DENIOS

ENGINEERING

» Thermotechnology «

- Heating
- Cooling
- Temperature-control
- Melting
- Drying

DENIOS
ENVIRONMENTAL PROTECTION
& WORK SAFETY

» Precise temperature control – DENIOS ensures optimum temperature of substances and materials «

Heat container Type 314-2 with steam heating.
Galvanised interior.

There are a wide range of modern thermotechnical requirements including storage at constant temperatures, frost-free storage and the requirement for thermal preparation of materials synchronous to the production process.

Temperature-sensitive materials play an important role in the manufacturing processes of the chemical, pharmaceutical and food industries.
The properties of these materials vary considerably and even the production processes differ from company to company.

For more than 20 years, DENIOS Engineering has been developing customer-oriented, efficient and high quality thermotechnical solutions.

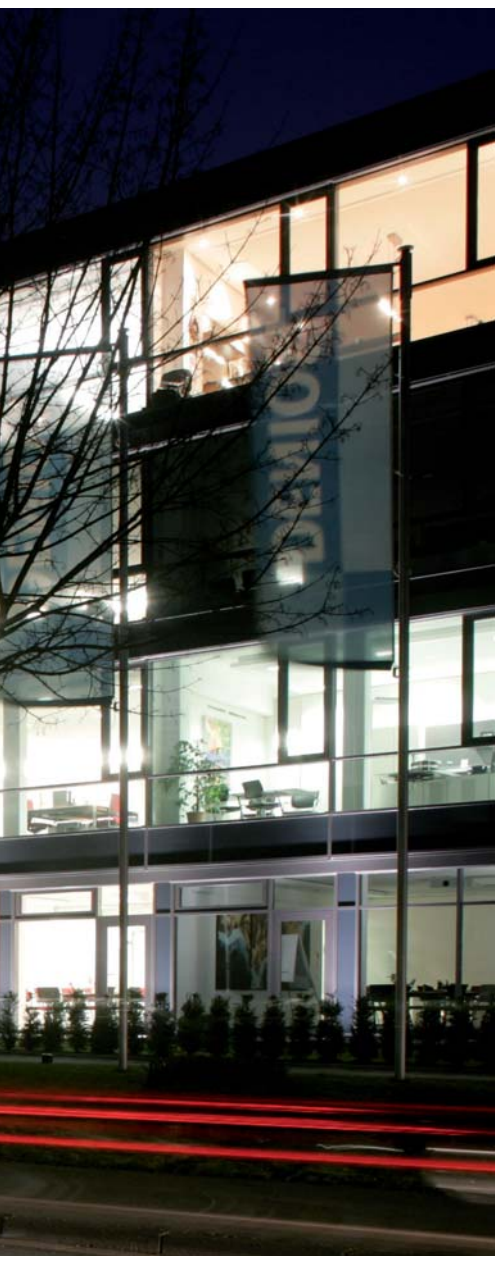
Content


DENIOS®


DENIOS

DENIOS – The company

Manufacturers are responsible:
for the quality of their products, for consumer protection, also for the safety of their staff and the environment. DENIOS has been helping to meet the challenge of this increasing responsibility for more than 20 years, as a manufacturer and supplier of products and as a provider of holistic, integrated solutions.
As an innovative company, we are always ready to work on the continuous improvement of products and services: this ability has made DENIOS one of Europe's leading suppliers for environmental protection and safety.



DENIOS-Engineering represents 'know-how' and quality in the development of integrated solutions for hazardous material storage technology, thermotechnology, ventilation technology, cleaning technology and IT safe room engineering.

DENIOS is prepared for every challenge with its competent team comprised of engineers within consulting, construction and production. This personnel and logistic ability allows us to deal with a varied range of demands from most industrial sectors. Quickly and efficiently.

DENIOS-Engineering is the perfect partner when real specialists are required. A lean, customer oriented, price-conscious organisation with impressive credentials.

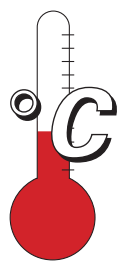
At a glance: Solutions

Heating and melting up to 300 °C

Heater boxes, heater cabinets
Heating jackets and drum heaters

Materials that require a precise temperature control to be processed are prepared in thermotechnical cabinets.
DENIOS has products suitable for all volumes and every size of container. Available with 2 wing doors or roller doors.

- heater boxes for up to eight drums
- heater cabinets for pallet/IBC storage
- heating jackets for IBCs and drums
- drum heaters for heating individual containers



Heated container
Technical details from Page 14.

for temperature-controlle

Frost-free storage

Module container/ MC-Vario and system containers

» Perfect for Your Needs «

Valuable, frost-sensitive warehouse goods are provided with comprehensive protection in the fully equipped DENIOS container systems:

- sliding, wing or roller doors
- walk-in systems
- Systems for pallet storage
- Ex-protection model inside/outside (optional)
- F90 fire protection (optional)
- inliners (optional)
- Ventilation

Frost-free storage
"Reliably protect frost-sensitive materials."
Details from Page 18.

valuable materials

Storage cooled down to -25 °C

Climate chambers, cooling containers, cold stores and cold rooms

The storage of chilled materials and products is necessary for processes within many industries. DENIOS cabinets are able to fulfil the most varied range of tasks:

- cold storage for temperature-sensitive materials
- secure storage for, e.g. organic peroxides
- chilling of food products
- built in fire-protection, available on request

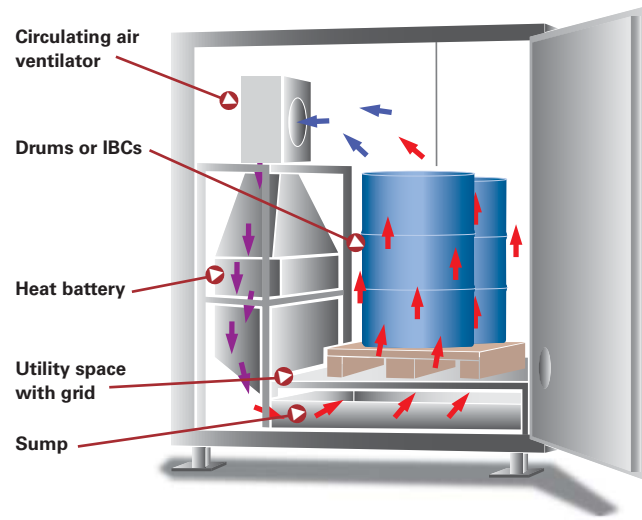
Cooling chamber
"Store correctly at low temperatures."
Details from Page 22.

DENIOS thermotechnology

- ✔ constant reliable temperture
- ✔ energy-saving and efficient
- ✔ low operating costs
- ✔ short warm-up and cooling-down times
- ✔ fire and explosion Ex-protection models
- ✔ sumps available for hazardous material storage
- ✔ compliant with the Water Resources Act (PPG 26)

Heat energy

Depending on the availability of energy sources, the heat to the system is provided by either: saturated steam, electrical energy, heated oil or hot water. Multiple chamber units can be incorporated to facilitate "heat-up" and "cool-down" production processes. DENIOS engineers will advise on the correct selection of fuel source individual to your installation, site and usage.



Diagrammatic sketch of a heater box

Functional design

Air is sucked into the cabinet by a radial ventilator in the top of the storage space. The downstream heat or ventilation battery with heat exchanger heats up or cools down the air. This air is circulated for even distribution into the lower area of the cabinet by an air duct system. The interaction between heat exchanger and air circulation, ventilators and air duct geometry is of decisive importance for even temperature distribution within the whole cabinet.

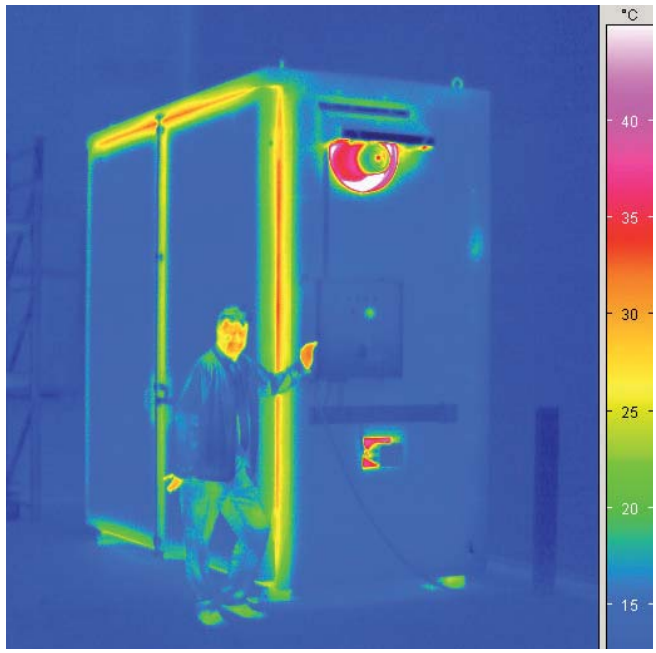
Control

The temperature is regulated by analogue controls, a two-point digital control unit or liquid capillary sensors. Combined systems such as electro-pneumatic control units, can also be installed. Various interfaces can be integrated on request, e.g. to control and regulate the temperature or to document the process.

'The Test' - Heater Cabinets at DENIOS

Thermotechnology is an empirical science. Process results can only be approximately calculated in advance and there is a wide range of variables within a process:

- position of the medium/container
- size of container
- number of containers and where they are placed



At DENIOS, it is important that customers get a solution that really matches their application and completely solves the problem at hand.

The testing of a DENIOS heated chamber ensures that both the concept and its implementation remain safe. Individual data is collected and trials are made to ensure special product qualities.

DENIOS customers are thereby able to have simulations carried out using their own containers and their own materials, resulting in optimal thermotechnology production containers with stable, secure and safe functionality. In some cases, data from the test process can help to increase the efficiency of the customers production processes.

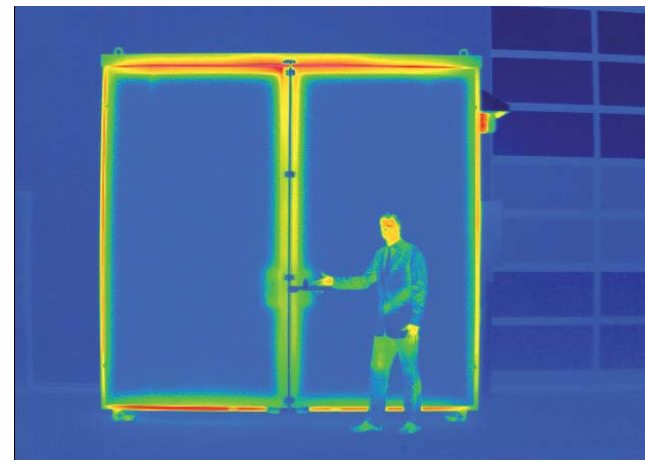
»Talk to our engineers. Let us carry out simulations using DENIOS thermotechnology with your own materials and containers.«

Individual solutions require exact calibration of parameters, such as:

- temperature and time frame
- material properties
- container type
- Quantitive structures
- Spatial geometry

For instance, in the DENIOS Test, the cabinet heat-up times can be precisely analysed, or the melting characteristics of substances are determined under real conditions at the workplace. On completion of the test series, DENIOS experts provide exhaustive test protocols and their evaluations: this is the basis of sustainable protection of your investment.

Special images from an infrared camera show the high impermeability of the heater cabinet and boxes from DENIOS.



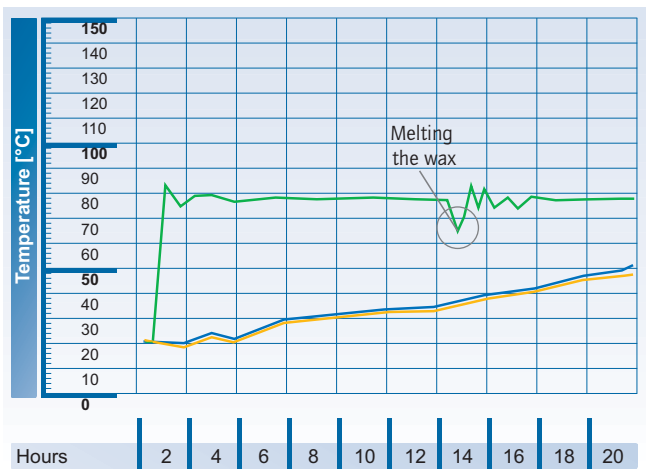
Test measurements in the test heated containers

Customer Example

A customer required wax to be melted and then heated up to 50 °C.
The material is stored in eight 200 Ltr drums on two chemical pallets. The heater box is designed to suit an internal workshop application. The workshop has an ambient temperature of 15 degrees C.

As a result of the test measurements, DENIOS engineers recommended using a model WB 24.12 heated box. At a heating power of 15 kW, the temperature in the heated box is increased and kept constant at 80 °C and the material is heated up in less than 24 hours from 5 °C to 50 °C.

This result completely fulfilled the customers requirements to his full satisfaction.



▲ Measurement curves of a test evaluation: Among other things, the measurement curves clearly indicate the heating up of the medium at various measuring points.

- Inside temperature of the heated container
- Temperature of drum, top
- Temperature of drum, bottom

Heater boxes

Heating and melting up to 200 °C

All DENIOS heater boxes are especially designed for storing small volumes of up to eight 205 litre drums or two 1,000 litre IBCs. If more capacity is required then DENIOS heater cabinets are recommended.

Heater box WB 12.12

Heater boxes

Type	WB 12.12	WB 18.12	WB 24.12
Outer dimensions W x D x H (mm)	2240 x 1850 x 2325	2600 x 1850 x 2325	3690 x 1850 x 2325
Inside width W x D x H (mm)	1300 x 1320 x 1500	1560 x 1320 x 1500	2600 x 1320 x 1660
Sump capacity (litres) Capacity	1100	1100	1100
Euro pallet (EP) Capacity	1	1	3
Chemical pallet (CP)	1	1	2
Capacity IBC	1	1	2
Load (kg / m²)	1250	1250	1250
Net weight (kg)	1200	1400	1700

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

Basic models of heating unit, place of installation NOT Ex

Steam heating with temperature control without auxiliary power	Electrical heating with digital temperature control (NOT Ex)	Electrical heating with analogue or digital temperature control (EExe II T3 - EExde II c T4)*
Thermostat with setting range 60...120 °C, permissible op. pressure 12 bar, Heating power min. 25 kW, galvanised or stainless steel housing, control valve and dirt trap, including circulating air ventilator, including safety temperature limiter	Temperature recording using Pt 100, set range 0...150 °C, Heat battery with integrated overheat control, heating power 7.5 to 15 kW, Stainless steel heating rods, stainless steel housing, including circulating air ventilator, Including safety temperature limiter	Setting range 0...150 °C, +/- 2 K, analogue or digital two-point regulator with integrated overheat control, heating power 6 to 15 kW, Stainless steel heating rods, painted housing, including circulating air ventilator, including safety temperature limiter

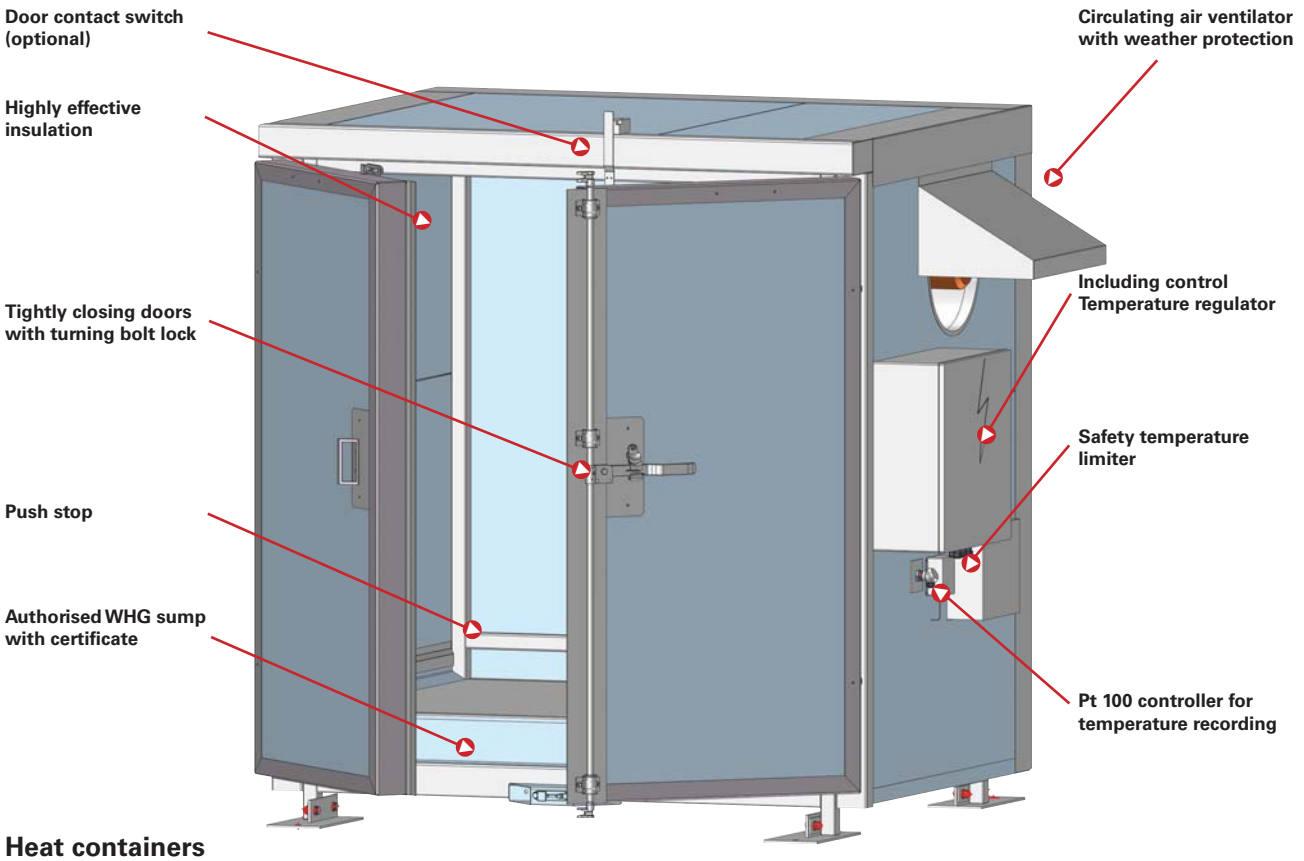
Other dimensions and models available on request.

*** Options available in the standard range:**
- Exhaust air / time control
- Operating time programming
- Door contact switch for the ventilator

Heater cabinets

Heating and melting up to 200 °C

Heat output and ventilation are perfectly combined with even heat distribution to ensure a homogenous temperature profile within the entire cabinet. Regulation-compliant heater containers are ideal temperature-controlled hazmat storage units. Heated hazardous chemicals and materials can therefore be stored in a DENIOS heater cabinet for a long period of time.



Heat containers

Type	WK 314-2*	WK 414-2*	WK 414-2-K*	WK 614-2*	WK 814-2*
Outer dimensions W x D x H (mm)	3800 x 1800 x 3380	5000 x 1800 x 3350	4500 x 1800 x 3880	6950 x 1800 x 3270	9350 x 1800 x 3300
Number of storage levels / bays	2/ 2	2/ 2	2/ 2	2/ 4	2/ 4
Inside bay size W x D x H (mm)	2700 x 1340 x 1250	3900 x 1340 x 1250	3380 x 1340 x 1500	2700 x 1340 x 1250	3900 x 1340 x 1250
Sump capacity (litre)	1100	1250	1250	1700	2500
Capacity Euro pallet (EP)	6	8	8	12	16
Capacity Chemical pallet (CP)	4	6	6	8	12
Capacity IBC	–	–	6*	–	–
Net weight (kg)	2300	2800	2900	4000	4700

*K-type with 1500 mm bay height for storage of IBC possible for all types

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

Basic models of heating unit, place of installation NOT Ex

Steam heating with temperature control without auxiliary power	Electrical heating with digital temperature control (NOT Ex)	Electrical heating with analogue or digital temperature control (EExe II T3 - EExde II c T4)*
Thermostat with setting range 60...120 °C, permissible op. pressure 12 bar, Heating power min. 25 kW, galvanised or stainless steel housing, control valve and dirt trap, including circulating air ventilator, Including safety temperature limiter IP 55 Also available with elect. servo drive and control	Temperature recording using Pt 100, set range 0...150 °C, Heating battery with integrated overheat protection, heating power min. 15 kW, Stainless steel heating rods, Stainless steel housing, incl. circulating air ventilator, incl. safety temperature limiter Digital two-point regulator IP 55	Setting range 0...150 °C, Digital two-point regulator, Heating battery with integrated overheat protection, heating power min. 15 kW, Stainless steel heating rods, painted housing, Including circulating air ventilator, Including safety temperature limiter

Other dimensions and models available on request.

*** Options available in the standard range:**
- Exhaust air / time control
- Operating time programming
- Door contact switch for the ventilator

Technical Details –
Heater boxes and heater cabinets

Design

- Suitable for indoor and outdoor use
- Robust steel frame construction
- Fire resistant flammable panels manufactured from mineral wool, laminated on both sides with galvanised sheet metal
- Turn-bolt door closures to ensure a tight seal
- Designed as temperature-controlled hazardous materials storage with integrating sumps compliant to water regulation PPG 26
- Galvanised, stainless steel or painted

Temperature control

Electrical-heater cabinets are controlled by a digital two-point regulator. An alternative and cost-saving analogue two-point regulator can also be used to control Ex models (see Photo 1).
The temperature of heater cabinets, that use steam, heated oil, or hot water as a heating medium are controlled mechanically or by auxiliary power (according to the principle of fluid expansion in capillaries). Additional possibilities are electrically controlled using a two-point regulator and PT 100, for temperature recording as well as electro-pneumatic controls.

1 Ex-protected analogue temperature control for an electrical air circulating heater.
2 Air ducts ensure optimum temperature control
3 Circulating air ventilator for turbulent heat transfer

Position of heat exchangers

Heat exchangers can be located on the side of the heater box or cabinet, on the rear wall or on the roof. This enables heat exchangers to be easily integrated into the overall design and connected to existing energy or power supplies. DENIOS will provide solutions in line with customer's specifications and existing structural conditions.

Minimised Costs

For the efficient use of heater boxes and cabinets, DENIOS has been able to combine an excellent price/performance ratio with short delivery times, due to its consistent standardisation and optimisation of single components and all fitted parts.

Heating mediums

Heat energy is applied according to the availability of energy resources:

- hot water
- electrical energy
- heat-carrying oils
- saturated steam

Fitting options
Heater boxes and heater cabinets

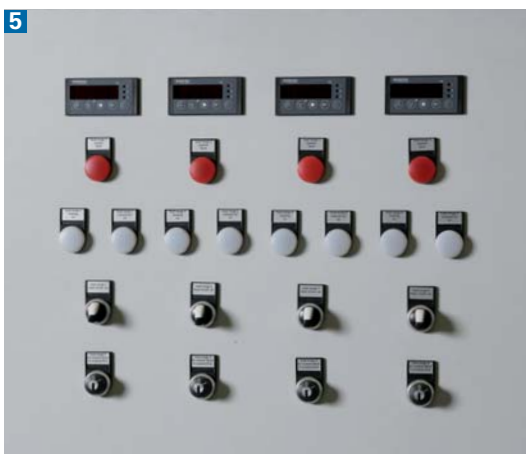
DENIOS heater cabinets have been extensively tested and are suitable for the widest range of applications. The capacities for the standard models can be delivered for up to 48 drums or 12 IBCs.
DENIOS also designs and manufactures bespoke individual solutions to meet a customer's dimensional constraints. DENIOS specialists also provide well-grounded consultation on-site.

- Ex-protection design
- 90 minute fire protection from the inside and outside
- Roll conveyors, turn tables and shelving
- Sumps manufactured in steel, stainless steel or plastic - depending on the medium requirements and level of temperature resistance
- Interface and connections for integration into the operating control station
- Hinged or roller shutter doors

Heater container WK 314-2

Standard sizes are well suited to normal user requirements and offer an excellent price-performance ratio. Other sizes can be supplied to meet individual specifications and these fulfil the same high standard and quality.

4 Extraction fans, shown here on a heated container separated into individual control areas
5 Control panel for an individually controlled DENIOS heated container
6 Control valve with electrical drive to control a circulating steam heater unit



Drum heaters

Heating and melting up to 300 °C

Optimum and even temperature control, in a variety of situations

Product profile

Drum heaters from the FH series have been specially designed for mobile use in a variety of situations. The cabinets are used for heating-up, melting and heating of substances to prepare them for further processing. The variable digital control range (0 °C to 300 °C) allows the heating power to be precisely adjusted to the current application. Heating systems that can be separately controlled (base heating, jacket or combined base/jacket heating) are suitable for a wide range of demands.

Drum heater Type FH-K 5.5, with base and jacket heater

Type	FH-K 1.5	FH-M 4.0	FH-K 5.5
Version	Base heater	Jacket heater	Base and jacket heater
Control range (°C)	0-300 °C	0-300 °C	0-300 °C
Heating power (W)	1500	4000	5500
Fittings	Mobile base plate	–	Mobile base plate
Outer dimensions Ø x H (mm):	1000 x 1200	1000 x 1200	1000 x 1200

Heating jackets for drums and IBCs

Cool on the outside and hot on the inside

Product profile

- Heat up and keep temperature constant
- From 25 litres up to 205 ltr drums / 1,000 ltr IBCs
- 240 V/ 50Hz/ Control range: 0 °C to 90 °C
- Type of protection: IP 40
- Ex-protection Version II 2G Ex e IIT3 (Zones 1 and 2)
- Space-saving storage

Design

DENIOS heating jackets made of PU-coated polyamide are water-repellent and abrasion resistant. Their high-quality insulation is made of Polyester or quilted fibreglass (Type LM4). In addition to very low heat loss, the heating elements with silicone insulation also provide considerably reduced energy consumption. There are also Ex-protected models in our range for 205 ltr drums and IBC.

Heat jacket Type LM 4 for IBCs

Heat jacket Type LM 3,A, suitable for 205 litre drums

Model	NOT-Ex					Ex-Versions	
Type	**LM 1**	**LM 2**	**LM 3**	**LM 3.A**	**LM 4**	**LM 3AEx**	**LM 4Ex**
Field of use	for 25-/ 30-l drums	for 50-/ 60-l-drums	for 205-l-drums	for 205-l-drums	for IBCs	for 205-l-drums	for IBCs
for drum circumference (mm) from/ to	870/ 1020	1100/ 1250	1800/ 1950	1800/ 1950	4060/ 4310	1800/ 1950	4060/ 4310
width of heat jacket (mm)	400	460	440	850	950	850	950
Power (W)	200	250	450	900	2000	720	1800

Induction drum heaters

Powerful, conserves energy and saves space

Induction drum heater combined with induction base plate (IBP), ideal for use in Ex-protected areas

	Induction heating units	Base heating plate
Heat output (W)	2250	500
Electrical connection	240 V/ 50 Hz	240 V/ 50 Hz
Outer dimensions Ø x H (mm)	750 x 710	745 x 60
Diameter, inside (mm)	613	560
Weight (kg)	48	45

Product profile

Induction drum heaters provide fast heating and the warming-up of fluids and are suitable for melting solids.

- Certified compliant to Atex for Zones 1, 2 (EEx e IIT3)
- Heat is fed immediately to the wall of the steel drum
- Automatic temperature limitation
  Maximum temperature: 170° C
- For steel drums up to 205 litres
- The optional induction base plate (IBP) optimises the heating process, e.g. when liquifying solids

"Frost-free" WHG storage container

Store sensitive materials frost-free

Walk-in container with storage areas of approx. 2 m² to 17 m² for frost-free storage of small containers and 205 ltr drums.

Product profile

The integrated heating systems, have been designed so that with an outside temperature of -15 °C, an internal temperature of at least +5 °C can be constantly maintained.

Design & Options

A practical container design that ensures industrial security and stability, due to the profiled steel sheet wall design. Provides a solid basis for every solution:

- Shelves for storing small containers
- Ramp
- Technical ventilation for active storage of flammable materials
- Lighting
- Variable door arrangement

Module Container WHG 340 ISO, heat-insulated version, equipped here with one shelf for frost-free storage of small containers

Approval

General building authority approval
DIBt German Institute of Construction Eng., Berlin
Approval-No.: Z-38.5-177

Door arrangement on long or short end, inside door size (W x H in mm) 1750 x 1910

Type	WHG 320 ISO	WHG 340 ISO	WHG 250 ISO	WHG 360 ISO
Outer dimension W x D x H (mm)	2990 x 2270 x 2345	4100 x 2800 x 2345	5100 x 2220 x 2345	6000 x 2800 x 2345
Inside dimension W x D x H (mm)	2710 x 1880 x 1940	3710 x 2520 x 1940	4710 x 1940 x 1940	5610 x 2520 x 1940
Sump capacities (l)	1200	2000	2000	3000
Load capacity (kg/m²)	1000	1000	1000	1000
Storage area (approx. m²)	6	11	11	17
Net weight (kg)	820	1300	1280	1650

"Frost-free" MC-Vario storage container

Store sensitive materials frost-free

Modular wall walk-in container – stable, weather-resistant industrial design

Product profile

Highly resistant thermal heat/cold insulation is incorporated into MC-Vario containers. The layered wall elements are sealed with steel sheets on both sides. The integrated heating systems ensure that at an outside temperature of -15 °C, a temperature of at least +5 °C is achieved on the inside of the cabinet.

Design & Options for MC Types

- Shelves for storing small containers
- Ramp
- Technical ventilation for active storage of flammable materials
- Window
- Lighting
- Variable door arrangement
- Inliner PE & VA

Standard with electric heating; available as Ex-protection model on request

Approval

General building authority approval
DIBt German Institute of Construction Eng., Berlin

Approval-No.: Z-38.5-177
Approval-No.: Z-38.5-187

MC Vario Depot MC 2.10, heat-insulated version, for frost-free storage of 2 IBCs

MC-Vario Container MC 4320-L2 in heat-insulated version, equipped here with shelves for frost-free storage of small containers

Doors can be arranged on long or short side, Door dimensions (W x H in mm) for single wing door 960 x 1980, for 2-wing door 1960 x 1980

Type	MC 1.6, insulated	MC 1.10, insulated	MC 2.10, insulated	MC 2310	MC 2520
Outer dimensions W x D x H (mm)	1590 x 1850 x 2500	1590 x 1850 x 2830	3020 x 1850 x 2500	2340 x 1490 x 2460	2490 x 2420 x 2460
Inner dimensions W x D x H (mm)	1340 x 1360 x 1930	1340 x 1360 x 1930	2770 x 1360 x 1930	2240 x 1240 x 2050	2240 x 2240 x 2050
Sump capacities (l)	600	1100	1250	550	1000
Load capacity (kg/m²)	1000	1000	1000	1000	1000
Storage area (approx. m²)	2, not accessible	2, not accessible	4, not accessible	3	5
Net weight (kg)	620	680	1040	950	1150

Type	MC 3320	MC 4320	MC 4330	MC 6320	MC 6330
Outer dimensions W x D x H (mm)	3420 x 2490 x 2460	4420 x 2490 x 2460	4420 x 2990 x 2460	6420 x 2490 x 2460	6420 x 2990 x 2460
Inner dimensions W x D x H (mm)	3240 x 2240 x 2050	3240 x 2490 x 2050	4240 x 2740 x 2050	6240 x2240 x 2050	6240 x 2740 x 2050
Sump capacities (l)	1500	1900	2400	2900	3500
Load capacity (kg/m²)	1000	1000	1000	1000	1000
Storage area (approx. m²)	7	8	12	14	17
Net weight (kg)	1480	1820	2100	2500	2640

"Frost-free" Drum/IBC containers

Store sensitive substances frost-free

Product profile

DENIOS produce system containers that provide practical solutions to store drums and IBCs. With storage capabilities of between 6 drums on Euro pallets, up to 48 drums or 12 IBCs, these DENIOS containers provide an optimum combination of practical sizes at competitive prices - for all storage spaces.

Design

Welded, steel-frame structures, clad with galvanised metal sheeting, including integrated heat and base insulation. PPG 26 compliant sumps and various door versions (see "Models") complete the range.
Together with matching heating systems, the integrated heat insulation ensures the energy efficiency of the complete system.

Approval

General building authority approval
DIBt German Institute of Construction Eng., Berlin
Approval-No.: Z-38.5-120

Temperature-controlled system container 2G 314.ISO with wing doors and integrated electrical ribbed pipe heating

System container, accessed from one side

Type	1G 314.ISO	2G 314.ISO	2P 414.ISO	2K 214.ISO
Outer dimension W x D x H (mm)	3220 x 1650 x 3120	3220 x 1650 x 3120	4120 x 1650 x 3120	2920 x 1650 x 3750
Number of storage levels / bays	1/ 1	2/ 2	2/ 2	2/ 2
Inside bay size W x D x H (mm)	3000 x 1280 x 2640	3000 x 1280 x 1250	3900 x 1280 x 1250	2700 x 1280 x 1500
Sump capacities (l)	750	1060	1375	1500
Load capacity (kg/m²)	1000	1000	1000	1000
Storage capacity Euro pallet (EP)	3	6	8	3
Storage capacity Chemical pallet (CP)	2	4	6	2
Storage capacity IBC	2	–	–	4
Net weight (kg)	1680	2160	2560	2000

Type	1G 614.ISO	2G 614.ISO	2P 814.ISO	2K 514.ISO
Outer dimension W x D x H (mm)	6340 x 1650 x 3120	6340 x 1650 x 3120	8140 x 1650 x 3120	5740 x 1650 x 3750
Number of storage levels / bays	1/ 2	2/ 4	2/ 4	2/ 4
Inside bay size W x D x H (mm)	3000 x 1280 x 2640	3000 x 1280 x 1250	3900 x 1280 x 1250	2700 x 1280 x 1500
Sump capacities (l)	1500	2800	2800	2000
Load capacity (kg/m²)	1000	1000	1000	1000
Storage capacity Euro pallet (EP)	6	12	16	6
Storage capacity Chemical pallet (CP)	4	8	12	4
Storage capacity IBC	4	–	–	8
Net weight (kg)	3000	3300	3800	3550

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

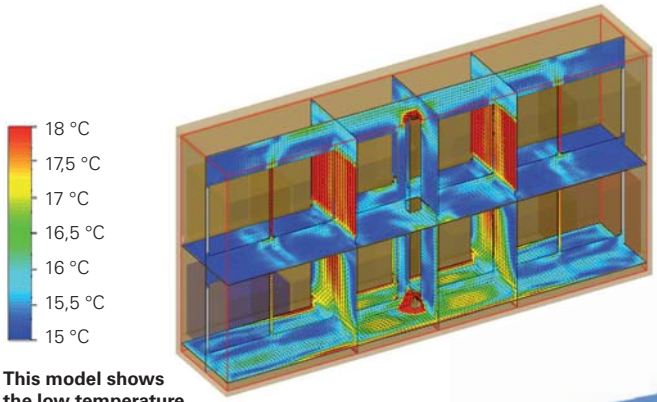
Other sizes and models (also with double installation depth for operation from both sides) available on request.

Heating systems

Designed for frost-free storage:
Outside temperature: -15 °C, inside temperature: +20 °C, Steel heating units: corrosion-protected.

Delivered fully assembled, including electrics ready for connection.

The heating systems normally comprise electrical recirculated air heating units; Ex-protected and other heating systems are also available on request.



This model shows the low temperature deviation within the complete container, achieved by optimum air circulation.

Models

DENIOS implements frost-free storage in a wide range of solutions – always adjusted to the individual needs of the customer. The following options are available:

- External walls and doors (wing, sliding or roller doors) with highly resistant thermal heat / cold insulation
- Insulated wall panels manufactured from high-quality materials designed for the storage of flammable or non-flammable products.
- Livery compliant to corporate design or painted (RAL colour) as per customer instructions
- Standard delivery with approved PPG 26 integrated sump; can be used for the storage of hazardous materials

Temperature-controlled system container 2G 614.ISO with sliding doors, integrated electrical recirculated air heating unit, Ex-protected; shown here with ventilation and combined air conditioning system.

System container, accessed from one side

Type	1K 414.ISO	2K 414.ISO	1K 714.ISO	2K 714.ISO
Outer dimension W x D x H (mm)	3600 x 1650 x 3120	3600 x 1650 x 3690	7100 x 1650 x 3120	7100 x 1650 x 3690
Number of storage levels / bays	1/ 1	2/ 1	1/ 2	2/ 2
Inside bay size W x D x H (mm)	3380 x 1280 x 2570	3380 x 1280 x 1500	3380 x 1280 x 2570	3380 x 1280 x 1500
Sump capacities (l)	1200	1500	1500	3000
Load capacity (kg/m²)	1250	1250	1250	1250
Storage capacity Euro pallet (EP)	4	8	8	16
Storage capacity Chemical pallet (CP)	2	4	4	8
Storage capacity IBC	3	6	6	12
Net weight (kg)	2080	2720	3100	4300

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

Other sizes and models (also with double installation depth for operation from both sides) available on request.

Cooling cabinets (Peroxide)

Store constantly within defined temperature range (+/-5 °C) or store cool down to -5 °C

Based on the tried-and-tested system container, DENIOS Engineering provides modular system solutions with corresponding cooling technology for cool-storage of substances at constant temperatures.

Substances are kept within a precise temperature range in DENIOS climate cabinets using powerful cooling units.

Both shelf systems (Type KK) as well as walk-in systems (Type KMC) are available for all applications.

The range of temperature deviations are precisely calibrated by DENIOS experts, including all relevant test and control technology.

Due to their robust industrial design, DENIOS' cooling cabinets can also be equipped with fire protection.

Cooling cabinet KK 33.30, shown here with integrated shelf for the storage of various container sizes at a constant temperature.

Type	KK 18.18	KK 27.21	KK 33.30
Outer dimensions W x D x H (mm)	11800 x 1800 x 1500	2700 x 2100 x 1800	3300 x 3000 x 1800
Inside dimensions W x D x H (mm)	1560 x 1560 x 1260	2460 x 1860 x 1560	3060 x 2760 x 1560
Inside door size W x H (mm)	1400 x 1400	2300 x 1700	2900 x 2600
Sump capacities (litres)	1100	1200	1400
Euro pallet (EP)	1	3	3
Capacity Chemical pallet (CP)	1	2	2
Capacity IBC	1	2	2
Load (kg /m²)	1250	1250	1250

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

Other dimensions and models available on request.

Cooling walk-in containers

Store constantly within defined temperature range (+/-5 °C) or store cool down to -5 °C

Fittings

The following options can be chosen in addition to the cooling technology:

- Ex-protection
- Fire protection from the inside and outside
- Built-in shelving
- Roll conveyors
- Fitted with an integrated sump for storage of hazardous materials (tested and approved to water regulation requirements PPG 26)

Product profile

The advantages of the container allow all required units to be integrated perfectly, e.g. sumps or 90 minute fire protection from the inside and outside.

Depending on the outside temperature, the cooling unit designed by DENIOS ensures that the material is stored securely at optimum temperatures.

Cooling container KMC-L 600 with double-winged door

Type	Outer dimensions W x D x H (mm)	Inside dimensions W x D x H (mm)	Storage area approx. m	Sump capacities (l)	Weight (kg)	Load capacity (kg /m²)
KMC 240	2660 x 2510 x 2520	2240 x 2190 x 2100	5	650	2000	1000
KMC 360	3860 x 2510 x 2520	3440 x 2190 x 2100	7,5	1000	2400	1000
KMC 480	5060 x 2510 x 2520	4640 x 2190 x 2100	10	1350	2800	1000
KMC 600	6260 x 2510 x 2520	5840 x 2190 x 2100	13	1700	3200	1000
KMC 360-X	3860 x 2970 x 2920	3440 x 2650 x 2500	9	1200	2700	1000
KMC 480-X	5060 x 2970 x 2920	4640 x 2650 x 2500	12	1600	3300	1000
KMC 600-X	6260 x 2970 x 2920	5840 x 2650 x 2500	15,5	2000	3900	1000
KMC 720-X	7460 x 2970 x 2920	7040 x 2650 x 2500	18,5	2400	4500	1000
KMC 840-X	8660 x 2970 x 2920	8240 x 2650 x 2500	22	2800	5100	1000

Other dimensions and models available on request. Door arranged on short or long side.

Cold stores and cold rooms

Cool down to 0 °C or deep freeze to -25 °C

Product profile

With these systems, DENIOS provides complete cooling cabinets that can be integrated into the production process. The cooled and frozen products stored inside are always available on demand at the correct location.

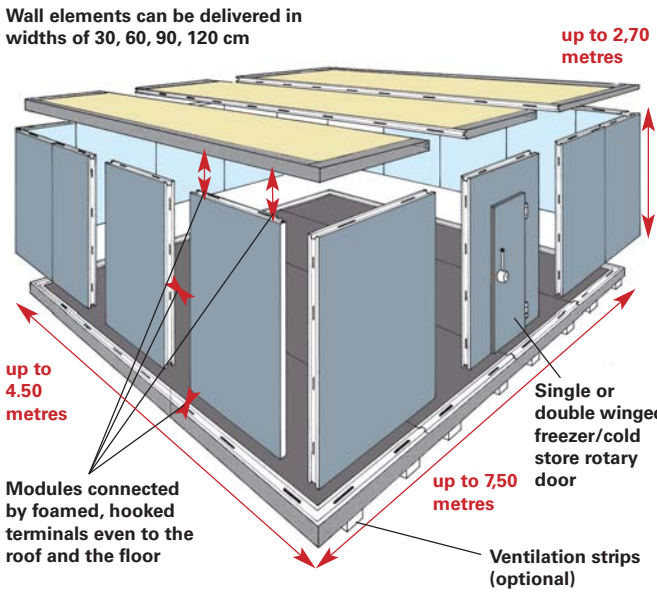
Cold store TZ 18.18 with 2-wing door

Cold room	Outer dimensions* W x D x H (mm)
Example dimensions – other sizes on request	1200 x 2100 x 2100 2400 x 2700 x 2400 3000 x 3900 x 2400 3900 x 6000 x 2700 4500 x 7500 x 2700

*** without cooling unit**

Design

The decisive advantages are the minimal acquisition and operating costs. Consistent standardisation across the range is the basis for an excellent price/performance ratio. Insulated using rigid polyurethane foam (FCKW- free) in thicknesses from 80-160 mm, depending on the required temperature range. Energy-saving cooling units provide highly economical operation.



Diagrammatic sketch for modular cold rooms

Cold rooms	TZ 18.18	TZ 27.21	TZ 33.30
Outer dimensions W x D x H (mm)	1800 x 1800 x 1500	2700 x 2100 x 1800	3300 x 3000 x 1800
Inside dimensions W x D x H (mm)	1560 x 1560 x 1260	2460 x 1860 x 1560	3060 x 2760 x 1560
Inside door size W x H (mm)	1400 x 1400	2300 x 1700	2900 x 2600
Capacity Euro pallet (EP)	1	2	3
Capacity Chemical pallet (CP)	1	2	2
Capacity IBC	1	2	2

Fittings			
Cold store attachment		**Solid floor version**	**Sump version**
For room sizes	up to 26 m³	Foamed chip boards (glued boil-proof) with slip-protection plastic coating	Tested and compliant to PPG 26, suitable for long-term storage of fluids and chemicals classified dangerous to the environment. Sump version fitted with galvanised grids as standard.
Cooling power at inside temperatures	-18 °C	Max. wheel load (rubber wheel) 200 kg	
Cooling power at inside temperatures	+32 °C	Max. surface load 2500 kg	
Cooling agent	R 404a	*A floor made of profiled stainless steel sheeting is also available on request.*	
Compressor power	1390 W		
Electrical connection	230 V/ 50 Hz		

Euro pallet (EP): 2 x 205 ltr drums, chemical pallet (CP): 4 x 205 ltr drums, IBC (mm): 1000 x 1200 x 1200

Other dimensions and models available on request.

Compact cooling depot

Used in cooling temperature-sensitive fluids or organic waste

Compact cooling depot Type KD2

Product profile

Compact cooling depots provide optimum protection against unpleasant smells and guarantee the right temperature for sensitive liquids when used as a storage space for drums.

Compact cooling depot

- Suitable for either 205 ltr drums or 240 ltr waste containers
- Environmentally friendly coolant R 134a
- Low energy
- Cools content down to +7° C
- Stable, weather-resistant design
- Suitable for use indoors and outdoors
- UV-resistant
- Low maintenance cooling units

Compact cooling depot Type KD1

Compact cooling depot Type KD2

- Either for 2 waste bins or two drums
- Made of glass-fibre reinforced polyester
- Removable front panel and two swing lids

Compact cooling depot Type KD1

- Either for one waste bin or one drum
- Made of environmental friendly Polyethylene
- With hinged door and removable swing lid

Drum and waste cooler	KD 1	KD 2
Capacities (drums / waste bins)	1/1	2/2
Outer dimension W x D x H (mm)	980 x 1050 x 1570	1650 x 1000 x 1620
maximum energy consumption (W per hour)	378	378
Average energy consumption (W per hour)	approx. 100	approx. 100
Connection	230V/ 50Hz	230V/ 50Hz
Weight (kg)	95	125

Individual solutions

Special projects require unique solutions. DENIOS-Engineering successfully meets this demand with its team of experienced engineers.

Whether the problem is integrating a heater cabinet into a small space, drying products,or even special temperature and control tasks: DENIOS provides the right, tailor-made system – to suit the application.

The basis for each new product is an analysis of the exact customer requirements carried out by expert DENIOS consultants and an exchange of ideas with the customer on-site. Optimum planning and economic implementation bring the project together.

DENIOS products have proven themselves in a wide range of industries and applications.
The customers individual requirements are precisely implemented. DENIOS- Engineering always has the right solution, irrespective of whether special dimensions, temperature ranges, built-in parts, data interfaces (for optimised process control), roll conveyors or shelving are required.

1 Control for Ex-protected cabinets
2 A mixing unit in a fire-protected heated container, also with Ex-protected fittings
3 External heater container for drying, with 90 minute fire protection
4 Stainless steel heater box with extendable sump
5 Stainless steel heater container Type WK 314-1 designed with steam heating and circulating air ventilator


1


2


3


4


5

Application Examples

Example 1

In this circulation heating cabinet, the media received is moved by roll conveyors during the heating up process to other stations within the production procedure according to the "first-in – first-out" principle. Transitional conveyors on the other side of the cabinet receive the drums. Separation of the receiving and removal area, ensures that media can be transported in-house, thereby optimising the process. ▸

Example 2

The project requirements of the customer: Creation of an extremely large receiving area for substances to be heated.

DENIOS-Engineering exploited its experience in system design for the storage of hazardous substances.
The result was an arrangement of large heated cabinets, suitable for installation outdoors, therefore only roofed walk-through areas with overhead strip lights were needed to be installed and the customer's requirements were met. A production building did not need to be constructed to install the heated cabinets; time and money was saved. ▸

Example 3

In this case, a special solution was needed in the area surrounding the doors, due to the narrow passage in front of the cabinet and the confined space. As hinged doors would have required too much space in all directions when opened, liftable gates were used and manufactured in stainlesssteel. In spite of the difficult initial project, the production process designed by DENIOS gave the customer the best possible solution. ▸

10 good reasons

for you to use thermotechnology from DENIOS

1 Efficient performance – fast heating/cooling.
Permanently store at constant temperature: Everything is implemented for you by DENIOS with an energy-saving design.

2 Safety. In the DENIOS Test process and together with our experts, you have the opportunity to examine which DENIOS product is best suited to your application.

3 Low operating costs. Thanks to the selection of the optimum insulation material, combined with precise heating, cooling and air circulation, we are able to minimise your operating costs.

4 Fire and explosion protection. On request, DENIOS products can also be produced for you with F90 (90 minute) fire protection and explosion protection.

5 Controls and process cycle. For optimum integration within your production cycle, the products can be equipped with a wide range of connections and interfaces, for example, to your production control station or for process documentation. You can also select between temperature measurement or temperature control via the internal operating temperature of the cabinet or the temperature directly in the product.

6 Sustainability. To protect our environment, we will be happy to equip all of our products with PPG 26 compliant sumps. In this way, every heater container or cold store is transformed into a hazardous materials storage unit.

7 Fittings - tried and tested. For ergonomic, effective work, we have a wide range of accessories for you to choose from. Roll conveyors, shelving, turn tables, mixer units, right up to space-saving liftable gates.

8 You buy Directly from the manufacturer.
Development, construction and production are all in the hands of DENIOS. Our know-how provides you with genuine planning and investment security.

9 DENIOS provides you with expert advice.
Our excellent references are from all branches of industry and all sizes of company – whether national or international – whether a group or an association: A tribute to DENIOS quality.

10 Product Guarantee. We will also reliably stand by you tomorrow. We are a commercially successful company that guarantees you future reliability for your investments. We deliver the required spare parts years after your purchase. Our **maintenance service** ensures your operational reliability.

The DENIOS range of products

DENIOS quality

"Manufactured by DENIOS" is a seal of quality in today's market when considering any of your complex engineering projects.
We work to a high level of competence and safety in all divisions: using tried-and-tested processes. Internal and external audits ensure our high level of quality. Our standards have been maintained at DENIOS for over 10 years by certification compliant to ISO 9001. As a declaration to environmental protection, DENIOS is also certified compliant to EN 14001. This is also a part of the DENIOS philosophy and supports the conservation of valuable resources for everyone.

DENIOS is certified compliant to ISO 9001 and 14001.

Proficient in finding solutions

DENIOS-Engineering distinguishes itself by its know-how in finding solutions for a wide variety of tasks. In addition to thermotechnology, our team also deals with the following:

- **Storage of hazardous substances**
  Core competency: DENIOS-Engineering has over 20 years experience in the implementation of cabinets, process units and projects of all sizes. DENIOS is the market leader.
- **Ventilation technology**
  DENIOS focus on clean air for people in the work environment. DENIOS-Engineering provide high quality stand-alone solutions and integrated systems for the storage of hazardous substances and thermotechnology.
- **Safe storage for technological equipment**
  These system solutions provide safe protection against fires and vandalism for sensitive technology and the storage of electronics and control systems.

The main DENIOS catalogue is also available as a valuable source of information. With more than 10,000 professional products, its 500 pages provide everything required for operational environmental protection and work safety in today's market.

Loading a heating cabinet

DENIOS is dedicated to environmental protection in 13 European countries and the USA.

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Switzerland	Tel. + 41	(0)	56 417 60 60
Spain	Tel. + 34	(902)	88 41 06
Czech Republic	Tel. + 420	(383)	313 222
USA	Tel. + 1	(5 02)	9 33 72 72

DENIOS
ENVIRONMENTAL PROTECTION
& WORK SAFETY

Worldwide, the DENIOS Engineering team are customer-oriented, efficient and manufacture to an exceptional quality, implementing thermotechnical solutions tailor-made to suit your exact requirements.

Request your individual quotation now.

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10/09/UK/Thermotechnology