Dantherm®
CLIMATE SOLUTIONS

APPLICATION GUIDE

DANTHERM ECOline ADVANCED MOISTURE- AND CLIMATE CONTROL

STORAGE – ARCHIVES – MUSEUMS – GALLERIES – INDUSTRIAL PROCESS – ICE RINKS – FOOD INDUSTRY – LABARATORIES – AQUACULTURE AND FISH PROCESSING

DANTHERMGROUP

1 DANTHERM ECOline
ENERGY-EFFICIENT CONCEPT WITH MULTIPLE APPLICATION AREAS

Left side: Dantherm DanX CF - Air Conditioning/Air Handling Units,
Right side: Dantherm SD 2300 adsorption dehumidifiers

With Dantherm **ECOline** full climate control is obtained according to your needs with our guidance.

Ventilation, dehumidification, humidification, heating, and cooling integrated into a system = ECOline
Ventilation with low energy consumption, EC fans, and high-efficiency counterflow heat recovery.

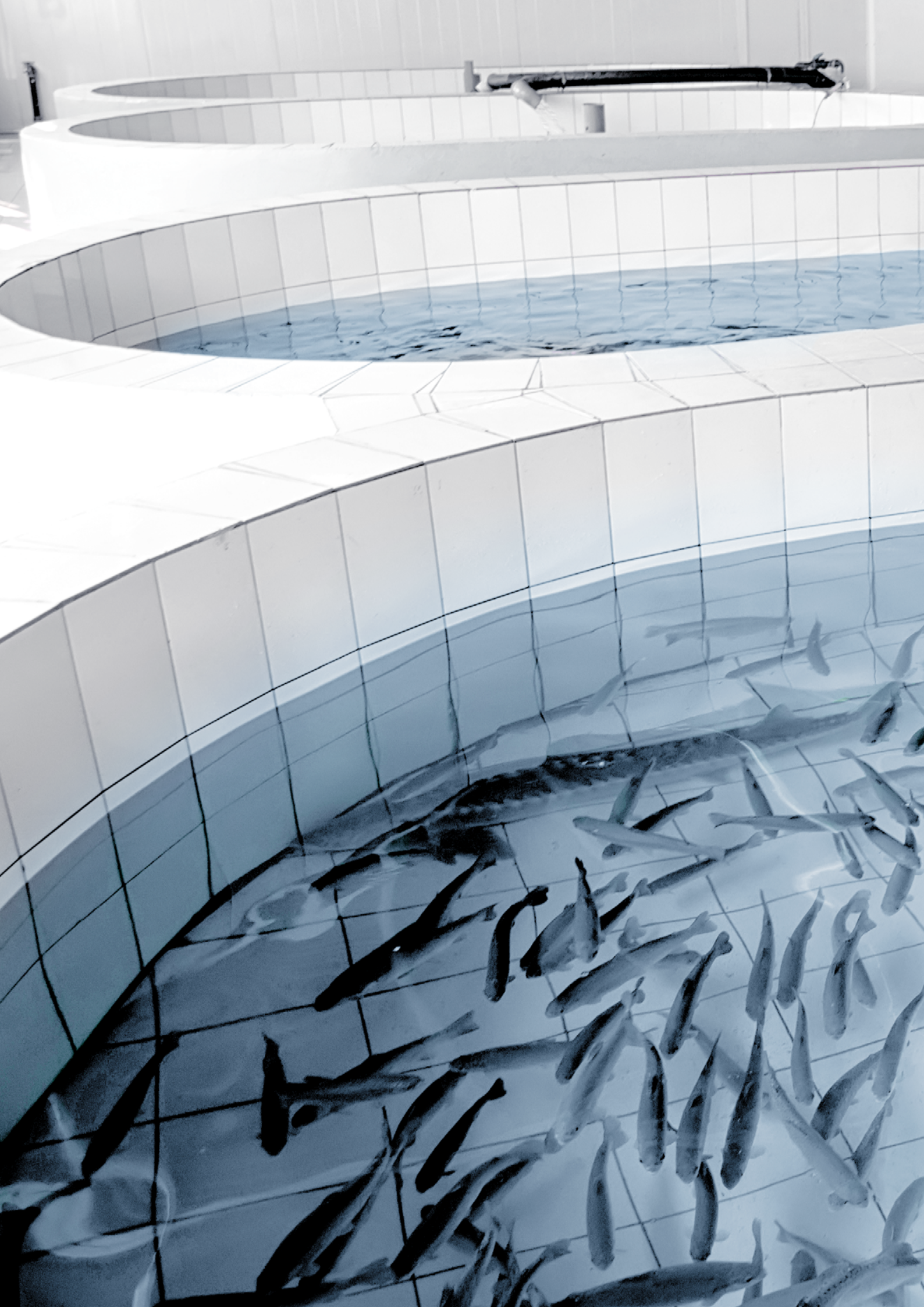
Dehumidification in multiple stages provides lower energy consumption for dehumidification. Regeneration of the desiccant rotor using surplus energy leads to significant energy savings.

Heating and cooling, preheating, post-heating, pre-cooling, and post-cooling are tailored to your needs. Humidification is an optional feature commonly used in museums, archives, and galleries but can be provided in various configurations. It is equipped with advanced control designed for the most energy-efficient operation in any situation.

ADVANTAGES OF THE DANTHERM ECOline PRINCIPLE:

- 100% climate control
- Most energy-effective solution
- Less and easier maintenance
- Simple and quick user-friendly installation
- Customised
- Functional and product warranty
- 50% lower operating costs are achieved by:
  1) 80% - 95% efficiency. Higher efficiency results in earlier moisture precipitation
  2) Adsorption dehumidification with regeneration with heat from the cooling system.

We customize your system according to your needs!



2 INDOOR FARMING

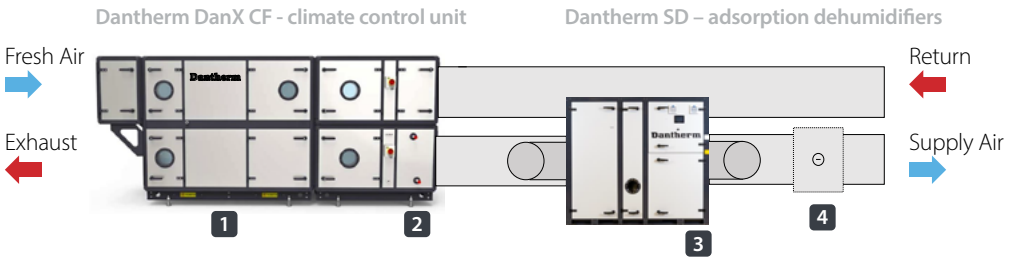
Hatcheries – fry production – smolt facilities – land-based aquaculture – distribution

All indoor activities in the aquaculture industry are challenged by condensation and moisture. In a salmon slaughterhouse, for example, the salmon must maintain the same temperature (the maximum variation is 1°C) from receipt to finished product. The recommended room temperature is approximately 10°C. In this environment with cold fish and a lot of water use, high humidity occurs. This creates a need for mechanical dehumidification.

Usually, the need for fresh air exchange combined with internal loads such as water spillage and evaporation from fish tanks determine the need for dehumidification. A complete air handling system controls air quality, humidity and temperature, thereby preserving buildings and production equipment, increasing operational reliability, improving the working environment and providing controlled hygienic conditions.

One should always look for climate control in indoor applications. Varying water temperature results in varying dew points and thus challenges in relation to the dimensioning of air handling systems. Dantherm supplies climate solutions for everything from the smallest technical rooms to large facilities.

Dantherm ECOline solution for indoor aquaculture



1. Counterflow heat exchanger
78-92% heat recovery efficency

2. Utilization of excess heat for air heating

3. Utilization of excess heat for drying the rotor in a adsorption dehumidifier

4. Cooling of dry air after the adsoprtion dehumidifer (to be considered based on needs)

Production	Washing	Drying process	Night-time
8h – 16h	1h – 2h	1h – 2h	4h – 14h

100% climate control **50%** lower operating costs

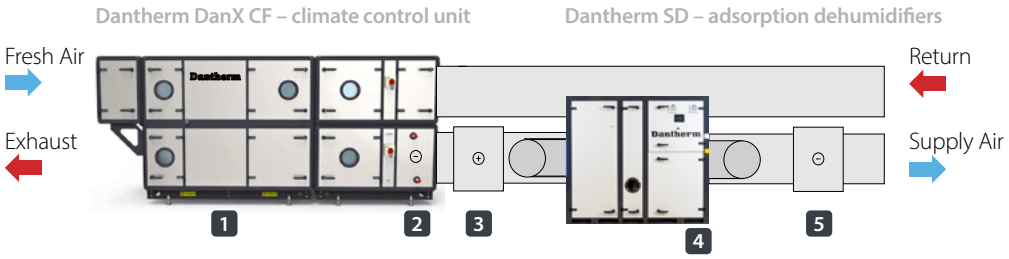
3 FOOD INDUSTRY – PROCESS INDUSTRY AND ICE RINKS

Energy-efficient, hygienic, and corrosion-resistant climate control units for the food industry, cleanrooms, process industry, and ice rinks.

There are strict hygiene requirements in the food processing industry, and good temperature and humidity control is essential. Each production facility must be calculated and designed according to needs, which also requires a high level of expertise and understanding when designing the air handling system. Dantherm has long and broad expertise in delivering optimal facilities from an operational and financial perspective.

An ice rink typically has strict requirements for temperature and humidity since the room itself is cold, and the ice even colder. Hard ice surfaces used for speed skating often require a drier climate compared to hockey and activity halls. Condensation/cooling dehumidification alone may not be able to solve the entire task. Therefore, reliance on adsorption is necessary to ensure a well-conditioned building and optimal ice conditions. Dantherm provides the solutions and can offer complete climate control with ventilation, temperature, and humidity management.

Dantherm ECOline solution for: food industry – process industry and ice rinks



1. counterflow heat exchanger
78-92% heat recovery efficency

2. Chilled water coil for moisture extraction

3. Heating of dry air (when additional dehumidification is not needed)

4. Utilization of excess heat for drying the rotor in an adsorption dehumidifier

5. Cooling of dry air after the adsorption dehumidifier (to be considered based on needs)

Production	Washing	Drying process	Night-time
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100% climate control **50%** lower operating costs

4 STORAGE, ARCHIVES MUSEUMS, AND GALLERIES

Climate systems for all types of rooms that store valuable objects for future generations

For all types of archives, museums, warehouses, etc., that require climate control, Dantherm can provide tailored solutions with full climate control

- Ventilation
- Dehumidification
- Humidification
- Temperature
- Humidity

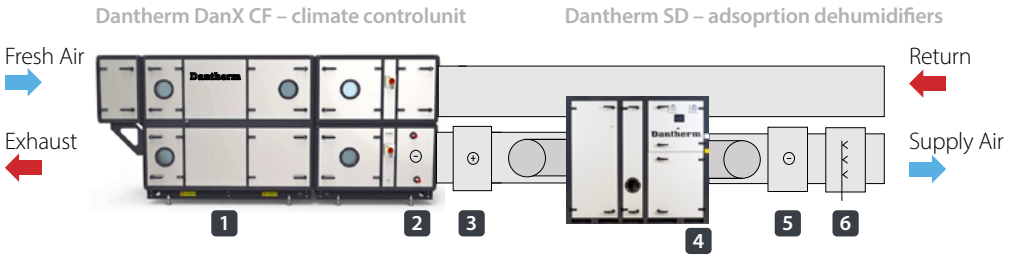
Either as a single unit or divided into seperate sections.

The internal moisture load, room type, activity level, and target requirements for temperatures and relative humidity can vary greatly. Typically, it is the design airflow rates that determine the significant dehumidification and humidification needs. In Norway, outside air varies throughout the year, with a water content ranging from approximately 0.5 grams of water per kilogram of air during the coldest winter to about 16 grams of water per kilogram of air during the summer. With a constant target requirement of, for example, 18°C/50% (6.2 grams of water per kilogram of air), this results in significant dehumidification needs during most of the summer and significant humidification needs during most of the winter, all depending on the fresh air requirements

Proper air circulation (minimum 2 times the room volume) is essential for correct climate control to ensure even climatic conditions throughout the conditioned space. This preserves objects and valuables for future generations. The scope and complexity of the systems are often based on TWPI (Time-Weighted Preservation Index)

With Dantherm's complete solutions, the startup is performed by a qualified service technician, and you receive full product and function warranty.

Dantherm ECOline solution for: storage, archives, museums, and galleries.



1. Counterflow heat exchanger
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5. Cooling of dry air after adsorption dehumidifer

6. Humidifer

100% climate control **50%** lower operating costs

5 DANTHERM ECOline

CONCEPT FOR ADVANCED MOISTURE AND CLIMATE CONTROL

Dantherm ECOline is an exceptionally energy-efficient solution that typically consists of the Dantherm DanX CF climate control unit with a counterflow heat exchanger with mixing section, EC fans, integrated cooling coil, and a separate Dantherm SD adsorption dehumidifier. The systems are equipped with autonomous control/automation in a separate electrical panel.

The systems can be customized to utilize excess energy from other processes, resulting in additional savings and optimal energy utilization.

Ventilation:

This solution handles ventilation, necessary fresh air exchange, and air circulation in the premises to create consistent and optimal conditions. The proportion of fresh air can vary from 0-100% and is defined based on the requirements of each individual project and the requirements in different operating phases if the system has multiple modes of operation (day, night, occupancy, etc.).

Dehumidification:

Multiple forms and stages of dehumidification can be utilized, as well as combinations of these methods:

- Dehumidification through moisture extraction in the counterflow heat exchanger in the DanX CF unit
- Dehumidification using chilled water and desiccant dehumidification
- Dehumidification using fresh air

Cooling:

- Cooling using chilled water or direct expansion (DX) coils
- Cooling through heat recovery in the DanX CF unit

Heating:

- Heat recovery in the DanX CF unit
- Electric or hydronic heating coil
- Excess heat from other process can be utilized

Humidifcation:

- Humidification using evaporative or steam humidifiers

6 DANTHERM ECOline CONSISTS OF THE FOLLOWING MAIN COMPONENTS

USER-FRIENDLY CONTROL SYSTEM

- Temperature control
- Manual or automatic operation control via an external hygrostat (optional)
- Safety features
- Time-delayed start/stop
- Display of unit status and alarms
- Temperature control for pre- and post-cooling or pre- and post-heating (optional)
- Customizable for customer needs (Johnson Controls)

DANTHERM DANX CF BENEFITS

- Energy-efficient EC fan motors
- Automatic monitoring and control of temperature
- Energy-optimised customised control with simple operation
- 100% moisture management
- Professional free guidance and support
- The factory building in sections
- Heating/cooling coil as needed
- The best surface treatment on the market
- Up to 95% efficiency
- Maintenance and service friendly

DANTHERM SD ADSORPTION DEHUMIDIFIERS

- Complete Solution
- User-friendly and easy to clean
- Flexible installation with connectivity options
- Energy-efficient solutions with high-efficiency rotors and EC fans
- Components from internationally recognised manufactures
- High-quality enclosure in powder-coated or stainless steel.
- Robust and reliable with a long service life
- Avaliable with thicker rotor (increased dehumidifcation capacity)

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