



# Refrigeration & Air Conditioning External Training Catalogue 2013



# Save

**Costs and Time**

Free of charge courses  
available 24/7

# Earn

**By learning**

Professional training courses to maximize  
performances and profits

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## DANFOSS TRAINING CATALOGUE

### **Invest in your Business Development by Learning!**

Danfoss offers a wide selection of trainings developed by Industry's experts in order to provide you in-depth knowledge on the subject you are interested in.

Each course has been designed to build, update and upgrade technical competency skills and therefore help maximize performance.

Our courses are exclusively available from our online training platform: **Danfoss Learning**.

#### **Who is it for?**

Danfoss Learning is the online platform to suit your professional training requirements.

HVAC-R professionals, students, teachers. Whether you are an installer, wholesaler, student, technician or developer, there's something in it for you.

#### **How much does it cost?**

Registration to the platform and to the courses is entirely FREE OF CHARGE!

#### **When and where can I start?**

Anytime from anywhere – you just need an internet connection.

You can start your studying process immediately after registration to Danfoss Learning. There are no restrictions on time, place, and number of learners or attempts.

Please follow the Danfoss Learning link in the course descriptions to enroll.

## TRAINING DELIVERY TYPES

### eLessons:



eLessons are self-study elearning modules which allow you to learn at your convenience. You

register for eLessons in Danfoss Learning.

### Self-study PowerPoint courses:



Courses are available as self-study PowerPoint presentations.



Courses are available as self-study PowerPoint presentations with Danfoss Tutor comments recorded.

Soon available in the catalogue!

### Tutorials, supporting materials:





## LIST OF COURSES

Courses	Description	Types	Content	Level	Page
<b>Fundamentals – Level Basic B – Intermediate I – Advanced A</b>					
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RA – DR Refrigeration Fundamentals – Module 1	Basics of refrigeration	eLesson	Theory	B	9
RA – DR Refrigeration Fundamentals – Module 2	Thermodynamics, refrigerants	eLesson	Theory	I	10
RA – DR Expansion Devices Module 1 – Introduction	Design, principles, functions, types	eLesson	Theory	B	11
RA – DR Commercial Refrigeration System – Introduction	Main components overview, functions	eLesson	Theory	B	12
RA – DR Basic Compressors	Intro to compressors technologies	eLesson	Theory	B	13
RA – DR Solenoid valves – Introduction to Commercial Refrigeration Solenoid Valves	Construction, types, operation	eLesson	Theory	B	15
RA – DR On-Off Control – Introduction	Design, function, types, range	eLesson	Theory	B	14
RA – DR Line components – Filter driers & Sight glasses	Design, function, types, range, installation	eLesson	Theory	B	16
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RA – DR Electrically Operated Expansion valves – Introduction to ETS	Overview, selection & installation	eLesson	Product	I	26
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Line components – SG/SG+ program	Overview, selection & installation	Self-study ppt	Product	I	27



Courses	Description	Format	Type	Level	Page
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RA – DR Scroll compressors - Performer® ‘H’ Series	Overview, applications, features & benefits	eLesson	Product	B	38
DR Scroll Compressors – Performer® ranges: ▪ Refrigeration compressors ▪ Heat pump compressors	Overview, applications, features & benefits MLZ HHP	Self-study ppt	Product	I	36 39
RA – DR Inverter Compressors Technology Module 1 – Introduction	Principles, technology benefits, applications	eLesson	Product	I	40
RA – DR Electronic controls – OPTYMA™ Control	Overview, applications, features & benefits	eLesson	Product	I	33
RA – DR Electronic controls – Case controllers Module 1	Portfolio, ranges, features & benefits	eLesson	Product	B	34
RA – DR Condensing units – Introduction to OPTYMA™	Overview, applications, features & benefits	eLesson	Product	I	29
RA – DR Condensing units – Introduction to OPTYMA PLUS™	Overview, applications, features & benefits	eLesson	Product	I	30
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RA – DR Carbon Dioxide as a Refrigerant Module 1	Introduction of CO2 as refrigerant	eLesson	Application	B	47
RA – DR Carbon Dioxide as a Refrigerant Module 2– Systems understanding	Systems knowledge	eLesson	Application	I	48
RA – DR CO2 Module 3a – Industrial Refrigeration	Specificities for industrial installations, general guidelines for selection	eLesson	Application	A	49





Courses	Description	Format	Type	Level	Page
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RA – DR Milk Cooling Tank Module 1 – Introduction	Types, market, legislation, Danfoss portfolio	eLesson	Application	B	54
RA – DR Milk cooling M2 – Product Selection	Danfoss products selection	eLesson	Application	I	55
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Expansion valves – Installation and Troubleshooting	Installation & troubleshooting	eLesson	Service	A	59
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## RA – DR Basic Refrigeration Technique



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

This eLesson is designed for learners with no special knowledge of refrigeration:

After completing the course the participant will:

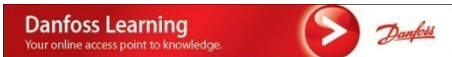
- Know about the physical principles and fundamentals of refrigeration
- Know about the simple build-up of refrigeration systems (main components and types)
- Know about types of control components in a refrigeration system
- Know about terms used in refrigeration

### Content outline

- What is an evaporator?
- What is a condenser?
- What are the basic components of a refrigeration system?
- How does a vapour compression refrigeration system work in principle?

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who needs basics knowledge about refrigeration or who is looking for a refresher course.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>

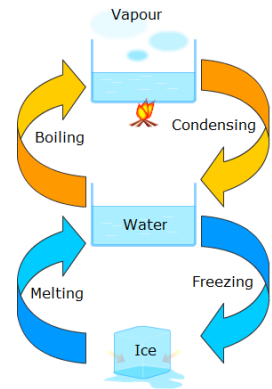




## RA – DR Refrigeration Fundamentals – Module 1



Course duration is 60 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is designed for learners who want to learn more about refrigeration terms and principles. Please complete Basic Refrigeration Techniques first.

After completing the course the participant will:

- Understand the basics of refrigeration
- Understand why refrigeration is required
- Know the fundamental terms within refrigeration
- Understand how heat transfer influences the refrigeration process
- Understand the relation between temperature and pressure for water and refrigerants

### Content outline

- Refrigeration
- Basic terms
- Heat Transfer
- Effects of heat transfer
- Phase change
- Unit of heat energy
- Latent heat
- Superheat
- Subcooling
- Vapour pressure
- Boiling point

### Registration

You can sign up for the course by following the [link](#)



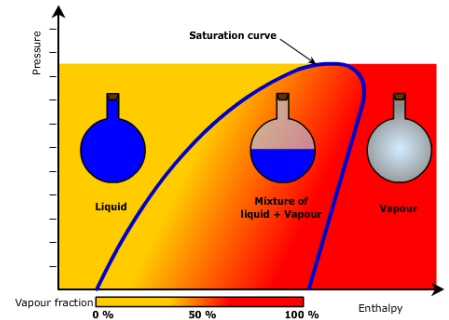
Target Group:	Price	Availability	Accessibility
Who wants to learn more about refrigeration terms and principles or who is looking for a refresher course.	Free of charge	24/7	Online



## RA – DR Refrigeration Fundamentals – Module 2



Course duration is 60 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

This eLesson is designed for learners who want to learn more about refrigeration terms and principles to a higher level and should be completed after Module 1.

After completing the course the participant will:

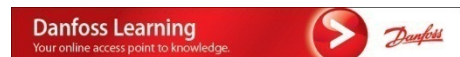
- Understand thermodynamics
- Understand the properties of pure substance
- Know about different types of refrigerant charts
- Read Lop(P)-h diagram
- Understand about refrigerants and their properties
- Know about different types of refrigerants

### Content outline

- Thermodynamics
- Thermodynamic property
- Thermodynamic property - Enthalpy
- Thermodynamic property - Entropy
- Property of a pure substance
- Temperature - Enthalpy diagram (T-h diagram)
- Pressure - Temperature diagram (CO<sub>2</sub> phase diagram)
- Pressure - Enthalpy diagram (P-h diagram)
- Pressure - Enthalpy diagram (Log(P)-h diagram)
- Log(P)-h diagram - R134a
- Properties of Refrigerants
- Selection of Refrigerants
- Classification of refrigerants

### Registration

You can sign up for the course by following the [link](#)



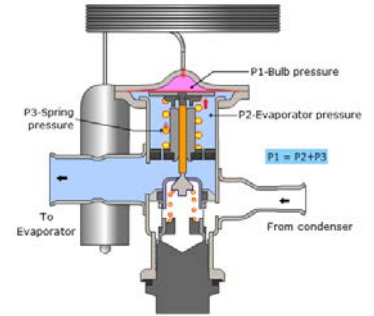
Target Group:	Price	Availability	Accessibility
Who wants to learn more about refrigeration terms and principles to a higher level. This course should be completed after Module 1.	Free of charge	24/7	Online



## RA – DR Expansion Devices Module 1 – Introduction



Course duration is 45 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for all learners who want to have basic knowledge of various expansion devices.

After completing the course the participant will:

- Understand the function of an expansion device
- Know different types of expansion devices
- Understand roles of Superheat & Subcooling in an expansion device
- Understand the function of a thermostatic expansion valve
- Be familiar with the different types of charges used in the expansion valve sensor bulbs

### Content outline

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>▪ Expansion device</li> <li>▪ Types of expansion devices</li> <li>▪ Capillary tubes</li> <li>▪ Automatic expansion valve</li> <li>▪ Thermostatic expansion valves</li> <li>▪ Construction details</li> <li>▪ Working principles</li> </ul> | <ul style="list-style-type: none"> <li>▪ Equalization pressure</li> <li>▪ Internal Equalization</li> <li>▪ External Equalization</li> <li>▪ Superheat</li> <li>▪ Subcooling</li> <li>▪ Charges</li> </ul> |
|---|---|

### Registration

You can sign up for the course by following the [link](#)



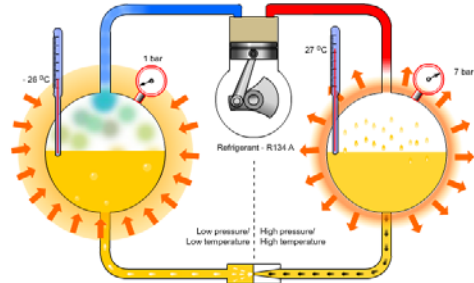
Target Group:	Price	Availability	Accessibility
<i>Who wants to have basic knowledge of various expansion devices.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Commercial Refrigeration Systems – Introduction



Course duration is 45 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is designed for learners who have knowledge in basic refrigeration and are interested in knowing how to automate a basic system.

After completing the course the participant will:

- Understand the basics of a refrigeration system
- Know the main purpose of automating a refrigeration system
- Know the main refrigeration components used to control a refrigeration system
- Understand how automation can keep a refrigeration system working efficiently even when ambient or load conditions change

### Content outline

- The Basic Refrigeration System
- Expansion Valve
- Receiver
- Thermostat
- Solenoid Valve
- How to control room temperature?
- Pressure control
- What is Pressure/Safety control?
- Oil Separator
- Filter Drier
- Sight glass
- Shut off Valve / Ball Valve
- Pressure regulator
- Condensing Pressure Control System
- Differential pressure Valve
- Condensing Pressure Control System - How does it work?

### Registration

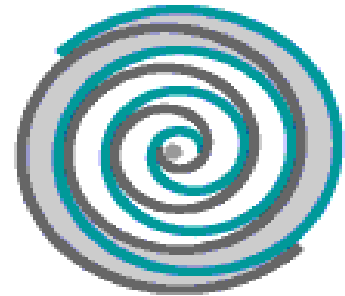
You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to have knowledge in basic refrigeration and is interested in knowing how to automate a basic system.	Free of charge	24/7	Online



## RA – DR Basic Compressors



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

This eLesson is suitable for learners looking for a basic introduction to compressors and their function in a refrigeration system.

After completing the course you will understand the following:

- The function of a compressor
- About different types of compressor
- The role of the compressor in a refrigeration cycle
- About different types of compressor used in Air conditioning and refrigeration and their working principle
- What to consider when specifying a compressor

### Content outline

- Basics
- Refrigeration Circuit
- Compressor Classification
- Compressor Application Range

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Learners looking for a basic introduction to compressor types and their function in a refrigeration system.	Free of charge	24/7	Online



## RA – DR On-Off Control – Introduction



Course duration is 45 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

This eLesson is designed for learners who want to know about refrigeration controls regulating in accordance with the on-off principle.

After completing the course the participant will understand:

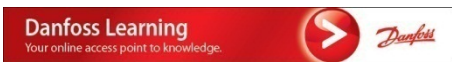
- What an on-off control is
- On-off control logic
- Basic elements of an on-off control
- What range and differences are
- The typical functions of pressure and temperature controls
- About differential switch and switch with a neutral zone

### Content outline

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>▪ What is an On-Off control?</li> <li>▪ On-off control – Logic</li> <li>▪ Basic elements</li> <li>▪ Switch elements</li> <li>▪ Range</li> <li>▪ Function</li> </ul> | <ul style="list-style-type: none"> <li>▪ Pressure &amp; Temperature Control</li> <li>▪ Pressure Control Function</li> <li>▪ Temperature Control Function</li> <li>▪ Differential switch</li> <li>▪ Switch with a neutral zone</li> </ul> |
|--|--|

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to know about refrigeration controls.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>

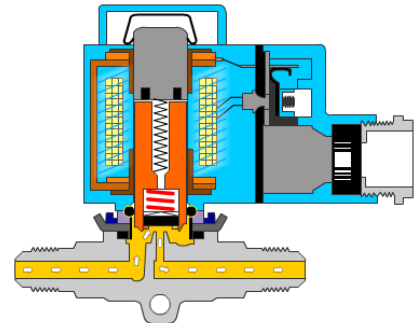




## RA – DR Solenoid valves – Introduction to Commercial Refrigeration Solenoid Valves



Course duration is 45 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners looking for an introduction to solenoid valves and their function in a commercial refrigeration system.

After completing the course the participant will:

- Understand the function of a solenoid valve
- Know the different components of a solenoid valve
- Understand what MWP, Max OPD and Min OPD are
- Know the applications of a solenoid valve

### Content outline

- Solenoid valve
- Components
- Types
- Direct-operated solenoid valve – Operation
- Servo-operated solenoid valve with diaphragm – Operation
- Servo-operated solenoid valve with axial piston – Operation
- Solenoid valve – NC
- Solenoid valve – NO
- Maximum Working Pressure (MWP)
- Maximum Opening Pressure Differential (MaxOPD)
- Minimum operating pressure differential (MinOPD)
- Valve Capacity
- Applications

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Learners looking for an introduction to solenoid valves and their function in a commercial refrigeration system.	Free of charge	24/7	Online



## RA – DR Line components – Filter drier & Sight glass



Course duration is 30 minutes  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to filter drier & sight glasses and their function in a refrigeration system.

After completing the course the participant will understand:

- The purpose of a filter drier
- The location of the filter drier in a refrigeration system
- About filter drier families
- About the materials used for filter drier solid core, and about their properties
- The purpose and know the location of a sight glass
- Some filter drier installation tips
- When a filter drier has to be replaced

### Content outline

- What is a Filter Drier?
- Function
- Location of a Filter Drier in a Refrigeration System
- Types of Filter Drier
- Re-design Filters
- Original Filters
- Filter Driers - Connection Types
- Filter Driers - Solid Core
- Refrigeration Systems
- Refrigerant
- How do desiccants work?
- Moisture Adsorption through the Desiccant
- Filter Driers - Selection Parameters
- Sight glasses
- Filter Driers - Installation

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who are looking for an introduction to filter drier & sight glass and their function in a refrigeration system.	Free of charge	24/7	Online



## Expansion Valves – General



Level: Basic  
Language: English



### Benefits

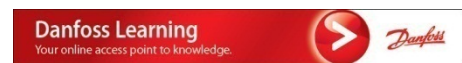
This course will broadly cover the basic information needed to precisely select either Danfoss thermostatic or electrically operated expansion valves to ensure the maximum performance of your refrigeration system.

### Content outline

- Introduction
- Overview of expansion valve types
- Function, working principles
- Internal vs. external pressure equalization
- Superheat
- Subcooling: fundamental points
- Charges
- Conventional port vs. “Balanced” port
- Valves with bleed
- Selection

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to know how to select an expansion valve.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Expansion Valves – AKV program



Level: Intermediate  
Language: English



### Benefits

You will have an in-depth knowledge of Danfoss’ electrically operated expansion valve series AKV after completing this course.

During the training you will receive the answers to the following questions:

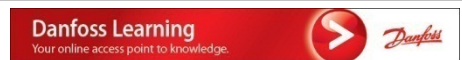
- How is the valve operated?
- What is the energy-saving potential of AKV?
- How do you make a correct selection via a detailed step-by-step description?

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Expansion Valves – PHT program



Level: Intermediate  
Language: English



### Benefits

You will gain an understanding of servo-operated valves for large capacities by completing the course.

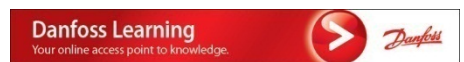
- What are the main applications for the PHT valve?
- How does the PHT valve work?
- How is the PHT valve installed?
- How could PHT installation help make a refrigeration system more reliable and energy efficient overall?

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about servo-operated valves and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Expansion Valves – T2-TE2 program



Level: Intermediate  
Language: English



### Benefits

After completing the course you will have extended knowledge of the thermostatic expansion valves type T2-TE2. This thermostatic expansion valve family is the most universal and adaptable series.

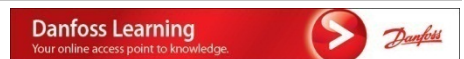
- T2-TE2: which range does it cover?
- Reliability: how that is ensured in the valve?
- What benefits are provided by the new fixing strap?
- New bulb design – what are the main advantages of this solution for accurate system control
- How do you make the correct selection of the thermostatic expansion valve type T2-TE2?
- How is the correct installation ensured?
- How do you adjust the valve?

### Content outline

- Introduction
- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment
- Service / maintenance

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain extended knowledge of thermostatic expansion valves T2-TE2 series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>





## Expansion Valves – TE5-TE55 program



Level: Intermediate  
Language: English



### Benefits

After completing the course, you will have in-depth knowledge on the thermostatic expansion valves TE5-TE55 – the latest upgraded version of Danfoss thermostatic valves – and will be able to answer the following questions:

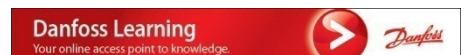
- What is the modular design of the upgraded version of the valve?
- Reliability – how is that implemented in the new valve design?
- How to minimize the stock surface with the upgraded version TE5-TE55?
- What makes the mounting of the TE5-T55 fast and easy?
- Why could the use of the upgraded version of T5-T55 improve the overall efficiency of the refrigeration system?
- How do you size, mount and adjust the correct valve?

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment
- Case stories

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves TE5-TE55 series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Expansion Valves – TGE program



Level: Intermediate  
Language: English



### Benefits

The course covers the thermostatic expansion valve for air conditioning application.

- Which types of Danfoss thermostatic expansion valve are used in air conditioning systems?
- How could I build an air conditioning system that makes the climate comfortable everywhere while at the same time protecting the environment?
- What are the technical features of TGE that ensure valve energy efficiency?

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment

### Registration

You can sign up for the course by following the [link](#)



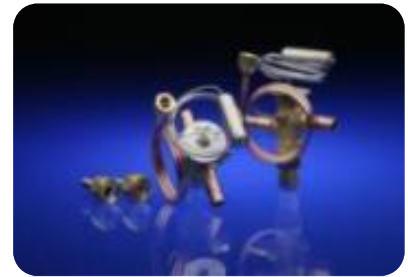
Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves TGE series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Expansion Valves – TR6 program



Course duration is 45 minutes plus a test  
 Level; Intermediate  
 Language: English + local languages where available



**Course available to US users only**

### Benefits

This eLesson is suitable for learners who are looking for an introduction to expansion valve TR6 series and their function

After completing this course you will:

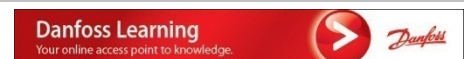
- Understand the designs of residential A/C units and Heat pump units
- Understand the effect of the Department of Energy regulation Seer 13 on residential A/C equipment and Heat pump units
- Know the main purpose and function of an expansion valve
- Know the Danfoss Expansion valve range
- Understand the benefit of applying TR6 in residential A/C units – new and retrofit
- Understand the contractors and customers benefits from using TR6
- Know How to select, install and troubleshoot the TR6

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves TR6 series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Pressure controls – Introduction to KPU



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



**Course available to US users only**

### Benefits

This eLesson is suitable for learners looking for an introduction to pressure controls, their function in a commercial refrigeration system.

After completing this course you will:

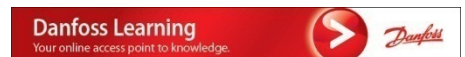
- Know what an on/off control is
- Understand on/off control logic
- Know basic elements of KPU control
- Understand what range and differential are
- Understand the typical functions of pressure and temperature controls

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to gain knowledge about pressure controls and how to install and service them.	Free of charge	24/7	Online



## RA – DR Expansion Valves – TU-TC program



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available

### Benefits

After completing the course you will have in-depth knowledge of the thermostatic expansion valves type TU /TC. This range of valves is made of stainless steel and is, therefore, very suitable for use in the food industry. The course answers the following questions:

- What are the benefits behind hermetic valve design?
- How reliable are the valves?
- How is reliability implemented in the new TU/TC design?
- Better plant reliability – how can the TU/TC design contribute to this?
- What makes the mounting of TU/TC quick and easy?
- How do you size the correct valve?
- How do you mount thermostatic expansion valve with bi-metal connection?
- Which version of TU/TC can be adjusted?

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation
- Adjustment

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves TU-TC series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Electrically Operated valves – Introduction to ETS program



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

The course will provide you with extended knowledge on the electrically operated expansion valves ETS.

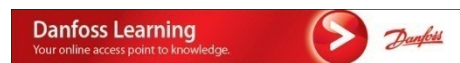
- ETS - valve operation principles
- Main applications
- What are the benefits of ETS electrically operated expansion valves
- Guideline for correct ETS selection ( selection example)

### Content outline

- Refrigeration Circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electrically operated expansion valves and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>





## Line components – SG/SG+ program



Level: Intermediate  
Language: English



### Benefits

You will gain extended knowledge of Danfoss Sight Glasses range covering the range, difference in SG+ and SG program, applications, selection example and guideline on correct installation.

### Content outline

#### Sight glasses type SG+

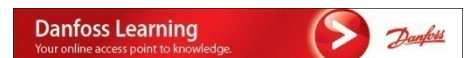
- Refrigeration circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation

#### Sight glasses type SG

- Refrigeration circuit
- Introduction
- Range
- Features & Benefits
- Selection
- Installation

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about sight glasses SG/SG+ series and how to install and service them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Controller – MCX



Level: Intermediate  
Language: English



### Benefits

The course will provide you with extended knowledge of MCX controllers, covering main applications, programmability, software tools.

### Content outline

- Introduction
- MCX system
- MCX network
- Programmability & software tools
- Hardware overview
- MCX standard applications
- Residential heat pump standard software
- Air handling unit
- Close control unit/shelter
- Rooftop
- Chiller with reverse flow (HP)
- Compressor rack
- MCX application examples
- Features & Benefits

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about electronic controller MCX for selected applications.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Condensing units – Introduction to OPTYMA™



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available

### Benefits

This eLesson is suitable for learners who are looking for an introduction to the standard condensing units range Optyma™.

After completing the course the participant will:

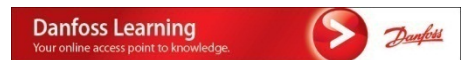
- Know about the history of Danfoss commercial compressors and condensing units
- Main applications
- Understand what a condensing unit is
- Know about the Danfoss condensing unit platform and nomenclature
- Know about the Optyma™ condensing units' features and benefits
- Know about the selection tools and other references available in Danfoss Internet

### Content outline

- What are the main components of the condensing units?
- Description of Optyma™ with reciprocating and scroll compressors
- Main applications
- Features & Benefits
- General selection guidelines

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to gain knowledge about standard Danfoss condensing units range.	Free of charge	24/7	Online



## RA – DR Condensing units – Introduction to OPTYMA PLUS™



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to the packaged condensing units range Optyma Plus™.

After completing the course the participant will:

- Know about the history of Danfoss commercial compressors and condensing units
- Understand what a condensing unit is
- Know about the Danfoss condensing unit platform and nomenclature
- Know about the Optyma Plus™ packaged condensing units' features and benefits
- Know about the selection tools and other references available in Danfoss Internet

### Content outline

- What are the main components of the condensing units?
- Description of Optyma Plus™ with reciprocating and scroll compressors
- Main applications
- Features & Benefits for
- General selection guidelines

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to gain knowledge about plug and play Danfoss condensing units range.	Free of charge	24/7	Online



## RA – DR Condensing units – OPTYMA PLUS™ New Generation



Course duration is 45 minutes plus a test  
Level: Intermediate  
Language: English + local languages where available



### Benefits

After completing the course, you will have an in-depth knowledge about:

- Optyma Plus™ New Generation product range
- Which upgraded /new features were implemented in Optyma Plus™ New Generation
- Benefits you will gained by installing Optyma Plus™ New Generation in your refrigeration system

### Content outline

- Introduction
- Improvements of OPTYMA PLUS™ New Generation: product features
- Targeted applications
- Product range
- Nomenclature
- Features & benefits overview

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about the new silent Danfoss condensing units range.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>

### Additional tools

Introduction videos

<http://www.youtube.com/watch?v=XoLEUtlCRVc&list=UU9Lg8czvr3MDvuhvm6C9AEQ&index=3&feature=plcp>



## RA – DR Condensing units – OPTYMA Slim Pack



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



**1 course for Europe market**  
**1 course for Asia & Middle East markets**

### Benefits

This eLesson is suitable for learners who are looking for an introduction to the OPTYMA™ Slim Pack condensing units.

After completing the course the participant will know:

- The technical characteristics of the OPTYMA™ Slim Pack
- OPTYMA™ Slim Pack components
- The envelope, models and capacity range
- The main applications of OPTYMA™ Slim Pack condensing units
- OPTYMA™ Slim Pack Nomenclature
- The features and benefits of OPTYMA™ Slim Pack condensing units

### Content outline

- Introduction
- OPTYMA Slim pack technical features
- Targeted applications
- Product range
- Nomenclature
- Features & benefits overview

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about the new Danfoss condensing units range.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>





## RA – DR Electronic controls – OPTYMA™ Control



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

Gain knowledge about the Danfoss solution for refrigeration systems control and protection by completing the OPTYMA™ Control course

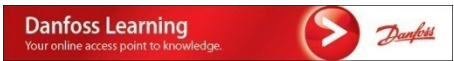
- Main technical characteristics
- Advantages of refrigeration system control with OPTYMA™ Control
- Electrical schemes
- Basic controller programming troubleshooting list

### Content outline

- What is it OPTYMA™ Control?
- Functionality
- Types: 1 phase and 3 phase
- Examples of applications
- Features & Benefits

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss electronic control solutions.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Electronic controls – Case controllers Module 1



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to Danfoss ADAP-KOOL® Case Controllers.

After completing the course the participant will know:

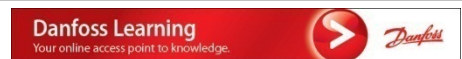
- What an ADAP-KOOL® case controller is
- What case controller is used for
- Case controller types
- Functionality of a case controllers
- Main applications of case controllers
- The application design
- The technical characteristics
- Features and benefits of case controllers

### Content outline

- What is it a case controller
- Functionality
- Types
- Examples of applications
- Features & Benefits

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to get an introduction to the Adap-Kool case controllers program.	Free of charge	24/7	Online



## Reciprocating compressors – Maneurop® range



Level: Intermediate  
Language: English

### Benefits

The course will provide you with extended knowledge of Danfoss' hermetic reciprocating range for commercial applications

- What is the Maneurop® range in terms of cooling capacity?
- What are the main applications for Maneurop® compressors?
- What are the main technical features which makes Maneurop® a reliable solution for your system?

### Content outline

- General program overview  
LBP/MBP/HBP, refrigerants, rating & capacities, cooling capacities range, application envelope
- Product Range
- Nomenclature
- Target Applications
- Features & Benefits

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss reciprocating compressor program.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Scroll compressors – Performer ranges

Refrigeration applications: MLZ



Level: Intermediate  
Language: English



### Benefits

By completing the course, you will have an understanding of:

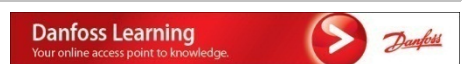
- MLZ targeted applications
- MLZ cooling capacities range
- Which refrigerant MLZ compressors are suitable for?
- Energy efficiency with MLZ compressors
- Reliability – in-depth information about MLZ compressors and the features which make the MLZ compressor a reliable solution for your installation

### Content outline

- Product Range
- Nomenclature
- Targeted Application
- Application Envelope
- Construction Features
- Features & Benefits
- Physical Configuration

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss scroll compressors for refrigeration applications.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



**Scroll compressors – Performer® ‘S’**  
*Air Conditioning applications: S series*



Course duration is 30 minutes  
 Level: Intermediate  
 Language: English + local languages where available



**Benefits**

This eLesson is suitable for learners who are looking for an introduction to the Performer scroll ‘S’ series and their function.

After completing the course the participant will:

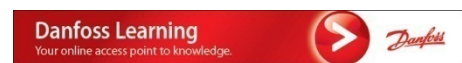
- Know about the product range of the Performer ‘S’ series
- Understand the gas and oil flow management of the Performer ‘S’ series
- Understand the sealing concepts used in the Performer ‘S’ series
- Know about the various technical features and the effect of COP
- Know about the Performer ‘S’ series range, applications and benefits

**Content outline**

- Product Range
- Nomenclature
- Design
- Targeted Application
- Features & Benefits

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss scroll compressors for A/C applications.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



**Scroll compressors – Performer® ‘H’**  
*Air Conditioning applications: H series*



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



**Benefits**

Compressor Series This eLesson is suitable for learners who are looking for an introduction to the Performer scroll ‘H’ series and their function.

After completing the course the participant will:

- Know about Danfoss commercial compressor milestones and manufacturing history
- Understand the working principle and function of a scroll compressor
- Know about general/technical features of the Performer ‘H’ series
- Know about the Performer ‘H’ series products and applications

**Content outline**

- Product Range
- Nomenclature
- Construction
- Targeted Application
- Features & Benefits

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss scroll compressors for A/C applications.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Scroll compressors – Performer ranges

Heat Pump applications: HHP



Level: Intermediate  
Language: English



### Benefits

You will have an extended knowledge of HHP compressors dedicated for heat pump applications after completing the course

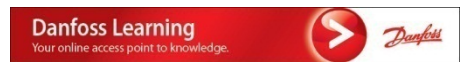
- What are the main types of heat pumps in which HHP compressors can be used?
- What are the key features which makes HHP compressor the ideal solution for heat pump applications?

### Content outline

- Product Range
- Nomenclature
- Targeted Application
- Application Envelope
- Features & Benefits

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about Danfoss scroll compressors for HP applications.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Inverter Compressors Technology Module 1 – Introduction

Energy-efficiency solutions for your applications



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to the inverter (variable speed) compressors technology.

By the end of this lesson you will:

- Know about the inverter technology
- Understand the working principle
- Know the benefits of the inverter technology
- Know the main applications
- Have overview of Danfoss inverter solutions

### Content outline

- Inverter technology principles
- Target Applications
- Inverter technology benefits
- Danfoss Inverter solutions overview

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
 Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
Who wants an introduction to the inverter compressors technology and its benefits.	Free of charge	24/7	Online





## RA – DR Cold Room Module 1 – Introduction



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

After completing the course you will have a broad understanding of cold room applications:

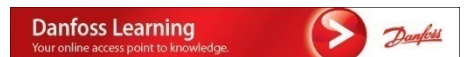
- Cold room design
- Types of cold rooms
- Factors and processes to be considered in order to comply with legislation and food safety

### Content outline

- What is a cold room?
- Purpose of a cold room
- HACCP
- Main factors affecting cold room design
- Cold room construction
- Refrigeration system
- Main components of the refrigeration system
- Air distribution in a cold room

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to gain knowledge about cold room application.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>

## RA – DR Cold Room Module 2 – Applications



Course duration is 30 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available

### Benefits

This eLesson is designed for learners who have taken Cold Room module 1 and wish to learn more about the application.

After completing the course, you will have in-depth knowledge of cold room types:

- By refrigeration system
- By room temperature
- By type of products stored in cold rooms etc.

You will also learn about:

- Cold room controls; defrosting, pump down process
- Most common refrigeration system used (simple, complete and advanced) and the advantages of each

### Content outline

- Cold room types
- Main applications
- Cold room refrigeration cases
- Refrigeration circuit: simple, complete and advanced
- Cold room examples: flowers, fruits/vegetables, cheese, fresh meat, fish, dairy, frozen food
- Pump down process
- Condenser fan on-off vs. variable speed
- Defrost
- Temperature variations
- Cold climate applications
- Load variations
- Bigger refrigeration capacity: shopping centers

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to get an in-depth knowledge about cold room application.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



**RA – DR Cold Room Module 3 – Cooling Load Calculation**  
**Part 1**



Course duration is 45 minutes plus a test  
 Level: Advanced  
 Language: English + local languages where available

$$\dot{Q} = U \times A \times \Delta T$$

$$U = \frac{1}{\frac{1}{h_i} + \frac{x_1}{k_1} + \frac{x_2}{k_2} + \frac{x_3}{k_3} + \frac{1}{h_o}}$$

$$\dot{Q} = \dot{m} \times c_p \times \Delta T$$



**Benefits**

This eLesson is designed for learners with good knowledge of refrigeration techniques and applications.

After completing the course the participant will:

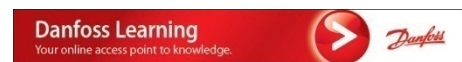
- Understand why it is necessary to calculate cooling loads
- Understand different temperature application ranges
- Understand how we calculate cooling load
- Know the different sources we need to consider when making cooling load calculations
- Know the different types of transmission loads
- Know the different type of product loads

**Content outline**

- Cooling load definition
- Types of loads
- Transmission loads
- Product loads

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to get an advanced knowledge about cold room cooling load calculation.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



**RA – DR Cold Room Module 3 – Cooling Load Calculation**  
**Part 2**



$$\dot{Q} = U \times A \times \Delta T$$

$$U = \frac{l}{\frac{l}{h_i} + \frac{x_1}{k_1} + \frac{x_2}{k_2} + \frac{x_3}{k_3} + \frac{l}{h_o}}$$

$$\dot{Q} = \dot{m} \times c_p \times \Delta T$$



Course duration is 45 minutes plus a test  
 Level: Advanced  
 Language: English + local languages where available

**Benefits**

This eLesson is designed for learners with good knowledge of refrigeration techniques and applications.

After completing the course the participant will:

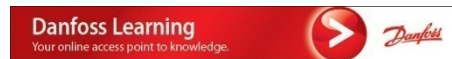
- Know about the different types of internal loads
- Know about different types of equipment related heat loads
- Understand about heat load from infiltration
- Know how to consider safety factors for total load
- calculations
- Know about information on load calculation
- Software and easy methods to calculate cooling load

**Content outline**

- Internal loads
- Equipment-related loads
- Defrosting
- Infiltration
- Total cooling load calculation
- Safety factor
- Running time
- Cooling capacity
- Refrigeration equipment selection
- Cooling load calculation software
- Cooling capacity in cold & freezer rooms

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to get an advanced knowledge about cold room cooling load calculation.	Free of charge	24/7	Online



**RA – DR Cold Room Module 4 – Product Selection  
Part 1**



Course duration is 60 minutes plus a test  
Level: Advanced  
Language: English + local languages where available

**Benefits**

This eLesson is suitable for learners who are looking for an introduction to the components used in a cold room and how to select them.

By the end of this lesson you will:

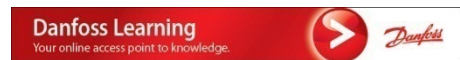
- Know about the basic components required for a cold room refrigeration system
- Know about the Danfoss product range applicable for cold rooms
- Know what data are required for the selection of components or valves
- Know how to select a compressor or a condensing unit for a cold room

**Content outline**

- Step-by-step selection of compressors and condensing units with Coolselector®

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to get an advanced knowledge about how to select products in a cold room application.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



**RA – DR Cold Room Module 4 – Product Selection  
Part 2**



Course duration is 60 minutes plus a test  
Level: Advanced  
Language: English + local languages where available

**Benefits**

You will get the complete guidelines of Danfoss product selection for cold room applications.

By the end of this lesson you will:

- Know about the basic components required for a cold room refrigeration system
- Know about the Danfoss product range applicable for cold rooms
- Know what data are required for the selection of components or valves
- Know about the valve opening process
- Know how to select a compressor or a condensing unit for a cold room

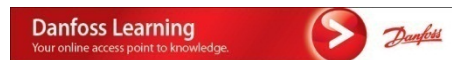
**Content outline**

Selection of:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>▪ Thermostatic expansion valves</li> <li>▪ Electrically operated expansion valves</li> <li>▪ Solenoid valves</li> <li>▪ Pressure regulators KV</li> <li>▪ Check valves</li> <li>▪ Variable Speed Control for Fans</li> </ul> | <ul style="list-style-type: none"> <li>▪ Pressure regulators ICS</li> <li>▪ Sight Glasses</li> <li>▪ Ball valves</li> <li>▪ Filter-driers</li> <li>▪ Pressure controls and thermostats / controllers</li> <li>▪ Monitoring and log data</li> </ul> |
|---|--|

**Registration**

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who wants to get an advanced knowledge about how to select products in a cold room application.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Carbon Dioxide as a Refrigerant Module 1



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners that wish to know more about Carbon Dioxide as a refrigerant.

After completing the course the participant will:

- Know the advantages of using CO<sub>2</sub> as a refrigerant
- Understand Global Warming, Ozone Depletion and Total Equivalent Warming Impact (TWEI)
- Know the legislation about emission of CO<sub>2</sub> and other refrigerants
- Know about the history and properties of CO<sub>2</sub>
- Know the differences between CO<sub>2</sub> and other refrigerants
- Know about the safety precautions that need to be taken when dealing with CO<sub>2</sub>

### Content outline

- Introduction
- Global warming
- Legislation
- CO<sub>2</sub> as refrigerant
- CO<sub>2</sub> vs. other refrigerants
- Safety with CO<sub>2</sub>
- CO<sub>2</sub> main applications
- CO<sub>2</sub> compared with R134a and R717
- Refrigeration processes with CO<sub>2</sub>
- Sub-critical systems
- Transcritical systems

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants to get an introduction to CO <sub>2</sub> as a refrigerant.	Free of charge	24/7	Online





## RA – DR Carbon Dioxide as a Refrigerant Module 2 – Systems understanding



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

By the end of this lesson you will understand:

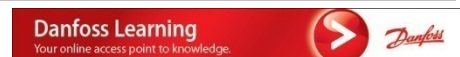
- The background for the use of CO<sub>2</sub>, with a focus on legislation and other initiatives to phasedown HFC's
- CO<sub>2</sub> as a refrigerant, and the process in a Log-ph diagram – what are the implications of CO<sub>2</sub>'s triple point and critical point
- What a subcritical system is – the main components and how it works
- What a transcritical system is – the main components and how it works
- How CO<sub>2</sub> is used in different applications/systems
- How to ensure optimal COP in a CO<sub>2</sub> transcritical system
- When/where to use a transcritical system
- The performance of a CO<sub>2</sub> system
- What precautions are necessary when using CO<sub>2</sub>?
- Safety issues and components (leak, pressure, alarms, ventilation etc/)
- Overview of Danfoss product range applicable for CO<sub>2</sub> applications

### Content outline

- CO<sub>2</sub> as a refrigerant: characteristic, drivers, legislation
- Subcritical & transcritical systems refrigeration process
- Typical CO<sub>2</sub> applications:
  - Two stage cascade system
  - Two stage cascade – pump system
  - Two stage booster system
- Optimal COP on transcritical operation
- Transcritical CO<sub>2</sub> systems: gas by-pass
- Efficiency and global distribution of subcritical and transcritical systems
- Climate performance of CO<sub>2</sub> systems
- Safety of CO<sub>2</sub>
- Danfoss product range applicable for CO<sub>2</sub> applications

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who is looking for knowledge on how CO <sub>2</sub> works in different systems.	Free of charge	24/7	Online





## RA – DR CO2 Module 3a – Industrial Refrigeration



Course duration is 60 minutes plus a test  
 Level: Advanced  
 Language: English + local languages where available



### Benefits

After completing the course you will gain the knowledge about:

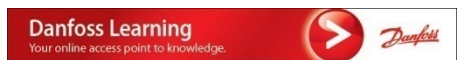
- Main advantages of using CO<sub>2</sub> for Industrial applications
- Main types of refrigeration systems used for Industrial Applications with CO<sub>2</sub>
- Danfoss CO<sub>2</sub> product range for Industrial applications

### Content outline

- Why CO<sub>2</sub> in industrial refrigeration applications?
- CO<sub>2</sub> as a refrigerant in industrial systems
- Designing pressure
- NH<sub>3</sub>/CO<sub>2</sub> secondary cooling system
- CO<sub>2</sub>/NH<sub>3</sub> cascade system
- Industrial refrigeration: CO<sub>2</sub> components overview

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for an advanced knowledge of CO<sub>2</sub> within industrial installations.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR CO2 Module 3b – Food Retail Refrigeration systems and product selection



Course duration is 60 minutes plus a test  
 Level: Advanced  
 Language: English + local languages where available



### Benefits

After completed the course you will gain the knowledge about:

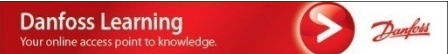
- Main advantages of using CO<sub>2</sub> for food-retail applications
- Main types of refrigeration systems used for food-retail applications with CO<sub>2</sub>
- Danfoss CO<sub>2</sub> product range for food-retail applications

### Content outline

- Why CO<sub>2</sub> in FR applications?
- CO<sub>2</sub> as a refrigerant in FR systems
- Designing pressure in CO<sub>2</sub> systems
- Food retail CO<sub>2</sub> transcritical booster system
- Food retail cascade HC/HFC-CO<sub>2</sub> system
- Food retail CO<sub>2</sub> components overview
- Case story

### Registration

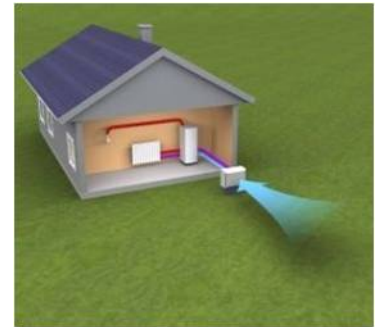
You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for an advanced knowledge of CO<sub>2</sub> within food retail installations.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Heat Pump Module 1 – Introduction



Course duration is 45 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

This eLesson is suitable for learners who are looking for an introduction to Heat Pump and its function.

After completing the course the participant will:

- Understand what a heat pump is
- Understand the working principle of heat pumps
- Know how the efficiency of a heat pump is calculated
- Understand the heat pump refrigeration cycle
- Know about different heat sources
- Know the different applications and markets for heat pumps
- Know the heat pump components produced by Danfoss

### Content outline

- What's a heat pump?
- Refrigeration system
- Applications
- Types of heat pumps
- Legislation
- Danfoss heat pump components
- Heat pump market
- Efficiency of Heat Pumps

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for an introduction to the heat pump systems.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Heat Pump Module 2 – Product Selection Part 1



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to the components used in a heat pump and how to select them.

By the end of this lesson you will:

- Know the heat pump components & compressors
- Know how to select a compressor
- Know how about heat exchangers used & how to select a heat exchanger
- Know about different types of expansion valves used in heat pumps
- Know how to select an expansion valve
- Know about controllers used in heat pumps
- Know about 4 way valves, their function and selection

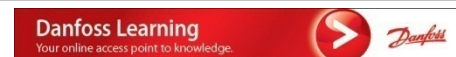
You will find the scope of prepared selection examples for main components based on the same operating conditions.

### Content outline

- Introduction: overview of the Danfoss components for heat pumps applications
- Expansion valves
- Compressors
- Controllers
- Heat exchangers
- 4-way valves

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for learning what the main components within a heat pump system are and how to select them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Heat Pump Module 2 – Product Selection Part 2



Course duration is 45 minutes plus a test  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

This eLesson is suitable for learners who are looking for an introduction to the line components used in a heat pump and how to select them.

By the end of this lesson you will:

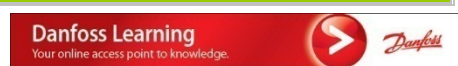
- Know how to select a solenoid valve
- Know how to select a sight glass
- Know how to select a filter drier
- Know how to select a ball valve and a check valve
- Know how to select high pressure & low pressure controls

### Content outline

- Introduction: overview of the Danfoss components for heat pumps applications
- Line components:
  - Sight glass
  - Filter drier
  - Ball valve
  - Check valve
  - Pressure controls

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for learning what the main components within a heat pump system are and how to select them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Milk Cooling Module 1 – Introduction



Course duration is 45 minutes plus a test.  
 Level: Basic  
 Language: English + local languages where available



### Benefits

After completing the course the participant will:

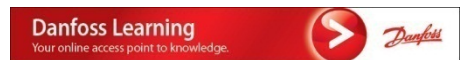
- Understand what a cold chain is
- Understand the design elements of a milk cooling tank
- Understand the classification of a milk cooling tank
- Understand the different types of refrigeration systems used in milk cooling tanks
- Know what a milk cooling tank is used for
- Be aware of the different standards which apply to milk cooling tanks
- Know the Danfoss milk cooling tank components

### Content outline

- Introduction
- Application description
- Legislation
- Refrigeration system
- Danfoss components for milk cooling applications
- Types of milk cooling:
  - Direct expansion cooling
  - Ice bank cooling
  - Precooling
  - Instant cooling
  - Two stage cooling

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who is looking for an introduction to the milk cooling tanks .	Free of charge	24/7	Online



## RA – DR Milk Cooling Module 2– Product Selection



Course duration is 45 minutes  
 Level: Intermediate  
 Language: English + local languages where available



### Benefits

After completed the course you will gain the knowledge about:

- The Danfoss product range for milk cooling applications
- How to select Danfoss products for milk cooling tank with direct expansion cooling system

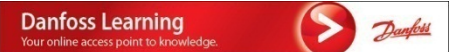
You will find the scope of prepared selection examples for main components based on the same operating conditions

### Content outline

- Introduction
- Direct expansion milk cooling type components
- Selection of:
  - Condensing unit
  - Expansion valve
  - Solenoid valve
- Selection of line components:
  - Sight glass
  - Filter drier
  - Ball valve

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Who is looking for learning what the main components within a milk cooling tank are and how to select them.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>





## RA – DR HVAC equipment – Chiller Module 1



Course duration is 30 minutes  
 Level: Basic  
 Language: English + local languages where available



### Benefits

After completed the course you will gain the knowledge about:

- Chillers application (characteristic, requirements, etc.)
- Overview of current legislation
- Chillers market overview
- Types of chillers
- Danfoss product range for chillers

### Content outline

- What is a chiller?
- Refrigeration system
- Applications
- Legislation and certification
- Chillers market in the world
- Danfoss components for chillers
- Types of chillers:
  - Air-cooled scroll chillers
  - Air-cooled screw chillers
  - Air-cooled ducted chillers
  - water (brine) - cooled screw chillers
  - water (brine) - cooled scroll chillers
  - Remote condensers chillers
  - Centrifugal chillers
  - Absorption chillers

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who is looking for an introduction to the chillers .	Free of charge	24/7	Online





## RA – DR Convenience store solutions



Course duration is 30 minutes

Level: Basic

Language: English + local languages where available



### Benefits

Suitable for learners that wish to know more about control solutions for Convenience store refrigeration systems:

After completing the course the participant will know:

- How the case controller is operating in the system
- Overview of the functionality

### Content outline

- Case controllers functions for display case, cabinet and cold room control
- How a case controller is used to control a cold room
- How a case controller is used to control a display case
- Overview of case controllers
- Normal On/Off thermostat control
- Defrost sequence

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Who wants to know more about control solutions for convenience store refrigeration systems.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## RA – DR Natural Refrigerants - Hydrocarbons



Course duration is 30 minutes plus a test  
 Level: Basic  
 Language: English + local languages where available

### Benefits

Suitable for learners that wish to know more about Hydrocarbons as a refrigerants

After completing the course the participant will know:

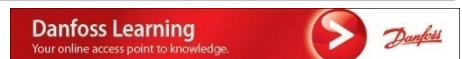
- About the status of different refrigerants and trends in their use
- About the qualities that will be required for future refrigerants
- Which Hydrocarbons are used as refrigerants
- The advantages of using Hydrocarbons as a refrigerants
- The properties of Hydrocarbons
- Differences between Hydrocarbons and other refrigerants
- The legislation overview on hydrocarbons
- Flammability limits
- The main applications of hydrocarbons
- Danfoss products range designed for hydrocarbon systems

### Content outline

- Refrigerant trends
- Refrigerants comparison
- Different hydrocarbons
- Legislation
- Security
- Danfoss products

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
Who wants an introduction to hydrocarbons and legislation.	Free of charge	24/7	Online



## Expansion Valves – Installation & Troubleshooting Guidance



Level: Advanced  
Language: English



### Benefits

After completing the course, you will have:

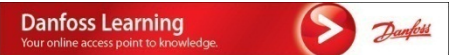
- An understanding of the Danfoss thermostatic expansion valve programs
- A knowledge of the fundamentals in order to make a correct selection of the TEV
- In addition, you will receive a basic knowledge on troubleshooting

### Content outline

- General guidelines
- Mounting the bulb
- Distributor
- Pipe work
- Airflow
- Setting the superheat
- How to check for lost charge
- Destructive mounting
- Troubleshooting

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service an expansion valve.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Maneurop Compressors Application Guidelines



Level: Advanced  
Language: English



### Benefits

You will learn how to correctly install and service Maneurop compressors in order to ensure high reliability and a long lifetime for your refrigeration system.

### Content outline

- Compressor Handling
- System cleanliness.
- Refrigerant Charging
- Piping design
- Operating voltage range.
- Cycle rate limit
- Sound & vibrations

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service a reciprocating compressor.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Condensing Units – Installation & Servicing guidelines

Optyma™ and Optyma Plus™ ranges



Level: Advanced  
Language: English



### Benefits

You will learn how to correctly install, maintain and service Optyma™ and Optyma Plus™ condensing units in order to ensure high reliability and a long lifetime for your refrigeration system.

### Content outline

- Transport & storage
- Safety measures prior to assembly
- Unit site location
- Refrigerating connections
- System cleanliness
- Leak detection
- Vacuum pump
- Charging with refrigerant
- Maintenance
- Replacement

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service standard and packaged condensing units.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Performer® Scroll Compressors Application Guidelines SH R410A



Level: Advanced  
Language: English



### Benefits

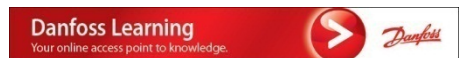
You will gain the knowledge how to correctly install and service Performer® Scroll Compressors R410A compressors in order to ensure high reliability and long life time of your installation.

### Content outline

- Compressor handling
- Mounting
- Electrical connections
- Danfoss MCI Soft-Start controller
- Internal motor protection
- Phase sequence and reverse rotation protection
- Approvals and certification
- Compressor ambient temperature
- Application envelope
- Maximum discharge gas temperature
- Cycle rate limit
- System design recommendations
- Installation
- Sound and vibration management

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service SH scroll compressor operating with R410A refrigerant.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## Performer® H Scroll Compressors Application Guideline



Level: Advanced  
Language: English



### Benefits

You will gain the knowledge how to correctly install and maintain Performer® H Scroll Compressors in order to ensure high reliability and long life time of your refrigeration system.

### Content outline

- Compressor Handling
- Mounting
- Oil type
- Electrical connections
- Internal motor protection
- Phase sequence and reverse rotation protection
- Terminal box
- Compressor ambient temperature
- Application envelope
- Maximum discharge gas temperature
- Cycle rate limit
- System design recommendations
- Installation
- Sound and vibration management

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service H series scroll compressor.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## SZ Performer® Scroll Compressors Application Guideline



Level: Advanced  
Language: English



### Benefits

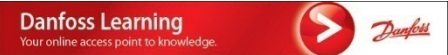
You will gain the knowledge how to correctly install and maintain SZ Performer® Scroll compressors in order to ensure high reliability and long life time of your refrigeration

### Content outline

- Compressor handling
- Mounting
- Electrical connections
- Danfoss MCI soft-start controller
- Internal motor protection
- Phase sequence and reverse rotation protection
- Compressor ambient temperature
- Application envelope
- Maximum discharge gas temperature
- Cycle rate limit
- System design recommendations
- Installation
- Sound and vibration management
- Maintenance

### Registration

You can sign up for the course by following the [link](#)



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service SZ scroll compressor.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>





## Performer® Heat Pump Scroll Compressors Application Guideline



Level: *Advanced*  
Language: *English*



### Benefits

You will gain the knowledge how to correctly install and service Performer® Heat Pump Scroll Compressors Application Guideline in order to ensure high reliability and long life time of your refrigeration system

### Content outline

- Compressor handling
- Mounting
- Electrical connections
- Internal motor protection
- Phase sequence and reverse rotation protection
- Terminal box
- Compressor ambient temperature
- Application envelope
- Maximum discharge gas temperature
- High and low pressure protection
- Cycle rate limit
- System design recommendations
- Installation
- Sound and vibration management

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service heat pump scroll compressor.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## SM - SY - SZ Performer® Scroll Compressors Application Guideline



Level: Advanced  
Language: English



### Benefits

You will gain the knowledge how to correctly install and service SM - SY - SZ Performer® Scroll Compressors in order to ensure high reliability and long life time of your refrigeration

### Content outline

- Compressor handling
- Mounting
- Electrical connections
- Danfoss MCI soft-start controller
- Internal motor protection
- Phase sequence and reverse rotation protection
- Compressor ambient temperature
- Application envelope
- Maximum discharge gas temperature
- Cycle rate limit
- System design recommendations
- Installation
- Sound and vibration management
- Maintenance

### Registration

You can sign up for the course by following the [link](#)

Danfoss Learning  
Your online access point to knowledge.



Target Group:	Price	Availability	Accessibility
<i>Advanced course to learn how to install, size and service S series scroll compressor.</i>	<i>Free of charge</i>	<i>24/7</i>	<i>Online</i>



## HOW TO REGISTER TO DANFOSS LEARNING?

### **Danfoss Learning Site Tour**

We recommend you to take Danfoss Learning site tour to get familiar with the site navigation and make your learning progress simple

[\*\*SITE TOUR\*\*](#)

### **How Do I Sign Up For Trainings?**

[\*\*New Learner? Click here to create and account\*\*](#)

### **Already registered?**

[\*\*Click here to login\*\*](#)





## CONTACTS

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**catalogue, please contact:**

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**[Danfoss Learning](#)**

PRACTICAL

