than BIP® cylinder technology and its very low levels of H₂O and O₂.”

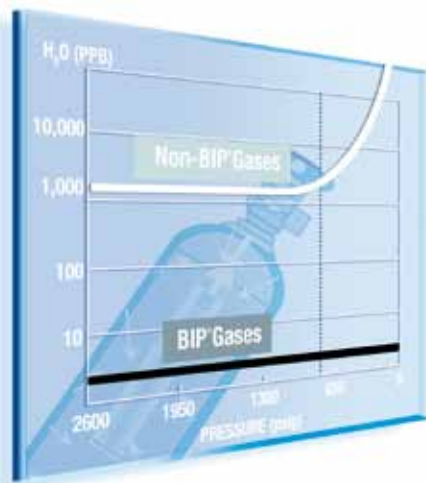
Arend Kooi.

Sales manager MBRAUN Glove Boxes,
BFI OPTILAS B.V., The Netherlands

➤ And if purity rhymed with consistency?

Air Products carries out strict quality controls to guarantee the purity of the gases contained in its cylinders. Each cylinder is delivered with a certificate of conformity. Furthermore, the unique BIP® purification system insures gas purity consistency up to the last molecule. Which means up to **20% more usable gas** compared with traditional cylinders.

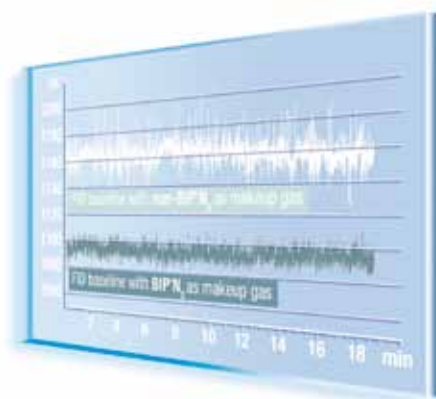
- Certified specs
- More usable gas for your money



➤ BIP® technology means failsafe analyses for all GC users

Since BIP® gases have **impurity levels as low as 10ppb total hydrocarbons, 10ppb of oxygen and 20ppb of water**, every gas cylinder fitted with BIP® technology gives GC users the benefit of an improved baseline, better peak separation, lower detection limits and greater sensitivity. All this in addition to greater lifetime for columns and detectors and minimal maintenance. BIP® gas is the ultimate zero-defect gas.

- Better analytical results



👉 You want purity, we've got it

Patented and designed by Air Products, the BIP® purification technology enables you to use argon, nitrogen, hydrogen and helium that are up to **300 times purer** than normal cylinder gases.

Experis® gases with BIP® technology are available in 3 grades, featuring impurities as low as <10ppb total hydrocarbons, 10ppb oxygen and less than 20ppb moisture.

GAS	HELIUM			NITROGEN			HYDROGEN		ARGON	
	Grade	BIP	BIP ECD	BIP PLUS	BIP	BIP ECD	BIP PLUS	BIP	BIP PLUS	BIP
O ₂	< 10 ppb	< 10 ppb	< 10 ppb	< 10 ppb	< 10 ppb	< 10 ppb	< 100 ppb	< 100 ppb	< 10 ppb	< 10 ppb
H ₂ O	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb	< 20 ppb
THC*	< 100 ppb	< 100 ppb	< 50 ppb	< 100 ppb	< 100 ppb	< 50 ppb	< 10 ppb	< 10 ppb	< 100 ppb	< 50 ppb
CO+CO ₂	< 0.5 ppm	< 0.5 ppm	< 50 ppb	< 0.5 ppm	< 0.5 ppm	< 50 ppb	< 0.5 ppm	< 50 ppb	< 100 ppb	< 50 ppb
H ₂	–	–	< 100 ppb	< 1 ppm	< 1 ppm	< 50 ppb	–	–	–	–
CFC**	–	< 1 ppb	–	–	< 1 ppb	–	–	–	–	–
N ₂	< 1 ppm	< 1 ppm	< 100 ppb	–	–	–	< 2 ppm	< 0.2 ppm	< 1 ppm	< 0.3 ppm
Certification of conformity	Batch	Batch	Individual	Batch	Batch	Individual	Batch	Individual	Batch	Individual

* THC = as CH₄

** CFC = halocarbons



“Switching over to BIP® cylinder technology is very easy because no adaptation of the current system is required.”

Dr. Frank David, R&D manager, Research Institute for Chromatography, Belgium.

👉 A range of shapes and sizes to suit every need

From Mini to Maxi packages, Experis® gases with BIP® technology are available in **3 container sizes**:

- Mini BIP® cylinder: a 10 litre cylinder that is light and easy to carry thanks to the valve guard handle
- The traditional 47 litre BIP® cylinder
- BIP® cylinder pack: a 12X50 litre pack
- Maxi BIP® cylinder pack: a 300 bar 18X50 litre pack with greater storage capacity for high consumption applications



• A suitable size whatever the gas requirement