



# *Technical Training Centre Course catalogue*





## CRYOSTAR Presentation

For more than 30 years, CRYOSTAR has been designing and manufacturing equipment for different applications for the industrial gases, hydrocarbons and in clean energy.

CRYOSTAR production covers a wide range of cryogenic pumps, turbo-machines and compressors, as well as heat exchangers and automatic gas filling stations.

Present on all continents due to the support of its business centres and subsidiaries, CRYOSTAR offers innovative solutions to its customers, in full respecting of its values: innovate solutions, taking up challenges, have a passion in excellence and generosity in what we do.

CRYOSTAR Technical Training Centre officially opened in 2006 to help its customers to be aware of essential technical knowledge to assure optimised performance and maintenance of their equipment.

This catalogue presents a small range of the courses performed - in our premises and at customers' sites - .



## *Technical Training Centre Involvement*

The Cryostar Technical Training Centre - CTC - is lead by an available team and is sensitive to the customers' expectations.

The technical training sessions are performed on our French premises in Héringue, in our 7 subsidiaries around the world, or on industrial sites and shipyards where our equipments are installed.

To improve the technical knowledge of purchased equipment and their optimisation of performance and maintenance, the CTC is a partner involved with its customers, in cryogenic pumps, turbo-machines, and their associated auxiliaries, and for various applications (industrial air gases, hydrocarbons, energy recovery, equipments for LNG carriers and last generation of LNG super-tankers).The perpetuation of financial investments and the optimisation of knowledge techniques for the operation and maintenance teams belong to our daily objectives.

Specialists, engineers and high qualified staff are involved in teaching construction, performance and maintenance principles of equipment.

The training, dedicated to our customers and also to our personnel, combines technical competences and teaching methods.

The CTC answers to every specified training request, in the domain of CRYOSTAR competences, not listed in this catalogue.





Regularly, around 300 foreigners per year, attend the CTC from an average period of 3 to 5 days, to gain theoretical knowledge and helpful practices to their job.

Trainees are welcome on our premises, assembly and maintenance workshops, where equipment and tools are made available.

In counterpart of those in-house missions, the CTC trainers provide external training, when requested by customer.

Our objective, by the application of an interactive teaching method calling upon teaching by means best adapted, aims to transmit to the participants the competences allowing them to apprehend the knowledge, the general rules but also the reflexes related to the control and the maintenance of our manufacture of cryogenic equipment.

A training certificate gives official recognition to the full completion of the training session.

A day to day signed attendance list attests the real participation of trainees.

During their stay, trainees have to conform to CRYOSTAR SAS and CTC internal rules.



## Teaching methods

- ★ Theoretical courses are performed in multi-media rooms.
- ★ Practical work takes place in the pump and turbine maintenance workshops.
- ★ Mounting operations of machines and assemblies are sustained in the assembly workshops of pumps and turbo-machines.
- ★ Cut parts available.
- ★ Follow - up of tests on the equipment in the dynamic testing ground of pumps and turbo-machines.
- ★ Special tools.

## Course characteristics:

- ★ Number of attendees : from 6 up to 10 per session.
- ★ Courses begin at 9:00 on Mondays.
- ★ End of the courses at 16:30 on Fridays.
- ★ Working day from 8:30 to 16:30.
- ★ Languages : French, English (Other languages on request).





## Location - Access maps

CRYOSTAR is located in South of Alsace, in “Tri-Rhena” area, natural border zone of the upper Rhine, between France, Germany and Switzerland, framed by the Vosges mountains and Swiss Alps.

The EuroAirport serves many various national destinations and main European capital cities. It is 5mn car drive away from CTC.

Daily train and TGV service to Strasbourg, Paris, Lyon, Bruxelles....and ICE to Germany.

## Your contacts

### Your contacts at CTC :

★ **Brigitte BEIL** - Assistant

Tel.: +33 (0)3 89 70 32 17

email: [brigitte.beil@cryostar.com](mailto:brigitte.beil@cryostar.com)

★ **Eric ALONSO** - Technical Trainer

Tel.: +33 (0)3 89 70 32 23

email: [eric.alonso@cryostar.com](mailto:eric.alonso@cryostar.com)

Cryogenic pumps - Shipboard equipment

★ **Lucien GRUPPI** - Training Coordinator

Tel.: +33 (0)3 89 70 27 18

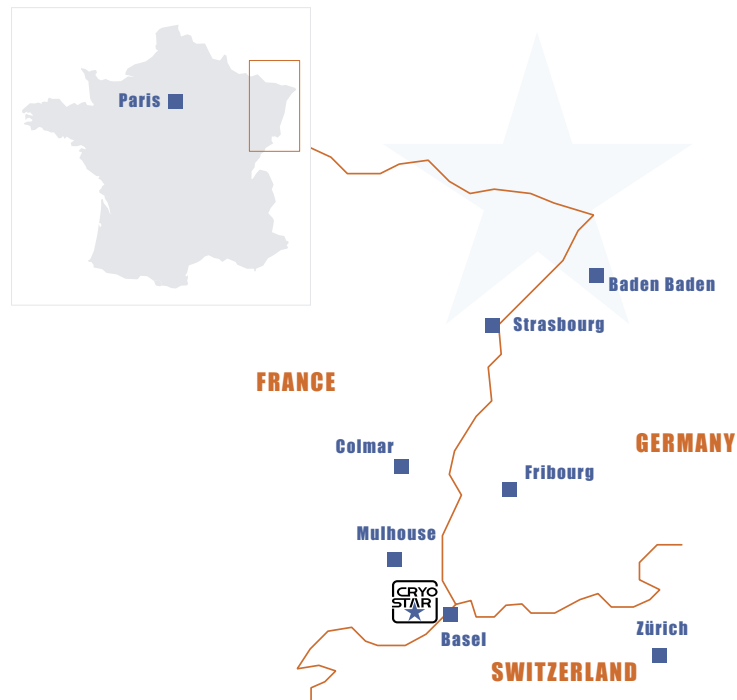
email: [lucien.gruppi@cryostar.com](mailto:lucien.gruppi@cryostar.com)

Turbo-expanders - Shipboard equipment

★ Reception desk CRYOSTAR

Tel.: +33 (0)3 89 70 00 00

email: [TrainingCentre@cryostar.com](mailto:TrainingCentre@cryostar.com)



## *Description of typical course:*

### **Cryogenic centrifugal and reciprocating Pumps**

#### Targets:

- ★ To familiarise participants with theory, concepts, construction and components of cryogenic pumps designed and manufactured by CRYOSTAR.
- ★ To teach the participants the procedures of maintenance and troubleshooting.

#### Teaching Objectives:

- ★ To assimilate the terminology of the trade.
- ★ To know the function and the construction of components and associated auxiliaries.
- ★ To assimilate the procedures for starting, operating, loading and stopping the pumps, and this in safe conditions.
- ★ To apply maintenance methods recommended by CRYOSTAR to optimise the operation and the reliability of equipment.
- ★ To understand the function of the safety systems and the main control loops.
- ★ To pose a diagnosis and tackle the methods of specific maintenance for cryogenic pumps in their daily environment.
- ★ To master the techniques of dismantling / re-assembling and of installation.

#### Pre-requisites:

- ★ An elementary knowledge in general mechanics and/or maintenance.

#### Modular course:

- ★ Module 1 : Introduction - Safety rules
- ★ Module 2 : Theoretical principles Applicable physics
- ★ Module 3 : Design - Construction - Technology
- ★ Module 4 : PID - Associated Auxiliaries
- ★ Module 5 : Electronic panels - Instrumentation
- ★ Module 6 : Installation - Operation - Settings
- ★ Module 7 : Maintenance and troubleshooting
- ★ Module 8 : Workshop/site practical training
- ★ Module 9 : Review - Evaluation - Conclusion





## Example of course:

### Expander turbines with oil bearings or with magnetic bearings

#### Targets:

- ★ To familiarise participants with theory, conception, construction and components of the various expander turbines with oil or magnetic bearings designed and manufactured by CRYOS-TAR, in the field of industrial gases or hydrocarbons.
- ★ To teach participants the specific procedures of maintenance and troubleshooting.

#### Teaching objectives:

- ★ To assimilate the terminology of the trade.
- ★ To know the function and the construction of components and associated auxiliaries.
- ★ To assimilate the procedures for starting, operating, loading and stopping the turbines, and this in safe conditions.
- ★ To apply maintenance methods recommended by CRYOSTAR to optimise the operation and the reliability of equipment.
- ★ To understand the function of the safety systems and the main control loops.
- ★ To pose a diagnosis and tackle the methods of specific maintenance for turbo-expanders in their daily environment.
- ★ To master the techniques of dismantling / re-assembling and of installation.

#### Pre-requisites:

- ★ A good knowledge in general mechanics, electricity and/or general technical maintenance





#### Modular course:

- ★ Module 1 : Introduction - Safety rules
- ★ Module 2 : Theoretical principles - Applicable physics
- ★ Module 3 : Design - Construction - Technology
- ★ Module 4 : PID - Associated Auxiliaries
- ★ Module 5 : Electronic panels - Instrumentation
- ★ Module 6 : Installation - Operation - Settings
- ★ Module 7 : Maintenance and troubleshooting
- ★ Module 8 : Workshop/site practical training
- ★ Module 9 : Review - Evaluation - Conclusion



## *Example of course:*

### Shipboard equipment for LNG carriers

#### Targets:

- ★ To familiarise participants with theory, conception, construction and the components of various compressors, exchangers and reliquefaction units, designed and manufactured by CRYOSTAR, in the domain of equipment for methane carriers (and on-shore installations).
- ★ To teach the crews the procedures of management, maintenance and specific troubleshooting linked to these equipments.

#### Teaching objectives:

- ★ To assimilate the terminology of the trade
- ★ To know the function and the construction of the different machines and their associated systems.
- ★ To assimilate the procedures of starting, operating, loading and stopping of the equipment for methane ships, in full safety.
- ★ To apply maintenance methods recommended by CRYOSTAR to optimise the operation and the reliability of equipment.
- ★ To understand the function of the security systems and the main control loops.
- ★ To pose a diagnosis and tackle the methods of specific maintenance for the equipment and in their user environment.
- ★ To master the techniques of dismantling / re-mantling and of installation.

#### Pre-requisites:

- ★ A good knowledge in general mechanics, in electricity and / or general maintenance.

#### Modular course:

- ★ Module 1 : Introduction - Safety rules reminder
- ★ Module 2 : Theoretical principles - Applicable physics
- ★ Module 3 : Design - Construction -Technology
- ★ Module 4 : PID - Associated Auxiliaries
- ★ Module 5 : Electronic panels - Instrumentation
- ★ Module 6 : Installation - Operation - Settings
- ★ Module 7 : Maintenance and troubleshooting
- ★ Module 8 : Workshop/site practical training
- ★ Module 9 : Review - Evaluation - Conclusion

## Course schedule

Please refer to our course schedule on our website [www.cryostar.com](http://www.cryostar.com) (Section Technical Training Centre).

Course	Duration	Reference
Reciprocating pumps - Industrial Gases	2 to 3 days*	RPIG
Reciprocating pumps -Process Applications	2 to 3 days*	RPPA
Centrifugal Pumps- Industrial Gases	2 to 3 days*	CPIG
Centrifugal Pumps - Process Applications	2 to 3 days*	CPPA
Oil brake loaded expansion turbine - ECO	3 days	TEOB-ECO
Oil brake loaded expansion turbine - TP	4 to 5 days	TEOB-TP
Compressor loaded expansion turbine - TC	4 to 5 days	TEOB-TC
Electric generator expansion turbine - TG	4 to 5 days	TEOB-TG
Oil brake loaded expansion turbine et compressor - TFC	4 to 5 days	TEOB-TFC
Electric generator expansion turbine - LTG	4 to 5 days	TEOB-LTG
Compressor loaded expansion turbines with magnetic bearings - MTC	4 to 5 days	TEMB-MTC
Turbo generator with magnetic bearings - MTG	4 to 5 days	TEMB-MTG
Equipment for conventional propulsion LNG carriers	2 days	LSE - CP
Equipment for DFDE propulsion LNG carriers	2 to 3 days	LSE-DFDEP
Reliquification Equipment for LNG carriers - EcoRel	3 to 5 days	LSE - ECOREL
LNG Equipment for on-shore terminal	2 days	LOSE
Active Magnetic Bearings - Knowledge level	On demand	AMB - KNW
Active Magnetic Bearings - Advanced level	On demand	AMB-ADV
Electrics for Mechanical Engineers	On demand	EME

\* According to the type of pump(s)



# Cryostar Worldwide



***Cryostar SAS (headquarters)***

2 Rue de l'Industrie  
ZI BP 48  
FR-68220 Hésingue  
Phone: +33 389 70 00 00  
Fax: + 33 389 70 27 00

***Cryostar Automation***

Saint Julien d'Empare  
FR-12700 CAPDENAC  
Phone: +33 5 65 80 20 20  
Fax: +33 5 65 80 20 25

***Cryostar UK***

Unit 1 Kea Park Close  
Hellaby, Rotherham  
UK - Rotherham S66 8LB, South Yorkshire  
Phone: +44 1709 702 777  
Fax: +44 1709 702 771  
Contact : Mr Ray RELF

***Cryostar Brazil***

AV. Santo Amaro, 2820 Brooklin  
BR - 04555-000 São Paulo, SP  
Phone: +55 11 5092 5262  
Fax: +55 11 5092 5013  
Contact : Mr Adilson SOUZA

***Cryostar China***

Building 2, NO. 10,  
Kangzhong Road  
Kangqiao Town  
PRC - 310015 HANGZHOU  
Phone: +86 571 8536 8331  
Fax: +86 571 8536 8409  
Contact : Mr Yaogu LIU

***Cryostar USA East***

5897 Colony Drive  
USA - Bethlehem 18017, PA  
Phone: +1 484 281 3401  
Fax: +1 484 281 3402  
Contact : Mr Jose MORENO

***Cryostar USA West***

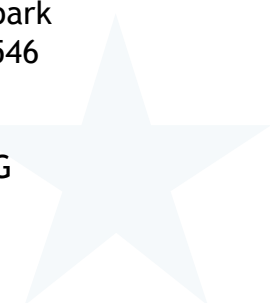
13117 Meyer Road  
USA - WHITTIER 90605, CA  
Phone: +1 903 1290  
Fax: +1 562 903 4511

***Cryostar USA - Houston Office***

5909 West Loop South, Suite 220  
USA - Bellaire 77401, TX  
Phone: +1 713 661 6000  
Fax: +1 713 661 6075

***Cryostar Singapore***

203 Henderson Road  
BLK B#10-09  
Henderson Industrial park  
SGP - SINGAPORE 159546  
Phone: +65 6276 7441  
Fax: +65 6276 7442  
Contact : Mr Eric TENG





## Commercial conditions

### 1. Payment terms and conditions

Payment is due in Euro, to CRYOSTAR SAS in Héringue, net and without discount. It is due in cash after course completion, by cheque to a French bank or by a bank account transfer indicated by CRYOSTAR SAS, according to positions indicated in the commercial quotation.

In case of payment done after the date indicated on the invoice, in accordance with arrangement of article 3 of the law L92 1142 of 31.12.1992, penalties would be applied by the legal calculated sums of increased interest rate by fifty per cent (50%). This will apply to the first day of delay after the deadlines defined in the commercial conditions.

Terms of payment cannot be delayed under some excuses whatever it may be, even in case of dispute.

### 2. Dispute

The place of jurisdiction and of payment is Héringue, Haut-Rhin, home of CRYOSTAR SAS.

All disputes, whatever sort it may be, are the competence of the MULHOUSE tribunal, Haut-Rhin, where it has exclusive attributions to the court, notwithstanding all conflicting clauses which appear in commercial documents of the client.

The mandate or acceptance of payment by cheque or bill, even if residence elsewhere, the payment conditions or intervention of

CRYOSTAR SAS operate neither innovative, nor infringement of this attributive agreement of payment and of jurisdiction and this, even in case of plurality of defenders, to call and consult to warranty.

All sales of CRYOSTAR SAS are exclusively governed, except written dispensation, by the French laws.

### 3. Training fees

Training fees include :

- The performance of trainer(s)
- Training material
- A welcome folder
- Local assistance to the trainees
- Coffee/tea breaks and a daily lunch

### 4. Prices

Prices are fixed and firm.

They agree except stipulation, apart from all taxes.

The total service amount is indicated in a prior commercial quotation. The customer shall confirm it by a formal purchase order to be approved by the CTC. This purchase order undertakes to attend the training.

## 5. Subscription confirmation / Cancellation

A confirmation of subscription to the course is sent to each person at least one week before the course starting date.

Our company reserves the right to cancel any session if participant number is not sufficient. Anyway, a new date would be suggested according to the annual training schedule.

Any cancellation of participation to a course, inferior to one week of the starting date, will be invoiced at 50% of the initial amount ; if no cancellation is sent then 100% will be charged.

If the CRYOSTAR Training Centre cancels the session, it will then submit new dates to the same economical conditions.

## Additional information

(CRYOSTAR SAS Internal Rules Extract)

### Behaviour - Safety - Responsibilities

Welcome participants in our premises are bound to behave in accordance with the internal rules of CRYOSTAR SAS, and common practice.

In order to make the risks - to which trainees can be submissive to in our premises - visible and to prevent them, a reminder of the basic rules of safety practiced within the company will be carried out at the start of the session.

CTC does not supply individual protection equipment (IPE), made necessary in addition to the aims. It is required that trainees carry their own equipment, as stated in the observations in the enrolment form.

In case of bad attitude or breach, CRYOSTAR reserves the right of exclusion of the course with information given to the employer of the concerned trainee.

In addition, CRYOSTAR SAS and the CTC are not to be held responsible for the behaviour of the trainee outside of the premises of the company.





[www.cryostar.com](http://www.cryostar.com)