THE CRYOSTAR magazine
N°9 spring 2007

Cleaner world
DVD special included

LEARNING EXCELLENCE
Training centre attracts global attention

MOTIVATION
Doing it Grospiron's way

SHARING EXPERTISE
The latest in knowledge management

EDITO

Understanding how to do one's job, use the equipment provided, how the business works and how to exploit technology is at the heart of every successful enterprise.

Cryostar's commitment to excellence of products, engineering, serving customers via a global network of business centres and working in partnership with customers is underpinned by knowledge.

And that knowledge is hard-won. It has taken decades to build Cryostar into the world-class company it is today. Behind that reputation are our employees, our engineers and our customer support staff.

And behind them is Cryostar's commitment to excellence through training. So much so, that the company commits up to four per cent of its annual salary spend on training.

Why? Well in Cryostar that's a simple question to answer. We have a commitment to our customers and partners to provide cutting edge and bespoke solutions.

And the only way to do that, and do so on a continual basis, is to invest in our staff, invest in their knowledge, their abilities and understanding of the various markets and industries which we serve.

Training has become one of our passions, along with customer service and cutting edge technological solutions. Proof of this is Cryostar's investment in its Training Centre (see page 3).

We have teamed-up with Edgar Grospiron to bring a unique view to our training programmes. We have even extended our training expertise to our partners in industry.

Cryostar is determined to offer nothing but a fully rounded service – from testing, engineering, in-field support and now training. Whether it's about how to get the best out of our technology or to achieve cost-effective maintenance, we are committed to enhancing the customer relationship and experience.

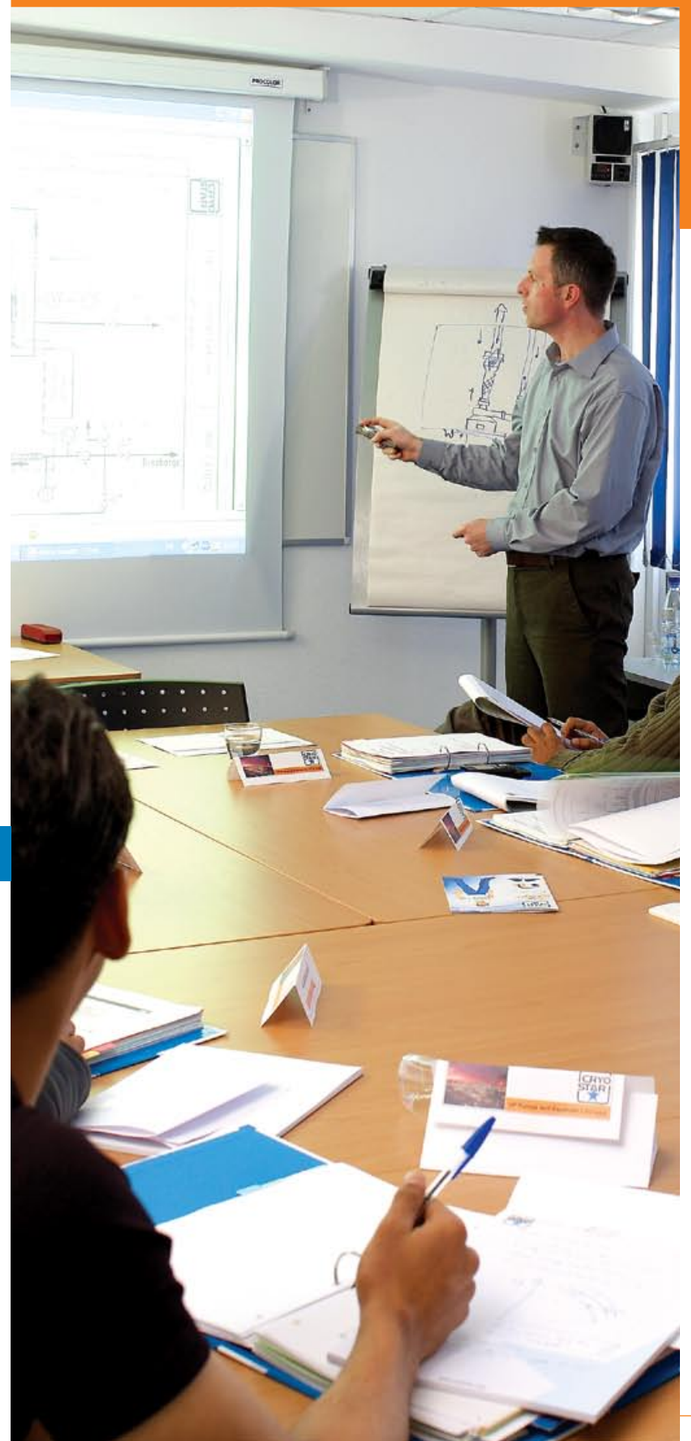
I am proud to say that Cryostar stands for excellence in all our operations and I am very pleased to extend our service offering further. Already, major companies like Deawoo, Samsung and Teekay of Canada, Statoil of Norway and Toyo Engineering of Japan, have taken advantage of our training programmes.

Cryostar plans to build up its Training Centre, offer distance learning to cut customer costs, and I welcome all our partners to exploit it. Training and knowledge is at the heart of any successful enterprise… it is at the heart of Cryostar, too.

Daniel MEYER
President

Centre of learning excellence

Forming partnerships with customers enables Cryostar to offer efficient and bespoke services. The company's Training Centre is an extension of that partnership, adding value where the customer needs it…



Since its launch, the Cryostar Training Centre has gone from strength to strength and this year aims to team-up with major companies and technical academies worldwide.

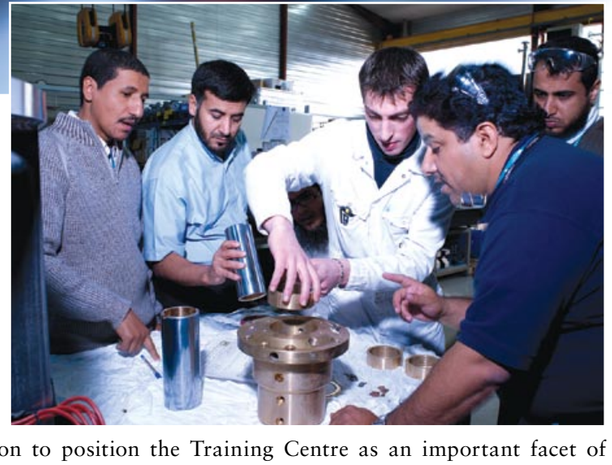
From its humble beginnings to support customers with knowledge about Cryostar equipment, the Centre is now looking to offer bespoke training packages across a wide range of topics.

It is also looking to extend online facilities to ensure, where possible, customers can avoid major travel and related costs while obtaining the highest standards of training packages that Cryostar has to offer.

To date, the Centre has attracted the support of many major companies, including Daewoo, Samsung and Hyundai Korean Shipyards, Ceres Hellenic Shipping of Greece, Teekay of Canada, Statoil of Norway, Toyo Engineering of Japan, CLSICO of China, Petrofac UK, Air Liquide, and White Martins Gases of Brazil, to name but a few.

Didier Walch, Customer Service Director, said: "The Training Centre has become a strong relationship and technical link between the company and the more than 250 customers who attended our courses last year."

Lucien Gruppi, Training Co-ordinator added: "In 2007, the number of courses and sessions will increase. Hands-on sessions will also be improved, with the help of assembly and maintenance workshops, and our test bed facilities.



"An e-learning offer will be made available within the year. This will be an additional tool to the courses performed in at the Training Centre."

Initially, the e-learning courses will be conducted internally in order to validate the courses contents, shape and effectiveness of the distance-learning tool, confirmed Lucien.

He added: "In the long term, it is our intention to position the Training Centre as an important facet of Cryostar's service offering, always focusing on meeting the needs of customers.

"About 20 courses are already scheduled for 2007 and, as of September, we will be issuing the Training Centre catalogue of courses. Of course, this catalogue will also be available on the Cryostar website, along training registration."

The Training Centre is looking to enhance some long term existing relationships by offering free technical training sessions for valued customers' employees.

Cryostar's global network of Business Centres will also be involved, ensuring some training sessions can be held locally, a huge advantage when it comes to keeping travel costs down.

Said Didier: "Technical training, related to our equipment, has been offered by Cryostar for some years but we found the courses were just answering basic product inquiries

"It is our aim to expand this training offer, to give customers access to a true centre of training excellence. As a result, we have selected the best engineers and people Cryostar has to offer to identify topics and design courses.

"The combined knowledge of these people equates to more than 200 years of experience with Cryostar and our customers activities. That in itself is great news for all our partners, across all the markets we serve."

All courses will be available in a database managed with "Livelink from Opentext".

Structured learning

The Training Centre is driven by three main processes:

- Analysis of the training needs (customers and internal).
- Production of the training material and updates.
- Training courses preparation and performance.

A quality measurement is set for each of them. At the moment the technical topics covered include:

- **LNG and hydrocarbon** for rotating cryogenic machinery dedicated to natural gas and LNG applications. The training package covers:
- The specific equipment for methane carriers, including their handling within the different processes, the rotating machinery itself, the associated mechanical and electrical auxiliaries.
- Hydrocarbon and natural gas equipment including turbo-expanders, cryogenic reciprocating and centrifugal pumps, automatic cylinder filling stations for L/CNG gases.

Industrial gases

The training offer covers the customer's needs linked to turbo-machinery and cryogenic pumps in the field of production and distribution of liquid air gases and some specific applications.

Clean Energy

Since 1986, Cryostar's energy recovery expertise has provided customers with more than 1,000 GWh of recovered electrical energy. Cryostar engineers have developed new technical concepts and innovative solutions in the areas of new energy resources and environmental care.

The Training Centre performs courses for this rotating machinery used in geothermal, geo-pressure and waste energy applications.

Courses available today

These are mainly focused around the customer's needs linked to Cryostar's traditional range of equipment:

- Reciprocating Pump Training.
- Centrifugal Pump Training.
- Oil Bearing Turbo-expander.
- Magnetic bearing Turbo-expander.
- Generator Loaded Turbo-expander.
- LNG Shipboard Equipment.
- Turbo-expander Special Application.
- Oxygen compatibility.

Other courses are on the way include:

- Magnetic bearings.
- Electrical motor drives and associated frequency inverters.
- Load and surge controls.

Each of the courses is split into modules. This modularity gives flexibility to deal with all subjects and also particular concepts of the equipment, like:

- Theoretical basics and physical phenomenon involved.
- Construction and technology.
- Auxiliaries and instrumentation.
- Special installation cautions, operation and maintenance.

Another advantage is the ability to define knowledge levels, therefore, skills.This can lead to the ability to analyse technical and human resources, particularly useful to human resources departments.

Every special training request submitted by customers is analysed for feasibility, and where possible, a bespoke course can be designed and offered as part of Cryostar's commitment to partnership.

Knowledge Management

★★★

Knowledge Management is key to building and sharing information and expertise with customers to ensure they get the very best out of Cryostar products and technologies.

Cryostar is at the leading edge of cryogenic equipment technology and maintains its position by promoting innovative research and development (R&D). The company has a proud history of not only meeting the needs of customers today, but of developing new applications to meet the demands of tomorrow.

This approach has spawned a 'can do' culture, where technical knowledge is shared across the business between sales, design, purchasing, manufacturing engineers and after-sales staff.

This wealth of information is now the backbone of Cryostar's Knowledge Management process. It is available online and accessed and updated utilising *Livelink* software, which is fully compatible with *Microsoft Office*.

"Like total quality management we capture every scrap of information about our products and technologies," said IT Project Manager, Christophe Schruoffeneger. "Everything from design choice and product calculations, component information, even down to customer feedback.

"Cryostar is about adding value, forming partnerships with customers. And to do this our service offering is the same everywhere in the world. Through Knowledge Management we provide all our business centres with instant access to procedures, instructions, safety and technical bulletins.

"We capture best practice and share this throughout the business – for the benefit of our customers."

To reflect this commitment, Cryostar now offers an internet portal which allows information exchange between customers, suppliers and Cryostar. This can be accessed via **www.cryostar-extranet.com.**

Christophe Schruoffeneger said: "The true benefit of Knowledge Management is to reduce time to market and to ensure that hard-won know-how is captured and transferred into product development.

"It also enables training and personal development, provides quick answers to customer queries and makes retrieval of all equipment documentation easy. They say knowledge is power – at Cryostar we use that knowledge to empower our people to serve our customers."

Success follows the 'right' attitude

Drawing a parallel between a career in sports and professional life is what Edgar Grospiron, Ski Olympic Champion 1992, is teaching through conferences and training programmes. For Cryostar, it is an interesting and enthusiastic way of training its personnel.

Training is important to Cryostar staff – not only in the technical skills needed to do the job, but training in management skills. Cryostar values highly motivated people taking up challenges with enthusiasm and in a spirit of innovation.

It is one of the means by which the business meets the many and varied demands of customers. Innovation and enthusiasm is a culture that defines Cryostar – the building of customer partnerships, in approaches to providing solutions and new technologies.

Reflecting these values, Cryostar has adopted an innovative training method – Edgar Grospiron's process communication management programme. Edgar Grospiron is a former Olympic champion and three times world champion in mogul skiing.

At the end of his sporting career, Edgar decided to show others what it takes and means to be a winner. Through his unique process communication management programme, he uses his experience as a world-class athlete to help people focus on the mechanisms of performance, giving conferences and coaching in management and communication.

After getting to understand Cryostar's people, vision and values, Edgar recently hosted a management conference around the mechanisms of success, focusing on five main areas: vision, pleasure, progress, integrity and cohesion.

Vision: those who think the world can change the world, putting emphasis on the need to give a meaning to life, to give a meaning to what is achieved in the workplace.

Pleasure: it is not the success which leads to pleasure, but pleasure which leads to success. When people enjoy what they do, they can reach the very highest level of achievement.

Progress: perfection at work can prevail over market conditions. Behind every successful strategy, there is a plan of action. The level of performance lies in the implementation of the plan and the commitment of the team to the plan. Success depends on the capability of managers to involve their team.

Integrity: ethics define values, values define the rules. High levels of ethics ensure the continuity of success and the positive perception of a system, an individual or a company. Those who are successful in the long term are those who have a high level of ethics.

Cohesion: physically sharing success prevails over stimulating words. Celebrating peoples' success, results and improvements will lead to a higher level of cohesion. The physical act of celebrating underscores the fact that work is a chance, progress is a virtue and success is the ultimate recognition.

Daniel Meyer, Cryostar president, said: "The conference was very well received by our people. Edgar was one of the top skiers of the world some years ago and today he is an excellent coach in management. All Cryostar personnel are looking forward to working with Edgar in the future, implementing his attitudes and ensuring that Cryostar remains the supplier of choice in the many markets we serve."

Proof of the pump

High-pressure pumps have become increasingly crucial in the packaged gas process and have had a major impact in terms of plant productivity.

Many customers choose to focus on their core gas retail business and look to Cryostar to provide the maintenance support solution for pumping equipment. Since Cryostar delivered its first MRP pumps in 2003, hundreds of units have been installed at customer locations all over the World. Here, we share with readers feedback we have received from customers:

"Thanks to its high performance the MRP has replaced two of our old pumps and we were surprised by the much higher efficiency. Concerning the maintenance, we have reached 1,900 hours by twice tightening the seal cartridge without dismounting the pump."
Mr Dieter SOENS – Technical director of IJSFABRIEK STROMBEEK (Belgium)

All major gas companies recognise that the pump is a very efficient and reliable. But the MRP has also proved a success for those smaller companies looking for a rapid return on investment. In fact, these companies may not have a dedicated department to repair equipment and high reliability is key.

"We have been running three MRP pumps for LIN, LOX, LAr since January 2005 in our cylinder filling station located near Würzburg. The working time of the LAR pump has exceeded 1,500 hours and we have not met with any problems or needed to carry out any maintenance yet. Pumps are equipped with automatic degassing valves, which minimise the risk of damage when the pumps start and we are operating them with a variable frequency drive to avoid the problem of bottle overheating in summer. We are very satisfied with our MRP pumps."
Mr Walter KELLER – Production Manager of TYCZKA INDUSTRIE GASE (Germany)

Thanks to its innovative design, with self-adjustable piston seals and self-oil lubricated crank drive, the MRP is achieving impressive lifespan results.

"The high-pressure pumping system with the MRP was installed in Boston Scientific Galway over 18 months ago. To date the pump has been working over 2,500 hours and we have had no issue with performance. In general we are very satisfied with the installation, the service and the overall system performance."
Mr Neil FINNERITY – Project Engineer of BOSTON SCIENTIFIC (Ireland)

With its robust design the MRP can work in extreme conditions, like that experienced by the four units installed by LINDE KCA in the industrial area of Norilsk, Russia, with a high corrosion atmosphere and ambient temperature going down to –45°C.

Developed according to Cryostar state-of-art designing and testing technologies, the pump will ensure total safety with any kind of fluid. In addition to being degreased, to standards higher than required by EIGA, the cold end is made of material fully compatible with oxygen use, such as Monel for the piston and the suction filter. Through its technical superiority, the MRP is also the solution for non-industrial gas related processes, like high-pressure natural gas or hydrogen applications, complete with explosion proof features.

"We are quite happy with the performance and the lifetime of the MRP which we are using to pump LNG. We are especially satisfied that the pump starts and reaches very quickly the rated pressure every time without any problem."
Mr. ErdoğAN GÖNÜLKIRMAZ - LNG Sales and Technical Operations Manager of AKPET NATURAL GAS (Turkey)

Thanks to its high flow capacity and pressure tolerance, the MRP is perfectly suitable for LCNG refuelling vehicle stations. The pump is also available for LH2 execution with an enhanced insulation of the cold end and vacuum jacketed suction and tank return connections.

Based on the feedback from the field Cryostar now offers all-inclusive maintenance contracts, based on preventive maintenance intervals, with its MRPs. Experienced engineers assess customer installations and customise the maintenance contract according to the reality facing the production site, offering exchange programmes that will help focus on revenues rather than on expenses.

Cryostar in Brazil first

Cryostar has commissioned its first LCNG refuelling station for public use in Brazil.
The installation is the first natural gas refuelling station based on a LNG supply source in this region.
The first of four, the station is a result of a Cryostar / Sondotecnica collaboration on behalf of customer White Martins.
A market leader in the use of alternative fuels, Brazil is also a major player in the natural gas vehicle market. Indeed, vehicles utilising three fuels – gasoline, ethanol, and compressed natural gas – are already on the roads.
The new station has two storage tanks, two Cryostar PD 3000 pumps, and two vaporizers, and is able to dispense fuel via four refuelling hoses. The entire station is automatically managed by a global PLC management system.
Such is the success of this LCNG station that a boom in vehicles converting to CNG followed hard on the heels of commissioning.

Two investments

Investing in excellence

To meet growing customer demands Cryostar is committed to a rolling programme of investment in workshop, test and office facilities. In 2006, the company completed a new workshop (see Spring 2006 Magazine), and this year intends to open an adjacent test stand in April. This third compressor/turbine test facility offers:

- A total test area, including compressors and frequency drive room, of 910m2 (650m2 for the facility itself and 260m2 for the air compressors and inverter rooms.
- A power supply of 6MW/ 6,6kV/50-60hz with the possibility to increase to 8MW with additional external generators.
- Two air compressors of total 2MW which can achieve 20000Nm3/h -10barg in order to test the high powered turbines.
- A frequency drive of 6MW.
- A water tower of 6MW with a circuit designed for 550m3/h; and
- An air compressor to supply dry and clean air for the whole facility.

With the additional test facility Cryostar will be able to test not only the "companders", but also the high powered TG and MTC turbines (3-12MW).

The techno-future

As Cryostar continues to grow, the business is investing in state-of-the-art information technology to ensure the integrity and security of all its data. To this end, it has transitioned to Blade Center and Storage Area Network IT systems.
This allows Cryostar, in a single rack, to consolidate up to 64 processors, called quad-core technology, with up to a total of 256 cores and manage up to 24 Terabytes data utilising fibre channel technology disks.
Boot on SAN technology, virtual server (VM) and equipment redundancy, now allow the online change of servers, disks and all hardware, without any down time of servers. Plus, if a failure was to occur, an alert is sent directly to the manufacturer HP.
With this new architecture, Cryostar is now ready to tackle future challenges and growth opportunities.

HPP Triplex test

In 2006, Cryostar supplied the HPP High Performance Piston Pump for 2 specific projects in the UK. These include:

Three HPP Simplex Pumps for the project PX Excellerate in Middlesbrough, located on the N.E. coast of England. The pumps were specified for LIN service with a capacity of 147 l/min (39 gpm) at a working pressure of 110 bar(g) (1600 psig). The function of the pumps is to provide a blanket of nitrogen for LNG ships arriving at a nearby terminal. In addition the pumps will be used to adjust the calorific value of the gas in the pipeline as required before this enters the national grid.

Two Triplex Pumps for the Centrica project in Easington which is also located on the East coast of England. The pumps were designed for a capacity of up to 603 l/min (159 gpm) in LIN at a pressure of 155 bar(g) (2250 psig) and were supplied with 250kW motors. The application of these pumps is also to adjust the calorific value of natural gas from a pipeline originating in Norway and entering the UK national grid at this location.

The two triplex pumps were subjected to a public witness test where customers from the industrial gas industry as well as the oil and natural gas well servicing industry attended. The test was a complete success with one pump displayed being tested at full flow rate and the other at the full rated pressure for the application being used. The pumps were tested at speeds as low as 45 rpms where you could literally watch the piston going back and forth with the pump remaining fully primed and operating perfectly. On the high flow test stand the pump was operated up to 450 rpms giving a flow rate of approximately 150 GPM.

The pumps proved to perform well and are looking to be used in array of applications such as process plants, oil and natural gas well servicing, nitrogen blanketing of LNG cargo ships and pipeline purging. For well serving, designs also exist for a quinteplex version of the HPP with performance ratings up to 300 GPM at 10,000 psig.

Events

★ **April 24-27, 2007**

LNG 15, 15th International Conference & Exhibition on LNG, Barcelona, Spain
More info : www.lng15.com

★ **April 26-27, 2007**

Shipping China 2007 - Energy Transportation Oil, gas, coal – demand, supply and marine transportation for China, Shanghai, China

★ **May 20-22, 2007**

GAWDA Spring Management Conference, Phoenix, USA. More info : www.gawda.org

★ **May 30 – June 2, 2007**

EIGA Summer Session 2007, Istanbul, Turkey
More info : www.eiga.be

★ **October 13-17, 2007**

IOMA Annual Meeting, Barcelona, Spain

★ **October 29 – November 1st, 2007**

DCNG 2007, 6th Doha Exhibition & Conference on Natural Gas, Doha, Qatar.

Lo-C – low carbon technology for a cleaner world

Cryostar's Lo-C will focus solely on carbon technologies for the recovery of 'pressure let-down' or 'Geo-pressure' energy. Lo-C technology harnesses un-used energy as natural gas comes out of the ground and is passed through 'pressure reduction stations'. Much of the energy created in this way is currently wasted, but Lo-C technology converts the natural kinetic energy into mechanical energy, which can then be used to generate carbon and sulphur-free electricity.

To introduce Lo-C, please find below a DVD which outlines the technology, engineering, customer benefits and the vital part Geo-pressure can play in reducing emissions and creating environmentally-sound power.

The DVD contains three separate but complementary presentations:

- Why the world needs Geo-pressure
- The global view
- Why the UK needs Geo-pressure

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