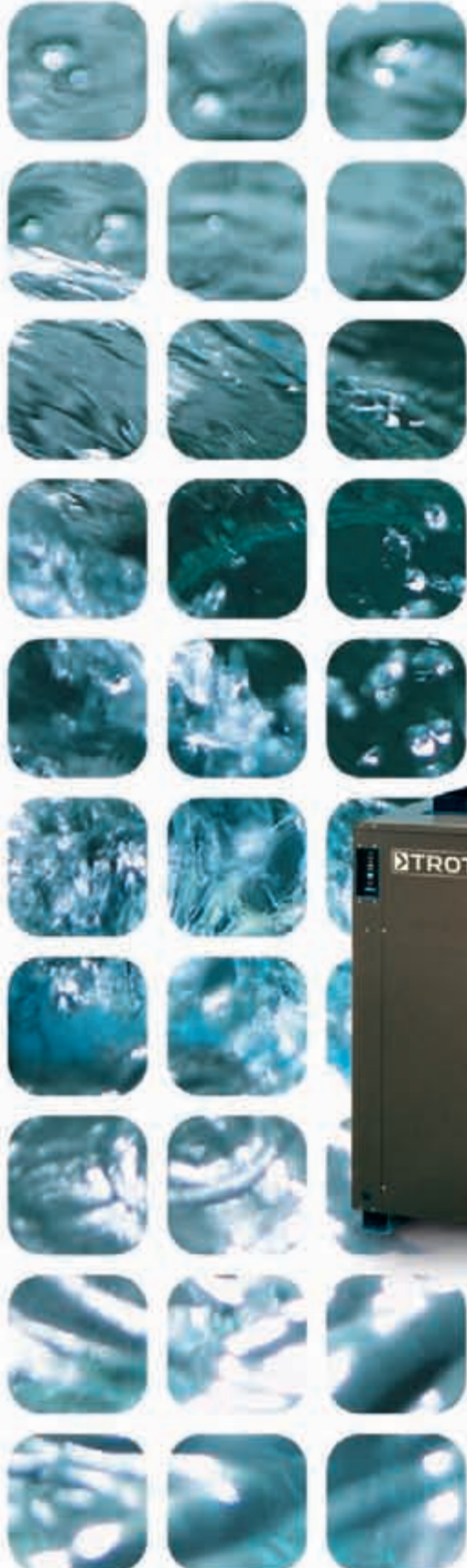




 TROTEC®



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*Dehumidifying  
solutions...*

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*...for the  
water industry*

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INDUSTRIAL DRYERS

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## Air humidity – the critical factor in industrial processes

Humidity is everywhere. Be it in manufacturing, processing or warehousing – in all industrial processes room air is the decisive carrier of humidity.

We can only guarantee optimal room climatic conditions if we have control over the air humidity.

### A high level of humidity can lead to a multitude of problems:

- corrosion
- condensate formation
- substandard product quality
- biocontamination of foodstuffs und lubricants
- increased maintenance of machines and buildings
- damage to substance of buildings
- increased heating costs owing to reduced insulation values of buildings
- bothersome odours

Previously unforeseeable variables, like shifting demands regarding the quality of the product to be manufactured, new production methods or complex logistical processes concerning storage and transport often make it necessary to adjust the air humidity to suit the given conditions.

## The problem: cold pipes and high humidity

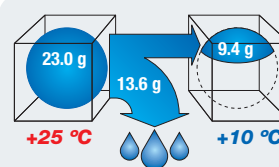
Technical installations in waterworks are constantly cooled by a steady stream of cold water. This means that the surface temperature of pipes, containers and aggregates can drop to temperatures lower than the dew point of the ambient air.

When air comes into contact with these surfaces, condensation forms and this in turn can lead to corrosion and water damage to technical installations and constructions.

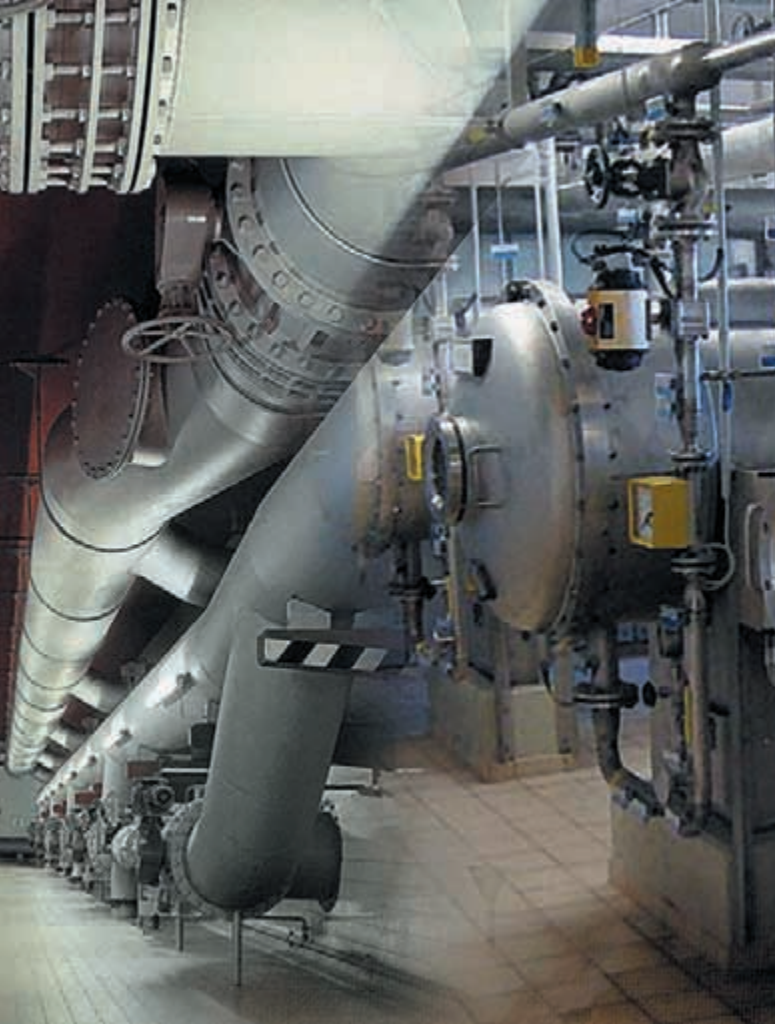
Surface moisture encourages the growth of mould and consequent creeping damage to nearly all organic and an organic substances.

This occurs independent of the temperature in the room, because the absolute water content in the air and the surface temperature are the decisive factors.

The problem can only be remedied by reducing the air humidity by drying of the ambient air, so that it once again reaches a temperature which lies above dew point.

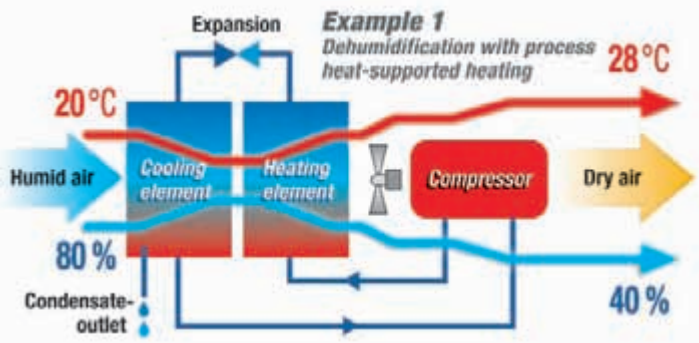


**Water vapour content of the air:** at an air temperature of 25 °C, one cubic metre of air can absorb a maximum of 23 g, which corresponds to a relative air humidity of 100 %. If the air cools off to 10 °C through contact with cold surfaces, it can only absorb 9.4 g. The excessive moisture condenses on the cooler surfaces to water.

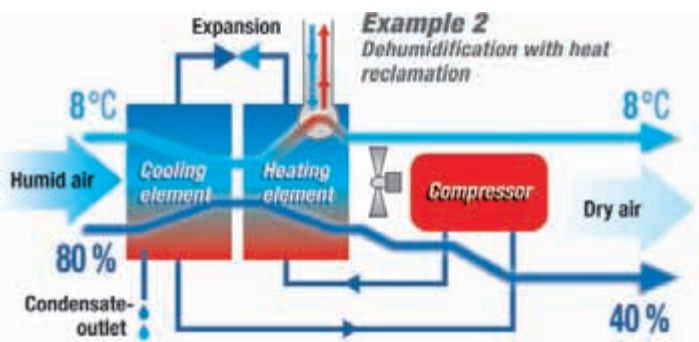


**It is possible to profit from this principle in two separate ways:**

In all environments which require a warming of room air, previously necessary additional heating costs can be significantly reduced by utilizing the heated dry air.



In low temperature environments it is possible to recover the warmth: in this case, water can be heated by the heat set free by this process and utilized for existing heating processes or water preparation.



**The solution – self-contained dehumidifying systems**



Trotec stationary dehumidifiers are self-contained, individually scalable drying systems that do not require any additional air supply; subsequent

installation is trouble-free and they are furthermore adjustable to meet the demands of any environment.

The room temperature regulation is hygrostatically or dew point controlled. **The broad operating range of -15 to +70 °C facilitates swift and economic drying in numerous fields of application.**

The dehumidifiers are also suitable for existing air-duct systems.



A significant reduction of energy costs can be achieved, particularly with applications requiring an increased demand for water.

Alternatively, it is optionally possible to deploy an external heating device outside of the rooms that are to be dried.

**Industrial dehumidification with stationary Trotec drying systems – an overview of the benefits:**

- self contained drying systems
- very high dehumidification performance
- swift and economic prolonged drying
- low temperature dryers for working conditions up to -15 °C
- process and product dryers for working conditions up to +70 °C
- corrosion protected construction
- scalable to match any conditions
- instant subsequent installation possible
- fully-automatic low-maintenance operation
- additional utilization in low temperature environments like cold storage facilities
- reduction of energy costs via warmth recovery or hot-air supported heating
- stainless steel, suitable for utilization in hygienic environments



The refrigerant type dryers draw in the moist surrounding air and cool it down to below dew point, whereby much of the air-bonded moisture condenses and can be withdrawn from the air. The condensate is conducted away and the dry cold air is circulated past the heating device of the cold block, where it is heated again by the energy set free by this process before being redirected and absorbed by the room air.



## Fields of application:

Excessive humidity causes damage in the following areas:

- service chambers
- pump houses
- pipe cellars and pump rooms
- pressure stations
- filter chambers
- elevated tanks and drying installations

### The correct room climate as parameter for manufacturing conditions

The cool surface temperatures of the machines and installations, coupled with the prevailing atmospheric conditions, cause the temperature to drop to below dew point, so that constant water condensation takes place. A dry room climate is a vital necessity for trouble-free operation: it prevents breakdowns from occurring and means that the installations only require little maintenance. The employees working in the rooms may not be subjected to conditions which would otherwise detrimentally affect their health. It is therefore essential that excessive moisture is drawn from the air.

Existing ventilation and extraction systems are often only capable of creating constant climatic conditions to a certain degree. Because the air that is conducted out of the building is replaced by outside air streaming back into the building, this process has little or no chance of success if the prevailing weather conditions are poor – in some cases the situation even gets worse.

The situation cannot be improved by simply increasing the temperature of the ambient air either. The relative air humidity is lower, but the dew point has already been passed because of the absolute amount of water vapour in the air. There is then an increased threat that the ambient air can absorb even more water from air infiltrating from the outside due to the fact that the relative air humidity is now lower.

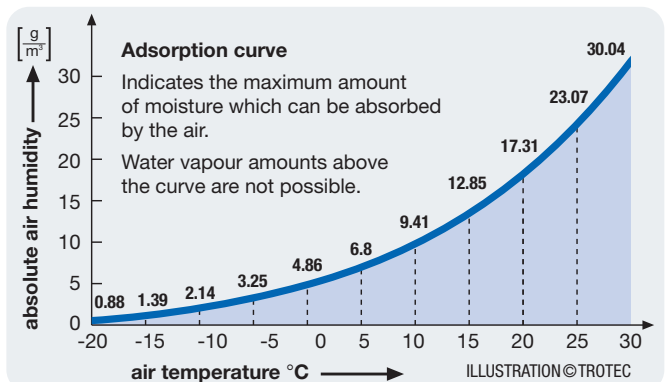
Virtually constant climatic conditions can be achieved in a short time with relatively little effort via the deployment of mobile drying aggregates, which are technically equipped to control the ambient air. When calculating the capacity requirements for the required dehumidification setting, specifics relating to the production environment, like temperature and water vapour development, or necessary cleaning intervals and working personnel are taken into account.

Trotec drying units automatically maintain an optimum humidity level. Product drying is accelerated due to the low relative humidity. Surfaces dry quickly when cleaning work has been carried out. The correct room climate conditions are not only important for the product and the machines – a pleasant perceived room climate is also of benefit with reference to the employees: higher productivity and lower sick leave rates.

### High performance at low temperatures

The decision whether to deploy refrigerant type dryers or adsorbers depends on further parameters including capital expenditure, energy consumption and installation complexity, which all have to be considered besides the dehumidifying performance itself during project development. Refrigerant type dryers are more cost-effective at medium and high temperatures.

Adsorbers, on the other hand, can have a higher dehumidifying performance in environments with low surface temperatures, where the relative air humidity has to be lowered considerably in order to prevent it from passing below the dew point.





Functioning principle of Trotec adsorption dryers

Results achieved with adsorption dehumidifying are equally good in all conditions; the dehumidifying performance is extremely high independent of the air temperature and relative humidity.

The **Trotec adsorption dehumidifiers in the TTR-series** suck in process air (A) and regeneration air (C) separately and dehumidify the air continuously.

A highly active silica gel acts as adsorption material; it is applied to an anorganic fibre mat in the form of a rotor with numerous horizontal air pipes to maximize surface contact.

Der in der Prozessluft (A) vorhandene Wasserdampf wird im Prozessluftsektor des sich kontinuierlich drehenden Rotors vom Trockenmittel aufgenommen, so dass nun trockene Luft (B) den Rotor verlässt und in den Raum abgegeben wird.

At the same time, the regeneration air (C) flows through the so-called blow-out sector (heat regeneration) and leaves the rotor as preheated air (D). The air is heated to the required temperature (E) in the integrated heating and absorbs the moisture which was bonded in the rotor while passing through the regeneration sector; it then leaves the rotor as moist air (F) which is then conducted outside via the ventilating system. If it is not possible to install exit ducts, the moist air can be alternatively conducted to a condense dryer, which releases the withdrawn moisture as free water.

### Avoiding condensation by reducing the dew point

The dew point temperature is the decisive factor for the formation of condensate – it specifies at which temperature the air is saturated with water vapour and unable to absorb any further moisture. The moisture then condenses on surrounding objects whose temperature is below that of the dew point temperature.

Whereby the dew point temperature is not an unchanging variable: it is calculated by taking into account the two variables room temperature and air humidity.

If the dew point temperature, for example, lies at 5.6 °C with an air temperature of 8 °C and a relative humidity of 85 %, the dew point temperature sinks to -3 °C when the relative humidity is decreased to 45 % while the temperature remains constant at 8 °C.

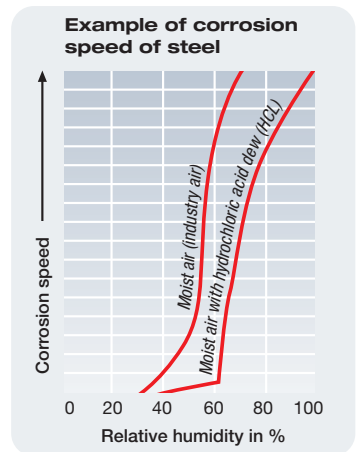
**By controlling the relative humidity and taking into account the optimum dew point, condensate formation on products, machines and building substances can effectively be prevented!**

The dew point temperature must be adjusted for each individual task to ensure that the object temperature and the storage temperature lie above it. **This is of special importance in cold storage facilities, water technical facilities and loading zones, where condensate formation can be effectively prevented using Trotec dehumidifiers which work according to this principle.**

### Corrosion speed

In order to prevent corrosion of metal components, the relative humidity must be reduced to below 50%. The diagram shows the gradient of the corrosion speed depending on the relative humidity.

A significant increase in the corrosion speed can be seen from approx. 60%, whereas the corrosion tendency is very low under 50%.



### Problems with open expanses of water in winter

In winter, a temperature difference develops between the warm water in the water basin and the cooled down walls and ceilings of the structure. Additional moisture is passed off into the air via surface condensation. This leads to condensation and drop formation on walls and ceilings unless drying aggregates are put into operation.

Apart from causing damage to the building fabric, drop formation above pure water basins is particularly problematic. The growth of toxic bacteria is enhanced and falling drops additionally contaminate the pure water.



## Count on our industrial service and play it safe...

### ...and invest in our tried and trusted solutions!

Each individual situation is different and requires an individual machine configuration. If the requisite capacity is only calculated theoretically, then this can lead to miscalculations, because too many unforeseeable parameters can influence the capacity calculation.



Irregular loading cycles in the loading zones of cold storage houses in combination with prevalent weather conditions can, for example, lead to unpredictable air streams and turbulence on ramps or at gates.

**The consequence: unnecessary additional costs due to an excessively high calculated demand or – even worse – solutions which do not work adequately in practice.**

**Trotec industry service does not simply offer you dehumidification technology – we offer you tried and trusted dehumidification solutions!**

Together with you we analyse the individual requirements on the spot and determine the specific type of equipment required and then work out a tailor-made project solution, including the exact location of all machines and equipment.

Before the required stationary aggregates are installed, our project service carries out a trial operation, initially working with mobile drying units which can be easily positioned without imposing any structural measures.



During the trial operation, all relevant climatic parameters like air temperature, relative air humidity, dew point or wind flow velocity are collected by our mobile TTSL- remote surveillance measuring equipment and transmitted continuously to the Trotec server. Telemetric climatic data which can be exploited for comparative analysis can be collected prior to the trial phase if so wished.

When the trial phase is completed, the results can be documented without interruption and the requirement calculation can be verified and optimized.

**The benefit for you: you only invest in workable solutions that have been proven in operational practice!**

Only when you are convinced by our concept do we supply the stationary aggregates. You only have to pay a low rental fee for the time of the trial installation.



## Trotec is your competent partner for versatile solutions all around climate conditioning

Established in 1994 with the aim of supporting firms providing drying service and damage restoration companies with a complete program of professional drying and service solutions, Trotec today

offers its clients a comprehensive portfolio comprising machines, measuring equipment and services in the following fields:

| Machines   | Measurement equipment  | Construction shelters & screens  | Rental service   | Consulting   |
|--|--|--|--|--|
| <ul style="list-style-type: none"> <li>• dehumidification</li> <li>• humidification</li> <li>• drying of buildings</li> <li>• heating</li> <li>• climatisation</li> <li>• ventilation</li> <li>• restoration of water damage</li> <li>• elimination of unpleasant odour</li> </ul> | <ul style="list-style-type: none"> <li>• preventative maintenance</li> <li>• building diagnostics</li> <li>• non-destructive detection of leakages</li> <li>• quality control</li> </ul> | <ul style="list-style-type: none"> <li>• workmen's tents for telecommunication and energy suppliers</li> <li>• pneumatic tents and screen walls for emergency services, technical help organizations and the military</li> </ul> | <ul style="list-style-type: none"> <li>• dehumidifiers</li> <li>• humidifiers</li> <li>• building dryers</li> <li>• air conditioners</li> <li>• heating units</li> <li>• ventilators</li> <li>• odour eliminators</li> </ul> | <ul style="list-style-type: none"> <li>• seminar and workshops to gain practical experience in the fields of leakage detection, building diagnostics and odour elimination</li> <li>• marketing – service</li> </ul> |

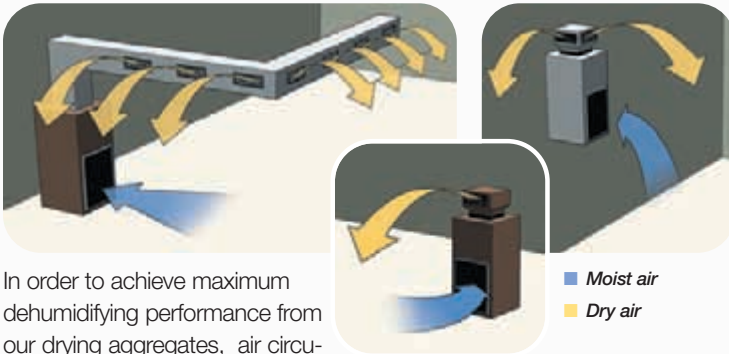
As a strong company network of subsidiaries and partner firms operating in the Benelux countries, England, France and Austria and a Europe-wide network of qualified distributors, we are able to offer you high-quality service home and abroad at any time of day – anywhere in Europe within 24 to 36 hours if required – with all-round

know-how regarding machines, measuring equipment and applications, which guarantee practice oriented solutions for every task.

**Are you interested? We should be most happy to advise you. Just give us a call.**



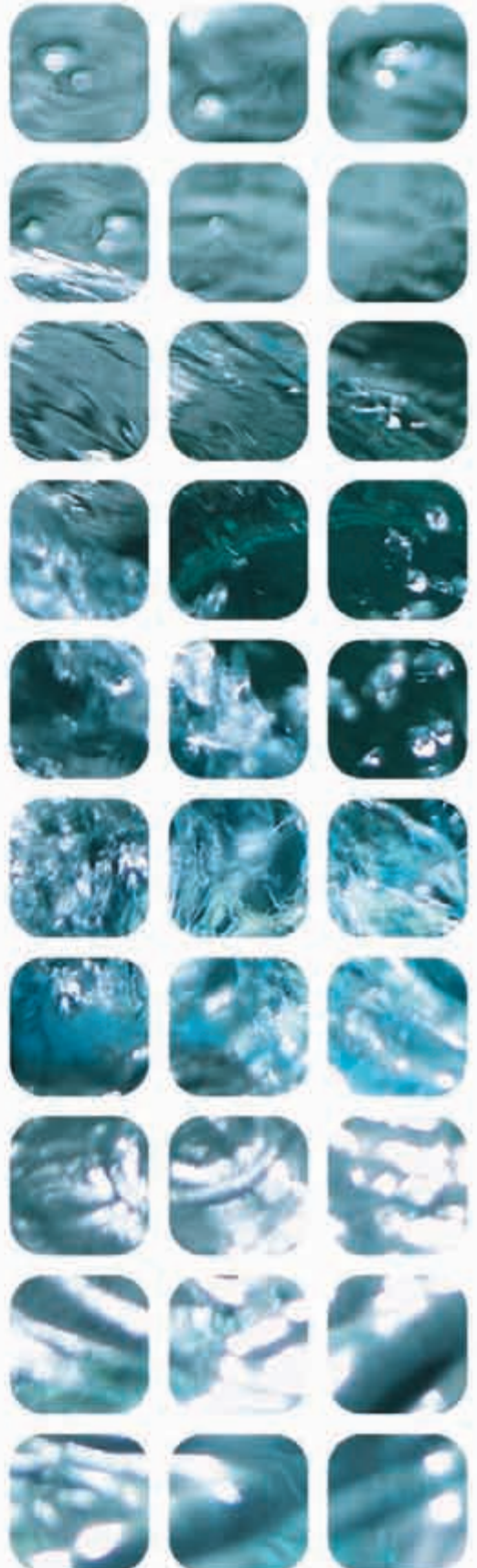
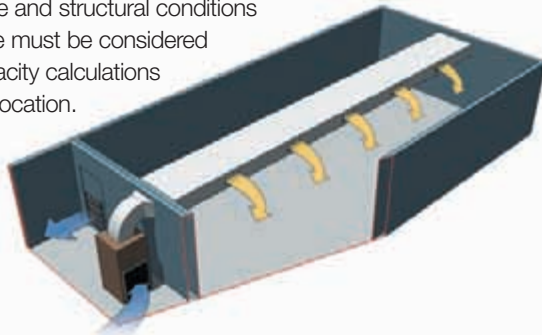
# TROTEC®



In order to achieve maximum dehumidifying performance from our drying aggregates, air circulation, air exchange rate and structural conditions within the relevant zone must be considered when carrying out capacity calculations or choosing the exact location.

■ Moist air  
■ Dry air

We have a whole host of installation solutions and air conducting systems on offer – allow us to advise you.



Describe your individual performance requirements and complete the fax coupon to get a personal consultation – or simply call us. We would be only too glad to advise you.

**Fax to +49 2452 962-200**

I am interested in a personal consultation without any further obligation. Please call me back to make an appointment.

Company

Contact person

Telephone number for return call

Can best be reached (date or day/time)

**Trotec**



Grebbeener Str. 7 · D-52525 Heinsberg  
Tel. +49 2452 962-400 · Fax +49 2452 962-200



Zellerberg 2 · A-6330 Kufstein  
Tel. +43 5372 68-419 · Fax +43 5372 68-424

[www.trotec.com](http://www.trotec.com) · [info@trotec.com](mailto:info@trotec.com)

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