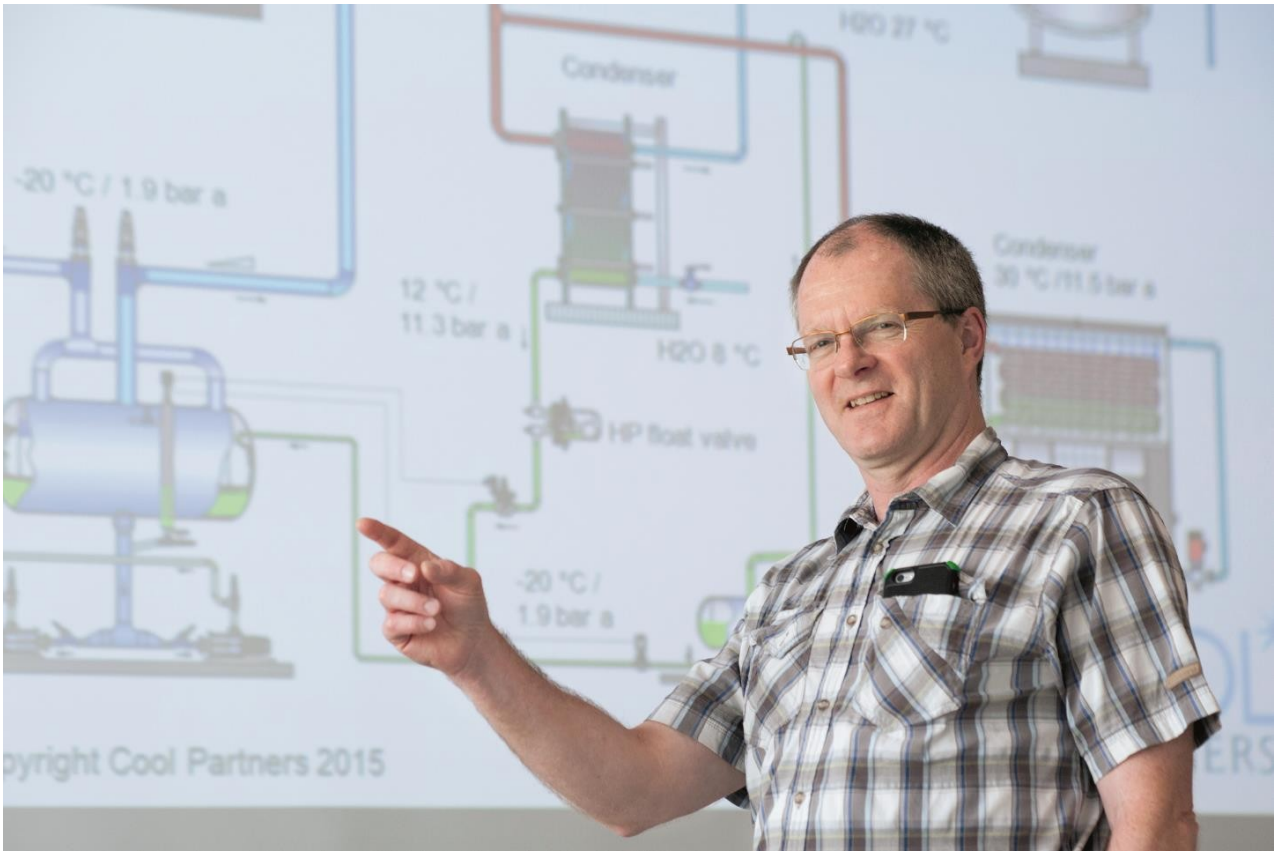
Education / Training / Seminars



Training seminars for Industrial refrigeration technicians, manufactures, contractors and end users are the knowhow and experience gained by working more than 35 years in the Industrial refrigeration business area, condensed into training seminars.

The seminars are high level education for everyone working in the field of Industrial refrigeration.

Complicated mathematics, physics and how to solve complicated equations can and should be learned on high schools and universities.

Cool Partners training seminars are about all the know how you cannot achieve at any engineering high schools or other theoretical studies.

In the Cool Partner seminars and trainings, we will go through how Industrial refrigeration systems can and should be build, operated, and serviced, so they are highly efficient and have low service and maintenance cost.

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Cool Partners training seminar

Subjects and contents

Cool Partners seminar proposal

1) **Industrial CO2 refrigeration systems**
   - Industrial CO2 refrigeration systems
2) **Optimization and efficiency of Industrial R744 systems**
   - Evaporators, correct circulation rates?
3) **Heat recovery and heat pumps**
   - How to make efficient heat recovery on refrigeration systems
   - Pitfalls in design, mounting and use of industrial heat pumps

Industrial CO2 systems

In this seminar we will review industrial CO2/NH3 cascade and CO2 trancritical systems. What are the differences on the two types of systems, what are the advantages and the disadvantages of them? How can they be made and pitfalls when designing and building them? What problems must be considered and solved when using Industrial CO2 transcritical flooded systems, and why will industrial CO2 transcritical system properly take over in the marine area, and on many land-based installations in the future.

-Industrial CO2 refrigeration systems.

CO2/NH3 cascade systems, how to make and control them.
Hot gas defrost, how can it be made?
Oil return systems, valve stations.
Stand still cooling, "power failure (black ship) what happens?
Cascade cooler, capacity regulation.
Defrost compressor, if such one is used.
Moisture in the CO2 system and what to do?
Transcritical industrial CO2 systems what are the problems with these and how to solve them? CO2 transcritical systems with pumped liquid what are the problems?
How can we solve the problems?
What is the future for industrial transcritical CO2 systems?

How can you build a CO2/NH3 cascade system with pump separator and hot gas defrost? Which kind of problems will you have to consider and solve in this type of systems? When and where will this type of systems be an advantage. What kind of problems are we facing on these types of installations?

Industrial CO2 transcritical systems what are the advantages and the disadvantages?
Why are these systems nearly always build as DX systems? What must be done, and which problems must be solved before building good CO2 transcritical flooded systems with pump separator and hot gas defrost. Are we going to see more of these systems in the future and why?

Oil in industrial R744 refrigeration systems.

How does it get out in the system?
What are the consequences of oil in the system to efficiency?
Can we do something to stop it?
Can we return it to the compressors?
Can the oil out blow be stopped in the system? Industrial refrigeration oils what are they and why?
oil analysis, how can we use them as trouble shooting tool

Oil give reason to many problems in refrigeration systems. How can we prevent the oil from reaching the evaporators and what happens if the oil gets into the evaporators anyway?
How can the oil in a safe way be returned from the system to the compressors and how to avoid contaminating the oil in the compressors? What is the importance of the oil types and what happens if the wrong oil types are used? What can we see in oil analysis and how can oil analyses results be used as a powerful trouble shooting tool?

Optimization of Industrial R717 systems

In these three seminars we will go through correct / optimal design, construction, and assembly of refrigeration systems. How to make the systems so they will perform with optimum energy efficiency, low service cost and maximum refrigeration capacity. It will be emphasized how the system design is done best possible according to the customers' needs and at the same time so energy saving as possible. It will be shown how to design so the very dangerous "liquid hammer" in pipes and valves in connection with hot gas defrost is avoided. "Liquid hammer" is the far most dangerous thing in industrial refrigeration systems and has been the "root course" of many of the worst and dangerous accidents with industrial systems, where large amounts of refrigerant was released, and people got severely hurt. There are no laws and / or regulations to prohibit design of refrigeration systems where "liquid hammer" can or will happen. It is completely up to the designers to ensure the systems are built in a safe way. Unfortunately, there are only very limited know how among refrigeration engineers in the area of what creates "liquid hammer" and how to avoid it from happening.

Evaporators, correct circulation rates?

Evaporators, what are the correct circulation rates and why?
Suction lines, risers how do they work and why?
DX systems?
How do liquid separators work and what should be calculated /considered?
How to protect refrigerant pumps?
Dry suction lines, are they always dry?

In this seminar we are looking at the low-pressure side of the refrigeration system. How is an evaporator made correctly according to circulation rates and refrigeration capacity? What do we need to consider when dimensioning "wet" and "dry" suction lines and why? What are the consequences due to energy consumption and capacity on the system? What do you need to consider when liquid separators are dimensioned and why? How do a liquid separator work and what makes it work? Why do refrigerant pumps fail and how is it avoided? Real life "case stories" will show the importance in doing dimensioning and piping the right way.

How to make efficient heat recovery on ammonia refrigeration systems.

Desuperheaters and water-cooled condensers for heat recovery, how to make it work efficient?
Where to be careful?
Heat pumps how do they work? Why is it not easy with heat pumps?
Hybride heat pumps how do they work and what is the experience with them?

We will go through the most common heat recovery initiatives used on industrial ammonia refrigeration systems and the most common refrigeration errors and mistakes made when installing them. The consequences of the refrigeration mistakes and errors and the impact on the refrigeration systems energy consumption and capacity will be explained. What kind of industrial heat pumps are available and what are the advantages and disadvantages of these different types.

Pitfalls in design, mounting and use of industrial ammonia heat pumps.

What kind of problems have we seen and why?

Case stories with heat pump problems including both screws and recips.
Complicated findings in trouble shooting which no one had expected.
Suggestions on how to avoid these kinds of problems.
Some important lessons learnt and some general guidelines in where to be very careful.

What kind of unexpected pitfalls have shown when running large industrial ammonia heat pumps? By going through uncovered areas of problems and case stories we achieve insights in the often very complex and unexpected problems which have shown to be present when designing, installing, running, and servicing the industrial ammonia heat pumps. Guidelines on what should be considered, investigated, and secured before a large industrial ammonia heat pump is put into operation. We will go through some important “lessons learnt” from very costly experiences with ammonia heat pumps which it will be advisable to take into consideration when these systems are designed and build or you are a customer wanting to buy an industrial heat pump.